NATURE-BASED SOLUTIONS

Supplementary document to the NAAONB Climate Action Framework and Toolkit

7th April 2022

Produced by the NAAONB Collaborative Climate Change Action Programme Nature-Based Solutions Sub-Group, including input from many AONB teams at workshops held in 2021

This document includes material within the overall Climate Action Framework and Toolkit, but has more detail, since this topic is so central to AONB work. Defra have set out in their recent funding offer the expectation on AONB teams to focus on Nature and Climate as well as People and Place priorities, including "increasing the role of our protected landscapes in delivering nature-based solutions to help address the twin biodiversity and climate crises." As with the Framework and Toolkit, comments and suggestions for improvement are welcomed, and updates will be made.

Contents

Summary

"Nature-based solutions are land management interventions that use nature and natural ecosystems to deliver improvements against societal problems, providing multiple benefits for the public and for biodiversity. Widely recognised as a critical aspect of our response to climate change, examples of nature-based solutions include woodland creation, peatland restoration and coastal managed realignment." Wimpole Nature-Based Solutions Compact, National Trust

The **climate and nature crises are linked**. Historically AONB teams have worked more on nature - here we are looking for climate benefits too, both **mitigation and adaptation**.

We support the principles set out in the **National Trust Wimpole Compact on Nature-Based Solutions** https://nt.global.ssl.fastly.net/documents/nbs-compact-october-2021.pdf

Additional **sequestration** is our goal, but we first need to protect the significant **carbon stores** in many existing habitats, and in the case of peatlands improve their condition to **stop current significant emissions**.

There is lots of activity in some (especially Northern) AONBs on **peatlands** which needs to continue, and in those AONBs which have more modest areas of peat there could also be increased targeted action for peatlands.

Carbon storage and sequestration in soils and vegetation in/on **grassland, heath and wetland** habitat mosaics are closely linked to agricultural practices, on which another sub-group is working.

On **trees and woodland** we need to look after what we have so that it regenerates, plus ensure that new planting and woodland creation is appropriate to the landscape and existing habitats. There is significant potential in many AONBs for more trees outside woods e.g. in the farmed environment, and new tree establishment is needed to offset losses from tree diseases.

Coastal and marine habitats relevant to some AONBs can be significant for 'blue carbon' storage and sequestration.

Natural Flood Management (NFM) approaches are important for climate change adaptation as well as providing many other benefits.

