



giving  
nature  
a home

# England's upland peatlands

– turning around a crisis

# Peatlands a priceless resource in need of restoration



From Bodmin Moor, Dartmoor and Exmoor in the south west, through the Peak District and Pennines to Cumbria and the North York Moors, England's upland peatlands are a priceless resource for current and future generations.

When they're healthy, they store carbon, provide a home for a wonderful array of wildlife, clean water and help to slow flood waters. Millions of people enjoy them for recreation and they are integral to local economies.

Yet today, they are in crisis. Poor investment and oversight threaten our upland bogs and all they do for us.

We believe it's time to correct this; we're calling for England's upland peatlands to be restored or to be under restoration management by 2020.



# A valuable habitat that gives nature a home

England's upland peatlands amount to 1.5% of the world's blanket bogs, extending across 355,000 hectares (ha). They are home to an extraordinary wealth of wildlife. Many are specialised species, which have adapted to thrive within a waterlogged, mostly acidic, nutrient poor habitat.

Our bogs are characterised by squelchy carpets of colourful sphagnum bog mosses; an intricate mosaic of species occupying differing niches within the hummocks and hollows of healthy peatlands. There's also a wealth of rarer bog plants – including carnivorous sundew and butterwort, aromatic bog myrtle, bog asphodel, bog rosemary, sedges and cotton grass.

Many different birds live in these habitats too. They are important for breeding wading birds such as dunlins, golden plovers, redshanks and curlews. Skylarks and twites sing in the upland skies, above the whirring red grouse, whilst rarer natural predators include merlins, short-eared owls and hen harriers.

These wet upland expanses are home to an abounding diversity of insects. They are our richest habitat for dragonflies: 25 of the UK's 38 species can be found here, with 11 of these living almost exclusively on bogs. There are many other specialist peatland insects, from large heath butterflies to smaller, lesser-known species like the bog reed beetle.



# England's upland blanket bog



# What peatlands do for us

## Climate change mitigation

Peatland soils are rich in carbon. Globally, peat soils cover 3% of the world's surface yet they contain 30% of the world's soil carbon, twice as much as the world's forests<sup>1</sup>. If natural peatlands are disturbed and the soil exposed to air, the carbon stored in the soil decomposes and releases CO<sub>2</sub>, contributing to climate change.

England's upland peatlands store away 138 million tonnes of carbon<sup>2</sup>, equivalent to 506 million tonnes of CO<sub>2</sub>. Holding on to this carbon store is vital in the fight against climate change.

## Water and flood management

Healthy peatlands reduce flood risk and help sustain water supplies. Upland peat bogs are the headwaters for some of our major drinking water capture areas. They play a key role in water resource management; they store a significant proportion of fresh water and release it throughout dry summers, maintaining water quality and helping reduce the effects of flooding.

Upland peatlands help regulate the flow of floodwater to downstream areas – and sit above a number of high flood-risk cities and towns. Peat restoration slows surface run-off, which may reduce flood risk in upland catchments.

## Clean water

About 70% of Britain's drinking water comes from upland catchments, which are generally peat dominated<sup>3</sup>. The Peak District peatlands alone supply four million people with water<sup>4</sup>. Birmingham, Exeter, Leeds, Liverpool, Manchester and Sheffield, and almost all of Cornwall, rely on peat catchments for their water.

Healthy peatlands, with carpets of sphagnum mosses, provide much cleaner water than degraded ones, where the soil washes away into the water courses and greatly increases discolouration.

# Peatlands in crisis

We are squandering the priceless things our upland peatlands provide, because they've been allowed to deteriorate.

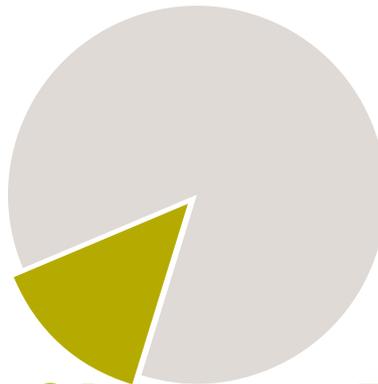
Today, only 4% of England's upland deep peatlands are in good ecological condition and actively forming peat<sup>3</sup>. Even across our protected wildlife areas, only 14% of blanket bog Sites of Special Scientific Interest in England are considered by Natural England to be in favourable condition<sup>6</sup>. Above 300 metres, this area falls to only 10.5% being in good condition.

