

NORTH DEVON UNESCO BIOSPHERE RESERVE NATURE RECOVERY PLAN, 2021-25

OUR CONTRIBUTION TO TACKLING THE GLOBAL ECOLOGICAL EMERGENCY

ACTION PLAN FOR GRASSLAND AND ARABLE



VISION FOR NATURE IN GRASSLAND AND ARABLE BY 2030

By 2030, nature on farmland in northern Devon is recovering. Wildflowers abound in broad field margins and across many entire fields. Insects like moths, bumblebees and hoverflies are recovering; clouds of butterflies on hot summer days are once more commonplace and fields resonate with grasshoppers. The song of yellowhammers, skylarks and cuckoos once more fills the countryside, and barn owls, kestrels and red kites are a common sight. Brown hares and harvest mice thrive. To achieve this, 24,400ha¹ of intensively managed grassland and arable land present in 2020 have been converted, or are under conversion, to wildlife-rich semi-natural habitat that include broad tussocky or flower-rich margins, herb-rich grassland, wetlands, scrub and native broadleaved woodland. Over at least 2,000 ha of this, natural processes prevail ((re)wilding). The management of all² remaining intensive grassland and arable land follows sound agroecology principles ensuring sustainable production, good soil health and condition, avoiding soil and nutrient run-off into

¹ Assumes 10% of Biosphere is currently semi-natural habitat in good or recovering condition, so that 20% of intensive grassland or arable has to be converted to reach the 30% goal, and that the area of land currently occupied by intensive grassland and arable is 122,000ha.

² Necessary to achieve the second Nature Plan goal, that nature is recovering over 100% of the Biosphere.

watercourses, with biocides like herbicides, insecticides and nematicides minimised or avoided altogether. Every remnant of flower-rich grassland and heathland is treasured and managed well, and every opportunity seized to expand and connect them. Bracken and scrub are managed as valuable wildlife habitat, at times cleared to create early successional habitats, at times allowed to develop into woodland. A degree of dynamic change is welcomed. Public money is supporting many more farmers and landowners to assist nature's recovery and to deliver wide benefits for society, such as flood risk management, pollution control and carbon sequestration. Simultaneously, the land is generating quality farm produce highly valued by locals, visitors and businesses.

Please read this plan in conjunction with the Introduction / Overview chapter

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PART I: SCOPE AND MAP OF THE HABITATS COVERED BY THIS ACTION PLAN

This plan covers the two most prevalent land uses in the Biosphere Reserve, namely intensively managed grassland and arable land (including horticulture). Together these cover about 70% of the land surface, grassland being by far the dominant land use. The plan also covers lowland heathland, flower-rich acid and neutral grasslands, and land parcels dominated by bracken. However, together these semi-natural habitats only comprise a tiny proportion of the Biosphere.

The action plan does not cover unimproved wet grassland nor fen meadows such as culm grasslands (which often have a strong heathy component); neither does it cover maritime cliff and slope or coastal grazing

marsh, nor upland moorland habitats, roadside verges or hedges (see other action plans). The focus is strongly on “improved” and “semi-improved” grassland and on arable land, together used almost exclusively to feed intensive livestock enterprises.

The action plan considers soil fauna alongside other wildlife, in recognition of the key role this fauna plays in the healthy functioning of farmland ecosystems.

Since the primary goal of the Nature Recovery Plan is that 30% of land within the Biosphere Reserve should be semi-natural biodiversity-rich habitat in good or recovering condition by 2030, it follows that a substantial proportion – around 20% - of the intensive grassland and arable land should be converted, or under conversion, to semi-natural habitats by 2030 to secure nature’s recovery, focusing on the opportunity areas identified through Devon’s Nature Recovery Network maps. Further, nature recovery should be integrated into 100% of the remaining intensive grassland and arable land in the Biosphere, in line with the secondary goal of the overall Nature Recovery Plan. Many forward-thinking farmers are already demonstrating how delivering multiple public benefits such as nature recovery can go hand in hand with farm productivity – and aligns with government priorities and support. By 2030, all farmland should be managed to assist in nature’s recovery as part of productive and sustainable farm businesses that are delivering multiple benefits to society.

