Case studies in large-scale nature restoration and rewilding:

Learning from existing projects

NatureScot
Scotland's Nature Agency
Buidheann Nàdair na h-Alba

Contents

Front cover image: Glenfeshie ©Lorne Gill/NatureScot

A review was undertaken to explore barriers and opportunities to large-scale nature restoration and rewilding projects and help identify what works and issues encountered. The review included ten case studies in the UK and Norway in rural and coastal contexts.

Key findings

1. The case studies showed a range of motivations for large-scale nature restoration; some relate to the interests of particular landowners with a rewilding vision, responses to the challenges of working difficult sites, or delivery of ecosystem services such as water purification and flood management for ecosystem service delivery.

2. Some of the examples are owner-occupied with direct control over all aspects of the project. In partnerships, a large number of organisations can slow down decisions but enable projects to be carried out at a larger scale, gain more influence, and means all interests are understood; they can be more transformational across landscapes.

3. Flexibility in the management of projects is a necessity. Working with natural processes requires an open and flexible approach, as ecosystems are dynamic and constantly changing. It is also important for land managers and other stakeholders to see that they have real influence over a project. This requires projects to be truly collaborative, neither top down nor bottom up, and for management to be flexible and able to demonstrate how projects have evolved in response to concerns raised.

4. Views found within some of the large partnership projects include contrasting conservation interests, including the preferred approach to moorland management, differing opinions on beaver reintroduction and management, and disagreement over the removal of some non-native species.

5. Engagement with local communities, land managers, and other stakeholders is critical and never ceases. It proved essential to plan communications into a project in the early stages and ensure that resources are set aside to deliver successful communication and engagement long-term.

6. The case studies showed the importance of learning from other initiatives. The interviewees reported that demonstration projects were the most effective method of engaging decision-makers and funders and encouraging advocacy.

7. Empowering existing actors is important because they are generally embedded in the local landowning community and understand a local area well. Staff retention is important to maintain important relationships with the communities, land managers and other local stakeholders.

8. Economic benefits from rewilding include tourism, developing and marketing high quality, local products as a means of enhancing agricultural income, reduction in flood risk and increased protection of properties, reduced maintenance costs of buildings and other infrastructure.

9. Changes in employment associated with management of the land and the wider economy were observed, with the creation of a range of new positions in land and habitat management, visitor management, education, and diversified businesses. It was also found that, depending on the project, there can be a loss of agricultural jobs. Overall, the case studies have provided limited quantitative evidence on the community and local economic benefits.

10. Funding is often a barrier to the scale and legacy of a restoration project. Most projects draw upon grant funding which - being time limited - serves to create uncertainty for projects which have long-term visions and objectives. This can result in 'boom-bust' cycles of job creation. A lack of alignment of the project aims with existing funding schemes is another issue being encountered.

11. On enclosed farmland, a potential model involves land allocation for rewilding on poorer soils, alongside traditional conservation management, and productive agriculture using regenerative practices on the better land.

12. These large-scale nature restoration and rewilding projects all aimed to benefit people locally and in wider society, using nature restoration to support improved quality of life. They created new opportunities for engagement with nature, volunteering, and citizen science, including through opportunities for school visits, research collaborations, and the provision of study and field centres for visitors. Apprenticeships were available in some of the case studies.

Conclusions

1. Species re-introduction can improve biodiversity and ecosystem productivity, and provide services to society though they can raise challenges too. Missing trophic levels and the absence of some keystone species mean that ongoing management and maintenance with direct human intervention has been and will be necessary in the future in Scotland. It will also be necessary to manage the impacts of past land use, such as non-native conifers encroaching on peatlands.

2. Reversing the historic, and continuing, degradation of the Scottish uplands could result in landscapes that would support denser and more viable rural communities.

3. Continued deer management to maintain low deer density will be essential to ensuring the success of woodland regeneration in the Scottish Highlands and ensuring that benefits are secured in the long term.

4. There would be merit in a more systematic assessment of the overall net effects on employment/income on large-scale nature restoration projects and in the wider economy compared with the baseline. There are requirements for upskilling to bridge a gap between existing land management skills and those needed for nature restoration.

5. A combination of different models that stack and work in unison will be needed to provide the funding for large-scale nature restoration and rewilding. A blended approach to finance could provide the opportunity to develop mechanisms using public funding to help initiate the start-up costs of valuing ecosystem services so that the private finance sector can inject money once the market is more established.

6. By re-establishing functioning ecosystems, large-scale nature restoration can ensure long-term productivity of the land and should support resilient food production for the long-term. The role of the Regional Land Use Partnerships and Frameworks (RLUF) is likely to provide a key mechanism for bringing forward co-ordinated action at a regional level. The RLUF can provide the guidance for the key policy priorities within the region and provide a facilitating mechanism to co-ordinate large-scale nature restoration and maximise the environmental, social and economic benefits.

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Underwood, S, Kaczor, K, Roberts, V, Tooze, G, Rayment, M, Smith, M, Fry, C, Swindlehurst, S, Armstrong, S and James, N. 2021. Mainstreaming Large Scale Nature Restoration. LUC in association with ABPMer, Accelar and Rayment Consulting Ltd. *NatureScot Research Report No. 1271* – NatureScot use only