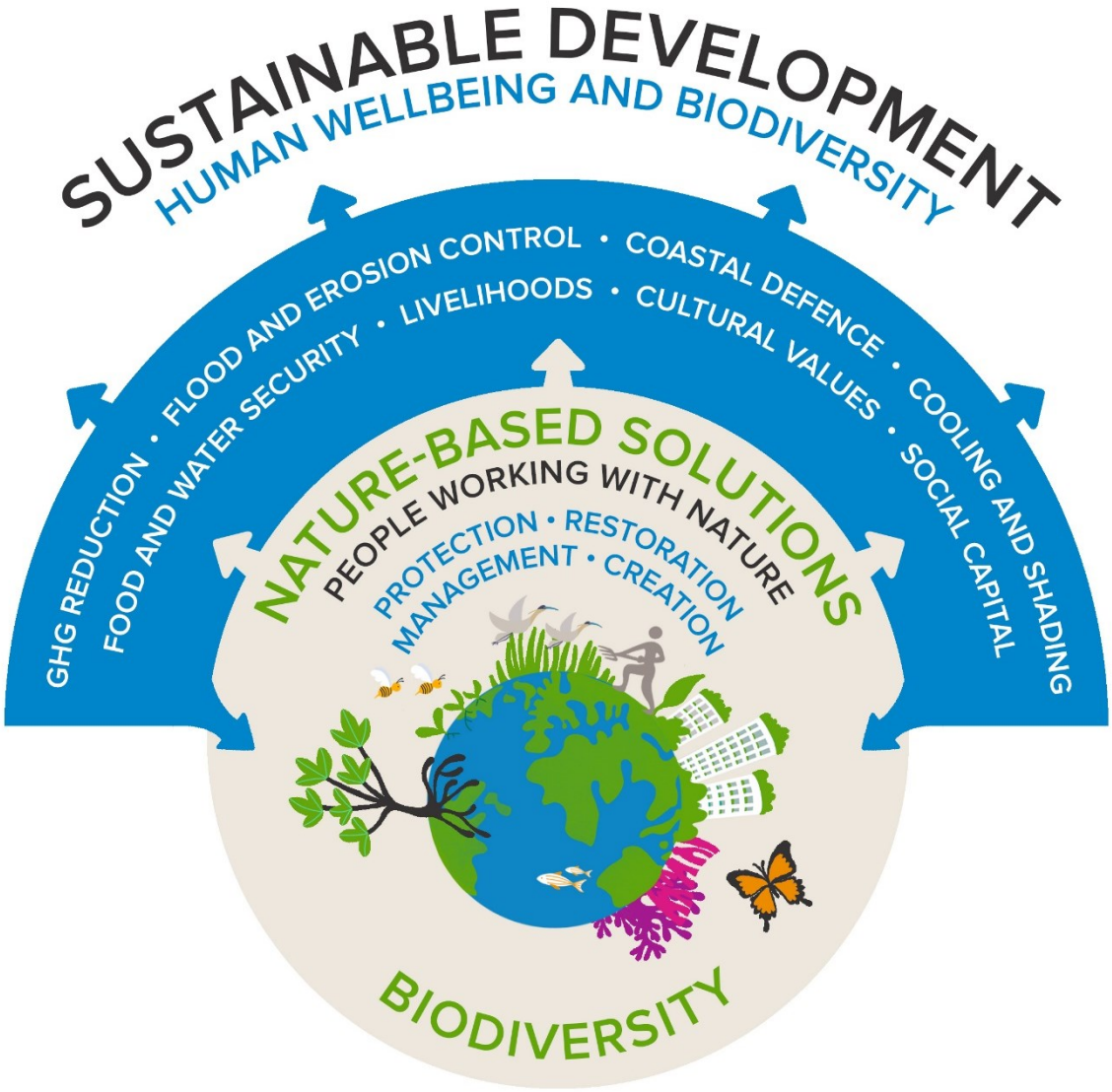
As well as technical expertise, successful NBS initiatives need to consider **engagement and co-design with land managers and local communities**.

We are commissioning data on **carbon storage and flux in priority habitats** in all AONBs, and exploring whether this can be done for classifications covering all land within AONBs.

Our **Nature Recovery Plans** (linked to forthcoming LNRS) and our **AONB Management Plans** are important tools to drive further NBS activity. We need figures to **understand where the greatest carbon gains can be made, in ways compatible with nature** and other interests. **Some proposals may be harmful to nature** if just looking at carbon storage on land (e.g. from commercial offsetting schemes) and we need to influence these.

The **funding** environment is complex but still inadequate. There is great potential for further **collaboration** between AONBs and with other partners to increase action and knowledge of NBS.

Nature-based solutions are not just about climate change mitigation, but also integrate with climate change adaptation and delivery of many other public benefits.



Source: https://www.naturebasedsolutionsinitiative.org/what-are-nature-based-solutions/

AONB narrative on nature-based solutions and climate change

This section aims to be an evidence-based narrative to influence national decision-makers, covering both mitigation and adaptation responses. Parts of this narrative were submitted by NAAONB to the House of Lords Science & Technology Select Committee Enquiry on nature-based solutions in October 2021. It also supported NAAONB's input into the National Trust Wimpole Compact.

The NAAONB's Colchester Declaration sets out an ambitious mission and targets for AONBs in terms of nature recovery and climate change, and therefore relates closely to nature-based solutions.

