NATURE-BASED SOLUTIONS IN THE UK

CASE STUDIES ON OVERCOMING BARRIERS

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About WWF

We're WWF, the leading global environmental charity and we're bringing our world back to life. We're tackling the causes of nature loss. And we're finding solutions so that future generations inherit a world where nature is thriving and the climate is stable.

This report has been prepared by WWF-UK, drawing on learnings from four Nature-based Solutions (NbS) projects delivered via the WWF-UK and Aviva three-year partnership (2021–2024).

This report reflects the views and analysis of WWF-UK only. It does not necessarily represent the positions or opinions of any other organisations, stakeholders, or individuals who may have contributed data, insights, or commentary during the development of this work.

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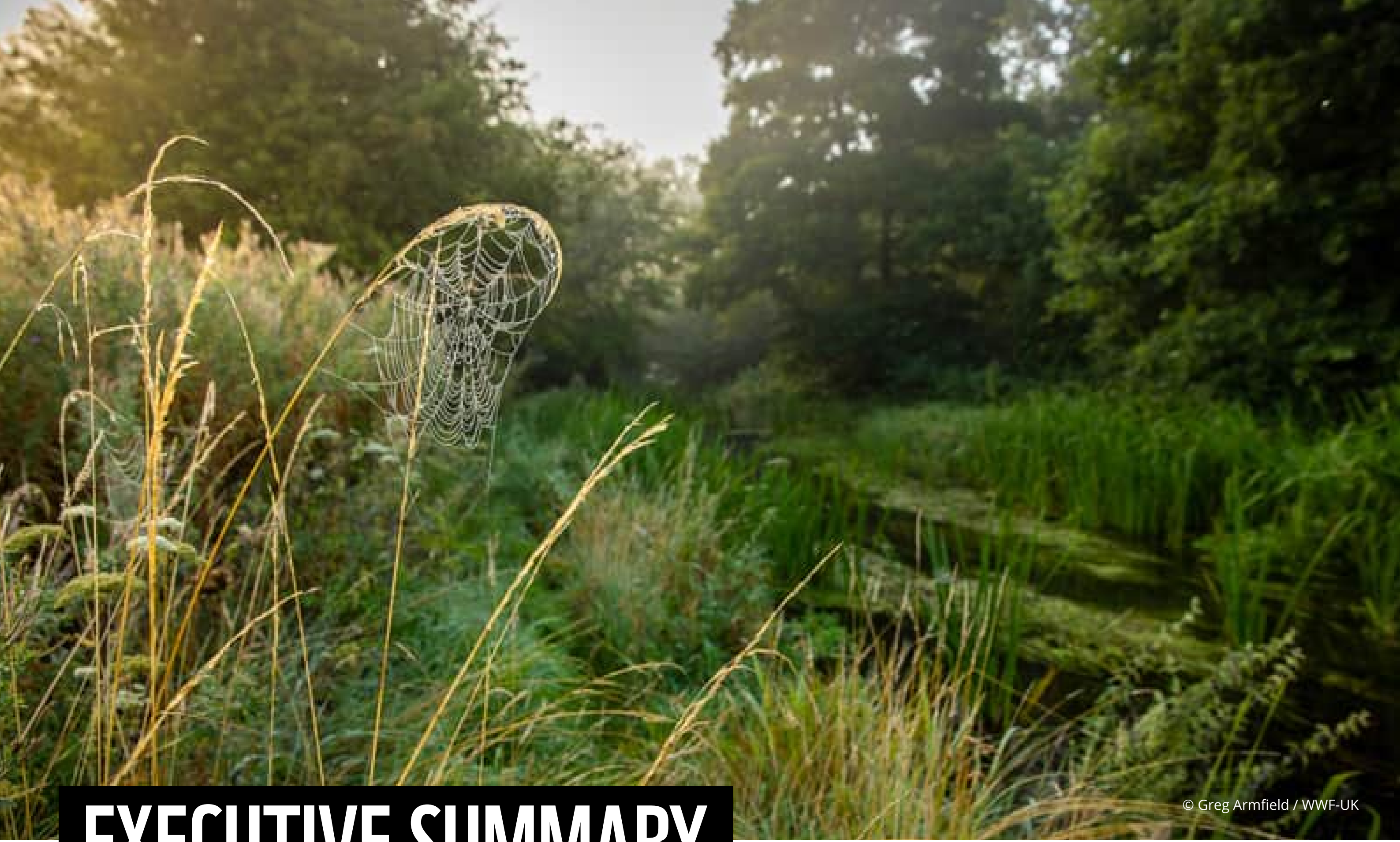

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EXECUTIVE SUMMARY

Nature-based Solutions (NbS) are key to tackling the triple challenge of biodiversity loss, climate change and societal wellbeing.

To demonstrate this, four NbS pilot projects across the UK have recently been delivered with the aim of enhancing community resilience to flooding, reducing environmental risks, and engaging local communities and other stakeholders in conservation. These pilot projects have informed WWF's long-term ambition to demonstrate not only that NbS are cost-effective options for building climate resilience through enhanced ecosystem health, but also that they are economically viable and should be better integrated into financial decision making.

This report seeks to highlight WWF-UK's learnings from the pilot projects and offer insights into barriers and enablers to scaling up NbS, as well as evidence on NbS effectiveness and impact. Key findings include:

- **Information:** Efforts to scale up NbS have been hindered by a lack of accessible information, including insufficient evidence on their performance and cost. Demonstration projects and targeted outreach can help to raise awareness of NbS benefits, overcome uncertainty, and build local support. Building in monitoring, valuation, and knowledge sharing as part of project design can strengthen the evidence base on NbS costs, benefits and performance, to build investor confidence and promote wider uptake.
- **Finance:** To scale up NbS on farmland, projects need to be tailored to minimise impacts on farm productivity, and farmers may need support in applying for funding from agri-environment and other schemes. Cost-benefit analysis can build the business case for NbS, especially when wider benefits are included in the valuation. The value of NbS investments can be enhanced through providing stable long-term funding that fully compensates for both implementation costs and opportunity costs from alternative land uses, to ensure project success.

- **Governance:** Strong, inclusive and collaborative governance structures that engage communities in co-designing projects from the start are critical, to build trust and legitimacy and manage conflicting stakeholder priorities. Community engagement, citizen science and volunteering programmes can build local ownership, skills and capacity, which is key for long-term stewardship, as well as bringing in local knowledge to inform project design. However, this requires dedicated funding, time, and institutional capacity.
- **Policy and regulation:** Some policies designed to address adverse environmental impacts are inadvertently acting as barriers to beneficial NbS ecosystem restoration projects. Project plans need to allow enough time and budget to obtain necessary licenses and permits, and sharing knowledge with other practitioners can help to minimise the impact of the licensing process on project delivery. In the longer term, practitioners are collaborating to gather evidence on how regulatory systems could be improved to integrate NbS into nature-positive planning and land-use, including the design of new housing developments.
- **Ecosystem pressures:** Resilience to future change can be enhanced by designing NbS that restore healthy, connected ecosystems, as part of landscape-level actions to reduce pressures such as pollution and habitat fragmentation (e.g. through catchment partnerships or landscape recovery schemes), supported by stronger regulation to protect ecosystems.

As others undertake NbS projects, we hope these case studies and the insights we have gathered are useful for illustrating how these challenges can be addressed in the future.

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CONTENTS


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1. INTRODUCTION

1.1 ADDRESSING THE TRIPLE CHALLENGE THROUGH NATURE-BASED SOLUTIONS

As climate change intensifies, so do the property and business losses from floods, fires, storms and droughts. The insurance industry has increasingly raised concerns about the difficulty of covering these climate-related damages.1 In response, Nature-based Solutions (Box 1) are gaining traction as cost-effective ways to simultaneously address climate change and reverse biodiversity loss while supporting the wellbeing of a growing population; referred to by WWF as the 'triple challenge'.[2]

BOX 1. DEFINITION OF NATURE-BASED SOLUTIONS (NBS)

According to the United Nations Environmental Assembly, Nature-based Solutions are:

"actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems, which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services and resilience and biodiversity benefits".

Nature-based Solutions help meet global biodiversity goals while addressing societal challenges like climate adaptation and disaster risk reduction. This aligns with the Kunming-Montreal Global Biodiversity Framework, particularly Targets 14-16, and 18-19, which focus on eliminating harmful subsidies, encouraging businesses to mitigate their impacts on nature, and increasing investment in sustainable practices.

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1.2 SCALING UP NATURE-BASED SOLUTIONS FOR SYSTEMIC CHANGE

Investing in NbS is critical to addressing nature-related financial risks facing the UK and mainstreaming ecosystem restoration and sustainable landscape management within resilience planning. Continued under-investment in nature drives significant social, and economic risks, given that nature degradation could lead to a 12% loss in the UK's GDP by 2030.[3]

WWF-UK is committed to scaling high-integrity NbS that deliver measurable benefits for people, climate and biodiversity. Guided by the IUCN Global Standard, inclusive governance and landscape-scale design, our approach ensures projects are locally relevant, economically viable and resilient. Mobilising finance is central to this vision, developing investable pipelines and blended-finance models, creating enabling policy and market conditions, and raising integrity and equity in carbon, biodiversity and wider nature markets, especially for Indigenous Peoples and local communities.

Through evidence, platforms and partnerships we aim to mainstream NbS in business and public policy as a cornerstone of sustainable development and climate action. An important part of our work is helping to demonstrate that NbS are cost-effective and economically viable tools for mitigation and adaptation, strengthening local resilience by restoring ecosystem health. We do this by working with practitioners and consolidating learning from pilot projects, like those featured in this report, to surface barriers and enablers and help embed NbS within key financial and regulatory frameworks.