Transitioning towards a nature-rich landscape in the uplands

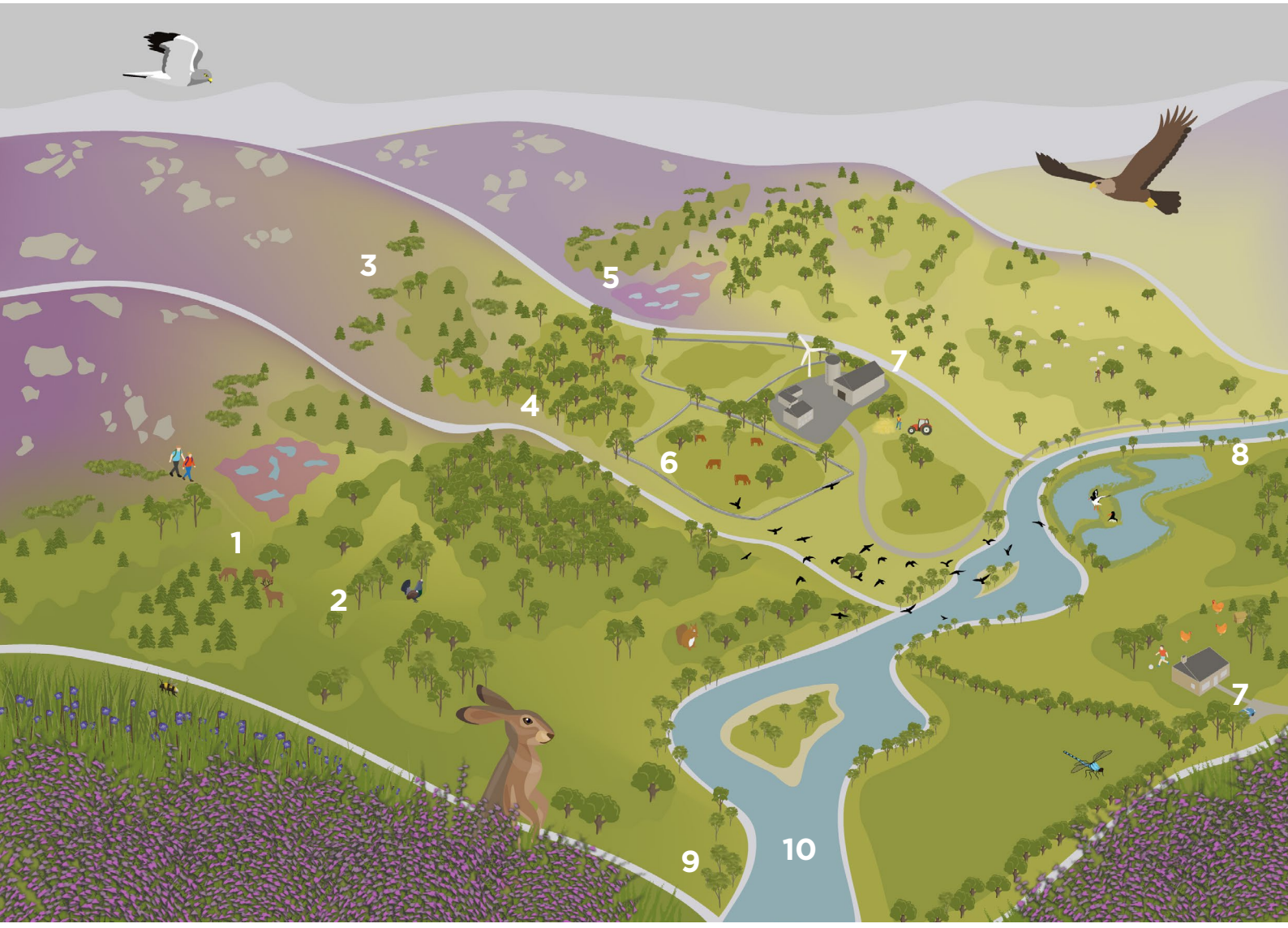
1 Controlling grazing and fewer deer mean trees, woodland understorey and other vegetation can come back which reduces soil erosion and water flows down the hill

2 Mosaics of habitats instead of a landscape dominated by heather and grass will support more insects, mammals, birds and other animals, plants, fungi and lichens

3 Natural open woodlands and scrub at higher elevations bring climate benefits, and a natural and scenic diversity that is currently missing

4 Expansion of deciduous and native trees and other woodland plants support more wildlife, reduce flooding risk and store carbon

5 Healthy peatlands hold vast amount of carbon, support unique plant species, absorb rain water and reduce GHG emissions



6 Silvopasture such as wood pasture is good for biodiversity, provides shelter to livestock, improves animal welfare and farm productivity

7 A nature-rich landscape can offer diverse livelihood opportunities and support a greater number of people

8 Reintroduced species such as beavers will enhance the range of benefits to people, in terms of water quality and smoothing water flows

9 Riparian woodlands shade and nourish the river helping fish and other aquatic wildlife be more protected from rising temperatures

10 A wilder river that has reclaimed its floodplain supports more wildlife, enhances landscape beauty, and reduces flooding downstream

Transitioning towards a nature-rich landscape in the lowlands

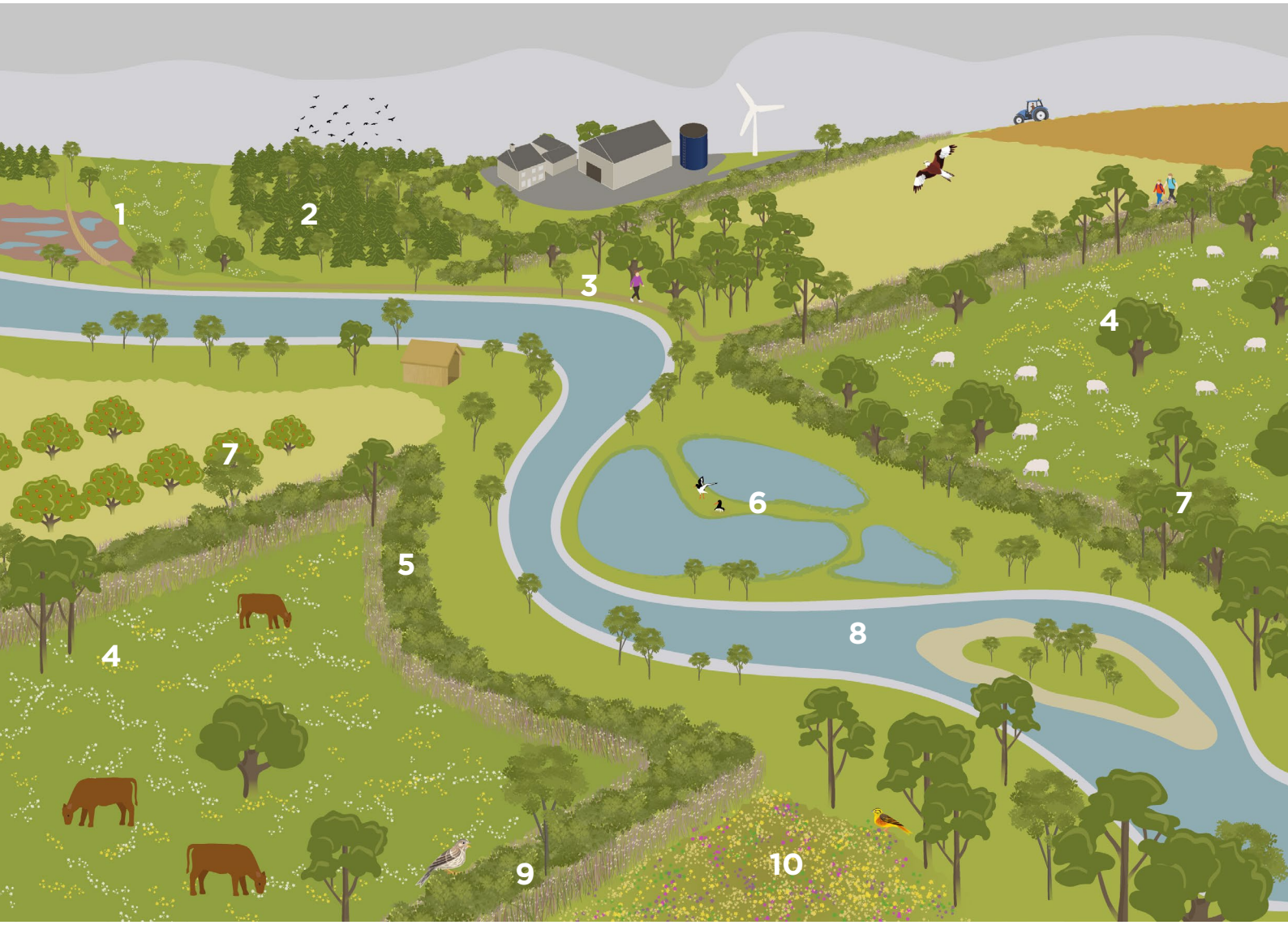
1 Restoring lowland raised bogs to a more natural state contributes to a more diverse lowland landscape and delivers climate benefits