How best to go about nature-based solutions in AONBs

- **The integration of nature-based climate solutions with actions for nature recovery is vital.** We must be "nature positive and carbon negative" at the same time. Measures adopted will often have other ecosystem benefits such as flood attenuation and also climate change adaptation benefits to improve resilience. They also connect with climate change mitigation and adaptation through agriculture and forestry – we must look at nature-based solutions holistically. Land (and water) delivers many benefits and services and must not be thought of just in terms of carbon.
- Nature-based solutions have an important role for tackling climate change, but they **aren't a way of avoiding the necessary deep cuts in emissions in all sectors.**
- Nature-based solutions can help to sequester further carbon from the atmosphere, but the **existing carbon storage in soils and vegetation** is already considerable, especially in semi-natural habitats. This store may be vulnerable and maintaining it by **conserving habitats in good condition is an important starting point.**
- Peat in poor condition is a major source of carbon emissions. However, the size of carbon sink in our peat is huge and the further sequestration potential of peatlands in good condition is significant. Some of the larger upland AONBs with large areas of blanket bog have large scale activity on peatland conservation and restoration, with multiple benefits including for climate. Lowland deep peats are less well represented within the AONB network, but we need to pay attention to the under-recognised shallow and pockety peat areas in a variety of AONB landscapes. **All peatlands can make a contribution for climate and we should be aiming for all to be in good condition**.
- All AONBs can benefit from increased tree cover, but the scope and potential will vary. **Tree cover expansion must be done in ways appropriate to nature recovery and landscape context.** Survival of trees to maturity matters as much as planting, so maintenance and where necessary control of damage by squirrels and deer is important. Care for existing trees and woodland should also not be overlooked.
- **Other habitats** including permanent grasslands, heathlands and coastal habitats are also important for carbon, particularly in **undisturbed soils**. Where **livestock** are used to manage these habitats, the **emissions** from these will typically be **the most significant factor** in the carbon flux of the land.

The role of designated landscapes and AONB partnerships

- Through their statutory AONB Management Plans, partnerships with broad representation, and small specialist staff teams with local knowledge, **AONB organisations collectively are already an important deliverer of nature-based solutions** and integrated land management, and have a strong track-record. See https://landscapesforlife.org.uk/about-aonbs/Nature-recovery/nature-recovery-solutions.

- However, with current resources and capacity, AONB teams and Partnerships are nowhere near fulfilling the potential of their areas for nature-based solutions. **AONB teams and other delivery bodies need additional support to fulfil this potential, both in terms of up-skilling and through additional resources.**

- The protection conferred by the AONB designation alone is not sufficient to ensure that all semi-natural habitats within AONBs are well managed and in good condition. **Enhancing the protection of AONBs and increasing resources for their pro-active management will therefore contribute directly to climate change mitigation and adaptation**, as well as nature recovery and other benefits.

- Scientific understanding of management of land for carbon storage and climate change mitigation is developing rapidly, and **ongoing collaboration and knowledge sharing to broaden and deepen understanding is vital** to achieving more on the ground.

- AONB teams and Partnerships can usefully contribute on nature-based solutions by **engaging with land managers and with local communities, and by co-ordinating the activity of partners**, as well as by direct delivery themselves. They also have a valuable role to raise public awareness and understanding of the topic.

- The **integration of nature-based climate action into the Environmental Land Management (ELM) schemes** will be important, and in the shorter term, the Farming in Protected Landscapes programme delivered by AONB teams and National Park Authorities provides a good additional mechanism in these areas.

- **The forthcoming review round of AONB Management Plans** provides an important and timely opportunity to further embed climate change and nature-based solutions within AONB work.

Recommendations for new policies and initiatives

- There are currently quite a lot of government funding schemes related to nature-based solutions. Many of them are quite short term, and they can arise at short notice, allowing small AONB teams little time to develop proposals (e.g. Farming in Protected Landscapes, Nature for Climate programmes). Many government funds involve bidding for limited sources, and so delivery bodies are competing against each other, with many unable to secure funds and deliver their proposals. The Peatland Carbon Code is not yet as far advanced as the Woodland Carbon Code, and is not working yet as the carbon price is not high enough. **We do need even more government funding to significantly upscale work, but programmes need to be longer term to allow momentum to build. Longer term programmes can link better to long term strategies such as the 25YEP and Net Zero Strategy.**

- **Swift and full implementation by government of the recommendations of the Glover Review of designated landscapes would enhance the capacity of AONB teams and partnerships to deliver on nature-based solutions, and should be taken forward at the earliest opportunity.** Climate is not specifically referred to in the purposes of AONB designation – this doesn't stop us working on it, but realigning purposes would help all stakeholders to accept that it is relevant to AONBs, and to help AONB teams to give it a higher priority.