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1.3 AIM AND STRUCTURE OF THE REPORT

This report synthesises insights from four pilot NbS projects for practitioners and investors, to inspire collaboration, and support scaling-up of NbS in the UK, with a focus on natural flood management.

The analysis builds on a literature review and expert workshops[4] which identified five types of barriers and enablers for scaling up NbS for climate adaptation: Information, Funding, Governance, Policy & Regulation, and Ecological Pressures (see Appendix).

Information on the pilot projects was provided by project partners and then analysed to extract key barriers and enablers, classified into the five categories above. These were then checked with the partners to ensure accuracy.

Section 2 of this report introduces the four pilot projects, with the main findings explained in Section 3, structured into sub-sections for each type of barrier and enabler. Each sub-section includes an overview of known barriers and enablers based on previous research, and then specific examples and deeper insights emerging from the pilot project case studies. As barriers and enablers are context-specific, the four pilot projects do not include all known barriers and enablers.

In Section 4, we discuss the practical implications of our findings for scaling, for practitioners and investors to help overcome barriers to implementation and financing. Overall conclusions are summarised in Section 5.

2. THE FOUR PILOT PROJECTS

WWF-UK and Aviva supported four Natural Flood Management (NFM) pilot projects in the UK over three years of their partnership:

- In Leicestershire and in East Anglia - slowing the flow of rivers
- In Yorkshire - restoring landscapes and planting woodland
- In Scotland - restoring coastal ecosystems.

These projects aimed to protect, restore, and sustainably manage natural ecosystems to enhance flood resilience, reduce environmental risks, and engage communities in conservation efforts.

2.1 RIVERSCAPE EAST ANGLIA

The Riverscape East Anglia pilot project increased the adoption of NFM across Norfolk. Deepdale Farm provides an example of the types of interventions adopted and the associated benefits.

Natural Flood Management in Norfolk

Norfolk is vulnerable to flooding due to being a coastal, low-lying county. Alongside urbanisation, intensified agriculture, and watercourse modification, this puts over 40,000 properties at risk.[5] NFM interventions like floodplain reconnection, leaky dams, and sediment traps were implemented at sites around the county to increase water retention and reduce downstream flow as part of Riverscape East Anglia. These interventions improved flood resilience, whilst also enhancing biodiversity, improving water quality, and sequestering carbon, proving cost-effective across three sites.

Deepdale Farm, River Burn Catchment

In 2020, Deepdale Farm faced the wettest winter in a decade, with storms Ciara and Dennis presenting unprecedented challenges. The fields were saturated, leading to surface water flooding of the A149, the village church, and a nearby home. The Norfolk Rivers Trust, the delivery partner, conducted on-ground walkovers and opportunity mapping to identify measures to slow and retain water. These included ditches and bunds, buffer strips, woodland creation, and a long-term plan for regenerative farming to improve soil health, manage pests, and support biodiversity.

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2.2 RIVERSCAPE SOAR

The Riverscape Soar pilot project had two sub-projects, in Loughborough and Whissendine.

Flood resilience efforts in Loughborough

Loughborough has a considerable flood risk, with 4,200 properties susceptible to surface water flooding (ranked as 69th out of over 4,000 at-risk settlements nationally).[6] This situation has been aggravated by intensive land management, drainage practices, and compacted soils. The Moat Brook catchment, encompassing 14 landowners, was designated as a priority area by local stakeholders. Trent Rivers Trust engaged with stakeholders in the catchment to discuss NFM, finding that NbS was an unfamiliar concept for many. Two publicly owned country parks within the catchment proved suitable for NFM measures such as brushwood bundles, leaky barriers, and wetlands, which were subsequently implemented. Site surveys and discussions on soil health and NFM opportunities were also conducted with private landowners.

Slowing the flow in Whissendine

Whissendine, a village in the Soar catchment, upstream of Melton Mowbray, has experienced four major rainfall events over the past six years, with frequent flooding affecting roads and properties. The farmland upstream of the village is dominated by large arable fields, with a history of drainage and hedgerow removal. Initially unsure about NFM, the village had formed a flood action group that disbanded due to conflicting views on solutions and methods. The project explored reducing flood risk through land use change and capital NFM works such as leaky barriers, ponds, and floodplain restoration, with community support. A citizen science programme was set up to collect observations of water quality and river morphology.

2.3 RESTORATION FORTH

Restoration Forth aims to enhance marine habitats in the Firth of Forth by restoring 4 hectares of remnant seagrass and introducing up to 30,000 European flat oysters by 2026. Oysters were once abundant in the Firth of Forth but became extinct by the mid-1900s. Aiming to inspire and support communities to conduct restoration activities, the project consulted residents, sea users, and organisations to understand local perceptions and use of the coastal environment. It built on established delivery community 'Hubs' to successfully engage volunteers and interact with local networks, including a Citizen Science project monitoring seagrass. As a result of the project, there are now 30,000+ oysters in the Firth of Forth, and over 2 hectares of seagrass have been restored. Local partners, community groups, and individuals were involved at every step.

Restoration Forth © Maverick Photo Agency

2.4 WILD INGLEBOROUGH

The Wild Inglebrough project aims to restore up to 1,500 hectares of peatland, woodland, and heath in the Yorkshire Dales. In July 2022, the WWF-UK and Aviva partnership enabled phase II of the programme, supporting Natural England and the Yorkshire Wildlife Trust who manage the project land, with a focus on ecological restoration, community engagement, and addressing the climate crisis. Recognising that landscape scale action is needed to restore ecosystem services, Wild Ingleborough also entered a landscape restoration partnership with private landowners in the surrounding area who are part of the 'Three Dales' Landscape Recovery Scheme funded by Defra's Environmental Land Management Scheme (ELMs). This involves eight stakeholders, including the Ingleborough Estate and common grazers.

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3. BARRIERS AND ENABLERS IDENTIFIED IN THE PILOT PROJECTS

Table 1. The five categories of barriers and enablers based on previous research

INFORMATION	FUNDING	GOVERNANCE	POLICY AND REGULATION	ECOLOGICAL PRESSURES
Barriers Lack of awareness, data, evidence and standardised metrics on costs and benefits Lack of practical skills and knowledge	**Barriers** Free rider problem Uncertainty and risk Lack of valuation for co-benefits High up-front costs, time lag before delivery	**Barriers** Fragmented and unclear governance Weak institutional frameworks Stakeholder conflicts Tenure insecurity	**Barriers** Conflicting policy goals Complex, inappropriate regulations Weak or absent NbS standards	**Barriers** NbS integrity at risk from climate change, pollution and invasive species Unsustainable economic activities
Enablers Info hubs Demo sites Training Standardised metrics Long-term monitoring Data sharing	**Enablers** Public-private finance Valuing co-benefits	**Enablers** Clearer frameworks Collaborative governance Long-term tenures	**Enablers** Coherent policies and supportive regulation Strong, well-resourced strategies	**Enablers** Stronger regulations and incentives to protect and connect ecosystems

3.1 INFORMATION

3.1.1 OVERVIEW

Efforts to scale up NbS have been hindered by a lack of accessible information, including insufficient evidence on their performance and cost (see Appendix). Although the evidence base has grown, further research is needed to demonstrate NbS value and performance across a range of local contexts. A key challenge remains the lack of resources for ongoing monitoring, evaluation, and learning, with many projects lacking capacity for long-term data collection and analysis. Inconsistent data and methods still obstruct cross-project comparisons, with a particularly wide variation in methods used to assess biodiversity and social impacts.[7] These gaps slow adoption, hinder adaptive management, and reduce confidence among funders, policymakers, and practitioners. Emerging technologies such as remote sensing and LiDAR could strengthen the evidence base and lower costs, but uptake is limited by funding and skills shortages.[8] Our pilot projects revealed barriers rooted in limited access to knowledge, technical capacity, and evidence gaps.

3.1.2 CASE STUDY INSIGHTS

Lack of awareness and access to knowledge

Barriers: Basic lack of awareness and understanding of NbS remains a significant barrier. At **Whissendine** in the **Riverscape Soar** project, which was focused on enhancing community flood resilience through NFM techniques, initial uncertainty and scepticism about NbS by landowners and the local community led to limited engagement at first. Similarly, in **Wild Ingleborough**, initial resistance from the farming community reflected concerns around the terms ‘wild’ and the implications of interventions (such as woodland creation and changes in grazing management) for land use and livelihoods. Such hesitations can hamper NbS adoption and lead to a default preference for conventional options, known as ‘status quo bias’.[4] For example, policymakers and engineers responsible for flood management in the catchment could resort to grey infrastructure such as dams and barriers, driven by perceived lower risk and easier alignment with funding streams.

Across many of the case studies, limited technical capacity, skills, knowledge, and tools among landowners, volunteers, and community groups also emerged as a key barrier to effective NbS implementation. In the **Riverscape Soar** project at **Loughborough**, for instance, many landowners were unfamiliar with NFM techniques and hesitant to adopt new practices without technical support and clear guidance.

Enablers: These barriers highlight the need for targeted engagement, knowledge sharing, capacity building and clear communication around NbS costs, benefits and performance. We found demonstration projects to be particularly effective in raising awareness and building familiarity with NbS across all four pilot projects. Demonstrations allow nearby farmers and landowners ‘looking over the fence’ to see how their neighbours are managing the land. In **Whissendine**, targeted outreach helped to overcome initial uncertainty, including the use of demonstration models, helping shift perceptions and build local support.

