Moving Towards the Sustainable Management of

Agricultural Lowland Peatlands

A discussion paper

The Wildlife Trusts

Summary

Despite covering only 10% of UK land area, peatlands are our largest terrestrial carbon store and are also vital habitats for highly specialised species. However, 90% of these soils have been drained to create highly productive agriculture land producing cereals, horticulture crops as well as grassland. Lowland peatlands are also subject to commercial peat extraction and an expected ban on this practice is overdue.

There are significant climate, biodiversity, soil and hydrological harms related to the ongoing drainage and use of lowland peat soils, which are summarised in this briefing. For instance, it is estimated that the East Anglian Fens have a remaining life under arable farming of between 25-50 years. In 2023, the highly anticipated Lowland Agricultural Peat Taskforce Report was published by the UK Government, which made a series of recommendations for a more sustainable future for agriculture on lowland peatlands in England. These were welcome but did not go far enough. This briefing outlines why further action is needed and summarises a vision for the future of lowland agricultural peatlands with four key recommendations to reverse the ongoing harms.

1. **Phase out of intensive grassland from lowland peat soils**
2. **Large-scale relocation of arable and horticultural production from lowland peat to mineral soils**
3. **Ambitious drive towards landscape-scale restoration to restore wider ecosystem function using environmental management schemes, a peatland code and a wider cross cutting strategy on horticulture**
4. **More sustainable farming practices across remaining lowland agricultural peatlands using paludiculture**

WESTHAY, SOMERSET © SAM GLASPOLE

Introduction

Peatlands are fascinatingly wild but often misunderstood habitats which have a critical role to play in reversing the interlinked nature and climate crises. Peatlands are home to a variety of highly specialised species, including the UK's very own carnivorous sundew plant and sponge-like sphagnum mosses, which can hold up to twenty times their own weight in water. Moreover, despite covering only 10% of UK land area, peatlands are our largest terrestrial carbon store, locking up more carbon than the forests of the UK, Germany and France combined. However, after centuries of exploitation, just 10% of the UK's peatlands are in near-natural condition[1].

In the UK, damage to peatlands occurs disproportionately in lowland regions of England such as the Somerset Levels and East Anglian Fens. In total, 90% – or over 400,000 hectares – of the UK's lowland peatlands have been drained to create some of the most intensively farmed agricultural and horticultural land in the UK[2]. Lowland peatlands are currently used for pasture, the production of arable crops for use in animal feed, and to a smaller extent, the production of vegetables for human consumption, such as lettuce, carrots, leeks and onions.

CARROT HARVESTING © TOM MARSHALL

In England, the systematic drainage of lowland peat dates to the 17th century[3]. Today, the Land Drainage Act places a responsibility on Internal Drainage Boards (IDBs) to oversee all matters relating to water level management within their district. In England, IDBs manage water levels and facilitate drainage across 1.2 million hectares – or one tenth – of the country[4].

The UK is one of the most extensively drained countries in the world[5]. In the East Anglian Fens, IDBs operate 286 pumping stations, which have the combined ability to pump 16,500 Olympic swimming pools of water into dykes and drainage channels every day (around 41,250Km³)[6]. Lowland peatlands are also subject to commercial peat extraction. The extraction of peat for use in amateur gardening and professional growing still occurs across the UK, except for in Wales. The UK and Welsh Governments have committed to ban the retail sale of bagged peat compost by 2024, but legislation has not yet been introduced at the time of writing.

The Impacts of Unsustainable Management of Lowland Peat

Climate change

The total utilised agricultural area in the UK is 17 million hectares[7]. Of this area, just 2.26% is on lowland peat. Despite this, emissions from lowland peatlands make up 29% of total UK agricultural emissions[8]. This figure – 13,250,000 tonnes of CO_2e per year – is equivalent to the carbon footprints of over 1.1 million British people.

Drained lowland peatlands have the highest greenhouse gas emissions per unit area of any land use and are responsible for 4% of total UK greenhouse gas emissions.