2 Mixed forestry sequesters carbon, produces timber, and is more resilient to the changing climate and more beneficial to wildlife than single species plantations

3 A more nature-rich landscape in the lowlands can improve the well-being of local communities and visitors

4 Species-rich grasslands support scarce plant species, provide food to pollinators and other insects and bring colours to the landscape

5 Hedges wide and tall support more biodiversity, prevent erosion, sequester carbon and connect habitats, enabling wildlife to move through the landscape



6 Buffer zones of wetland vegetation growing by the side of the river, away from crops and fenced off from livestock, enable the resurgence of wetland plants and animals

7 The integration of trees in grassland or in crops in an agroforestry system can deliver multiple benefits for the environment and for farm productivity

8 A re-naturalised river system that supports wildlife and bring back riverine habitats enhances landscape beauty and reduces flood risk

9 Removing land at the field edge to create or enhance wildlife habitats is important as part of a network of nature-friendly linear features around fields

10 Cover crops, legumes and wild bird cover provide an additional boost to wildlife while reducing soil erosion

Selecting projects

A review of ten case studies in the UK and Norway was undertaken, demonstrating large-scale nature restoration and/or rewilding in rural and coastal contexts. In addition, there was a light review of another fifteen case studies in the UK and Europe.

We included a mix of projects, with some including a greater rewilding component set aside from agriculture and commercial forestry while others have a high proportion of land managed for agriculture. They are all projects that were consciously set up for restoring nature to various levels of ambition, except in one case where nature restoration occurred indirectly over time due to socio-economic drivers.

The idea was to see various transitions along a spectrum from transition to more sustainable forms of land management to re-establishing natural processes towards more self-sustaining ecosystems. The case studies were selected in 2020, and no community-led project could be included at the time. The detailed review involved interviews.

Case study: **South West Norway**

South West Norway provides a good example of natural woodland regeneration, as the climate, soils, and topography are very similar to Scotland. This case study is not a specific project, rather a reference area for successful nature restoration. South West Norway was largely a deforested area for centuries resulting from livestock grazing, muirburn, and felling for timber. The earliest evidence of natural regeneration occurring is from the 1860s after people started to emigrate to America and due to limited wild grazing. There has been a snowball effect in the last 50 years as more trees have established and spread seed. The total area of the forest increased in South West Norway by 55% between 1963 and 1993 and around half of the naturally regenerated woodland (in biomass terms) has occurred since 2000.

Regenerated woodlands in SW Norway ©Kate Holl

Key characteristics:

- Large-scale nature restoration in South West Norway was not a conscious decision but resulted from wider socio-economic developments.
- Most of the land is privately owned by farmers, owner-occupation is legally required.
- Estates/farms are much smaller than those in Scotland, and multi-purpose, providing more sustainable income.
- Multiple income streams from the same property include small-scale arable cropping, sheep grazing (at modest intensities with shelter for animals in woodland during poor weather), forestry, game shooting (deer, moose, grouse), fishing, non-hunting recreation, woodfuel production, as well as cabin sales and rental. Land managers also receive government subsidies. Foraging is a culturally prevalent activity that brings a supply of berries and mushrooms.

- The overall population in rural areas is much larger than in Scotland and of greater density, proving that woodland regeneration and farming can work harmoniously to support incomes.
- Forestry cooperatives – most forest owners belong to regionally-based forestry cooperatives, which are responsible for the bulk of timber management, harvesting, and sales.
- Deer management is undertaken by a system whereby the government sets quotas for the number of deer (of a given species, age, sex) to be taken from hunting areas (areas are much smaller than in Scottish Estates). Farmers then sell quotas on the free market or use them, or a combination of both. The landowner is responsible for achieving the quota, and it is usually achieved at the district level.

Lessons learned:

- South West Norway provides a good example of the positive economic and ecological effects of reductions in grazing and muirburn over the last one hundred years. Enhanced ecosystem services have the potential to provide the wide range of economic outputs that are now enjoyed by the people of South West Norway.
- The area of non-commercial woodland in coastal West Norway now comprises 12% of the region's land area and is predicted to increase greatly in extent particularly in the coastal and montane areas. Woodland, already 2,400 km2 in extent today (26% of the land area), can reach c. 4,000 km2 (52%) through continued natural regeneration, most of which is predicted to occur. This has resulted mainly from the steep decline in the intensity of domestic stock grazing and associated human activities such as muirburn.
- A variety of woodland structures, from closed canopy through wood pastures to montane scrub provide the ecological and structural diversity necessary to support a wide range of integrated land uses.
- Tight forestry blocks are not useful for hunting and therefore harvesting tends to favour continuous cover forestry or small coup rotational cropping. Both allow for natural regeneration, retain an understorey for livestock and deer, and provide a more even income stream.
- Natural forest regeneration and afforestation in recent decades have indicated the ecological potential for woodlands in semi-natural heaths and meadows.
- Making similar changes in Scotland (reducing browsing/grazing pressure, in particular from deer, and reducing muirburn) should see a similar pattern of woodland regeneration, which would occur more rapidly if actively managed to that end.
- Reversing the historic, and continuing, degradation of the Scottish uplands through the reinstatement of woodland and scrub would result in landscapes that would support denser and more viable rural communities.