The projects also identified ways of tackling a lack of relevant skills. In **Loughborough**, the Trent Rivers Trust developed a Landowner Toolkit to demystify NFM and support landowner engagement (Box 3).[9] **Wild Ingleborough** complemented ecological interventions with strong community engagement and skills development through volunteering programmes and peer learning networks. **Restoration Forth** used a community hub model to build local ownership, skills and capacity, which is key for sustaining outcomes, raising awareness of NbS benefits and strengthening community resilience (Box 4). Projects found these enablers not only addressed immediate skills and knowledge gaps but also laid foundations for long-term stewardship.

Evidence gaps

Barriers: The natural processes and interactions that occur within an ecosystem and the way they change over time are difficult to predict. In **Restoration Forth**, there was uncertainty about the effectiveness of different oyster and seagrass reseeding techniques, and it was hard to establish suitable targets for restoration because the historic extent of seagrass was not known. **Wild Ingleborough** encountered challenges in assessing ecological outcomes as landscape changes take time. Substantive quantitative results are only expected five years after implementation (Box 2).

The difficulty in valuing and demonstrating ecological impact and benefits at scale can in turn undermine confidence among landowners and stakeholders. For example, in **Loughborough**, many were hesitant to adopt NFM without confidence of the economic impacts to farm profitability, production and lack of any sufficient payment. In flood management, stakeholders often expect clarity on the protection levels of NbS compared to grey infrastructure, making it important to evaluate the potential of NFM to avoid unrealistic expectations.[10] As noted in **Riverscape Soar**, NFM often works best combined with other measures like hard flood defences, flood storage, property-level protection, and land use planning, depending on local conditions.[11]

Enablers: Reducing uncertainty requires robust evidence, the bridging of academic and local knowledge, and clear communication about performance. Quantitative methods like cost-benefit analysis (CBA) can help build confidence among investors and policymakers. **Riverscape East Anglia** applied CBA to evaluate NFM interventions, demonstrating high benefit-cost ratios ranging from 11 to 21 based solely on avoided flood damages (Table 2). While this enables comparison across contexts and highlights the economic value of NFM, the analysis excluded long-term maintenance costs and wider co-benefits, illustrating the need for more holistic valuation approaches.

Local knowledge, for example, long-term observations of flood-prone areas, river health and changes in land use, is also crucial to strengthen data collection and help validate models, enhancing the credibility of NbS planning. **Restoration Forth**'s community hubs combined scientific and local input, enabling data sharing and adaptive learning (Box 4). Similarly, in **Whissendine**, community-led monitoring and citizen science (Box 5) provided valuable insights into the level of community understanding of water quality, natural processes and appropriate channel maintenance. A community focus group further revealed local knowledge about surface water flow and flood dynamics and helped develop a better understanding of catchment dynamics. **Wild Ingleborough** is tracking ecological change over time using volunteers alongside the core team, with early monitoring showing increases in butterfly numbers, tree density and plant diversity. Community insights have also highlighted wider benefits such as improved mental health, access to nature and social cohesion (Box 2).

Practitioners within **Restoration Forth** adopted an experimental mindset, treating the project as an opportunity to refine their seagrass and oyster restoration techniques and share lessons learned with other practitioners. This iterative approach is essential in contexts where a degree of uncertainty is inevitable, helping to build a cumulative evidence base over time. They also trialled the development of standardised metrics for assessing the impacts of marine NbS, to facilitate wider data sharing and cross-project comparisons.


Restoration Forth © Maverick Photo Agency

BOX 2. WILD INGLEBOROUGH: QUANTITATIVE AND QUALITATIVE EVIDENCE

Landscape change is a long-term process. It will take time for the monitoring at Wild Ingleborough to provide landscape-level quantitative data on the benefits of habitat diversification. An initial report is anticipated in 2025/26, five years after the project started. However, early results from land use change to date include a seven-fold increase in butterfly numbers, an 18% increase in the number of trees each year, and nine extra plant species per 2x2m plot. They are working on developing a landscape-wide indicator of ecological integrity, to help monitor overall improvement.

Stakeholders and the community have cited several benefits including habitat improvements, increased biodiversity, and associated aesthetic improvements from ecological restoration activities. In addition, there were a range of benefits for health, well-being, social equity and community cohesion:

- Restorative mental wellbeing benefits were reported for students and young adults who volunteered.
- Volunteering supported skills development, knowledge sharing, and confidence building, whilst also helping to overcome social isolation, forge new relationships, and build community networks, leading to improved community capacity, cohesion, and resilience.
- The project improved access to the outdoors for individuals and communities from all walks of life and age groups.

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3.2 FINANCING

3.2.1 OVERVIEW

According to external estimates, the UK faces a substantial nature financing gap of £44–97 billion over the next 10 years.[12] While public funding is essential, it cannot bridge this gap alone. Defra projects a need for £500 million in private capital annually by 2027, rising to £1 billion by 2030.[13] Yet private finance remains limited, largely driven by philanthropy or corporate social responsibility initiatives rather than scalable investment models.

Persistent, interlinked barriers constrain private investment in NbS:

1. **Nature is a public good:** NbS deliver benefits such as biodiversity and flood protection, but because these benefits are shared by everyone, it can lead to free-rider problems, which challenge generating clear revenue streams and funding models. Investment in natural flood management, for example, is often limited across public and private sectors, due to challenges in valuing these benefits.[13]

2. **Market constraints:** NbS are undervalued due to uncertain returns or clear predictable revenue streams from NbS, long timeframes, and overlooked co-benefits. Nascent markets—like biodiversity units and peatland carbon credits—suffer from limited data, fragmented demand, and modest returns. Small-scale projects also may not attract institutional capital, unless aggregated.

3. **Policy uncertainty:** Frequent changes to schemes and incentives can reduce confidence among practitioners and investors. A lack of clarity around the future of existing mechanisms such as biodiversity markets and agri-environment schemes, has raised uncertainty about long-term reliability and delivery.

4. **Valuation gaps:** Conventional investment models often ignore non-market benefits (such as nature recovery or carbon storage) and apply discount rates that undervalue long-term outcomes, making NbS appear less attractive than grey infrastructure.

The case studies illustrated how these challenges play out in practice.

3.2.2 CASE STUDY INSIGHTS

Economic viability and policy support

Barriers: The viability of NbS at farm or landowner level is shaped by both economic and policy factors. Tight farm profit margins, the risk of reduced production, yields and high opportunity costs can make NbS financially unattractive in the short term. In **Loughborough**, while some farmers and landowners were open to diversification, many were reluctant to adopt alternative land management practices due to concerns about profitability and the lack of clear financial incentives. Payment rates for ELMs remain low and restrictive, at the time of the project ranging from £151/ha for low-input permanent grassland to £596/ha for buffer strips. While regenerative farming approaches can deliver comparable or greater returns over time than conventional practices, transitions require upfront investment, time and carry considerable uncertainty. It is difficult for landowners to absorb opportunity costs during this transition period without financial support. [14]

In addition, unexpected changes to agri-environment schemes, such as the Sustainable Farming Incentive (SFI) and Countryside Stewardship, have created uncertainty. For example, in **Loughborough**, inconsistencies in the roll-out of schemes led some farmers to postpone action in anticipation of more favourable offers. **Wild Ingleborough** experienced similar delays, underscoring the importance of clear, consistent, and predictable mechanisms to incentivise land use change and habitat restoration.

In the absence of clear, coherent policy frameworks that value and reward NbS, landowners prioritised more immediately profitable uses. In **Loughborough**, at least three landowners in the Moat Brook catchment are pursuing land sales for housing development, where land values can reach up to £40,000 per hectare - far exceeding returns from conservation-based land management. Combined with continuing increases in the price of land, this poses a substantial challenge to NbS uptake.

These challenges illustrate how farm-level economics and policy design are closely linked. Without reliable incentives and predictable support, landowners face financial risks and a perception that engaging in NbS will jeopardise their revenue streams.

Enablers: To improve project viability, the **Riverscape Soar** projects and **Wild Ingleborough** deployed a range of practical strategies. In **Riverscape Soar** (Box 3), the Trent Rivers Trust engaged directly with landowners to develop tailored NbS options aligned with operational priorities, balancing farm productivity and flood management. Trent Rivers Trust developed a Landowner Toolkit which played a role in improving economic viability by helping landowners understand how NFM could align with their business priorities. By clarifying setup costs, maintenance needs, and potential benefits, it supported more informed decision-making. Demonstration sites on public land provided visible examples of NbS in action, building legitimacy and wider community understanding, while volunteer engagement and media coverage helped raise the profile of NbS locally.

To navigate funding policy complexity, intermediary organisations played a critical role. In **Loughborough**, the project team supported landowners with SFI applications and worked with Natural England to secure higher-tier Countryside Stewardship funding for more ambitious interventions, such as wetland restoration (Box 3). In **Wild Ingleborough**, the team has begun developing a long-term finance model as part of the Three Dales Landscape Recovery Scheme, designed to attract private investment and reduce dependence on public funding.

These experiences underline that short-term financial incentives, clear technical guidance, and sustained support are all essential to bridge the gap between policy ambition and practical delivery. Combining farm-level economic strategies with appropriate incentive schemes is critical if NbS are to become a mainstream choice for landowners.

Challenges in valuation approaches

Barriers: Valuing the benefits of NbS such as natural flood management is challenging because their impacts vary depending on the specific location, nature and stage of the intervention, and complex models are needed. This is a challenge when trying to justify increased public or private investment. Also, conventional cost-benefit analysis (CBA) undervalues broader NbS benefits, such as biodiversity, water quality, aesthetics, and social engagement, while discounting long-term ecological gains, potentially biasing decisions towards engineered solutions.

