

The Habitat Restoration Target



Changes in land use and management have destroyed, degraded, and fragmented habitats.¹⁻³ This has driven the majority of declines in wildlife over the last century in England ([PN 617](#), [PB 42](#)).⁴ Restoring habitats will deliver nature recovery.⁵ This POSTnote focuses on restoration of terrestrial habitats for the new 'wider habitats target' in England.

Background

Land use change is the main driver of declines in the extent size, and quality of habitats resulting in global losses of biodiversity (the variety of ecosystems and species and the interactions between them, [PN 617](#)).^{1,2} Loss of habitats has impacts on humans, for example by reducing carbon storage ([PN 651](#)) or wellbeing.⁷⁻⁹ The United Nations recognised the urgency to restore degraded ecosystems and declared 2021–2030 as the Decade on Ecosystem Restoration.^{10,11} Internationally, governments have published restoration plans,¹² including proposals for legally binding targets for the EU.¹³

Ecological restoration can prioritise outcomes at the level of ecosystems, habitats or species (Box 1). UK environmental policy focuses on habitat and species outcomes.¹⁴⁻¹⁶ Restoration methods can range from minimal human interventions that encourage natural regeneration of habitats like rewilding approaches ([PN 537](#)),¹⁷⁻¹⁹ to more intensive interventions,²⁰ such as seeding or planting vegetation.^{21,22} Once drivers of degradation have been addressed, methods have been developed for restoring most habitat types found in England such as grasslands,²³ saltmarshes,²⁴ and heathlands ([PB 48](#)).²⁵ However, projects achieve varied levels of success. This results from differences in site-specific contexts such as levels of

Overview

- A habitat provides all the environmental conditions to enable a species to persist.⁶
- Agricultural intensity, built development and infrastructure, pollution, invasive species, unsustainable extraction, and climate change can degrade habitats. Ecological restoration can promote their recovery.
- Defra has consulted on the 'wider habitats' target to 'create or restore 500,000 hectares of wildlife rich habitat' outside of protected sites in England by 2042.
- Barriers to delivering targets include: the funding of management and monitoring, land ownership and access issues, and capacity/skills gaps.
- Emerging monitoring technologies for habitats and species can be used to monitor success and identify when further intervention might be needed.

degradation, project timelines and goals, restoration methods, and funding.^{5,26-28}

The UK's devolved nations are setting out various approaches to nature recovery in plans and strategies.^{16,29-32} The UK Government has commitments related to habitats including: protecting 30% of UK land and sea for nature by 2030;³³ establishing a Nature Recovery Network (NRN) in England; and, restoring 75% of protected sites (by area) to favourable condition by 2042, many of which are set out in its 25 Year Environment Plan (25YEP).^{16,34} Under the Environment Act 2021,¹⁵ which introduces a post-EU membership framework for environmental governance, the UK Government is required to set legally binding targets for nature recovery in England to help achieve key objectives for nature. Defra has since consulted on a suite of targets. These include a 'long-term wider habitats' target to create or restore 500,000 hectares (ha) of wildlife rich habitat outside protected sites by 2042 (3.8% of England's land area).³⁵ This supports the key target to halt the decline in species abundance (the number of individuals per species) by 2030.³⁵ This POSTnote (alongside [PB 48](#)) focuses on restoration of terrestrial habitats for the wider habitats target in England and the challenges involved. Terrestrial habitats are usually described as including freshwater and coastal habitat types.

Box 1: Glossary

- Defra define **habitat creation** as 'establishing a wildlife-rich habitat where it is currently not present'.³⁵
- The CBD define an **ecosystem** as a 'dynamic complex of species and their non-living environment, interacting as a functional unit'.^{36,37} The IUCN Global Ecosystem Typology classifies ecosystems on their functions and features for nature conservation and research purposes.³⁸
- There are many definitions of 'habitat',⁶ but the EU Habitats Directive defines **habitats** as 'terrestrial or aquatic areas distinguished by geographic, abiotic (non-living) and biotic (living) features, whether entirely natural or semi-natural'.^{39,40} Habitats are classified into **habitat types** with shared characteristics (see [PB 48](#)).
- **Recovery** has been defined as the rate and process of an ecosystem returning to a pre-disturbance state.⁴¹ It is also used to broadly refer to an improvement in environmental condition towards a projects target state.
- **Resilience** has many definitions, but can be described as an ecosystem's ability to recover from disturbance.^{42,43}
- **Restoration** is the process of promoting ecosystem recovery from a degraded state.⁴⁴