MAP OF THE HABITATS COVERED BY THIS ACTION PLAN

To be added

For specific targeting opportunities, please also refer to the Nature Recovery Network maps for Devon, expected to be published by the Devon Local Nature Partnership during 2021.

PART II: PRIORITY ACTIONS FOR NATURE’S RECOVERY IN GRASSLAND AND ARABLE

The following actions have been identified as priorities for the period 2021-25 to progress towards the 2030 Vision and overall Goals of the Biosphere Nature Recovery Plan. The lead partner for each action (shown in bold) will actively engage with the other partners to drive implementation and report on progress. In general, resources for the actions are not yet secured and the partners will examine ways to integrate the action into their own programmes, as well as seeking new resources (and partners) where necessary. Therefore, being listed as a lead or partner organisation does not imply a commitment of new resources but does confirm support for collaborating to deliver the ambition and principles of the actions. Where “Biosphere land management partners” are listed in this action plan, it refers particularly to those partners with land management advisory roles.

These actions have been developed following a careful, fresh examination of the state of nature in the Biosphere and of the underlying reasons for decline and loss, focussing on the current, on-going, factors which are driving nature’s decline. See Part III below for details.

Much good work has been done by Biosphere partners and farmers/land managers over the last decade and this is also outlined in Part III, along with issues that are shared between this and the other four plans. Over the plan period, farmers will face challenges regarding withdrawal of the government’s Basic Payment Scheme, but also opportunities to realign their business models to be more nature-friendly. Biosphere partners will work with farmers and landowners to help deliver this action plan, using the incentives of the

existing Countryside Stewardship scheme, the new Environmental Land Management scheme, green finance and other mechanisms.

Habitat-related actions	Lead / Partners	Budget Source	By when
A1. Ensure all existing high quality semi-natural grassland, heathland and bracken habitat is under favourable long-term management.	Biosphere land management partners, Landowners	CSS / ELMs, Private investment, Farm business, Green finance	2025
A2. Encourage/support 25% of farms to use or move towards regenerative agriculture practices (including organic and biological practices)	Biosphere land management partners, Landowners	CSS / ELMs, Private investment	2025
A3. Support landowners to bring 200ha of intensive grassland or arable land into the process of conversion to high value semi-natural grassland and heathland.	Biosphere land management partners, Landowners	CSS / ELMs, Private investment, Green finance	2025
A4. Support landowners to bring 10,000ha of intensive grassland fields into conversion to semi-improved grassland that have a range of herbs and native grasses present within them, for example through the introduction of herbal leys and changing grazing and nutrient management regimes.	Biosphere land management partners, Landowners	CSS / ELMs, Private investment	2025
A5. Support landowners to manage/establish 500ha of farmland as wood pasture, silvo-pasture or silvo-arable, with in-field trees, including those managed traditionally for fruit production. Encourage all farmers to have in-field trees and to ensure all existing trees have successional planting plans.	Biosphere land management partners, Landowners	CSS / ELMs, Private investment	2025
A6. Support landowners to take 2000ha of land out of farming and being used for wilding and habitat creation, targeting areas in the Less Favoured Area and those with high-risk soils. Place emphasis on giving space for natural processes, including the development of dynamic edge habitats and scrub.	Biosphere land management partners, Landowners	CSS / ELMs, Private investment, Green finance	2025
A7. Support landowners to fully buffer 3000ha of edge and linear habitats (e.g. hedges, rivers and ditch margins) against the impact of fertilizer, herbicide and pesticide applications to adjacent land. Develop guidance on what this buffer should be, for example that all hedges should have 3m margins.	Biosphere land management partners, Devon Hedge Group Landowners,	CSS / ELMs, Private investment, Green finance	2025
A8. Create at least 100 small wildlife ponds and scrapes, aiming for every farm in the Biosphere to have at least one pond or scrape by 2030.	Biosphere land management partners, Landowners	CSS / ELMs, Private investment	2025
A9. Improve soil health across arable and pasture land moving from an estimated 38% suffering from severe degradation to <25% degraded	Biosphere land management partners, Landowners	CSS / ELMs, Private investment	