Biodiversity loss

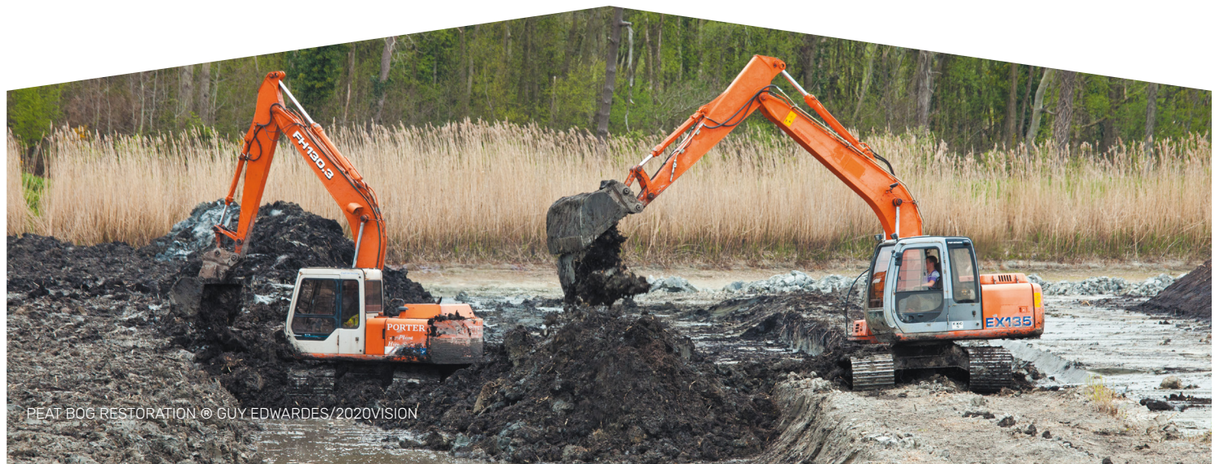
The widespread degradation and, in some cases, permanent loss of critical habitats such as peatlands has contributed to the UK's status as one of the most nature-depleted countries on the planet[9]. The UK now ranks amongst the bottom 10% of countries for biodiversity remaining[10]. The intensification of agriculture has been a key driver of nature's decline, with one in six species now at risk of extinction in Great Britain[11]. In Somerset, sphagnum mosses, the carnivorous sundew, large marsh grasshopper, bog bush-cricket and cotton grasses are expected to benefit from restoration of the degraded lowland peatbogs[12].

Soil subsidence

When a peatland is drained, there is often shrinkage, compression, oxidation, wind erosion and increased instance of accidental burning[13]. The Office for National Statistics estimates that farming and ploughing on drained peat results in the loss of between 10-30 mm of peat per year[14]. Peat is therefore being lost faster than it can accumulate; the Climate Change Committee estimate that there is only enough peat soil left to continue farming as we do now for another 20 to 50 years[15]. Since 1850, the deep peatlands of the Fens have suffered wastage of over 3.9 meters[16]; in fact, subsidence here has been so extensive that just 16% of the peat stock recorded in 1850 remains[17].

Hydrological changes

When peat becomes degraded, its ability to hold water below the surface of the ground is reduced. When healthy, the peat can hold large quantities of water; sometimes it can act like a sponge. But when it becomes exposed and oxidized it does not manage water in the same way[18]. In addition, it is the movement of water in peats that drives carbon storage and flux. Peatland drainage not only impacts upon the drained area, but also impacts upon the hydrology of adjacent peatlands, whether they have been drained or not. This knock-on effect increases flood risk, reducing the ability of peatlands to absorb rainwater during storm surges[19]. Simultaneously, the drainage of peatlands increases the vulnerability of landscapes to drought during dry periods[20].



PEAT BOG RESTORATION © GUY EDWARDES/2020VISION

Climate Change and Future Farming Scenarios

The ability of peat soils to support food production is continuously diminishing because of their intensive management and the impacts of climate change. It is estimated that the East Anglian Fens have a remaining life under arable farming of between 25-50 years[23].

The UK Food Security Report identifies climate change and biodiversity loss as the two largest threats to food security in the UK in the mid to long term[21]. Farmers across all landscapes are already increasingly subject to pressures arising from drought, flooding and wildfire. These manifestations of the climate crisis will only continue to intensify.