Case study: **Wild Ken Hill, England**

The Ken Hill Estate is a 1600-hectare estate located in Norfolk. It is a lowland arable landscape that stretches towards to coast and sits at the intersection of several soil types. The holding holds a diverse set of habitats and landscapes: undulating terrain with good, base-rich soils, sandier soils where arable farming is possible but difficult, deciduous woodland, acid heathland, grazing meadows, freshwater marshes, and areas of coastal park.

The Wild Ken Hill project began in late 2018 and aims to drastically change the way land is used to benefit nature and climate. This includes restoring a mixture of agricultural land and woodland toward a mosaic of woodland pasture, heathland, and other habitats while productive land is managed under a regenerative agriculture approach. The project aims to enable greater carbon sequestration through carbon storage in the ground and also in the biomass of the rewilding area. The estate hopes to provide an attraction for people interested in wildlife alongside more leisure and recreation activities.

Curlews on the marsh at Ken Hill Estate © Dominic Buscall

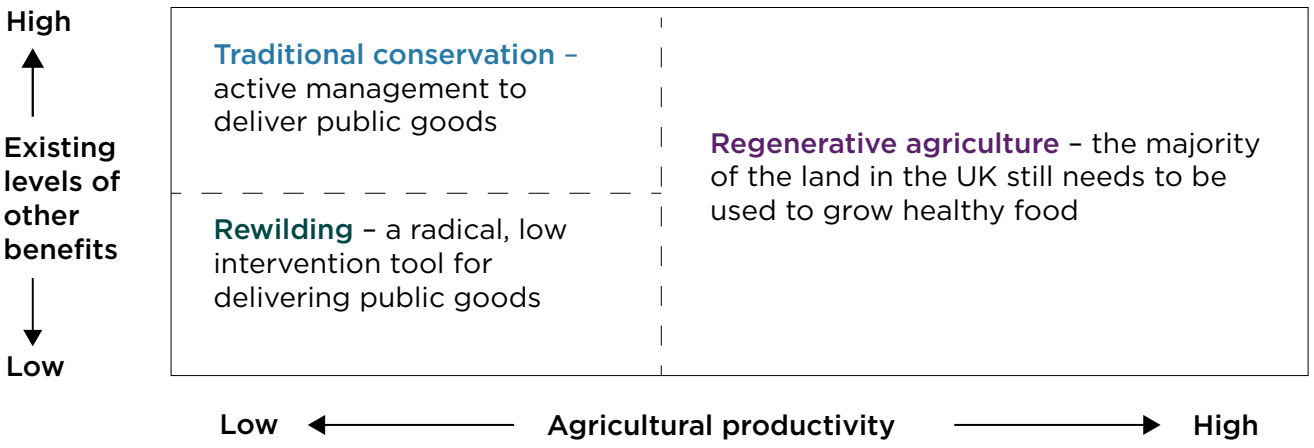
Key characteristics:

- The rewilding of around one quarter (425 hectares) of the Ken Hill Estate is mainly upon sandy soils which were less productive for conventional arable production. The freshwater marsh (around 200 hectares) is above clayey soils and is under traditional conservation (managing water levels and grazing), whilst pioneering regenerative arable agriculture for food production is undertaken on the rest of the holding which is typically Grade 3 (and some Grade 2) agricultural land (see the Ken Hill Estate's approach on the diagram next page).
- Agri-environment payments have been essential to fund the delivery of these changes, with a multi-million-pound Countryside Scheme covering all ex-arable land with financially competitive options. There are additional options implemented on the marsh and arable land (through Environmental Stewardship Scheme) and payments for capital works.

- Through regenerative agriculture, the project will rely on beneficial invertebrates instead of pesticides, use fewer inputs and have greater soil health and productivity.
- Beavers were reintroduced in March 2020; this is the first time that beavers have existed in Norfolk for hundreds of years.
- The project team includes 5 members of staff. The Ken Hill Estate generates other economic returns (in addition to government funding through agri-environment and traditional farm income) to help sustain the project, through the sale of wild meat and provision of visitor accommodation, and in the future through the introduction of safaris and educational wellness retreats.
- The Ken Hill Estate is keen on knowledge sharing of land management practices in the Wild Ken Hill project, locally, and Europe-wide as a member of the European Rewilding Network.
- Socio-economic benefits include community involvement and volunteering, ecotourism, education, adventure parties for children, recreational activities, opportunities for research, and the sale of local sustainable products.

Lessons learned:

- The three-pronged approach has enabled a diversification of the farm income, providing the landowner with a more resilient system.
- The regenerative agriculture approach is helping the farm to be more climate-resilient with the benefits already being noted during the 2020 drought (yields remained good).
- The lack of understanding of technical ecological aspects from a private landowner perspective is an issue e.g. species, monitoring, and hydrological analysis, and means the Ken Hill Estate has to outsource most of the complex monitoring work, which is costly. They undertake some informal, routine monitoring work themselves with the help of volunteers.
- Some regulatory issues create a barrier including how the value attributed to different land uses affect inheritance tax, as well as misalignment between government agencies and how they regulate funding and management requirements.
- Getting advice from existing similar projects, in this case, the Knepp Estate in Sussex has helped Wild Ken Hill identify what works best in lowland agricultural landscapes and understand all practical aspects of project delivery.



© Wild Ken Hill Land use model 2020

Case study: **Wallasea Wild Coast, England**

Wallasea Island (850 hectares) lies within the Crouch and Roach estuaries and is an important coastal wetland. It is a wintering site for Brent Geese and waterfowl assemblage. The predominant habitat types are saltmarsh, mudflats, islands, saline lagoons, and coastal grazing marsh. The surrounding farmland is flat low-lying land predominantly under arable farming.

Sea defences used to protect large areas of reclaimed grazing marsh and its associated ancient fleet and ditch systems, and productive arable farmland. In the 15th century, the Dutch constructed a sea wall and drained the first parcels of land at Wallasea for agriculture; over time, what used to be at least four separate islands were claimed and joined, eventually forming Wallasea Island. At the end of the 20th Century, the sea wall fell into disrepair at the same time as the risk of flooding increased.