Enablers: The pilot projects contributed to the growing evidence base on cost-benefit analysis of NbS. **Riverscape East Anglia** sites provided strong evidence of the economic efficiency of NFM, with high benefit-cost ratios of between 11 and 21 (Table 2). In **Riverscape** Soar, modelling showed savings of up to £20 million per major rainfall event in avoided damages, assuming a 50% uptake of NFM across the catchment. Wider soil management (WSM) was found to generate the highest flow reductions across large catchments and created the greatest economic benefits.[6]

The **Riverscape Soar** Landowner Toolkit (Box 3) expanded the framing of NFM beyond traditional cost-benefit analysis. It highlighted co-benefits such as improved land productivity, water quality, and flood resilience; elements often excluded from conventional appraisal models. This broader valuation lens helped stakeholders appreciate the full socio-environmental value of NbS and supported more holistic investment decisions. Public demonstration sites in **Loughborough** further reinforced these messages, offering tangible examples to engage local communities and stakeholders. These approaches underscore the need to complement standard CBA with accessible, multi-dimensional tools that reflect the full value of NbS. This includes using new indicators and metrics, such as an Ecological Integrity Index being piloted at **Wild Ingleborough**, to better capture long-term ecosystem recovery.

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BOX 3. RIVERSCAPE SOAR – LOUGHBOROUGH: ENGAGING WITH PRIVATE LANDOWNERS

Although modelling confirmed that upstream flood storage was needed to reduce downstream flood risk in Loughborough, several significant barriers emerged when engaging private landowners in NbS initiatives: insufficient financial incentives, uncertainty around Government support schemes, and competing land use opportunities such as housing (see above). Despite these barriers, Trent Rivers Trust (TRT) implemented several strategies to build landowner engagement and encourage NbS adoption[11]:

- **Targeted outreach using trusted advisors.** TRT used specialist advisors to approach landowners, including agricultural advisors, agronomists and NFM specialists, and they also engaged the local Farmer Cluster.
- **Stakeholder engagement and landowner negotiation.** Each NbS feature required careful negotiation to align with landowners' operational priorities while achieving hydrological effectiveness. Discussions addressed construction impacts, long-term performance, maintenance responsibilities, and compatibility with existing land uses. Achieving consensus often involved balancing flood management goals with individual business needs.
- **Support with economic viability.** Throughout the project, TRT supported farmers in designing financially viable NbS interventions that protect their livelihoods. They supported landowners with SFI applications and continue to collaborate with Natural England to secure additional funding for higher-tier Countryside Stewardship schemes, particularly for wetlands and other complex NbS projects. In response to the competing pressure to sell land for housing, TRT remains engaged with the Planning Authority, responding to development applications and working with land agents to identify opportunities for integrating NbS into planning proposals.
- **Use of public land for demonstration.** Publicly owned sites were used to demonstrate NFM techniques and their wider benefits. These installations engaged both local rangers and the public, increasing awareness and fostering a sense of community ownership, which in turn supports knowledge-sharing and wider adoption.
- **Volunteer engagement and awareness-raising.** Volunteer work parties contributed to public site works. This required considerable coordination and supervision but yielded valuable public engagement and generated local media coverage and visitor interest, enhancing understanding of NbS and its role in flood risk reduction.
- **Development of a Landowner Toolkit.** To support informed decision-making, TRT developed a toolkit designed to demystify NFM and engage landowners[9]. It outlines the benefits of NbS, available implementation options, socio-economic and environmental impacts, and associated set-up and maintenance requirements. The guidance is tailored to landowners' operational contexts, helping to build confidence and reduce hesitation around adopting unfamiliar practices. By combining technical clarity with socio-economic framing, the toolkit serves as a foundational resource for knowledge transfer, capacity building, and long-term stewardship.

For more details, see the **Natural Flood Management Guide** by Trent Rivers Trust.

Table 2. Riverscape East Anglia Cost Benefit Analysis*

	Gissing, River Waveney Catchment (Dickleborough Stream)	Hempnall, River Tas Catchment (Hempnall Beck)	Edgefield, River Bure Catchment (Upper Bure, confluence with Scarrow Beck)
Interventions	Strategic bank lowering to reconnect the floodplain, restoration of a dry, historic channel, 100 metres of new flood relief channel, a leaky dam, and new wetland scrapes.	Installation of 10 in-ditch leaky dams, 2 attenuation ponds and field bunds, and planting of 950 metres of native hedgerow.	Construction of 3 leaky dams, a sediment trap and bund, culvert replacement, track cross drain with piping into a small swale and bund.
Cost (incl. VAT)	£8,779	£22,840	£11,478
Properties directly protected	6 residential	14 residential	4 residential
Potential insurance savings**	£180,000	£420,000	£120,000
Wider benefits	New and enhanced habitat for wildlife; groundwater recharge (replenish 574 million litres/year); improved water quality; enhanced aesthetic value of the landscape; educational opportunities for local communities, organisations and landowners.	New and enhanced habitat for wildlife; improved water quality; groundwater recharge (replenish 256 million litres/ year); educational opportunities for local communities, organisations and landowners.	Groundwater recharge (replenish 56 million litres/year); improved water quality; valuable topsoil captured; and an improved public culvert crossing.
Cost-benefit ratio***	21	18	11

*Costs are the investment needed to make the mitigation measures fully operational, including site visits, mapping and design work, obtaining planning and consent, construction, and post-delivery monitoring. Maintenance costs and opportunity costs from potential loss of productive land are excluded. Benefits are defined as potential avoided flood damage to properties, modelled in the development phase.

** Based on an average home flood insurance payout of £30,000 multiplied by number of properties at risk. To note £30,000 is an illustrative figure sourced from an external exercise.[15]

*** The cost-benefit ratio does not consider the lifespan of the interventions or the probability of a flood event. Land managers commit to maintaining interventions for 5 years, then they can manage the site as they wish.

3.3 GOVERNANCE

3.3.1 OVERVIEW

A common problem facing NbS projects is that different stakeholders can have conflicting or misaligned values and priorities. Strong and inclusive governance structures are needed alongside inclusive community engagement to manage these tensions. Organisations may lack the capacity and resources to provide this. Challenges include a lack of clear mandates, well-defined roles, and funding mechanisms that support long-term collaboration and community engagement. If governance is weak, fragmented across different organisations, or excludes some stakeholders, projects can struggle to gain legitimacy, mobilise resources, or maintain momentum over time. Short-term funding cycles also challenge relationship-building, and regulatory complexity can restrict local participation (see section 3.4).[16]

3.3.2 CASE STUDY INSIGHTS

Conflicting stakeholder values and priorities

Barriers: Although NbS typically deliver multiple benefits for people and nature, they can also involve trade-offs - such as taking land out of agricultural production or reducing grazing density to allow degraded land to recover. These trade-offs can be perceived as conflicting with traditional land use, food security, and the cultural and socio-economic value of landscapes and the rural communities that depend on them. In **Loughborough**, some landowners were concerned about loss of agricultural production or were considering housing development as a more profitable option to NbS (Section 3.2.2). Similarly, **Wild Ingleborough** encountered early resistance from farmers concerned about the implications of ecological restoration for changes in land use and production, often tied to a deep cultural attachment to existing farmed landscapes. In **Whissendine**, a local flood management group had previously disbanded due to differing views over effective flood solutions and conflicting advice, highlighting how misaligned stakeholder priorities can disrupt collective action and hinder NbS delivery.

Enablers: The case studies underscore the importance of strategic and collaborative community engagement, participatory decision-making, and co-design, showing that NbS are only as strong as the communities that sustain them. **Wild Ingleborough** (Box 2) and the **Restoration Forth** community hubs (Box 4) demonstrated how engaging communities as co-creators, rather than passive stakeholders, can build trust, strengthen social capital, and make projects more resilient and effective. In the case of **Wild Ingleborough**, early and close community engagement addressed initial concerns with the use of the word "Wild" in the project name, as the rewilding concept was associated with fears over loss of productive agricultural land. Similarly, in **Whissendine** (Box 5) and **Loughborough** (Box 3), citizen science and engagement with the broader public and schools helped shift perceptions and increase trust in the delivery teams. In **Loughborough**, Trent Rivers Trust also engaged individually with landowners to address perceived conflicts with farm profitability, such as discussing where trees could be planted or bunds created to hold back floodwater without affecting farm operations.[7]

Community engagement also plays a powerful role in amplifying project impact through communication and advocacy. In **Restoration Forth**, **Wild Ingleborough**, and **Loughborough**, committed community members helped spread awareness of NbS, advocated for their benefits, and attracted additional support and potential funding. Capital works in the public park generated media attention, and volunteer activity strengthened local social networks, and helped embed NbS into broader community narratives. Empowering local champions and embedding flexible, long-term funding mechanisms are essential to sustaining engagement. These approaches ensure that NbS are not short-term interventions but part of a broader strategy for resilient, community-led environmental management.[7]

Insufficient organisational capacity

Barriers: Several case studies highlighted gaps in organisational capacity across the governance networks delivering NbS. **Riverscape Soar Loughborough** identified underfunding of local authorities and delivery bodies as a barrier to strategic planning for NbS. In **Restoration Forth**, community-led delivery exposed some capacity constraints due to volunteers not having the time and resources to take on roles typically filled by paid staff (Box 4). **Wild Ingleborough** relied heavily on volunteers to implement woodland creation and habitat restoration, due to limited funding for paid staff.