2022 heralded the UK's first ever 40°C day, with overall temperatures 1.15°C warmer than the pre-industrial period. If business as usual continues, emissions from lowland agricultural peatlands can be expected to continue at a rate of over 13 million tonnes of CO_2e per year, keeping us on a path towards far exceeding 1.5°C warming by 2050.

Moreover, according to the UNEP's Global Peatlands Assessment[22], if global greenhouse gas emissions from drained and degraded peatlands continue at their current rate, this will consume:

- **41% of the emissions budget that remains to keep global warming below +1.5°C**
- **12% of the emissions budget that remains to keep global warming below +2°C**

To the west of the country, the Somerset Levels and Moors are home to the second largest area of lowland deep peat in England. Of this area, 70% has been converted to grassland to support livestock farming and the remaining 30% is under arable cropping.

This area produces less food per hectare than the average for Somerset or for England. According to an economic assessment of the region, the social cost of farming on the Somerset Levels and Moors is greater than the market value of all output[24].

In 2023, the UK Government published its highly anticipated Lowland Agricultural Peat Taskforce Report, making a series of recommendations for "a more sustainable future for agriculture on lowland peatlands in England"[25].

The work of the Taskforce was welcome. However, the report is grounded in the assumption that the correct approach to take is "to extend the useable life of lowland agricultural peat soils". As a result, it may be failing to consider the range of benefits that would arise from shifting production elsewhere in a sustainable way. Moreover, several of the report's underlying assumptions – such as that the current Internal Drainage Boards (IDBs) are best placed to sustainably manage water levels – could be challenged. There have been critiques on the membership, accountability and actions of some IDBs and the suitability of The Land Drainage Act 1991 under which they act, which need to be addressed[26].

Yet the report fails to delineate a credible approach to the lowland peat problem which both mitigates the nature and climate crises whilst safeguarding food security.

A Vision for the Future of Lowland Agricultural Peatlands

The Wildlife Trusts envision that a combination of interventions will be required to address the decline of the UK's lowland agricultural peatlands. These will be targeted to balance the urgent need to address the nature, water and climate crises whilst safeguarding food security.

1. Phase out of intensive grassland from lowland peat soils

According to the Climate Change Committee, achieving net zero requires the release of 9% of agricultural land by 2035 and 21% by 2050[27]. We currently use 85% of total agricultural land in the UK to rear livestock, either through grass pasture or feed crops (40% of arable crops in the UK are used to produce animal feed), yet this produces just 32% of the calories we eat[28].

Intensive grassland on lowland peat currently produces 5.6 million tonnes CO_2e per year. Removing all intensive grassland from lowland peat would reduce total UK intensive grassland area by just 2.6%[29].

Emissions arising from intensive grassland on peat make up 42% of lowland agricultural peat emissions. By removing intensive grassland from lowland peat and bringing these areas under restoration management, significant emissions reductions can be achieved whilst impacts upon food security are minimised. This should be accompanied by strategies to deliver local enterprises as well as fair, sustainable supply chains and sustainable and responsible dietary choices.

2. Large-scale relocation of arable and horticultural production from lowland peat to mineral soils

The emissions resulting from cropland (arable + horticulture) on peat are more than 7.5 million tonnes CO_2e per year[30].

It is estimated that horticultural lowland peat soils provide 22% of the UK's total vegetable supply – approximately 950,000 tonnes per year[31]. Horticulture is a critical area to address as vital for healthy diets, yet we have such low levels of production (we are only 55% self-sufficient in vegetables), but arable lowland peat soils producing crops such as barley and sugar beet also clearly contribute to food security. A proportion of arable cropland on lowland peat is used to grow cereal crops for use in animal feed, which could be considered less essential.

It is vital that we do not reduce the UK's capacity to produce vegetables, however, these need to be produced with a lower impact on nature and climate. Some may still be produced using rewetting techniques such as technology-based approaches using subterranean water management[32]. To maintain the UK's capacity to produce vegetables, we need a plan to support industry, with policies to support a transition covering a range of issues.