Species-related actions	Lead / Partners	Budget Source	By when
B1. Reduce (and eliminate where alternatives are available) across 50% of farms the use of chemical wormers and pesticides that are having, or suspected to have, an impact on invertebrate diversity.	Biosphere land management partners, Landowners	Project funding, action through farm advisors	2025
B2. Implement insect-friendly measures (flowers for pollinators, beetle banks and in-field strips) and other measures to benefit farmland birds (later silage cut, seed mixes, skylark plots) on 8% of farms in the Biosphere.	Biosphere land management partners, Landowners	CSS / ELMs, Private investment	2025
B3. Implement immediate response measures to protect from disturbance and predation any breeding attempts by lapwing and curlew, and initiate programme to restore and expand populations.	RSPB, Devon Birds, Landowners, Biosphere land management partners	CSS / ELMs, Private investment	2023
B4. Reintroduce broken-belted bumblebee to 2 suitably managed receptor sites.	Bumblebee Conservation Trust, Landowners	Project funds, private investment	2025
Enabling actions	Lead / Partners	Budget Source	By when
C1. Conduct programme to ensure landowners are aware of Nature Recovery Network (NRN) mapping of connectivity and opportunities, and provide advice on which land to manage towards semi-natural habitat based on soil type, resting periods and grazing strategies.	Biosphere land management partners, NRN, DCC	NRN funders	2023
C2. Promote and educate landowners and land use advisors about regenerative and organic systems, as well as broader soil health improvements, and appropriate stock management to minimise use of chemicals.	Biosphere land management partners, farming organisations	Project funding	2025
C3. Provide training, advice and access to funding to avoid diffuse pollution (water and air) and promote compliance with existing best practice and legislation (e.g. EIA Regs, Farming Rules for Water, COGAP, NVZ, SSAFO Regs, Habitat Regulations, Clean Air Strategy).	Biosphere land management partners, farming organisations	EA, NE, CSF, CSS / ELMs, project funding	2023
C4. Promote uptake of citizen science programmes including monitoring soil health, pollinator populations and key species.	Biosphere land management partners with national organisations	National programmes, volunteers	2025
C5. Establish and coordinate a landowner network to support regenerative agriculture, habitat management and habitat creation, or support existing ones such as the Nature-Friendly Farming Network.	Biosphere land management partners, NFFN, Moor Meadows	NFFN, project funding	2024
C6. Train land agents, contractors and agronomists in wildlife-friendly farming methods and habitat awareness, taking advantage of the existing farming groups.	Biosphere land management partners, farming organisations	Project funding	2025
C7. Train estate agents and land agents in statutory and non-statutory designations and basic identifiers of valuable habitat,	Biosphere land management	Project funding	2025