Identifying where and what to restore

In 2010, the Lawton review made recommendations to improve England's wildlife,⁴⁵ including restoration activities to increase the area of high-quality habitats and create connections between them ([PN 652](#)).⁴⁵ Natural England research suggests core areas for wildlife of at least 5,000 ha per area are required.⁴⁶ In response, restoration projects are being set up across England (such as the landscape-scale restoration case study in [Box 2](#)).⁴⁷⁻⁴⁹ Defra intend that priority areas for restoration are informed by mapping of the NRN and local nature recovery strategies ([PN 652](#)), due by 2024. Restoration activities will also take place outside of priority areas.

Approaches for restoring habitats

The majority of habitats in the UK are regarded as semi-natural, which means that they support complex communities of native species but have been modified by human activities for thousands of years.⁵⁰⁻⁵² They are classified into types with shared characteristics and are the main focus of restoration activities ([PB 48](#)).⁵³ There are many drivers of habitat degradation, including: intensive agriculture, development, pollution, non-native invasive species, unsustainable extraction and climate change. Each causes different types and levels of degradation. For example, converting a semi-natural grassland to arable farmland would result in a loss of that habitat type.⁵⁴ Invasive non-native plant species ([PN 439](#)) can outcompete native plants for space, light and nutrients, degrading that habitat.^{55,56} Restoration practitioners first assess the current condition, the causes of degradation and whether they can be stopped, reversed or reduced at the site ([PB 48](#)). However, this is not always possible at the site scale. The UK Government are also setting targets to reduce some of these pressures in England, such as reducing water pollution.⁵⁷

The next steps involve identifying the key components of the habitat that are essential for its character or that support key ecological processes. Species that are critical for the functioning of the habitat may need to be reintroduced through planting or releasing animals.⁵⁸⁻⁶⁰ There is evidence on how to restore many habitat types found in England ([PB 48](#)) but projects can

Box 2: Case study, the Wendling Beck Partnership

Five major nature recovery programmes have been funded across England,⁴⁷ including the Wendling Beck Partnership project along the river Wensum in Norfolk. The river is a chalk stream, a rare habitat of which 85% are located in the UK.⁶¹ The key part of the partnership, the Wendling Beck Environment project (WBEP), covers ~809 ha and is a collaboration between four farmer landowners, Norfolk Council and Norfolk Wildlife Trust, with support from a range of NGOs and Anglian Water.⁶² It will be funded via combined public and private finance for the provision of benefits like flood management, carbon storage and habitat banks ([Box 3](#)). So far, 89 ha of parkland, lowland meadow, lowland fen, native woodland, and heathland habitats have been delivered. WBEP will share lessons learned with landowners covering around 10,000 ha in the river catchment.⁶³

vary in their levels of success.⁵ The time taken to restore different parts of habitats to reach high levels of ecological complexity and biodiversity value can vary from a few years to centuries ([PB 48](#)).⁶⁴ There is limited understanding on restoring the more complex aspects of habitats, such as soil communities ([PN 601](#)),⁶⁵ but the evidence base is developing ([PB 48](#)).⁶⁶ It is unlikely that a habitat will return to a level that matches its original state.⁶⁷ Approaches that are more intensive and complex may speed up recovery times but may be more expensive compared to natural regeneration.⁶⁸ Achieving restoration and creation targets is more challenging on heavily degraded land and where that habitat is no longer present.²⁷ Ongoing projects are informing best practice for heavily degraded sites by conducting research on the costs and impacts of methods used in habitat creation, for example on farmland.^{69,70} Defra has indicated that ~40% of their target might eventually be met by habitat creation.⁷¹

Challenges for habitat restoration

Habitat restoration has been previously required under legislation such as the Habitats Regulations.^{14,72,73} Some progress has been made on 25 YEP targets, but some restoration targets have been challenging.^{74,75} For example, the UK Government reported falling short of its target to restore 4,700 ha of peatland between 2020 to 2021 by 1,100 ha;⁷⁵ and many protected sites are in a declining or degraded condition.⁷⁶ Meeting future targets will depend upon overcoming a number of barriers summarised below.