Enablers: Each project introduced measures to build or supplement capacity within their governance networks. **Restoration Forth**'s community hubs addressed delivery capacity constraints (Box 4). **Riverscape Soar** recommended the creation of a dedicated delivery vehicle and increased support for agency staff, alongside training for planners and developers in NbS. Trent Rivers Trust also liaised with the Loughborough Flood Board which served as a cross-departmental working group, helping to align objectives and coordinate delivery across agencies. Through the Three Dales Landscape Recovery scheme, **Wild Ingleborough** is building capacity by supporting existing volunteers and onboarding a new wave of participants, ensuring that community engagement and project delivery are sustained over time. They highlight the importance of incentivising and rewarding volunteers, especially young people.


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BOX 4. RESTORATION FORTH COMMUNITY ENGAGEMENT

Restoration Forth established a series of delivery 'Hubs', including Edinburgh Shoreline, Fife Coast and Countryside Trust, Heart of Newhaven, The Ecology Centre, and the Scottish Seabird Centre, to effectively engage volunteers and connect with local networks. Embedding these hubs within their communities played a vital role in fostering local relationships, enabling knowledge-sharing, and providing training, resources, and ongoing support.

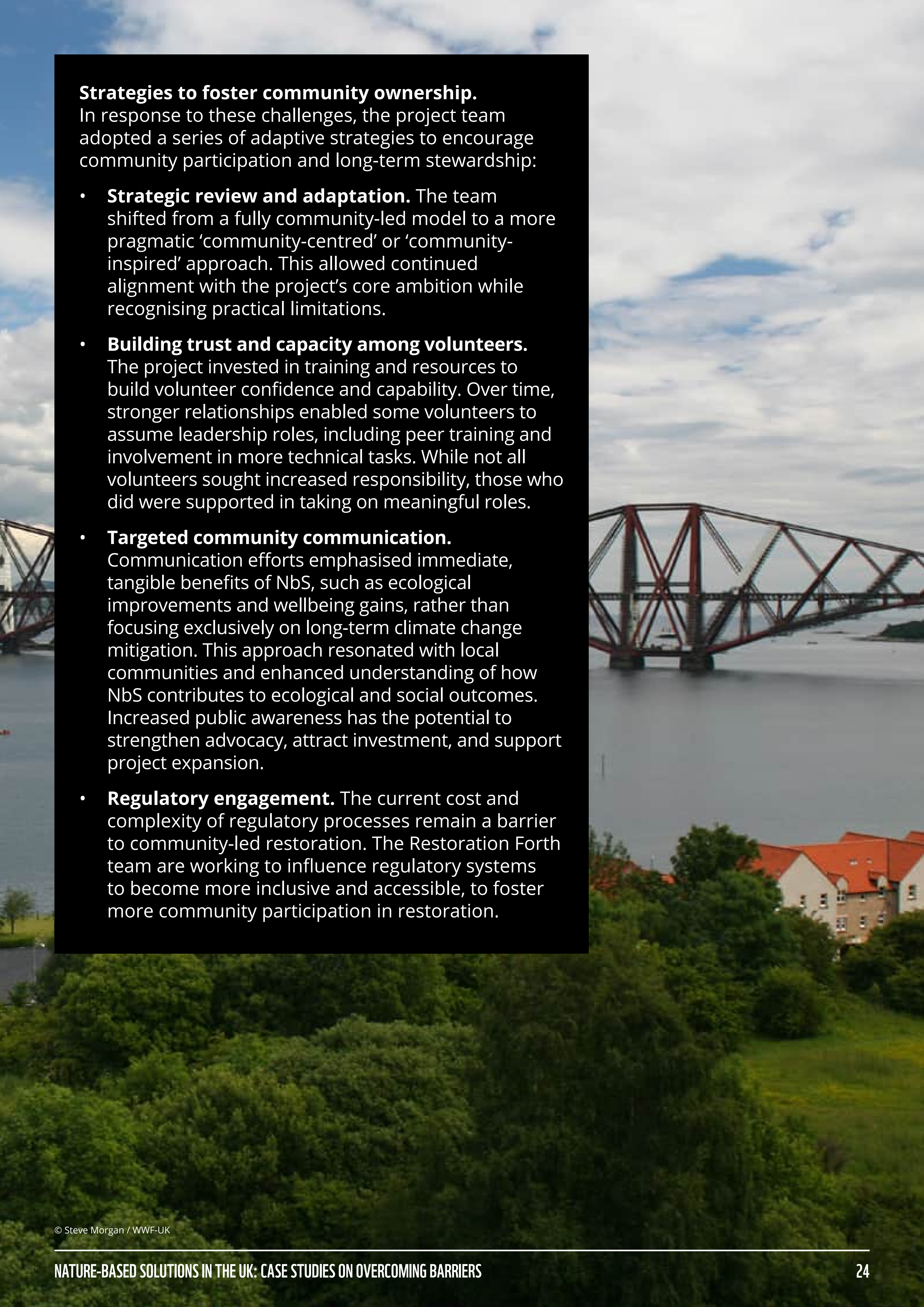
The hubs empowered volunteers to participate in and lead restoration activities such as citizen science seagrass monitoring, marine awareness initiatives, volunteering opportunities, and a community champion programme. They also facilitated collaboration across sites, supporting project sustainability and strengthening long-term outcomes. For example, knowledge and lessons from seagrass restoration in Wales and the Solent, and oyster restoration in Dornoch, were shared across the network, enhancing delivery effectiveness. The hubs contributed to local resilience, offering opportunities for people to engage, learn, and appreciate the role of NbS in habitat restoration, biodiversity enhancement, and climate change mitigation.

Challenges to a fully community-led approach. The original ambition for Restoration Forth was to transition to a fully community-led model during the project's lifetime, empowering communities to initiate and manage their own restoration initiatives. However, this vision proved unattainable due to several constraints:

- **Time and resource constraints.** The time and effort required for meaningful community engagement were significantly underestimated. Inadequate time was allocated for this critical phase of project development.
- **Regulatory barriers.** The complexity and cost of regulatory processes created a significant obstacle, making it difficult for communities to independently initiate and complete restoration projects.
- **Reliance on unpaid volunteers.** Given the high costs associated with restoration work, there was a heavy reliance on unpaid volunteers. Many volunteers were either balancing other professional commitments or were retired, which limited their capacity and willingness to take on responsibilities typically carried by paid staff.

Strategies to foster community ownership.
In response to these challenges, the project team adopted a series of adaptive strategies to encourage community participation and long-term stewardship:

- **Strategic review and adaptation.** The team shifted from a fully community-led model to a more pragmatic 'community-centred' or 'community-inspired' approach. This allowed continued alignment with the project's core ambition while recognising practical limitations.
- **Building trust and capacity among volunteers.** The project invested in training and resources to build volunteer confidence and capability. Over time, stronger relationships enabled some volunteers to assume leadership roles, including peer training and involvement in more technical tasks. While not all volunteers sought increased responsibility, those who did were supported in taking on meaningful roles.
- **Targeted community communication.** Communication efforts emphasised immediate, tangible benefits of NbS, such as ecological improvements and wellbeing gains, rather than focusing exclusively on long-term climate change mitigation. This approach resonated with local communities and enhanced understanding of how NbS contributes to ecological and social outcomes. Increased public awareness has the potential to strengthen advocacy, attract investment, and support project expansion.
- **Regulatory engagement.** The current cost and complexity of regulatory processes remain a barrier to community-led restoration. The Restoration Forth team are working to influence regulatory systems to become more inclusive and accessible, to foster more community participation in restoration.



BOX 5. RIVERSCAPE SOAR – COMMUNITY ENGAGEMENT FOR SLOWING THE FLOW IN WHISSENDINE

Whissendine is a well-connected village with an active community, including a local environment group and a strong Women's Institute. The Parish Council has been proactive in addressing flood risk, and both residents and landowners expressed interest in NFM as an alternative to traditional brook maintenance and dredging.

Trent Rivers Trust (TRT) engagement activities[6]:

- A comprehensive survey at the start of the programme to ascertain awareness of flood risk, protection for homeowners, available resources, and support for homes at risk of flooding.
- Community consultation and awareness-raising on proposed NFM schemes.
- Interactive sandbox and catchment model demonstration to the Parish Council, events and schools.
- NFM toolkit for landowners and farmers to support understanding of NFM and the benefits.
- Pop-up village event to recruit citizen scientists and gather feedback on NbS, leading to formation and support of a local Citizen Science Group.
- Webinar and focus group to discuss NFM, watercourse maintenance, and dredging.

Community-led monitoring

Working with local volunteers, TRT established a Citizen Science programme involving monthly monitoring of water quality and river morphology. Parameters included dissolved solids, visible pollution, wildlife, phosphate, nitrate, and temperature.

The initiative was well received, fostering informed community dialogue around flooding, water quality, and the role of NbS.

"We have learned more about what can be done to alleviate local flooding and are hoping that this will be achieved and, ultimately, will serve its purpose. The training was good, and it was a useful experience. We met and worked with village residents that we hadn't previously met."

- Whissendine resident and CSI participant.

"Since TRT became involved there seems to have been a shift in opinions within the village; both in conversation and on social media. It seems that 'slowing the flow' is now seen as a positive approach in seeking to reduce the impact of flooding on the village."

- Whissendine Parish Council

3.4 POLICY AND REGULATION

3.4.1 OVERVIEW

Policy and regulation shape how NbS can be scaled up and embedded within wider land use and development priorities. While farm-level incentives directly influence individual decisions (see 'Financing' section), broader land use planning and regulation establish how NbS are valued, prioritised, and implemented.

Regulatory processes designed to minimise environmental harm are essential for preventing further ecosystem degradation. Yet strict compliance requirements and penalties designed to address environmentally damaging activities can create unintended barriers to beneficial NbS projects, slowing innovation and delivery[4].