statutory designations and EIA regulations. Agree a Biosphere standard for adverts for land sale, including proper assessment of what the land is suitable for and its wildlife value, to avoid further loss of good habitat and further degradation of semi-natural habitat.	partners , farming organisations		
C8. Re-establish a Biosphere Farming Awards programme.	Biosphere team	DCC	2023
Monitoring priorities	Lead / Partners	Budget source	Frequ ency
M1. The proportion of land managed regeneratively and/or organically, and trends.	North Devon Biosphere / DBRC	Project funding	Every 5 years
M2. Recent changes in the relative proportions of arable and grass fields – is one being converted into the other?	North Devon Biosphere / DBRC / North Wyke	Project funding	Every 5 years
M3. Implementation of a monitoring programme to increase our understanding of soil biology (worms/insect count) and an incentivization scheme to improve soil health. Monitoring could be undertaken by advisers/farmers or through citizen science.	Devon and Cornwall Soils Alliance	Project funding	TBC
M4. Monitoring all CWS and SSSI's to understand their condition status.	DBRC / all Biosphere partners	Project funding	Every 5 years
M5. The extent of grassland or arable land under each standard level within different levels of ELM agreements (and previous agri environment schemes in transition).	Natural England / all Biosphere partners	Project funding	Every 3 years
Research priorities	Lead / Partners	Budget/source	Frequ ency
R1. The quality and health of soil fauna and fungi in (semi) improved grassland and arable fields in the Biosphere. An approach such as that used by Earthworm Watch https://www.earthwormwatch.org may be appropriate.	Devon and Cornwall Soils Alliance	Project funding	TBC
R2. Alternatives to pesticides such as round-up, work with ENNIS? Including integrated pest management.	Devon Wildlife Trust, all Biosphere partners	Project funding	TBC
R3. Effective ways of introducing herbs to improved fields on the heavy clay fields characteristic of much of the Biosphere, including the establishment of herbal leys.	Universities, IGER	Project funding	

INDICATORS

The following three outcome indicators will be monitored to track the overall impact of plan implementation.

Indicator	Baseline 2020	Target 2030	Means of verification	Responsible for monitoring
Soil health: physical condition, organic content and worms	Compaction of soils – 38% is severely physically degraded	No soil compaction – link with target above	Landowner soil apps/ citizen science, advisor input, agronomists, VESS (Visual	Biosphere partners, Devon and Cornwall Soils Alliance, Environment Agency, Natural England

			evaluation of soil structure)	
Area of semi-natural grassland (not Culm) - includes Lowland dry acid grassland, Lowland meadows, Upland hay meadows, Upland acid grassland	9,288 (see Intro. Annex 3). Highly improbable there is so much semi-natural grassland in the Biosphere - needs verification	Doubled from baseline	New CWS identified, Agri-environment Agreements	DBRC , advisory projects
Farmland bird index increasing in the Biosphere	TBC for defined area / Devon figure	5% above baseline	Farmland Bird index survey	BTO / Devon Birds / RSPB
Air quality	Can be provided by DEFRA	16% reduction in line with Gothenburg Protocol	National ammonia monitoring network and modelling	CEH/DEFRA/Nitrogen Futures

PART III: SUPPORTING INFORMATION

IMPORTANCE FOR NATURE

Intensively managed grassland and arable land are low in biodiversity and of limited nature conservation value compared to semi-natural habitats. Indeed, most intensively managed fields in the Biosphere are effectively wildlife deserts. Biodiversity is largely restricted to field edges – to the hedges and any uncultivated, unfertilised and pesticide-free margins or where pollinator or wild-bird mixes have been sown. The big challenge is to reverse this, by greatly magnifying the recent efforts of the many nature-friendly farmers. Often the best starting point will be to improve the health of the soil biota.

Skylarks nest in small numbers in some semi-improved grasslands and arable fields, although populations are much larger in open semi-natural habitats. Flocks of starlings, wintering thrushes, crows, rooks, jackdaws, and gulls may be seen on freshly manured or cultivated fields. Swallows, house martins and swifts sometimes forage for flies around livestock. Herds of red deer sometimes graze on improved grasslands.

Breeding lapwings and curlews are now effectively extinct across the Biosphere, cuckoos have declined dramatically and wintering golden plover have disappeared from many traditional inland sites. Barn owls and kestrels rarely hunt over improved grasslands or arable land – there are few small mammals and precious few large invertebrates to catch. Brown hares and harvest mice are scarce at best. The broken-belted bumblebee is now extinct in northern Devon, and most other bumblebee species have declined considerably both in range and numbers. Large dung beetles are now a rare sight.