Wallasea Island © RSPB

The key characteristics:

- The Wallasea Island Wild Coast Project was a partnership between RSPB (who own Wallasea Island), Crossrail and the Environment Agency. It provides an example of a sustainable managed realignment approach. This involved an intertidal habitat creation technique, using breaches (holes) in the sea wall to allow the sea in to recreate intertidal habitats.
- The project received funding from Crossrail, has benefited from a tax credit scheme as part of the project approval from ENTRUST with monies from both Viridor Credits and the Enovert Community Trust. Some further funding has come from the Landfill Communities Fund. Work to restore the final 269 hectares on the southern half of the island began in 2018, funded with a contribution from Viridor Credits and Enovert Community Trust.

- The project required some of the low-level land to be raised, with the habitats created being dependent on the height of the land being flooded. A partnership with Crossrail began in 2008, as there was an opportunity to reuse clean spoil (clay, chalk, and gravel) from their tunnelling in London. In addition, Crossrail helped to create saline lagoons, a creek network and a grazing marsh.
- The design (split into five cells constructed in project phases) allows up to 2 million m3 of water to enter and leave parts of the site (and thus the estuary).
- Over the course of the project, the plan has been to restore a total of around 670 hectares of coastal wetland habitats. The works also include an expanse of grassland (including grazing marsh and seawall) and a small area of rotational arable land ('wild bird cover').
- Biodiversity benefits include plants such as samphire, sea lavender and sea aster being established, saltwater fish such as bass, herring, and flounder using the wetland as a nursery; the site is also home to a range of breeding birds. It is hoped that, under the changing climate, the new reserve will provide a habitat for newly colonising species to the UK, such as spoonbills and black-winged stilts.
- Under the aim to reconnect people with their coastal heritage, there are plans for a visitor centre and five birdwatching hides; some 15 km of new footpaths and cycle routes have already been completed, which allow people to get closer to the island's wildlife.

Lessons learned:

- The RSPB gained insights by learning from experience elsewhere, with visits to projects in the Netherlands, Germany, Denmark, Spain, Hong Kong and China. The importance of seeing projects elsewhere not only informed project development but was important in securing confidence that the end result could be achieved. Taking stakeholders and key community representatives to see successful projects, and meet wider communities in project areas to talk to them about concerns, was also considered to be transformative.
- The project team established a wide local liaison group, beyond the planning requirements. The farming community had concerns over loss of farmland and a precedent being set while oyster fishermen became more vocal about their concerns towards the end of the project – highlighting the importance of a flexible approach to consultation as new stakeholders may appear outside of the consultation period as they realise projects might have an impact.
- The project team also established a technical panel to bring in key regulators. This highlighted the importance of understanding regulatory issues to help shape project planning and decisions at an early stage to inform development phases. It was important to agree on reporting arrangements at the beginning and ensure that these are workable and sensible from the outset.
- The partnership with the RSPB was a key part of Crossrail's sustainability strategy and demonstrated the benefits that can be achieved when the construction industry and environment groups work together to create a positive environmental legacy.
- The project is an example of the circular economy in the built environment, where construction materials have been reused in a high-value conservation project providing benefits for both people and wildlife.
- The project led to a flux in economic benefits. For example, two farm workers were made redundant while the project provided three job opportunities for RSPB staff and additional short-term work for the contractors involved in the implementation process.

Case study: **Wild Ennerdale, England**

Wild Ennerdale is a partnership between the main landowners in the Ennerdale valley in Cumbria, including Natural England, Forestry England, National Trust and United Utilities. The project covers an area of 4,400 hectares in an upland landscape, with peaks, ridges and open fells, separated by U-shaped valleys with a lake and rivers. It includes internationally important fell habitats, rivers, lakes, unimproved grassland, and native woodland.

The key challenges for this area include flood management, pressure on water resources, water quality, habitat condition and connectivity, visitor/transport pressures, landscape resilience, adaptation to climate change and supporting sustainable and resilient hill farming systems and businesses.

Natural woodland regeneration © Wild Ennerdale

Key characteristics:

- Wild Ennerdale is not trying to recreate a past point in time but rather enable a 'future natural'. The project takes an opportunistic approach, to reflect natural processes; hence some of the results may be unexpected.
- The guiding principles include restoration at the landscape scale, giving freedom for natural processes to enable more robust, resilient and better functioning ecosystems to develop, with no fixed endpoint or prescriptive targets.
- The Stewardship Plan is the core partnership document that helps steer and influence decisions. It is not a typical management plan with prescriptive targets and deadlines, as there is no endpoint. The emphasis is on moving away from traditional land management and instead demonstrating the broader concepts for change and 'direction of travel' in Ennerdale.
- Areas of intensive grazing in the valley bottom and forest have given way to extensive, all-year-round cattle grazing by Galloway cattle. The project has been restoring natural aquatic processes through the removal and re-engineering of bridges to allow fish passage and gravel movement. The Marsh Fritillary butterfly was also successfully reintroduced.

- Some of the management of the land is funded and secured through agri-environment schemes, with tenant farmers. This includes Higher Level Stewardship and Countryside Stewardship Schemes. External funding is sought on a project-specific basis. Funding for the project officer is supported by contributions from each partner organisation and additional support through their own annual budgets.

Lessons learned:

- The partnership approach to the future management of the valley recognises that people are a significant part of a 'wild' landscape. There was little support or local understanding initially, due to the team struggling to describe what it was they were trying to achieve as there was no defined endpoint. Today, and as the project progressed, the message has become much clearer, local stakeholders understand better, even if they may disagree with it for some.
- Since the official formation of Wild Ennerdale, the non-native conifer forest has seen significant change. Sitka spruce has been naturally regenerating but it was allowed to do so as long as it does not dominate the future forest species mix. Woodlands are becoming more diverse and interesting.
- Grazing with Galloway cattle has allowed the valley bottom to become more open and wilder. The removal of some boundary fences has helped to blur the open space/forest boundary. Fish populations have increased significantly; the situation for Arctic charr (which was considered on the brink of extinction 30 years ago) is now sustainable and resilient.
- Normally the presence of surrounding flocks helps keep sheep in particular parts of the fells. As sheep numbers fall, the hefting process becomes less effective and barriers need to be put in place; in this case, Wild Ennerdale committed to rebuilding a stone wall on a high ridge to prevent stock from coming into the area.
- Fences were installed where they would not impact natural processes, for example on higher ridges in the valley to allow the river to naturally fluctuate rather than impact on farmed land.
- Some local businesses are seeking to benefit from the initiative and have begun to use the Wild Ennerdale brand for local produce, which could result in local economic gains over time.