Restoration Forth © Maverick Photo Agency

3.4.2 CASE STUDY INSIGHTS

Securing permits for restoration

Barriers: Securing permits for restoration initiatives can be a complex and time-intensive process, involving multiple agencies and stakeholders. For instance, **Restoration Forth** needed a marine licence, a translocation licence, and a habitat regulation assessment for seagrass restoration (Box 6). Similarly, oyster restoration using vessels and divers required marine licences equivalent to those issued for environmentally harmful projects, simply due to material deposition (in this case oysters) on the seabed and due to using a boat. Experience elsewhere corroborates these challenges - seagrass restoration in the Solent faced permit fees up to £5,000, typically applicable to damaging marine activities, highlighting how current regulations can inadvertently penalise beneficial efforts[4].

Enablers: In **Restoration Forth**, allocating adequate resources and planning sufficient lead time for obtaining permits was critical to managing regulatory complexities. Specialists and intermediaries, including conservation NGOs, scientists, and local authorities, played pivotal roles in bridging communities and policymakers. For instance, WWF-UK facilitated knowledge exchange by identifying regulatory barriers and providing feedback to government consultations aimed at streamlining processes. Furthermore, the community hub model (Box 4) promoted shared learning, identified common challenges, and coordinated collective responses. While robust environmental regulations are essential, they may not always suit beneficial restoration activities. Fast-tracking permitting and licensing for NbS, where specific environmental criteria are met, would accelerate project implementation.

BOX 6. RESTORATION FORTH – ADDRESSING COMPLEX REGULATION

The project's intention to inspire and support community-led restoration activities quickly revealed the challenges posed by existing regulatory processes, which are complex and focused on mitigating harm rather than supporting restoration activities. For example:

- Under the Marine (Scotland) Act 2010, a marine licence is required for certain activities, including the use of a vessel and divers to deploy oysters. This system, designed to manage development or extractive industries, is not suited to activities aimed at improving or enhancing the marine environment. Securing marine licences is time-consuming and costly, and while these processes are intended to minimise negative impacts, their complexity acts as a barrier for community groups or individuals with limited resources.
- Hand planting of seagrass did not require a marine licence but did require a translocation license for moving seagrass seeds from the sourcing site (Orkney) to the restoration site. This work involves snorkelling to pick the seeds (thousands at a time), technical knowledge on how and when to pick and process the seeds, and access to seagrass planting trial methodology to inform the seeding process.
- Proximity to nature conservation designations required a Habitats Regulations Assessment. For both species, an assessment, including biosecurity procedures, was developed. The complexity of this process was resource-intensive and required the sub-contracting of a consultant, despite the extensive experience of some partner organisations.

To overcome these barriers, the project explored several strategies:

- Building in sufficient capacity and lead time to secure the necessary licenses and permits.
- Improving the system through collaborating with other restoration projects in Scotland to share experiences with regulators. In Spring 2024, the Scottish Government launched a consultation proposing a new self-registration system as an alternative to the marine license. While the consultation outcome did not fully resolve the identified challenges, collaboration with government is continuing to explore a more inclusive and accessible pathway for marine restoration. A dedicated marine restoration policy is under development, with publication expected by the end of 2025.
- Sharing the learning gained from this project with other projects, including those with fewer resources than Restoration Forth.

Restoration Forth © Maverick Photo Agency

3.5 PRESSURES ON ECOSYSTEMS

3.5.1 OVERVIEW

While NbS can offer resilient and cost-effective responses to societal challenges, they remain vulnerable to pressures such as climate change, pollution, habitat fragmentation, and invasive species, which can undermine their success. Addressing these pressures requires investment in ecological restoration, stronger protections for critical habitats, and integrated, landscape-scale approaches that improve the long-term resilience of ecosystems.

Climate resilience can be boosted by establishing healthy, biodiverse ecosystems that are well connected through provision of ecological corridors, to enable species to move in response to environmental change. This will be facilitated by the network maps developed by the emerging Local Nature Recovery Strategies in England, which should help to channel funding and restoration efforts into optimum locations for building resilience and connectivity.

3.5.2 CASE STUDY INSIGHTS

Habitat loss, degradation and fragmentation

Barriers: In **Wild Ingleborough**, the land was heavily degraded due to historic practices such as drainage, overgrazing, and other intensive farming practices. In **Restoration Forth**, external stressors such as pollution from farm runoff and sewage outflows continue to threaten the recovery of sensitive habitats like seagrass beds. These pressures not only undermine restoration efforts but also reduce the long-term resilience of NbS to climate impacts.

Enablers: To ensure NbS can deliver sustained benefits, projects must go beyond isolated interventions and adopt a landscape-scale approach. Both **Wild Ingleborough** and **Riverscape Soar** focused on restoring ecological connectivity by creating corridors, together with catchment-wide planning and integrated land management to reduce pressures such as pollution. In both cases, these strategies not only supported ecosystem resilience but were also linked to improved floodwater management. Early observations in **Wild Ingleborough** suggest better water attenuation and reduced downstream flood risk due to peatland and woodland restoration.

Ecosystem vulnerability to climate change

Barriers: In **Restoration Forth**, coastal reclamation and the use of hard sea defences in the face of sea-level rise have increased ecosystem vulnerability for seagrass. These climate-driven pressures have complicated restoration efforts, highlighting how environmental vulnerability can limit where and how NbS can be deployed effectively. In **Wild Ingleborough**, as for all UK peatland, hotter, drier summers could cause the peat to dry out and become more vulnerable to erosion, losing vast quantities of stored carbon as well as its ability to contribute to flood management.

Enablers: To address these challenges, **Restoration Forth** focuses on restoring marine habitats that enhance carbon storage, biodiversity, and water quality, contributing to long-term resilience. **Wild Ingleborough** is improving ecological stability and reducing vulnerability to climate change by restoring peatland through planting sphagnum moss and blocking drains, to help the peat store more water. By restoring and connecting native woodlands and grasslands, the project is also increasing the landscape's capacity to adapt to future climate impacts.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4. DISCUSSION AND RECOMMENDATIONS

4.1 INTERLINKED BARRIERS TO NATURE-BASED SOLUTIONS

Across the case studies, a consistent set of barriers emerged that collectively constrain the scaling of NbS in the UK. This report has highlighted the following: **Knowledge and capacity gaps; evidence and valuation limitations; financial constraints and market failures; stakeholder misalignment and cultural resistance; governance and institutional fragmentation; and regulatory complexity.** These barriers are deeply interconnected and often reinforce one another. Addressing them presents significant opportunities for coordinated action.

4.2 LOOKING AHEAD

Scaling up NbS in the UK will require a shift from isolated interventions to coordinated, long-term strategies by multiple actors, that respond directly to the systemic barriers identified.

Tackling knowledge and capacity gaps means investing not only in training and demonstration hubs, but also in mechanisms that translate evidence into practical guidance for landowners, planners, and delivery bodies, such as the Landowner Toolkit developed by Trent Rivers Trust (Box 3). This includes embedding long-term **monitoring and evaluation** into financing structures, and expanding the use of emerging technologies and indicators tailored to NbS type (e.g. NFM) to build confidence in performance.

Financial constraints and market failures demand a rethinking of how public goods are valued and rewarded. Incentives must be designed to reflect the distributed benefits of NbS, such as downstream flood protection, and to overcome the problem of free riders, such as if one business invests to improve resilience in a sector or catchment but others do not contribute. Blended finance models, stable and adequate public support pathways, and improved valuation tools, such as multi-criteria analysis for capturing non-monetary values of nature, can help align public and private capital to support ecological integrity. These mechanisms must be supported by coherent policy frameworks and robust public oversight to avoid cost-shifting (where private finance displaces rather than supplements public investment) and ensure that funding flows to interventions with the highest social and ecological value. Public funding will, however, remain essential to address market failures and support NbS that deliver significant public benefits which are not directly linked to revenue streams.

Governance and regulatory reform are equally critical. NbS must be embedded in inclusive, well-resourced governance structures that foster **stakeholder alignment** and resolve competing land use priorities. This requires long-term grant-based funding for activities, such as coordination and relationship-building, that do not generate financial returns and therefore typically sit outside commercial investment structures. It's WWF-UK's view that at the national level, the development of a Land Use Framework and continued implementation of the Environmental Improvement Plan in England (including the development of Local Nature Recovery Strategies) offer opportunities to integrate NbS into planning and development control, enabling landscape-scale delivery. Policies that strengthen protection of habitats from fragmentation and reduce pressures such as pollution are also important, as healthy and connected ecosystems will be more resilient to future change. Planning frameworks play a critical role in shaping outcomes for nature[17] and integration of NbS such as SuDS.[18] However, without sufficient safeguards and alignment, there is a risk that planning reforms may weaken environmental protection and overlook opportunities to embed NbS.

Ultimately, scaling NbS will depend on our ability to align policy, finance, and practice around shared environmental goals, and to treat these barriers not as isolated challenges but as interconnected systems requiring integrated solutions.

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4.3 IMPLICATIONS FOR SCALING UP NATURE-BASED SOLUTIONS

1. Strengthen the evidence base through monitoring, valuation, and knowledge sharing

The case studies revealed how limited long-term monitoring and inconsistent data remains a key barrier, making it difficult to demonstrate the effectiveness and value of NbS, especially compared to conventional infrastructure. Gaps in valuation approaches (failing to recognise the wider benefits of NbS) and lack of accessible data can undermine confidence among potential investors, regulators, and adopters.