**England's upland deep peatlands**



**4%**  
In good ecological condition

**Protected wildlife areas in England's upland peatlands**



**14%**  
In good ecological condition

**Protected areas above 300 m in England's upland peatlands**



**10.5%**  
In good ecological condition

# Why England's upland peatlands are in poor condition

The very poor condition of England's upland blanket bog is a result of several different types of damage, leaving large areas of degraded and often eroding peatland.



Non-peat forming vegetation

51%



Burned

30%



Grip drained

21%



Gully erosion

14%



9%

Overgrazed



7%

Forested

1%



Bare peat

% Blanket bog area<sup>3</sup>

Some areas can have a combination, or all of these types of damage.

# Impacts of poor quality peatlands

## Releasing greenhouse gases

The poor condition upland blanket bogs in England release 350,000 tonnes CO<sub>2</sub> to the atmosphere each year<sup>2,3</sup> – the same as from 140,000 cars<sup>5</sup>. Three quarters of this is a direct result of burning the vegetation on peatlands<sup>2</sup>.

## Compromising water supply

Over 30 years the amount of dissolved organic carbon in water (the brown colour of peaty water) from upland peatlands has doubled, mostly due to peat degradation. As well as the discolouration, each square kilometre of bare peat sends up to a quarter-ton of soil into streams and rivers each year<sup>7</sup>. Burning deep peatlands increases water discolouration, which is also worse on heather dominated peats<sup>8</sup>.

## Disappearing wildlife

Many upland birds are in trouble, with their numbers in worrying declines. Hen harriers, dunlins, skylarks and twite are on the Red list of UK Birds of Conservation Concern<sup>9</sup>. Red grouse, merlins, golden plovers, snipe, meadow pipits and short-eared owls are all Amber listed. Curlews now meet the Red list criteria and are globally near-threatened, with 25% of the world population in the UK. Hen harriers failed to breed in England in 2013.

Of the English uplands bird species, around **45%** are in decline. More widely across the UK, **65%** of upland butterflies, **66%** of invertebrates and **67%** of upland flowering plants are declining<sup>10</sup>.



**Intensive burning and  
draingae measures  
on a Natura 2000  
deep peatland site in  
the Pennines.**

# Saving our peatlands

We want at least 200,000 ha more of England's degraded, unrestored upland peatlands to be restored or to be in active restoration by 2020.

This will triple the area currently being restored<sup>3</sup>. It will bring England's upland peatlands back into a functioning condition so they can contribute to reversing, not exacerbating, issues of climate change, water management and wildlife declines.

## What will this cost?

Restoring 200,000 ha of upland peatland may cost between £51.8 million to £270.4 million in capital costs, with ongoing annual costs of £5m to £34.8m<sup>3</sup>. This suggests an annual capital cost of £26.85 million over the six years to 2020, estimated on the mid-point of this range (which reflects management costs in different types and locations of degraded peatland). Approximately £20 million is required annually for management in the early years following initial restoration works.

Agri-environment grants already provide part of this funding. However, all too often these do not deliver appropriate peatland management and the schemes should be improved to gain the wide benefits of peatland conservation.

**Restoring**  
**200,000 ha**  
**of upland peatland may**  
**require an annual costs per**  
**annum of £26.85m.**

# Wide ranging benefits

## Carbon saving

Restoring 200,000 ha of damaged upland peatland would change them from being a source of CO<sub>2</sub> emissions to actively sequestering between 200,000 and 400,000 tonnes of CO<sub>2</sub> each year<sup>11</sup>.

This is worth between £13 million and £26 million each year in saved CO<sub>2</sub> emissions, estimated from Department of Energy and Climate Change's carbon prices<sup>12</sup>. The overall carbon store of England's upland bogs is worth billions of pounds.