The tiny areas of lowland heathland and of flower-rich acid and neutral grassland that remain, and land parcels dominated by bracken, are of far greater value for nature. In particular, the rare surviving fields of unimproved neutral grassland, often managed as hay meadows, can have spectacular displays of one or two species of orchid alongside a wide range of other herbs. The few remaining patches of lowland heathland are important for invertebrates such as hoverflies of the genus *Microdon*, while bracken covered slopes can be important for those fritillary butterflies that feed as larvae on violets.

Current management of the improved grassland and arable land present in the Biosphere has significant adverse consequences on the quality of other habitats, and on the distribution and abundance of many species. For example, nutrient and soil loss is responsible for widespread pollution of water courses, biocides deliver lethal and sublethal effects far beyond their intended targets, and high levels of ammonia cause severe damage to lichen populations, including to the string-of-sausages lichen, *Usnea articulata*, a Devon Special Species. Ammonia travels to protected sites and causes damage through toxic effects, acidification and fertilisation.

BASELINE AND CONDITION / TRENDS (PARTICULARLY SINCE 2010):

Table 1a. Trends in quantity and quality of intensively managed grassland, arable and horticultural land.

Habitat	Baseline Area (ha)*	Trend** quantity	Trend** quality	Comments (e.g. main reasons and sources of information)
Improved grassland (i.e. intensively managed)	53,524 ha (see Annex 3 of Intro.)	Increasing (in area)	N/A	Further intensification, including greater slurry applications, higher stocking rates, more silage cuts, drainage, and introduction of zero grazing systems.
Semi-improved grassland	35,023 ha (see Annex 3 of Intro.)	Increasing (in area)	N/A	Baseline extent likely to be far too great. Cultivation, re-seeding and the factors listed above.
Arable and horticulture	31,847 ha (see Annex 3 of Intro.)	Not known	N/A	Use of powerful biocides, use of larger machinery, larger fields, cultivating margins and unsuitable sites

Table 1b. Trends in quantity and quality of the semi-natural habitats covered by this action plan.

Habitat	Baseline Area (ha)	Trend** quantity	Trend** quality	Comments (e.g. main reasons and sources of information)
Species-rich grassland (excluding culm grassland)	(see Annex 3 of Intro.)	Declining?	Not known	Some sites are being lost due to agricultural intensification, while for others the quality has been improved following the introduction of favourable management. Sites can also be lost to poorly located tree planting.
- Lowland dry acid grassland	1,603 ha			Highly improbable there is so much lowland dry acid grassland and lowland meadow in the Biosphere.
- Lowland meadows	4,963 ha			
- Upland hay meadows	12 ha			
- Upland acid grassland	2,710 ha			
Bracken (includes both)	1,803 ha	Stable?	Not known	As above

lowland and upland)	(see Annex 3 of Intro.)			
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*For baseline areas refer to Annex 3 in the Introduction regarding confidence assessments

** Trend estimates from expert opinion unless otherwise evidenced

Table 2a. Trends in the abundance and distribution of species characteristic of intensively managed grassland, arable and horticultural land.

Indicator species	Trend quantity	Comments (e.g. main reasons and sources of information)
<u>Mammals</u> Brown hare	Declining	Too frequent grass cutting, shooting, loss of mixed farming.
<u>Birds</u> Skylark Grey partridge Kestrel Linnet Yellowhammer	Declining Declining Declining Declining Declining	Too frequent grass cutting, unfavourable arable management, loss of mixed farming, too few invertebrates.
<u>Invertebrates</u> The 'Big Seven' bumblebees. Farmland butterflies like the meadow brown and ringlet. Dung beetles	Declining Declining Declining	Loss of flowers both in-field and in margins, livestock dung becoming toxic due to use of wormers, and overall increasing use of powerful biocides.
<u>Higher Plants</u> Arable flowers like corn marigold and poppies. Grassland herbs like red clover, trefoils, ribwort plantain and sweet vernal grass.	Declining Declining	Intensification and use of herbicides. Air pollution also causing general decline in botanical species diversity favouring grass growth. Creeping thistle and nettle, while indicative of artificially raised nutrient levels, are very valuable for invertebrates.
<u>Fungi and lichens</u> String-of-sausages lichen	Declining	Air pollution, especially ammonia from intensive livestock units.