A phased approach to this should be taken on crop production, beginning with the relocation of crops that are not intended for human consumption, such as biofuels and animal feed and gradually following with the relocation of horticultural production. Measures influencing demand would help reduce pressure, such as dietary shifts towards plant-rich diets and reduced wastage. This would decrease pressure for foods and free up areas of land that are currently managed for livestock but could otherwise be used for vegetable production.

We need improved public investment in agricultural research around how we might limit the damage it causes and financial incentives to drive uptake of these practices. Paludiculture, for example, is a form of wet agriculture which seeks to combine the continued productive use of peatlands with the minimisation of carbon dioxide emissions and subsidence. Paludiculture sites may act as net carbon sinks within a narrow water table range and trials have included the growth of sphagnum moss as an alternative growing medium and edible crops, including blueberries and watercress. Paludiculture sites may also have potential to be used in the treatment of wastewater in the final stages, providing both income and public-good.

This transition will require significant action to support industry, including through the introduction of policies to tackle barriers to diversification including farmgate prices, consideration of infrastructure requirements and addressing supermarket cosmetic specifications.

3. Ambitious drive towards landscape-scale restoration to restore wider ecosystem function

There should be an ambitious drive towards landscape-scale restoration of the UK's lowland peatlands. Restoration must not solely focus on reinstating the carbon sequestering capabilities of peatlands; it should restore wider ecosystem function.

This needs to be managed in a way that allows a just transition for farmers and land managers currently dependent upon these landscapes; farmers are already experiencing difficulties as some supermarkets become reluctant to source goods grown on lowland peat to reduce their Scope 3 emissions. A just transition for farmers can be achieved through:

Environmental Land Management Schemes (ELMs)

The UK Government's Net Zero Strategy outlines a commitment to restore 280,000 hectares of peat in England by 2050, with an interim target of 35,000 hectares by 2025 supported via the Nature for Climate Peatland Grant Scheme (NCPGS)[33].

As the NCPGS ends in 2025, the Environmental Improvement Plan states that *"Beyond 2025, the main delivery vehicles for peat will be incentives through the government's new farming schemes"*, with Landscape Recovery providing *"long-term funding to support large-scale peatland restoration projects"*.

The total budget for Environmental Land Management schemes in England is £2.4 billion per year. The 2024 Sustainable Farm Incentives (SFI) and Countryside Stewardship offer in January included new actions with significant payments rates for rewetting peat soils to 30cm and to top level. (see Box SFI and CS options) However, the scheme has not yet opened and farmers can only apply by expressing interest.

SFI and CS options

In January 2024 these options were published:

SFI: Premiums for more sustainable management of farmed areas of peatland:

- Raise water levels in cropped/arable peat soils
- Raise water levels in permanent grassland

£892/£840 per ha. The water level on cropped or arable land/grassland with lowland peat soils is raised to between 31 to 50cm below the field surface and maintained throughout the year .

CS (Mid-Tier and Higher Tier) - restoration and re-wetting of areas peatland on individual holdings (including join-up across multiple holdings)

£1409 per ha to raise water levels in cropped or arable peat soils to near the land surface

£1382 per ha to raise water levels in perm grassland peat soils to near the land surface

And a ditches option and lowland raised bog habitat options[34].

In addition, just £25 million (or 1%) of the total ELM budget was allocated to the larger Landscape Recovery schemes in 2023. There has been no government commitment to fund Landscape Recovery beyond the initial two rounds. Landscape Recovery provides farmers and land managers the opportunity to co-design a bespoke agreement to produce public goods across landscape scale projects. Projects receiving Landscape Recovery funding include Leven Carrs Wetland in East Yorkshire, where plans are being developed to transition an intensive arable farm towards more sustainable farming practices, while working towards recovery of local water vole populations and supporting the local economy[35]. To continue to drive delivery beyond 2025 the UK Government must commit additional and dedicated funding towards the landscape-scale restoration of peatlands in England.