If we don't restore upland peatlands, CO<sub>2</sub> emissions from degraded peatlands are likely to increase by 30% for every 1°C rise in average global temperature. Peatlands with healthy ecosystems are by contrast expected to be relatively robust to climate change. So it's important to begin restoration urgently, to make our upland peatlands resilient to climate change.

## Multiple benefits

Yet the benefits of healthy peatlands are much wider than just for carbon storage and climate change mitigation. Taking the central value for all aspects of the benefits from restoring our 200,000 ha of upland peatland gives an overall benefit value of between £32.5 to £50 million each year over an 80 year period, for low and high climate change scenarios respectively. This could be as high as almost £90 million each year for a high climate change scenario future<sup>3</sup>.

**If we don't restore upland peatlands, CO<sub>2</sub> emissions from degraded peatlands are likely to increase by**

**30%**

**for every 1°C rise in average global temperature.**

# Improved water management

Blocking peatland drains slows the instant water run-off from upland peat soils by 75% <sup>13, 14, 15</sup>. Healthy peatland habitat with sphagnum cover slows flood peak water run-off by 10% compared to bare peat surfaces<sup>4</sup>. Holding water high in the upland catchment areas also helps to control water movement. All of these things reduce flash floods, which can cause millions of pounds of damage in hours.

Peatlands in good condition have better water quality. Water running off healthy, active peatlands is some 40% clearer, with 40% less colour, than water from burned peat <sup>4, 16</sup>. This requires less treatment when it's used for drinking water. Water companies spend millions of pounds each year cleaning peat from water supplies.



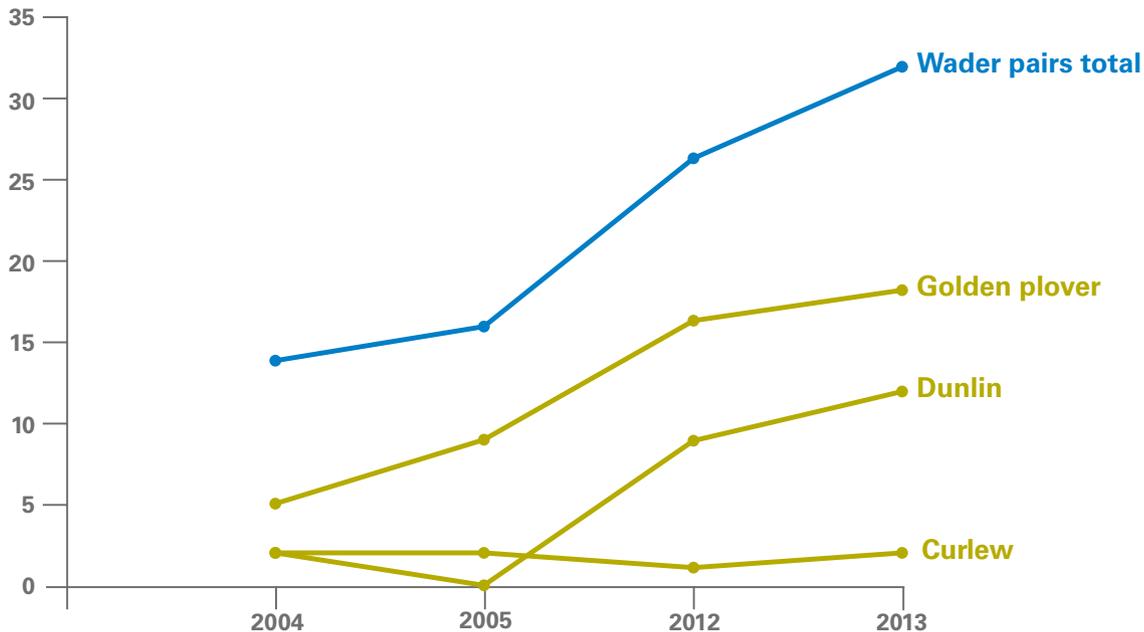
# Wildlife returns



At Dove Stone, South Pennines, the RSPB and United Utilities restored around 500 ha of upland bog between 2007 and 2009.