- **Private finance for nature-based solutions has significant potential and will become increasingly important, but has pitfalls which need to be avoided.** A risk associated with nature-based solutions is that organisations (or individuals) seek to buy their way to claims of carbon-neutral operations by modest emissions reductions and then offsetting the rest, which usually involves nature-based solutions – often tree planting. There simply isn't enough offsetting capacity available through nature-based solutions for all the companies and people who might want this easy route. It can also drive poor land-use changes in areas of countryside selected for offsetting schemes. **Government schemes seeking to bring in new financing models should ensure to avoid these pitfalls. Consideration should be given to a centralised private finance initiative for AONBs, as for National Parks.**

- **Developing partnership is key to reaching the potential of nature-based solution in AONBs**. Most AONB organisations don't own or manage land directly themselves (some manage Council owned sites) and so have to work with landowners. At a national level, initiatives such as the Nature Recovery Network Partnership, and the National Trust's compact on nature-based solutions are welcome. Local Nature Recovery Strategies and Net Gain activities also have important potential. **Achieving the best synergy between programmes and organisations requires commitment at all levels.**

- **Alongside stepped-up delivery there needs to be continued monitoring and research.** Some of the science in this field is quite new, established metrics are not in place, and there is wide variability in the figures for carbon sequestration and storage by habitat due to variability of natural factors. **There are gaps in knowledge and understanding and the evidence base needs expanding. This does not all mean that action cannot start or continue – proven actions should go ahead, alongside monitoring.**

- **Environmental Land Management will be a vital delivery mechanism, and the weighting given to climate within this will make a big difference.**

Toolkits, guidance and case studies on nature-based solutions to climate change relevant to AONBs

General

National Trust Wimpole Nature-Based Solutions Compact 12th October 2021. Recent agreement among land-based bodies in UK, sets out some useful principles for Nature-Based Solutions. NAAONB had input and is a signatory to this. https://landscapesnetwork.org.uk/Resource-583-Nature-based-Solutions-Compact

Natural England Carbon Storage and Sequestration by Habitat 2021 (NERR094). Definitive and detailed figures for carbon storage and flux for different habitats and changes to other land uses. http://publications.naturalengland.org.uk/publication/5419124441481216

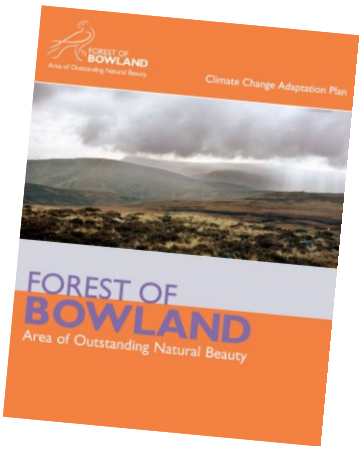
Nature-based Solutions for Climate Change in the UK: A Report by the British Ecological Society Excellent informative guidance on NBS in general and detail on peatlands, woodlands, saltmarsh, hedgerows and field margins, agroforestry https://www.britishecologicalsociety.org/policy/nature-based-solutions/read-the-report/

JNCC web pages created on behalf of the UK Inter-Agency Climate Change Group (IACCG). Showcase of some of the very best examples of projects on Nature-based Solutions from across the four countries of the UK https://jncc.gov.uk/our-work/nature-based-solutions-iaccg-case-studies/

The Nature-based Solutions Initiative - an interdisciplinary programme of research, education and policy advice based at the University of Oxford. Its mission is to enhance understanding of the potential of Nature-based Solutions to address multiple global challenges and support their sustainable implementation worldwide. https://www.naturebasedsolutionsinitiative.org/