Case study: **Holnicote Estate, England**

The National Trust owns the 12,500-acre Holnicote Estate, which is located in Somerset, on the edge of the Exmoor National Park. It comprises around 40km2 of land draining the catchments of the Aller and Horner Water and includes uplands wooded combes and lowland vale. There are multiple tenant farmers on the land. Two river restoration projects were undertaken: the earlier multi-objective flood risk management demonstration project (2010-2015) which focused on in-channel intervention; and, the current National Trust Riverlands Project (2018-2023) which focused on working with natural processes to deliver multiple benefits for people and nature.

Water management has shaped the landscape through drainage ditches, irrigation gutters and relict water. The river was fragmented and disconnected from the natural floodplain through changes in land management practices and watercourse maintenance activities. Transport infrastructure has also impacted the landscape and has increased the speed and volume of surface water run-off.

Natural Flood Management through floodplain reconnection © Nick Upton National Trust

Key characteristics:

- The project aims to provide evidence on the role of Natural Flood Management (NFM) measures in reducing flood risk while producing a range of wider environmental and social benefits. It is expected that through a more naturalised approach, it will be possible to achieve a natural ecosystem that is self-sustaining and resilient in the future.
- The current Riverlands project, with a value of £10 million, is led by the National Trust, working in partnership with the EU Interreg 2 Seas Co-Adapt programme (funder), Somerset Rivers Authority (funder) and Environment Agency (partner and funder).

- One of the key river restoration schemes being delivered as part of the project is restoration to ''Stage 0'' (based on experience from Oregon, USA) of sections of the river catchment, reconnecting sections of stream and river to the surrounding landscape, and re-establishing the connection between terrestrial and aquatic ecosystems.
- Successful restoration of multiple streams and rivers to slower flowing systems could lead to multiple, smaller channels, pools, riffles, and wetlands, supporting a richer diversity of both animal and plant life (based on the Oregon example).
- Other activities include beaver release into two enclosures, upland drainage restoration, road and path flow diversion, woodland creation (tree planting and natural regeneration), hedge planting, pond creation, working with farmers to develop alternative land management practices (to reduce run-off and soil erosion), and catchment/site scale hydrological monitoring.

Lessons learned:

- Since the project began, there has been no flooding in the vulnerable downstream villages that had experienced regular flooding in the past - even during the extreme rainfall events of winter 2013 to 2014, where measured hydrological data clearly showed a significant reduction in flood peak. With a combined insurance value of £30 million, none of the 98 properties at risk were affected by flooding in 2013.
- Soft-engineered, earthwork bunds on connected floodplains are a highly effective and environmentally sustainable method to prevent flooding, by attenuating the peak stormflow. It is also important to allow natural woody dams to develop wherever possible within woodland areas;
- Although the National Trust owns 90% of the catchment area, much of this is managed by 14 tenant farmers and those with commons rights in the uplands. Strengthening personal relationships via one-to-one meetings with tenant farmers has been the most effective method to overcome resistance and ensure restoration efforts do not detriment farm businesses.
- The project team has found that lower-cost monitoring methods such as photographs and drone footage have been more effective when engaging with the community and wider public, given they are more understandable and relatable forms of data than the detailed monitoring data required by funders.
- Pioneering projects such as these have few examples to learn from, hence the project team had to work comfortably in the ‘grey areas’.
- Aligning the project aims across all stakeholders at the outset of projects is important to enable effective delivery.
- A Defra pilot of Payment for Ecosystem Services (PES) for the initial project showed that raising the profile of the efficacy of nature-based solutions and building awareness among beneficiaries is key to long-term success.

Case study: **Northern Upland Chain Local Nature Partnership, England**

The Northern Upland Chain Local Nature Partnership (NUCLNP) spans a huge area of land (over a million hectares) across the Pennine uplands encompassing the Northumberland National Park, North Pennines (Area of Outstanding Natural Beauty) AONB, Yorkshire Dales National Park, Nidderdale AONB and the Forest of Bowland AONB. Most of the land is used today for traditional upland farming (of sheep and some beef).

The uplands have vast areas of blanket bog and heather moorland, contain most of the UK's upland hay meadows, and most of England's limestone pavement. These are largely open landscapes, but naturally, there would be potential for larger areas of native woodlands with associated benefits for biodiversity.

Peatland restoration © Northumberland National Park Authority

Key characteristics:

- The vision for farming and the environment is to produce locally distinctive, high-quality food in a way that delivers a range of public benefits, and to secure the long-term economic viability of High Nature Value (HNV) farming that is found in some of the Pennines uplands.
- The partnership aims to facilitate coordinated decision-making on the natural environment and members (land managers, protected landscapes, NGOs, specialists, public sector) aim to act jointly to deliver integrated outcomes for a wide range of economic, social and environmental benefits.
- An HNV pilot project was developed in Teesdale and Swaledale with the foresight to roll this out across the uplands.

- There are five additional themes: habitat opportunities monitoring; Great Upland Forest; hay meadow restoration; peatland restoration; and biodiversity offsetting and creation of environmental markets involving corporate natural capital accounting.
- Natural Capital Accounts of the region have been developed. The NUCLNP have also developed Peatland and Woodland Natural Capital Investment Plans for the area.
- The partnership is funded solely by small contributions totalling approximately £25,000 annually from the lead protected landscapes across which it functions, and all member activity is voluntary. Other sources of funding include charitable grants and funding attained for specific projects within the partnership area albeit not directed explicitly to the functioning of the NUCLNP.
- Although not represented directly on the Board, the Northern Hill Farming Panel is an integral part of successful working. It includes the National Farmers Union.
- The partnership has to date facilitated small pilot trials as opposed to large-scale nature restoration, and there is limited analysis of the environmental and socio-economic benefits derived.

Lessons learned:

- The function of the NUCLNP is to help curate projects and act as a conduit to bring the right stakeholders together to facilitate delivery, rather than leading and delivering projects themselves. Specialists / organisations propose projects to the board, and it is then determined which to prioritise for delivery. This method works well to shortcut fragmented discussions across the area and averts the risk of a siloed approach to conservation.
- Working over a large area enables delivery of larger projects with the potential for more widespread impact and greater visibility to attract funding in the future. However, in this case, the predominant barrier to more widespread delivery of nature restoration projects is the lack of funding for the partnership.
- The Northern Hill Farming Panel is voluntary but has been successful in engaging the wider farming community and overcoming reluctance to restoration. The group feeds into the NUCLNP through a quarterly report.
- The NUCLNP sees value in moving away from short-term, grant-based solutions for nature and feels there is a need to make nature restoration and conservation more economically visible.
- While the partnership brings together all key partners, conflicts in opinion can impact on the progress of project development, for example over moorland management techniques.
- The Natural Capital investment plans were designed to stimulate stakeholders to propose suitable projects, but it appeared that they needed to be better targeted to buyers.