This work is turning an eroding, carbon-source peatland into thriving wildlife habitat capable of sequestering 500 to 1,000 tonnes of CO<sub>2</sub> from the atmosphere each year.

On restoration areas there are already more than twice as many breeding pairs of wading birds. Dunlins and golden plovers, two specialist birds of blanket bogs, are doing particularly well. Water voles, declining nationally, are being found in increasing numbers, and dragonflies patrol the newly created bog pools.



# References

1. Parish F, Sirin A, Charman D, Joosten H, Minaeva T, Silvius M (Eds, 2008) *Assessment on peatlands, biodiversity and climate change*. Global Environment Centre, Kuala Lumpur and Wetlands International Wageningen, 179 p.
2. *England's peatlands: Carbon storage and greenhouse gases*. Natural England (2010).
3. *Managing the land in a changing climate*. Adaptation Sub-Committee Progress Report 2013, Committee on Climate Change. (Plus additional ASC info)
4. Defra (2009) *Ecosystem services of peat – Phase 1*. Project code: SP0572.
5. Carbon Trust conversion factors. [carbontrust.com/media/18223/ctl153\\_conversion\\_factors.pdf](http://carbontrust.com/media/18223/ctl153_conversion_factors.pdf)
6. *ENSIS (English Nature Site Information System) Date of extraction: 30/09/2013, Natural England*.
7. Evans MG, Warburton J & Yang J (2006) *Sediment budgets for eroding blanket peat catchments: global and local implications of organic sediment budgets*. *Geomorphology*, 79, 45–57.
8. *The effects of managed burning on upland peatland biodiversity, carbon and water*. Natural England Evidence Review NEER004 2013.
9. Eaton M A, Brown A F, Noble D G, Musgrove A J, Hearn R, Aebischer N J, Gibbons D W, Evans A and Gregory R D (2009) *Birds of Conservation Concern 3: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man*.
10. *State of Nature 2013 report*. Burns F, Eaton M A, Gregory R D et al. The State of Nature partnership.
11. Quick T, Reed M, Smyth M, Birnie R, Bain C, Rowcroft P and White A (2013) *Developing place-based approaches for Payments for Ecosystem Services*, Defra/ Natural England Technical Report URS London.
12. *A brief guide to the carbon valuation methodology for UK policy appraisal*. DECC, (2011).
13. Bain C G, Bonn A, Stoneman R, Chapman S, Coupar A, Evans M, Gearey B, Howat M, Joosten H, Keenleyside C, Labadz J, Lindsay R, Littlewood N, Lunt P, Miller C J, Moxey A, Orr H, Reed M, Smith P, Swales V, Thompson D B A, Thompson P S, Van de Noort R, Wilson, J D & Worrall F (2011) *IUCN UK Commission of Inquiry on Peatlands*. IUCN UK
14. Wilson L, Wilson J, Holden J, Johnstone I, Armstrong A & Morris M. (2010) *Recovery of water tables in Welsh blanket bog after drain blocking: Discharge rates, time scales and the influence of local conditions*. *Journal of Hydrology*, 391, 377-386.
15. Wilson L, Wilson J, Holden J, Johnstone I, Armstrong A & Morris M. (2011) *Ditch blocking, water chemistry and organic carbon flux: Evidence that blanket bog restoration reduces erosion and fluvial carbon loss*. *Science of the Total Environment*, 409, 2010-2018.
16. Yallop A R, Clutterbuck, B & Thacker, J I (2010) *Increases in humic dissolved organic carbon export from upland peat catchments: the role of temperature, declining sulphur deposition and changes in land management*. *Climate Research*, 45, 43-56. [int-res.com/articles/cr\\_oa/c045p043.pdf](http://int-res.com/articles/cr_oa/c045p043.pdf)

**The RSPB,**  
UK Headquarters,  
The Lodge, Sandy,  
Bedfordshire  
SG19 2DL.

Tel: 01767 680551

[rspb.org.uk](http://rspb.org.uk)

**The RSPB is a member of BirdLife International, a partnership of conservation organisations working to give nature a home around the world.**



The RSPB is a registered charity in England and Wales 207076, in Scotland SC037654

Front cover by Alamy

272-0740-13-14