Actions that can help address this include:

- Embedding long-term monitoring and evaluation into project design and financing, using consistent indicators and shared data platforms such as the NFM Dashboard[19] and NWRM website[20], to strengthen the wider evidence base on NbS costs, benefits and performance and build investor confidence.
- Using demonstration projects and targeted outreach to raise awareness of NbS benefits, overcome uncertainty, and build local support.
- Harnessing emerging technologies (e.g., remote sensing) to facilitate knowledge sharing and increase confidence in NbS investments.
- Supporting the development of citizen science programmes to enhance data collection, community involvement, and shared understanding.
- Expanding use of toolkits, e.g. to help tailor projects to minimise impacts on farm productivity, and support farmers in applying for funding from agri-environment and other schemes.
- Using cost-benefit analysis to build the business case for NbS, especially when wider benefits are included in the valuation.

2. Unlock blended and long-term financing to de-risk investment

Case studies consistently highlighted how uncertain revenue models, short grant cycles, and a lack of scalable financial mechanisms continue to constrain private investment in NbS. While public funding remains foundational, long-term finance models and creative de-risking mechanisms are needed to catalyse wider participation and adoption at scale. Stakeholders including policymakers, financial institutions, landowners, nature-linked businesses, and project developers may find value in collaborative efforts to align incentives and create clearer pathways for private finance.

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Considerations may involve:

- Extending public funding cycles and ensuring public and private finance can align, whilst continuing to refine the policy detail, option design, and payment rates for agri-environment schemes. For example, schemes such as Defra's Landscape Recovery programme can help align public and private capital, mitigating risk and enhancing bankability.
- Exploring instruments such as regional resilience bonds, revolving funds, and aggregated project portfolios (see Glossary) that match the long-term nature of ecological recovery and the need for integrated, landscape scale investment to address the scale and complexity of the issues.
- Supporting blended finance approaches that bring together philanthropic, public, and private capital through coordinated design and shared risk frameworks, such as by continuing to grow seed funding in the Big Nature Impact Fund and similar schemes. WWF's **Pounds in Pockets** report calculated figures for blending ELM payments with private supply chain finance from food retailers, processors and brand as an option to address farmers' profitability at low cost to taxpayers.
- Encouraging businesses with nature-linked value chains (e.g. insurance, retailers, food brands) to contribute technical assistance and funding through collaborative funding pools.
- Aligning public appraisal frameworks (e.g., the Green Book) with NbS valuation, including through catastrophe risk modelling and better recognition of long-term benefits.
- Developing robust governance and compliance mechanisms for nature investment to ensure the creation of reliable and transparent revenue streams.

3. Build organisational capacity and collaborative delivery structures

Limited organisational capacity within both delivery organisations and regulatory bodies continues to challenge NbS projects. For example, limited technical capacity, short-term contracts, and underfunded coordination roles can inhibit effective governance and reduce project momentum.

This can be addressed by:

- Investing in capacity-building for local authorities, delivery partners, and planners to strengthen NbS integration into land management.
- Supporting place-based governance structures (such as catchment partnerships) that enable collaboration across sectors and build long-term relationships with landowners and communities and ensure they have the funding and mandate to drive change.
- Strengthening delivery infrastructure through community hubs and intermediaries (such as Trent Rivers Trust) that can bridge funders, regulators, and local stakeholders and support for new partnerships and governance models to deliver and maintain NbS, that enable local stakeholders and eNGOs to collaborate, utilising local networks and knowledge.
- Providing targeted training in planning, risk assessment, and finance for NbS practitioners.


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4. Foster trust and legitimacy through early and inclusive engagement

The projects showed how resistance to NbS often stems from unfamiliarity, competing land uses, or challenges in navigating changing policies. Where engagement is limited or top-down, project legitimacy and long-term maintenance are harder to sustain. Fostering inclusive partnerships involving landowners, practitioners, communities, local authorities, businesses, and NGOs can amplify project impact, secure broader support, and enhance long-term sustainability.

Actions that may help build local support include:

- Engaging stakeholders, including landowners, local councils, and communities, early in project development through participatory design and transparent decision-making. This requires adequate resources and capacity for effective early and sustained engagement to be built into the project design and funding from the outset.
- Investing in pilot projects on public land to demonstrate NbS in action and increase visibility among stakeholders.
- Supporting local champions and volunteers through community-led monitoring, training, and communication platforms. This can build local ownership, skills and capacity, which is key for long-term stewardship, as well as bringing in local knowledge to inform project design.
- Creating spaces for dialogue and shared learning across sectors to build mutual understanding and collaborative intent.

5. Align policy and regulation with nature-positive land use and investment

Policy uncertainty and complex regulatory environments can discourage participation in NbS and slow delivery. Greater clarity, coherence, continuity and proportionality in policy and regulation would build confidence for implementers and investors while helping to reduce transaction costs.

It is WWF's view that opportunities exist to:

- Develop strategic, spatially informed land use frameworks that integrate climate, biodiversity, and development goals, with tailored nature protection and restoration commitments for different economic sectors. In England, this can be aligned with the emerging Local Nature Recovery Strategies and Environment Land Management Landscape Recovery Programmes, ensuring there is a policy incentive for these to align.
- Align planning and permitting systems with NbS objectives to ensure restoration opportunities are prioritised and supported, retaining environmental safeguards while reducing ecological pressures such as pollution and habitat fragmentation, to improve NbS resilience. WWF-UK's **Pounds in Pockets** Report calculates savings from expanding permitted development rights to on-farm NbS solutions like wetlands.
- Streamline licensing processes for restoration activities while retaining appropriate environmental safeguards.
- Facilitate coordination across devolved administrations to reduce regulatory fragmentation and promote consistency, aligning all nations with best practice for protecting and restoring ecosystems.
- Plan NbS projects to allow enough time and budget to obtain necessary licenses and permits, supported by sharing knowledge between practitioners. Gather evidence on inappropriate regulatory barriers to beneficial NbS to inform suggestions for how regulatory systems could be improved.

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5. CONCLUSION

NbS provide a crucial opportunity to address the Triple Challenge, delivering resilience benefits for people, nature, and the climate. However, scaling up NbS is constrained by financial, governance and policy challenges. This report has summarised WWF's key findings from four pilot projects supported by the Aviva-WWF-UK partnership, which provide practical demonstrations of these challenges and how they can be addressed.

- **Lack of awareness and understanding of NbS** can be addressed through targeted outreach, demonstration projects and stakeholder engagement, coupled with investment in projects and research which build the evidence base on the performance, costs and benefits of NbS. This includes evidence on the effectiveness of co-ordinated NFM interventions across large catchments.
- **Financial viability** is a major barrier. Farmers and landowners need stable and predictable NbS funding streams that cover both the implementation costs and compare favourably with lost revenues from alternative land uses.
- **More private finance is needed**. Nature-dependent businesses can play a key role by supporting landscape-scale NbS projects which mitigate their exposure to nature-related risks and support their supply chain and operational resilience.
- **Strong and inclusive governance** is critical, including early and sustained engagement and co-design with stakeholders. This requires adequate capacity, funding and resources to be designed into projects from the start.
- **Policy and regulation** should be adapted to ensure beneficial NbS projects are not inadvertently penalised, while being strengthened where necessary to reduce ecosystem pressures such as pollution and fragmentation.

Some positive steps to address these barriers are being made, but more needs to be done to unlock the potential of NbS at scale. As part of a wider body of evidence on NbS barriers and enablers, we hope that the real-life examples in this report will help to drive coordinated action by all those working together to scale up NbS across the UK.

GLOSSARY

Adaptive management.
A systematic approach to learning and adjusting management actions based on monitoring results and evidence.

Aggregation / project portfolio.
Bundling small projects to achieve scale and attract institutional capital.

Bankability.
The degree to which a project meets investor requirements on risk, return and reliability.

Biodiversity Net Gain (BNG).
A policy requiring new developments to leave biodiversity in a better state than before.

Biosecurity procedures.
Protocols to prevent the spread/introduction of pests and diseases during restoration work.

Blended finance.
Combining public, philanthropic and private capital, often with risk-sharing, to crowd-in investment.

Buffer strips / hedgerow planting.
Vegetated margins and hedges to intercept runoff, trap sediment and enhance habitat.

Catchment.
The area from which rainfall flows into a river, lake, or reservoir.

Co-benefits.
Additional economic, social or environmental gains (e.g., water quality, recreation) beyond the primary objective.

Co-design / participatory decision-making.
Involving stakeholders and communities in shaping interventions from the outset.

Community hubs.
Local delivery partners that coordinate volunteers, training and engagement for restoration work.

Concessional finance / guarantees / patient capital.
Instruments that lower risk or extend time horizons to make NbS investable.

Cost–Benefit Analysis (CBA) / Benefit–Cost Ratio (BCR).
Appraisal comparing costs with quantified benefits to inform investment decisions.

Countryside Stewardship (CS).
Payments for more ambitious habitat and water management actions.

Delivery vehicle.
A dedicated entity/structure set up to deliver and coordinate NbS projects at scale.

Discount rate.
The rate used to reduce the value of future costs/benefits to present terms; high rates can undervalue long-term NbS gains.

Ecological connectivity / corridors.
Linking habitats to support species movement and system resilience.

Ecosystem services.
The benefits people obtain from ecosystems (e.g., flood regulation, water purification, recreation).

Environmental Improvement Plan (EIP).
England’s plan for nature recovery and environmental targets.

Environmental Land Management Schemes (ELMs).
England’s post-CAP farm support, including sub-schemes like SFI and Countryside Stewardship.

Farmer Cluster.
Group of neighbouring farmers collaborating on environmental outcomes across holdings.