Table 2b. Trends in the abundance and distribution of species characteristic of the semi-natural habitats covered by this action plan.

Indicator species	Trend quantity	Comments (e.g. main reasons and sources of information)
<u>Mammals</u> Harvest mouse	Stable?	Recent surveys suggest the species is widespread in remnant fragments of habitat and new patches of rough tussocky grassland.
<u>Birds</u> Reed bunting Stonechat	Declining Declining	Loss and fragmentation of habitat. Devon Bird Atlas
<u>Reptiles</u> Adder	Declining	Fragmentation of populations.
<u>Invertebrates</u> Butterflies like the marbled white and skippers	Stable?	Can respond rapidly to habitat improvement or creation.
<u>Higher Plants</u> Yellow rattle Knapweed Carnation grass (a sedge)	Stable, perhaps increasing	As above.
<u>Fungi and lichens</u> Wax caps	Declining	Indicative of low soil fertility levels and long-term habitat stability, so threatened by changes in management.

This century has seen further intensification in the use of grassland and arable fields to achieve greater forage, silage and cereal yields, a process which started after WWII. It has also seen increased stocking levels of both cattle and sheep. Moreover, in recent years there has been a marked increase both in maize growing and in winter sheep grazing. Although the total volume of pesticides applied to arable crops has fallen, the chemicals used are more toxic and are being applied more frequently. Chemicals to control nematodes and flies within and on livestock are applied frequently and are believed to contribute to the large-scale and ever-greater declines in invertebrate populations.

Some farmers have agri-environment agreements which limit the amount of nitrogen applied to their fields. Although primarily a measure introduced to reduce water pollution, it may have a beneficial impact on soil fauna. Increasingly, new farmers are interested in sustainable land management practices and open to new ideas. Some are actively pursuing agro-ecology principles, regenerative or organic farming, (re)wilding or other measures for nature's recovery. Quite a few adopt extensive livestock systems, producing high quality meat at a premium price. Farmers are therefore a key part of the solution to nature's recovery.

Populations of farmland birds associated with grassland and arable land uses have continued to fall this century. Between 1977-85 and 2007-13, breeding populations of grey partridge, lapwing, barn owl, little owl, kestrel, curlew, swift, cuckoo, skylark, swallow, starling, mistle thrush, spotted flycatcher, meadow pipit, linnet and yellowhammer all declined severely in northern Devon.

ROOT CAUSES TO BE ADDRESSED

Although very significant losses of nature occurred prior to the turn of the Century, the key underlying cause of the continued 21st Century loss of nature is the further intensification and homogenization of farmland. This applies not only to the land uses under consideration in this action plan but indeed to habitats across the Biosphere as a whole.