Case study: **The Tweed Forum, Scotland & England**

The Tweed Catchment straddles the national and administrative border between Northumberland (England) and the Scottish Borders (Scotland). The upper stretches of the Tweed are characterised by lower-intensity extensive land use, mostly sheep grazing, heather moorland and significant coniferous forestry. Through the middle reaches, there is more intensive pastoral land use, although forestry remains a significant land use in the upper part of this section. In the lower reaches, the Tweed lies in the bottom of a broad, low-lying intensively farmed river valley.

The condition of the catchment has been affected by drainage, habitat loss, agricultural intensification, development, and invasive species. The Tweed Forum is the umbrella organisation dedicated to the integrated management of the Tweed and its tributaries. It was initially formed in 1991 as an informal liaison group in recognition of the cross-border nature of the Tweed catchment (5000 km2) and the clear need for better coordination. In 1999, it was able to employ a dedicated team of staff. In close partnership with its members, the Tweed Forum staff have worked to protect and restore the natural, built and cultural heritage of the River Tweed and its tributaries.

Re-meandering of Eddleston Water in the Tweed catchment © Colin MacLean

Key characteristics:

- The Tweed Forum is a company limited by guarantee and a charitable trust. It is an umbrella organisation and membership is open to those with an interest in the river and its management. It currently has 25 members, drawn from statutory, private and voluntary sectors. It is a UNESCO Demonstration Catchment and has received various prizes.
- The initiative has been funded largely by the Heritage Lottery Fund (45%) with the remaining match funding coming from a wide range of sources (e.g. NGOs, government grants, Biodiversity Net Gain).
- The broad range of stakeholders identify and agree on priority issues within the catchment, with accompanying strategic delivery of practical measures and projects to deal with those issues.

- Management is guided by the Tweed Catchment Management Plan (TCMP), a strategic document that synthesises the Tweed Forum's 25 members' aspirations with regards to the river into one cohesive vision and plan of action.
- Work includes tree planting, peatland and wetland restoration, river re-meandering, Natural Flood Management, control of non-native invasive species, repair to buildings of historic value, provision of education and training, paths and engagement with the public.
- Beyond the core team servicing the Forum, the work has resulted in the employment of local people to undertake projects from design, modelling, to implementing. There is usually a large number of people involved across all projects.
- There is a portfolio of cooperative research partnerships delivering innovative solutions across a range of topics, and ecosystem services.
- The Forum provides input at a policy level to key policy consultations as well as contributing to national steering/working groups in key catchment management areas.

Lessons learned:

- Having a broker or trusted intermediary who is not regulatory or statutory is beneficial to help enact change through goodwill, persuasion, education and enthusiasm.
- Employing a facilitator can help ensure that the agri-environmental measures concerned with water management are rolled out collaboratively and that the right measures are taken up in the right places at the right scale.
- Staff retention is important to maintain important relationships with the communities, land managers and other local stakeholders, as change, particularly with changing attitudes to land management, is a gradual process over time.
- The importance of local knowledge of natural assets and also, crucially, local social context is central to the successful delivery of projects.
- The challenges of raising and securing financial support are constant. The work involved in funding applications and administering grants is a challenge as it occupies a significant proportion of staff time and resources.
- Establishing a trading arm of the Forum has enabled consultancy work to take place outside the immediate remit and thus raise funds to help ensure the continuation of the Forum.
- Facilitating and sourcing funding for a wide range of projects and crucially, multiplying contributions to achieve significant gearing and leverage is one of the most compulsive arguments/justification for the Forum approach.
- The Tweed Forum as a delivery mechanism is 'light on its feet' and can implement projects more quickly than many members would individually.
- A single management framework is useful to deal with the many interacting and interdependent environmental resources in the catchment in order to preserve the special qualities of the Tweed.
- The impact of the Tweed Forum has reached beyond its 'core work' and has helped to deliver a large number of diverse projects, many of which would not have happened without the Forum.
- Working at scale can be both highly beneficial as it creates large-scale impact, but also a challenge as projects can often involve several landowners.

Case study: **Cairngorms Connect, Scotland**

Cairngorms Connect stretches over 60,000 hectares and works to realise common aspirations for the landscape between the partnership organisations. The project is delivered by a partnership of neighbouring land managers including RSPB, Wildland, Forestry and Land Scotland and NatureScot.

The Cairngorms is a landscape of ancient woodlands intersected by rivers and lochs, encircling an Arctic-like mountain massif. There are extensive tracts of blanket bog, wetlands and woodland bogs. The health of ecosystems found in the Cairngorms is not as good as it could be, due to the impacts from wild deer preventing natural regeneration of woodlands, degraded peatlands and modified rivers. The project is committed to a 200-year vision and focuses on sequestering carbon, restoring nature and building resilience to climate change.

Glenfeshie © scotlandbigpicture.com

Key characteristics:

- Cairngorms Connect focuses on expanding and restoring woodlands to a natural state, peatland restoration, restoration of rivers and wetlands.
- It is funded by the Endangered Landscapes Programme (ELP), which is funded by Arcadia, a charitable fund, and is managed by the Cambridge Conservation Initiative.
- Each partner organisation has its own staff on the ground, amounting to around 50 – 55 full-time employees (FTE). The partnership has appointed nine FTEs to service the partnership for a period of 5 years.
- Deer management is important to the project and consists of managing deer within the forest, managing deer at the forest edge where there is the best potential for natural woodland regeneration, and control of deer in more remote locations.

- The project aims to align with the Scottish Government's objective to enable people to participate in making decisions regarding land management that may impact them. Cairngorms Connect is working on a 60-year vision for people.
- An economic indicator is used to measure the direct and additional economic impact of the Cairngorms Connect project on the economy of the local area. The real market economic impact can be measured in terms of jobs and value added to the local economy.