Financing restoration

The Green Finance Institute has reported that in England there is at least a £21-53bn shortfall in public and private sector funding to deliver all the Government's nature recovery targets over the next ten years.⁷⁷ For commitments to protect and restore biodiversity such as habitats, this gap is estimated at £9bn.⁷⁷ Defra estimate the cost of their wider habitats target as £1.13bn to 2100, with the benefits estimated at £7.85bn.⁷⁷ Projects already often have to combine funding from different sources ([PN 636](#)),⁷⁸ which in future, may include:

- **Environmental Land Management schemes (ELMs)** ([PB 42](#)).⁷⁹ There are three complementary schemes: Sustainable Farming Incentive (SFI), Local Nature Recovery (LNR) and Landscape Recovery (LR). Alongside food production, ELMs will deliver a range of environmental objectives. SFI and LR have launched and LNR remains in a pilot phase.^{80,81} ELMs has the potential to create 300,000 ha of habitat by 2042.⁸²

What restoration activities farmers and landowners will be paid for will remain under consideration until ELMs is fully developed around 2024-25.

- **Payments for ecosystems services (PES).** These are payments for benefits arising from the restoration of ecosystems, such as sequestering carbon under the Woodland Code.^{83,84} These can be traded through formal markets or negotiated via bespoke agreements (PN 661). If PES schemes only maximise one benefit, such as carbon sequestration, and do not manage trade-offs with other benefits, there could be negative impacts on biodiversity.⁸⁵
- **Biodiversity Net Gain (BNG)** will be mandated from November 2023 in England, requiring all Town and Country Planning Act 1990 developments to deliver a minimum 10% increase in biodiversity from that present beforehand (PN 369, PB 34).^{15,86} Some local planning authorities (LPAs) may choose to raise it to 20% to deliver more nature recovery.⁸⁷ When habitats themselves cannot be restored on-site then units can be purchased directly from a landowner who will deliver the units offsite or from a 'habitat bank' (Box 3). The number of 'biodiversity units' required to compensate for the loss of the area of habitat types in their current condition is calculated using Natural England and Defra's BNG metric.⁸⁸ This could generate £100-300 million per year,^{89,90} with Defra estimating that BNG could contribute 1,551 ha of habitat towards the habitats target annually (29,469 ha by 2042).⁵⁷
- **Other funding for restoration:** grants (such as the Nature for Climate Fund),⁹¹ charitable donations, and income related to restoration activities.

A Financing Nature Recovery UK report, informed by 300 experts in the business, farming, and environmental sectors, identified measures to increase nature recovery investment.⁹² They included updating tax and land valuations of restored land, establishing accreditation schemes for environmental benefits, implementing outcome-based monitoring and developing a BNG project and credit registry system.⁹²

Capacity and skills

The Environmental Audit Committee (EAC) reported that a shortage of skilled ecologists and environmental land managers employed in the field is a significant barrier to the delivery of the Government's long term environmental targets.^{93,94} A Defra commissioned report stated that only 5% of the 192 Local Planning Authorities that responded had the ecological skills and capacity needed,⁹⁵ following historic losses of this capacity.⁹⁶ The National Audit Office reported that funding cuts and restructuring at Natural England has resulted in fluctuations of staff numbers and their ability to monitor the recovery of protected sites.⁹⁷ There are also studies and reviews suggesting trusted, good quality advice improves land manager participation in and quality of engagement with agri-environment schemes, including habitat restoration.⁹⁸⁻¹⁰² For example, Defra-commissioned research into provision of government agri-environmental advice found 'high levels of agreement that scheme advice leads to beneficial outcomes', which was linked to 'high overall and individual schemes levels of appreciation among farmers'.¹⁰³ Other research has found a link between high quality advice and optimal environmental outcomes.^{104,105,106} The House of Lords Science and Technology Select Committee recommended that the Government establish