House of Lords Science & Technology Select Committee report 'Nature-based Solutions: rhetoric or reality? The potential contribution of nature-based solutions to net zero in the UK', January 2022 https://landscapesnetwork.org.uk/Resource-608-Science-Tech-Select-Committee-report-on-Nature-Based-Solutions-Jan-2022

Natural England Climate Change Adaptation Manual, 2nd edition 2020
A resource to support practical and pragmatic decision-making, by bringing together recent science, experience and case studies.
http://publications.naturalengland.org.uk/publication/5679197848862720



Forest of Bowland AONB Climate Change Adaptation Plan
https://www.forestofbowland.com/climate-emergency

Cornwall AONB ELM Test & Trial on natural capital of the Lizard
https://www.cornwall-aonb.gov.uk/lizard-test-trial-farming-for-the-nation

Peatland restoration

Peat is very unevenly distributed in AONBs, with deep peat being very concentrated in the North Pennines along with Forest of Bowland and Nidderdale. Elsewhere peatland work will be at a much smaller scale, but can nevertheless be significant. See Appendix for figures and maps showing the national distribution of peat in AONBs and commentary on this.

Tools and guidance

IUCN Peatland Restoration web page with links to strategies, case studies and the 'Conserving Bogs' Management Handbook https://www.iucn-uk-peatlandprogramme.org/about-peatlands/protecting-peatlands/peatland-restoration

Nature for Climate Peatland Grant Scheme Government funding to restore peatlands in the uplands and lowlands of England. A competitive grant scheme that will run until 2025.
https://www.gov.uk/guidance/nature-for-climate-peatland-grant-scheme

Climate Change Committee outcomes case study on peatlands
https://www.theccc.org.uk/wp-content/uploads/2019/07/Outcomes-Peatland-case-study.pdf

England Peat Action Plan May 2021
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1010786/england-peat-action-plan.pdf

Case Study - Northern upland peat restoration

Action for peatlands can improve carbon sequestration and storage, but also since the condition of many peatlands is poor, it is vital to actually reducing current emissions. 6% of UK carbon emissions come from damaged peatlands (comparable with the 7% of emissions which come from air travel). Restored and well-managed peatland stores and sequesters millions of tonnes of carbon every year, allowing it to then sequester more carbon into the future. Healthy peatland also plays a vital role in flood mitigation and reducing both sediment load and water colour in our rivers.

Since 2006, the North Pennines AONB team has led the restoration of 35,000ha of drained or bare/eroding peatland – an area three times the size of Newcastle. Additionally, since 2010, the Forest of Bowland AONB unit has managed and delivered the restoration of over 4,000ha. of degraded peatland. These two AONB teams are now working with Yorkshire Wildlife Trust on the Pennine PeatLIFE project https://www.northpennines.org.uk/what_we_do/peatland-programme/pennine-peatlife/.

The work involves re-wetting large areas of blanket bog through blocking grips (drainage ditches) and gullies, and revegetating bare and eroding peat by managing water flow, spreading seed-rich heather brash, cottongrass planting and *Sphagnum* inoculation. This benefits blanket bog vegetation communities and supports a suite of upland bird species including curlew, golden plover and dunlin.

More recently, AONB Partnerships have been at the heart of the developing peatland restoration initiative, the Great North Bog (https://greatnorthbog.org.uk/). This is a landscape-scale approach to restoration across nearly 7,000 km^2 of upland peat in the Protected Landscapes of northern England, which currently store 400 million tonnes of carbon. Damaged peat in the Great North Bog releases 3.7 million tonnes of carbon annually. The programme aims to develop a working partnership to deliver a 20-year funding, restoration and conservation plan to make a significant contribution to the UK's climate and carbon sequestration targets.