Free-rider problem.
When those who benefit from a public good do not pay for it, weakening funding incentives.

Habitat fragmentation / degradation.
Breaking or damaging habitats, reducing ecological function and resilience.

Habitats Regulations Assessment (HRA).
Assessment to ensure activities do not adversely affect protected sites/species.

Invasive species.
Non-native organisms that can disrupt ecosystems and undermine NbS outcomes.

Intermediary organisation.
Body that brokers between landowners, communities, funders and regulators to unlock delivery.

Kunming–Montreal Global Biodiversity Framework (GBF).
Convention on Biological Diversity global agreement with targets to halt and reverse nature loss and align finance and business with nature-positive outcomes.

Landscape Recovery (LR).
Long-term, landscape-scale projects that can blend public and private finance for restoration.

Local Nature Recovery Strategies (LNRS).
Spatial strategies identifying priorities and opportunities for nature recovery and connectivity.

Natural Flood Management (NFM).
NbS measures that slow, store, or reduce runoff using natural processes (e.g., wetlands, woodland creation).

Nature-based Solutions (NbS).
Actions to protect, conserve, restore, use and manage ecosystems to address societal challenges while delivering biodiversity, wellbeing and resilience benefits.

Opportunity cost.
The income foregone by choosing NbS over a more profitable (short-term) land use (e.g., development, intensive cropping).

Payback period.
Time needed for cumulative benefits/cash flows to recover upfront costs.

Payments for Ecosystem Services (PES).
Schemes that pay landholders for measurable environmental services.

Public good.
Benefits that are non-excludable and non-rival (e.g., flood protection), making private monetisation difficult.

Regenerative farming / improved soil management.
Practices that enhance soil health, structure and infiltration while maintaining productivity.

Resilience (community/ecosystem).
The capacity of communities or ecosystems to withstand, adapt to, and recover from shocks such as floods or storms.

Resilience bond / green bond / revolving fund.
Financing mechanisms that fund resilience/ nature outcomes, sometimes recycling capital via repayments.

Stakeholder mapping.
Systematically identifying who is affected/ involved and how to engage them.

Sustainable Drainage Systems (SuDS).
Planning/design requirements that use natural processes to manage runoff in new development.

Sustainable Farming Incentive (SFI).
ELMs component paying for environmentally beneficial actions on farms.

Translocation licence.
Permission to move organisms (e.g., seagrass seeds) between sites for restoration.

Triple challenge.
The combined goals of tackling climate change, reversing biodiversity loss, and improving societal wellbeing.

APPENDIX: FRAMEWORK OF BARRIERS AND ENABLERS

The framework below, drawn from Smith & Chausson (2021)[4], was used to categorise the evidence on barriers and enablers. Some categories were merged to promote streamlining, while retaining framework coherence. The right-hand column in each table indicates which case studies provided insights on the corresponding barrier and/or enablers, noting that not all barriers and enablers reported in the wider literature were important for our pilot projects.

INFORMATION

Table A1. Barriers and enablers related to access to information on NbS in the UK

BARRIER	ENABLER	RELEVANT CASE STUDIES
Lack of awareness and understanding of NbS amongst landowners, planners and communities Limited access to evidence and data	Targeted engagement, demonstration sites, cross-sectoral knowledge-sharing platforms, open data initiatives	Riverscape Soar (Loughborough, Whissendine) Restoration Forth, Wild Ingleborough
Uncertainty in ecosystem functionality	Integrating academic & local knowledge to improve understanding	Restoration Forth
Limited long-term datasets on NbS outcomes	Establishing long-term monitoring frameworks (including citizen science) and data-sharing platforms	Riverscape Soar (Whissendine) Restoration Forth
Lack of standardised methodologies for impact and revenue assessments	Developing harmonised performance indicators and standardised metrics	Wild Ingleborough Restoration Forth
Lack of monetary valuation and cost-benefit analysis (see also Finance section)	Applied research on performance and cost-effectiveness across different landscapes	Riverscape East Anglia Riverscape Soar, Loughborough
Lack of skills and knowledge for implementation and design	Training centres, peer-to-peer-learning, site visits, apprenticeships, design manuals and toolkits	Riverscape Soar Restoration Forth

FINANCE

Table A2. Barriers and enablers related to financing NbS in the UK

BARRIER	ENABLER	RELEVANT CASE STUDIES
Ecosystem services are public goods NbS often generate benefits (e.g. biodiversity, clean water, flood protection) that are non-excludable and non-rivalrous, making it hard for investors to generate financial returns.	Public funding, subsidies, or fiscal incentives Blended finance to share costs and risks Public-private partnerships to align implementation with societal goals Multi-stakeholder benefit-sharing mechanisms	Not explicitly reported in our pilot projects
Weak project-level economics and uncertain returns High upfront costs, long payback periods, and uncertain cash flows reduce financial viability, especially for landowners and investors with short return horizons. [Also see information barrier on lack of monetary valuation and cost-benefit analyses]	Risk-sharing instruments (e.g. guarantees, concessional finance) Aggregation of multiple revenue streams (e.g. carbon + water + agri-environment) Support with investment-readiness and project structuring Short-term incentives (grants, government subsidies, PES, patient capital) to bridge opportunity costs Tenure security	Riverscape Soar (Loughborough) Wild Ingleborough
Distorting policy signals and harmful subsidies Current policies and subsidies often drive nature-negative practices (e.g. planning policy that undervalues NbS, or tax breaks for fossil fuel production)	Reform of harmful subsidies Alignment of public funding and policy with nature priorities Use of public procurement and regulatory mandates to steer investment	Riverscape Soar (competition with sale of land for housing) otherwise not relevant to our pilot projects.

BARRIER	ENABLER	RELEVANT CASE STUDIES
Weak valuation approaches and lack of evidence Non-market benefits (e.g. biodiversity, social resilience) are undervalued or excluded from decision-making, and impact data is inconsistent or lacking.	Development of alternative appraisal tools (e.g. cost-effectiveness analysis, multi-criteria analysis) Standardised nature metrics and indicators Clear evidence of long-term cost-effectiveness Information platforms on NbS benefits and performance	Riverscape Soar (Loughborough) Riverscape East Anglia Restoration Forth
Inadequate financial instruments for NbS NbS projects often do not align with conventional financial products, which are typically designed for large-scale, asset-heavy investments with clear cash flows. The lack of tailored instruments limits the ability to finance NbS effectively at scale.	Nature-linked financial instruments (e.g. green bonds, resilience bonds, biodiversity credits) Revolving funds, contingent loans Performance-linked finance mechanisms	Wild Ingleborough

GOVERNANCE

Table A3. Governance barriers and enablers in the UK

BARRIER	ENABLER	RELEVANT CASE STUDIES
Fragmented governance structures at landscape level	Aligning NbS objectives with land-use policies Integrated management approaches Encouraging ecosystem-wide coordination and catchment-scale planning	Wild Ingleborough Riverscape Soar (Whissendine)
Lack of clearly defined roles and responsibilities, combined with siloed or fragmented authority at different governance levels	Establishing cross-departmental working groups, dedicated governance bodies and clear institutional frameworks Stakeholder mapping & use of intermediary organisations	Riverscape Soar
Insufficient organisational capacity within governance networks to design, deliver, and maintain NbS.	Building institutional capacity for long-term stewardship and maintenance	Restoration Forth Riverscape Soar Loughborough
Conflicting stakeholder values and priorities	Promoting participatory decision-making and co-design with diverse stakeholders through place-based partnerships	Riverscape Soar Wild Ingleborough
Tenure insecurity	Promoting tenure security and long-term payments	Not reported in our pilot projects
Underfunding of government agencies and regulatory bodies	Increasing funding (staff and resources) for agencies responsible for delivery of NbS	Riverscape Soar

POLICY AND REGULATION

Table A4. Policy and regulation barriers and enablers

BARRIERS	ENABLERS	RELEVANT CASE STUDIES
Weak, misaligned or underfunded policies e.g. policies that ignore or conflict with NbS, set unambitious targets, have loopholes, or lack sufficient funds for implementation.	Mainstreaming NbS in national and sectoral policies including urban planning, flood management, and agriculture; Coherent land use framework to manage trade-offs and promote ecological connectivity Measurable, realistic and well-resourced targets for NbS delivery	Riverscape Soar
Inappropriate and inconsistent regulatory frameworks	Updating regulatory frameworks to align with broader climate adaptation and biodiversity strategies Simplified permitting & licensing procedures where appropriate (while maintaining environmental protection standards)	Restoration Forth
Inadequate standards, resulting in poor quality NbS	Wider adoption of standards to ensure high-quality NbS, e.g. for SuDS and green roofs[4]	Not relevant to our pilot projects

PRESSURE ON ECOSYSTEMS

Table A5. Barriers and enablers related to pressures on ecosystems

BARRIER	ENABLER	RELEVANT CASE STUDIES
Habitat loss, degradation and fragmentation	Stronger protection for nature in planning policy; End damaging practices such as moorland burning, overgrazing, overfishing, and dredging / bottom trawling of the sea floor Implement ecosystem restoration programs and community-led stewardship models	Restoration Forth Wild Ingleborough
Pollution	Stronger regulations, especially for water pollution, and tougher penalties for non-compliance. Catchment-based approach to pollution reduction	Restoration Forth
Vulnerability to climate change	Reduce GHG emissions to control climate change Strengthen ecosystem resilience and connectivity Monitoring and adaptive management (including Citizen Science)	Wild Ingleborough Restoration Forth
Invasive species	Enhance local engagement in NbS implementation and maintenance	Not relevant to our pilot projects

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