Box 3: Habitat banks

Habitat banks are areas of land where habitats are restored or created. They are established by landowners, LPAs, NGOs and private companies to deliver BNG units off-site. There are incentives within the BNG metric to set up habitat banks within priority areas identified in the LNRS, to deliver higher gains for biodiversity. Habitat banks will need to be registered in the BNG site register which is being developed by Natural England.^{15,107} Voluntary legally binding conservation covenants could be set up to link landowners with 'responsible bodies', which will be designated by the Secretary of State.¹⁰⁸ Either through a covenant or planning obligation, units are legally secured for a minimum of 30 years. Some existing providers, like the Environment Bank,¹⁰⁹ monitor the ecology and physical characteristics of their habitat banks annually. While management and monitoring plans will be submitted to the register, there is no standard for monitoring or an accreditation scheme for projects to ensure a level playing field between providers.¹¹⁰

a training programme to increase ecological skills capacity.¹¹¹

Accessing priority land

Defra stated that restoring habitats in rural areas is needed to deliver nature recovery targets.³⁵ However, this may be in competition with other land uses including food and timber production; development of infrastructure; renewable energy production or carbon storage (PB 42). State acquisition of land was proposed by experts advising Defra on the measures needed to achieve the wider habitats target,³⁵ but this approach is largely opposed by rural landowners.¹¹² The NFU suggested that meeting the targets could impact food production.¹¹³ If this leads to increased food imports without other policy protections in place, it could lead to nature loss in more biodiverse habitats in the tropics.^{114,115} Defra have committed to publish a land use framework in 2023 to manage these trade-offs,¹¹⁶ but land uses are not yet considered in the national spatial planning system.

Monitoring restoration progress

Monitoring is essential to understand how successful restoration activities have been at achieving targets at the site and national scale.¹¹⁷ An accurate assessment of the ecological condition of the area before restoration begins is needed to identify best approaches and monitor restoration progress.⁵⁹ Projects often determine goals and target states to guide restoration activities, such as establishing diverse vegetation.^{118,119} Often recovery in the condition or quality of habitats is tracked by identifying biodiversity increases, the increasing similarity of the site to high-quality intact reference habitats or indicators that show the recovery of natural processes.¹¹⁷ No single metric can be used to measure the condition of a habitat. Multiple measures (such as the number of species present, soil pH, age or height of trees) may need to be recorded. These are referred to as proxies or indicators and can provide information on the state of a single habitat component or the conditions of the whole habitat or ecosystem (PN 644). Projects may conduct additional monitoring to track the impacts of restoration activities on a particular species, whether a habitat is naturally functioning, and outputs of natural processes, such as carbon storage levels (PN 668). An investigation into a wetland restoration monitoring project reported that monitoring and evaluating restoration is complex, expensive and requires a range of expertise.¹²⁰

Setting baselines, targets and goals

The Society for Ecological Restoration sets global restoration practice recommendations. It states that targets should be informed by native reference habitat sites, while allowing for adaptation to ongoing environmental change.⁴⁴ At the site and landscape-scale, information on native reference habitat sites may be obtained from historical archives,^{121,122} or from contemporary habitat sites in favourable condition. However, for some habitats the pre-disturbance reference condition may be unknown due to a lack of data prior to their degradation. Differences in geography, geology and historic uses can also make it challenging to identify suitable contemporary comparisons for some habitats. Some commentators argue that in a UK context, expert judgement could be appropriate for determining targets for restoration when pre-disturbance conditions are unknown.¹²³ In practice, project targets are based on a combination of ecological, social, and financial factors. A review of 25 large scale UK and EU-based restoration case studies conducted by NatureScot found the targets and goals of restoration projects are highly variable and often change over time to meet the expectations of funders.⁷⁸ As project scale goals and targets are so varied, assessing success in delivering nature restoration at the country scale is complex.