Lessons learned:

- Collaboration helps improve contract value for money through the packaging of works for contractors, and also for marketing of project successes. As a partnership, the team can interpret what is happening on a much larger scale and collaboratively promote their message with greater influence.
- There is a need for incentives that encourage (or are scaled to favour) the removal of barriers to restoration: reward work at a big scale; reward connected holdings, where land is contiguous and management creates a seamless landscape for wildlife; and reward long-term commitment.
- There is a need for more funding for floodplain and river restoration, which is an important area for climate change adaptation.
- The fixed timeframes of the funding have presented a challenge with the capacity to spend the money in time. There is a need for commensurate support for the delivery of work when there is a big budget to spend.
- Large-scale nature restoration brings local economic benefits through the creation of new posts to support the partnership and land management jobs. There are direct and wider employment opportunities associated with ecotourism and recreational opportunities.
- The biggest challenge has been where neighbouring estates are impacted by the level of deer reduction where they maintain a stalking interest on their land. The reduction in deer numbers has led some neighbouring estates to change their focus away from stalking.
- Controlling deer to deliver tree recovery at a particular density within a particular timeframe is difficult in remote locations and high altitudes, and where there is a poor seed source.
- Controlling deer populations, and lessening the impacts from wild grazing, is the fundamental intervention for achieving the aims of the project. As deer have no natural predators nowadays in Scotland, control will require ongoing direct intervention.

Case study: **Forsinard Flows, Scotland**

Located in Caithness and Sutherland, the project comprises the RSPB-owned Forsinard Flows National Nature Reserve. Forsinard Flows, which covers 21,000 hectares, is part of a vast expanse of blanket bog, which makes up almost 5% of the world's blanket bog and is one of the world's rarest habitats. The nationally and internationally important peatlands cover 400,000 hectares, together with associated areas of moorland and open water.

The environmental baseline before the project included areas of habitat value but often degraded as blanket bog vegetation with scattered bog pools and lochans, as large areas of land which had been subject to drainage to plant non-native forestry in the 1970s and 1980s, as well as land claimed for agriculture. There has been a history of peatland restoration at Forsinard by the RSPB since 1993. However, this case study explores the Flows to the Future project which ran from 2013-2018.

Bog pool, Forsinard Flows © NatureScot

Key characteristics:

- The project was delivered by the Peatlands Partnership, led by RSPB Scotland, and predominantly funded by the Heritage Lottery Fund (HLF).
- It tested the relative effectiveness of leading approaches to 'forest-to-bog' peatland restoration in delivering key ecosystem services (biodiversity, carbon storage, and water quality).
- Rare wetland habitats for birds and other species including upland waders and birds of prey were restored and re-established.
- Community learning opportunities were provided for people across the Flow Country, including through outreach visits to schools, school visits to Forsinard and events such as walks, talks and workshops.

- A peatland science centre for education and research was set up at the Field Centre and there was collaboration with universities nationally and internationally.
- Posts created by the project included 5 direct posts as well as 5 summer contracts for field ecologists. Local contractors were involved with peatland restoration work as well as for the construction of the Field Centre and Lookout Tower.
- Given the long history of successful restoration at the reserve, it is hoped to secure funding for peatland restoration so that a long-term project can be developed.

Lessons learned:

- Continuity of the local economic benefits is not guaranteed and it is very important to plan for legacy before the end of a project. While the project generated jobs, work for local contractors and tourism opportunities, and an estimated £4.3 million was spent within Caithness and Sutherland businesses, some of these benefits were temporary, in particular the intended retention of FTE posts was not delivered.
- Deer and the impacts of wild grazing, as well as non-native woodland regeneration from adjacent plantations, can raise ongoing management issues in peatland restoration, which require long-term funding cycles if the ecological benefits are to be maintained. Long-term funding for nature restoration is also more conducive to jobs retention and supporting local investment.
- Community engagement is important early on, can take time and has to be sustained through events, meetings and networking locally; loss of staff after the project meant less community engagement and knowledge sharing that had been successful during the project lifetime.

Case study: **Pumlumon, Wales**

The Pumlumon Project is a longstanding project on the uplands of the Cambrian Mountains in Wales spanning over 40,000 hectares and involving multiple landowners. The ongoing project began on the ground in 2007 and is led by the Montgomeryshire Wildlife Trust (MWT).

Habitats include dry and wet dwarf-shrub heath, heather moorland, blanket bog, semi-natural woodland, unimproved acid grassland and several oligotrophic lakes. The land is also characterised by agriculturally improved grassland, broadleaved woodlands and forestry plantations. Overall, woodland cover is low, and native woodlands are scarce.

Intensive land use activities have resulted in a significant loss of biodiversity, with many of the upland habitats being lost or degraded over time. Historical overgrazing and land use change (ploughing and drainage) have induced soil compaction, which results in diffuse pollution and increased flooding in the lowland areas.

Restoration of hagged peat © Montgomeryshire Wildlife Trust

Key characteristics:

- The ethos of the project is based around understanding that the declining wildlife is intertwined with the declining demography and economy.
- The project aims to drive economic benefits for local farmers, foresters and tourism businesses through the establishment of robust markets for the delivery of ecosystem services, including safeguarding existing carbon stores, carbon sequestration, reduction of flood risk, and recreation.
- A collaborative learning group was set up to share ideas between lay public and private sector stakeholders, while a community group was set up in the project area to enhance landowner engagement and knowledge sharing.

- Funding has largely been provided by charitable trusts (including the Waterloo Foundation, JP Getty, Biffa and The Wildlife Trusts), with additional contributions from the Welsh Government and statutory agencies.
- The role of private sector investment in funding project delivery, through Payment for Ecosystem Services (PES), is expected to grow. The predominant growing market is for carbon; the project area includes extensive peat resources.
- Since 2006, the project has delivered a wide range of ecosystem services valued at £893,243. Off-site visitor expenditure is estimated to have added £350,000-£500,000 to local incomes, supporting around 10 jobs in the local economy.

Lessons learned:

- The project has demonstrated 'proof of concept' by delivering ecosystem services through visible and sustainable changes in landscape quality, biodiversity, access and economic well-being.
- Cattle were introduced for habitat enhancement, due to their different grazing habits to sheep. They have helped restore the diversity of grassland, providing more and better niches for species.
- The socioeconomic approach to restoration has ensured buy-in and success as restoration has to improve nature as well as make business sense for the upland farmers.
- The collaborative approach is essential to the success of the project as it ensures a full understanding of landowner interests and what works from a business perspective.
- To raise the profile of the Payment for Ecosystem Services approach, there is a need for improved metrics, new governance and contractual structures, and time to establish new relationships between actors and intermediaries.
- The geographical distance between suppliers and beneficiaries of ecosystem services is a challenge. This includes linking the efficacy of the land management intervention to ecosystem service delivery, as well as demonstrating the opportunities to the investor (i.e. that alterations to a mountain landscape in Wales can impact on flooding issues in a much more distant location).