Root causes	Solutions
Poor soil condition and health, including reduced spring soil moisture and high levels of compaction leading to sediment run-off into water courses.	<ul style="list-style-type: none"> ● Adopt sustainable agro-ecology and regenerative farming practices. ● Compliance with and enforcement of baseline legislation, and of conditions linked to public support schemes. ● Raise awareness and incentivise the use of best practice guidelines (e.g. on maize growing, rules for water and SSAFO).
Decline in mixed farming practices, and in the availability of fallow land.	<ul style="list-style-type: none"> ● Incentivise and adopt mixed farming practices: a mix of grassland, arable and horticultural land.
Increased use of grassland for intensive silage production.	<ul style="list-style-type: none"> ● De-intensify. Adopt sustainable agroecology practices.
Increased frequency of mowing and grazing.	<ul style="list-style-type: none"> ● As above
Increased stocking rates, especially winter sheep grazing.	<ul style="list-style-type: none"> ● As above
The reduction, removal or suppression of marginal habitats including scrub, flower-rich or tussocky field margins, and infield trees.	<ul style="list-style-type: none"> ● As above, and recognise the value of these features to nature, to the delivery of ecosystem services, and to farm businesses. ● Incentivise their restoration.
Use of increasingly powerful biocides (pesticides including broad-spectrum herbicides, nematicides (anthelmintics), insecticides and second and third generation rodenticides).	<ul style="list-style-type: none"> ● Adopt Integrated Crop Management or organic practices, using biocides within strictly defined limits, usually only as a last resort and never on a precautionary or regular basis.
Reduction in air quality; in particular, locally damaging increases in ammonia.	<ul style="list-style-type: none"> ● Reduce protein levels in feed. ● Encourage uptake of measures in the Clean Air Strategy 2019. ● Improve management of manures in livestock housing, storage and methods of slurry and fertilizer application. ● Encourage tree planting to buffer intensive units. ● Encourage nutrient management planning and increased use of legumes.

The further destruction and attrition of lowland heathland, flower-rich acid and neutral grasslands, and other semi-natural farmland habitats.	<ul style="list-style-type: none"> • Ensure compliance with legislation and good practice guidance. • Incentivise retention, creation and favourable management of these habitats through the provision and encouraging uptake of well-designed and delivered CSS / ELMs and green finance. • Raise awareness of the value of these habitats.
Eutrophication due to atmospheric N deposition	<ul style="list-style-type: none"> • Most atmospheric N is generated outside the Biosphere and needs to be addressed by national and international policy. Action can, however, be taken to reduce local ammonia generation from intensive livestock enterprises (see above).
Climate change	<ul style="list-style-type: none"> • Many solutions lie at national and international levels; however, there are measures that every farm can take to reduce carbon emissions and lock up carbon in the land.

BENEFITS / ECOSYSTEM SERVICES

The intensive grassland and arable land that currently covers most of the Biosphere focuses largely on food production with many disbenefits in terms of ecosystem services. It has led to the loss of most infield wildlife, including soil fauna, apart from a handful of common species, and contributed to reduced and declining population levels of many species in semi-natural habitats throughout the Biosphere. It has also led to impacts beyond the farmland, for example ammonia impacts on protected sites and water quality issues in rivers and Bathing Waters. In contrast, the semi-natural habitats that are encouraged by this plan, those which have been so widely replaced by intensive grassland and arable land, provide a rich biodiversity and deliver multiple ecosystem services to both the farmer and the public. The benefits of retaining these semi-natural habitats and keeping them in good health include raising the quality of meat, cereals and other foods produced, and indeed the diversification and saleability of farm products to an increasingly demanding and selective customer base. All this can strengthen farm profitability.

Provisioning services: Meat, dairy, fruit and horticultural products of varying quality, including those requiring high inputs of nutrients and biocides when farmed intensively to the detriment of nature. Provision of renewable energy through solar farm installations (sometimes on valuable wildlife habitat) and biodigesters – the latter with severe negative environmental impacts through supporting intensification and maize growing. Slurry pits and anaerobic digesters release ammonia which is particularly harmful to lower plants and lichens. Bog (*Sphagnum*) mosses on peatland sites are among the lower plants affected by ammonia emissions, resulting in reduced ability to fix carbon and to reduce flood peaks.

Regulating services: Current management of intensive grassland and arable land increases the speed of run-off and risk of flooding, lowers both air and water quality, and results in a net increase in atmospheric carbon and a net loss of soil. Increasing water abstraction for irrigation threatens river flows during the summer. Virtually no native species benefit. Furthermore, the intensive livestock industry is a major driver of climate change which also threatens nature.