The Government intends to assess progress towards the habitats target through action-based assessment that will record whether an area of land is signed up to a restoration scheme such as ELMs.³⁵ This will not identify whether the restoration action was successful nor if long-term increases in habitat area are secured. Whether a loss in habitat area occurs will also not be monitored nationally, so overall gains or losses in habitats will not be measured. The Office for Environmental Protection (OEP) has criticised the target stating that this makes it 'weak from a nature recovery perspective'.¹²⁴ The OEP highlight that despite their importance, there is no target to improve habitat quality and connectivity between habitats (Box 4) as mentioned in the 25YEP.¹⁶ This is due to a historic lack of data availability on habitat condition outside of protected sites. An outcome indicator (PN 644, PB 41), to monitor habitat quantity, quality and connectivity, is being developed. This may support monitoring the wider habitats target, but does not correspond directly to any targets being consulted on.¹²⁵

Novel groups of species in habitats

Some researchers recommend that when there is no relevant habitat reference state to measure against, targets should instead focus on whether key ecological processes are re-established, and the complexity of habitats increased (PB 48). This should improve their resilience to environmental change (Box 1).^{126,127} With climate change, habitats and the communities of species within them will be affected by changes in weather, such as increased rainfall, temperature and increasing frequency of extreme events. These could result in changes in species behaviour, such as migration patterns, as well as direct impacts on habitats (PN 679).¹²⁸ Restoring self-regulating natural processes is also a potential restoration target that is often used by rewilding projects (PN 537).¹²⁹

However, this approach can be controversial due to unpredictable outcomes of restoration.^{130,131} This is because the restored habitats may include new combinations of species that

Box 4: Restoring connectivity, B-lines for pollinators

In the UK, ~97% of wildflower-rich grassland has been lost over the last 100 years.¹³² This has contributed to significant declines in insect numbers (PN 619), such as a 58.5% decrease in flying insects between 2004 and 2021.¹³³ Buglife has mapped a UK wide network of priority areas for wildflower habitat restoration and creation with an aim of increasing pollinator abundance.¹³⁴ Restoration along 'B-lines', creates stepping stones to connect existing wildflower rich habitat. To date over 2,500 ha has been restored or created within the network.¹³⁵ The West of England B-Line, a collaboration between Buglife and the Avon Wildlife Trust, has alone restored 140 ha of wildlife rich habitat with the assistance of 743 days of volunteer time.¹³⁶ However, the current funding landscape provides little support for training and coordination of large volunteer groups, which may be needed for the long-term monitoring of large-scale restoration projects.

could include species non-native to the UK, and are referred to as novel ecosystems, communities or habitats.¹³⁷ While such changes have occurred historically, existing habitat type classifications commonly used in UK surveys are often fixed systems, with some exceptions (PB 48). If novel ecosystems were accepted, it would be difficult to assess their value ecologically and economically within existing environmental frameworks. Some researchers suggest this could lead to novel ecosystems lowering environmental standards and increasing the risk of new invasive non-native species becoming established (PN 673).^{137,138} Others argue that novel ecosystems are inevitable and can support valued wildlife.¹³⁸⁻¹⁴¹

Monitoring technology

Botanical and habitat surveys by expert ecologists are the most common approach to monitoring restoration outcomes. But a lot of UK biodiversity monitoring relies on skilled volunteers (PN 644)¹⁴² with habitat monitoring systems developed to support them.¹⁴³ However, small or hard to identify species can be missed and these surveys are time consuming to conduct across large areas (PN 644, PB 41). Existing and new technologies that could assist with monitoring are:

- **Sampling environmental DNA:** Genetic material in environmental samples can be analysed to identify large numbers of species.¹⁴⁴ Environmental DNA has been used to monitor restoration projects,¹⁴⁵⁻¹⁴⁷ including monitoring the recovery of groups of fungi and bacteria which are often omitted from traditional surveys.¹⁴⁸⁻¹⁵⁰
- **Acoustic monitoring:** Inexpensive remote sound recorders can monitor animals in a restored area, including at night or underwater.¹⁵¹⁻¹⁵³ Manual processing of acoustic data can be time consuming, but researchers are using machine learning to automate species identification.¹⁵⁴
- **Remote sensing:** Satellite and drone derived data can be used to monitor vegetation cover, structure and ecosystem function of restored sites over large areas.¹⁵⁵⁻¹⁵⁷
- **Apps:** A range of apps have been developed to support land managers and NGOs in species identification, planning restoration and conducting ecological surveys.¹⁵⁸⁻¹⁶¹
- **Artificial intelligence** is being used to inform decision making,¹⁶² such as in trials to remotely track the spread of invasive species and diseased trees along train tracks, to indicate when management action is needed.¹⁶³

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