It is vital that the limited ELM budget is very well targeted to deliver the outcomes needed for nature recovery and climate mitigation and adaptation. New economic analysis, by The Wildlife Trusts, RSPB and the National Trusts demonstrates that the current agricultural budget is significantly less than what is required for the UK farm and land management sector to help tackle the nature and climate crisis. To support the just transition for farmers, many of whom have tried and failed to access SFI, Countryside Stewardship and Landscape Recovery schemes, the overall budget for Environmental Land Management schemes must be increased to at least £5.9 billion a year.

Private finance – Peatland Code

Private finance will inevitably play a part, but it needs to fit the ambition for lowland peat restoration. The Peatland Code allows farmers on lowland fen soils under agricultural production to lever private finance to support restoration but it is not necessarily a good fit for lowland peat restoration so far. Across all habitat types, the Peatland Code is currently supporting the restoration of over 44,000 hectares of peatland, with an estimated 10 million tonnes of emissions avoided[36].

Wider government interventions

To facilitate large-scale restoration of lowland peatlands, it is likely that more government intervention will be necessary. This may include the facilitation of land swaps, introduction of further regulation, and structural reforms such as of IDBs, which must move towards sustainable water management and operate in public rather than private interest.

The UK Government must develop a Horticulture strategy[37] that addresses the barriers to developing sustainable farming on lowland peat and the transfer of production to other land. This includes:

- A coherent **Land Use Framework** to help drive changes needed in a fair and cross departmental way, helping to develop sustainable horticulture production more widely and looking at the social value of current land uses such as for large scale biofuels and biomass. It should also look at opportunities for increasing agroecological horticulture production on peri-urban and urban land – providing skills, training, jobs and enterprise opportunities as well as near market distribution benefits.
- Resources to help **build capacity elsewhere** for field vegetables including payments for environmental benefits from the production, skills and training, storage, part processing and marketing i.e. the infrastructure for decentralising veg production.
- Action to **reduce unhelpful cosmetic and just-in-time specifications** and to remedy unfair contract negotiations. Fairer contracts and supportive markets should lead to growers being able to cover higher costs on lower value (non-peat) soils.


LINNETS IN FLIGHT © LUKE MASSEY/2020VISION

4. More sustainable farming practices across remaining lowland agricultural peatlands: paludiculture

Paludiculture is a form of wet agriculture that seeks to combine the continued productive use of peatlands with the minimisation of carbon dioxide emissions and subsidence. Initial studies suggest that paludiculture sites can act as net carbon sinks within a narrow water table range. While the term “paludiculture” is a recent one, its practice in England goes back generations[38].

Paludiculture can be used to grow a range of both novel and mainstream crops, from cranberries, watercress and *Typha* (reed) for insulation. Where it is impossible to fully manage hydrology to facilitate restoration, paludiculture may act as the ‘next best’ solution, acting as a buffer in areas surrounding restoration sites.

Where paludiculture is taking place, it should adhere to the IUCN UK Peatland Programme’s Principles for Sustainable Peatland Paludiculture[39]. These include that paludiculture should halt the degradation of peat through rewetting; that it should be planned and managed with due regard to biodiversity; and that it must be adapted to be appropriate to local circumstances, conservation and restoration goals.

The Wildlife Trusts are conducting paludiculture trials in Lancashire and the Cambridgeshire Fens[40]. Trials have included the growth of sphagnum moss as an alternative growing medium and for edible crops, including blueberries and celery. Winter wheat has also been planted to showcase how farmers can combine nature-friendly farming techniques with wetter farming. Linnet, yellowhammer and other farmland bird species have been found to utilise the winter wheat crop.

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We are facing climate and ecological emergencies and the two are inextricably linked — we cannot solve one crisis without tackling the other. The Wildlife Trusts is on a mission to restore a **third of the UK's land and seas** for nature by 2030 — not only in celebration of the value of nature, but also because people are part of, and entirely dependent on, nature.

We believe **everyone, everywhere, should have access to nature** and the joy and health benefits it brings. No matter where you are in the UK, there is a Wildlife Trust **empowering people to take action for nature** and standing up for wildlife and wild places. Each Wildlife Trust is an independent, grassroots, community-powered charity formed by people getting together to make a positive difference for wildlife, climate and future generations. Together we care for 2,300 diverse and beautiful nature reserves and work with others to manage their land for nature, too.

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