Facilitating services: the use of biocides has a strong negative impact on all wildlife including wildflowers, pollinators, soil biota and farmland vertebrates either through direct mortality and/or reduction of food supply and habitat. Local ammonia generation from intensive livestock enterprises can contribute to atmospheric pollution and run-off of nutrients to eutrophication in water bodies.

Cultural services: Farmland, through an extensive network of public rights of way, as well as views of the landscape, often provides public access to the natural environment, benefitting people's physical and mental health.

MAIN ACHIEVEMENTS 2010-2020

Many farmers and landowners have worked with conservation and land use bodies on a number of initiatives over the last decade, supporting restoration of biodiversity through farming systems in north Devon.

These include existing schemes and policy instruments designed to address the negative impacts of agriculture on biodiversity, agri-environment schemes such as Countryside Stewardship and its predecessors and Catchment Sensitive Farming (CSF).

They also include projects, typically partnerships led by non-governmental organisations, which have provided much of the one-to-one land management advice available to farmers and secured significant capital improvement. Examples of these include the Northern Devon Nature Improvement Area (DWT), Facilitation schemes, Soils and Water Alliance (WRT), and schemes on land around the estuary (Biosphere team). For example, Devon Wildlife Trust has delivered farm advice to approximately 30% of land in the Torridge catchment, with over 100 workshops being given for farmers and landowners. Facilitation Groups in north Devon linked to Countryside Stewardship have delivered over 200 training and peer-to-peer workshops within farming clusters, helping to deliver landscape-scale environmental outcomes.

A further category of achievement has been through large landowning organisations improving their own land management practices, such as the National Trust and Clinton Devon Estates.

It is difficult to obtain an overall picture of the results of all of these efforts, particularly as farming systems have continued to intensify. The outputs and outcomes below are likely to be an underestimate.

- Over 2,000ha of semi-natural habitat has been restored in the Biosphere, and over 170ha new semi-natural habitat created, by Devon Wildlife Trust led projects. (NB. The focus has been on Culm grasslands, covered by the Wetlands plan.)
- Over 50ha of strategically located woodland creation, contributing to whole farm soil management and water quality improvements, through the Woods 4 Water project.
- On the National Trust estate, habitat creation and improvement works have included creating arable field margins, provision of overwinter stubbles and the reintroduction of an arable plant species, the small-flowered catchfly. Lowland meadows have been restored, wetlands have been re-wetted, and wood pasture/parkland restored.
- CSF has provided diffuse pollution advice to 80 farms each year from 2016-2018 and 190 farms per year since 2019.
- North Devon and Torridge District Councils have worked closely with CSF resulting in the adoption of planning guidance for agricultural developments and training for local planning authority staff. As a result, they are alert to the need to mitigate applications that could emit damaging levels of ammonia.

Nevertheless, despite all this positive effort, at best the rate of loss and destruction of nature that follows in the wake of intensive farming has only been slowed. A transformative approach is needed to tackle the huge

problems caused to nature throughout northern Devon by the intensive grassland and arable management that prevails over most of the land area.

CROSS-CUTTING ISSUES WITH OTHER ACTION PLANS

Coast: Opportunities to create semi-natural habitats from intensively managed farmland; impacts of run-off and spray drift from adjacent farmland.

Towns and Villages: impacts of run-off and spray drift from adjacent farmland.

Trees, Woods and Hedges: Opportunities to create semi-natural habitats from intensively managed farmland; impacts of run-off and spray drift from adjacent farmland; loss of connectivity.

Wetlands and Waterbodies: Opportunities to create semi-natural habitats from intensively managed farmland; impact of intensive farming on water flow through the catchment; impacts of sediment run-off and diffuse pollution on ecological condition of water bodies; impacts of spray drift from adjacent farmland.

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