Case Study - South West Peatland Partnership

Cornwall AONB team is a partner of the South West Peatland Partnership (SWPP). On behalf of the SWPP, South West Water have successfully secured in Dec 2021 funding from Natural England's Nature for Climate Peatlands Restoration Scheme which is made up of local and regional organisations to restore 2,634 hectares of damaged peatland in Cornwall, Devon and Somerset, saving a total of 652,625 tonnes of CO2 equivalent.
https://www.southwestwater.co.uk/environment/working-in-the-environment/south-west-peatland-partnership/

Case Study - Shropshire Hills peatlands project (in development)

The Shropshire Hills has localised areas of deep peat, along with much larger areas of shallow, modified peat which have not until recently been really thought of as peatlands. Gathering information on this has focussed attention on this under-valued resource, and both habitat and soil maps have been found to under-estimate the extent of peat in the area. Peatlands and catchment headwaters are now a priority both for the AONB Partnership and for Natural England in the region. The topic is coming up the agenda with landowners but current government grants are focussing attention on deep peat areas, so securing funding for a peatlands project is proving difficult so far.
https://www.shropshirestar.com/news/local-hubs/south-shropshire/2021/09/16/shropshire-peatland-set-to-play-a-crucial-role-in-battling-climate-change/

Woodland creation and management

All AONBs have trees and woodlands but the extent varies a lot by landscape. Some of the most heavily wooded are the High Weald, Wye Valley and the Chilterns. The protection and management of existing woodlands is an important action for nature-based solutions in all AONBs. A high proportion of the carbon stored in a woodland is in the soil.

AONB partnerships play a very significant role in driving, pioneering and enabling the storing and sequestering of carbon in trees and woodlands, across AONB landscapes. Across the AONB network there is 165,289 hectares of woodland in active management, taken as a proxy for regenerating woodland. There are many initiatives spearheaded by AONBs that are linking supply and demand chains to bring undermanaged woodlands back into management including woodfuel, machinery ring and community projects. In addition, trees outside woodlands are a high priority and there are many active projects, including strengthening field boundaries plus hedgerow trees, protecting veteran trees, wood pasture, orchards and in-field trees/ agroforestry plus mitigating for losses due to tree diseases such as ash dieback.

Effort has stepped up several gears in order to accelerate the re-creation of new trees and woodlands, whether planted or allowed to regenerate, following right place right tree principles. [data being currently sought from the FC & Woodland Trust for data for grant aided new planting since 2019, across all AONBs]. In many AONBs, this is linked to efforts to restore catchments using the catchment based approach.

AONBs are not likely to be areas for the largest scale of new woodland creation, though new woodlands and tree planting will enhance many AONB landscapes at some scale. Some AONBs are however more limited in opportunities, due to the value of open landscapes and habitats, the high proportion of woodland found already, historical and archaeological value and other reasons. In some landscapes such as marginal uplands there is increased pressure for larger scale woodland planting, increasingly driven by carbon objectives or private markets, which may be contentious in landscape terms or in relation to the value of other habitats. The case to retain shallow peatlands as largely unwooded wetland habitats has not been won.

Tools and guidance

Government web page on tree planting and woodland creation
Good information on planning schemes, grants and funding, links to case studies and advice.
https://www.gov.uk/guidance/tree-planting-and-woodland-creation-overview

Woodland Trust Emergency Tree Plan for the UK: How to increase tree cover and address the nature and climate emergency, January 2020
https://www.woodlandtrust.org.uk/publications/2020/01/emergency-tree-plan/

Restoring ancient woodland – Woodland Trust
Information on how and why to protect, manage and restore our ancient woodlands.
https://www.woodlandtrust.org.uk/protecting-trees-and-woods/ancient-woodland-restoration/

Woodland Wildlife Toolkit
This toolkit provides advice on managing woodlands for wildlife, including practical advice on management techniques, information on woodland management issues and legal considerations.
https://woodlandwildlifetoolkit.sylva.org.uk/

Forestry England Woodland Partnership
Forestry England are offering to lease land from local authorities, farmers or private landowners to create and manage new woodland. https://www.forestryengland.uk/woodland-creation

Woodland Trust MOREWoods scheme
Where 500+ trees are planted as woodland on at least 0.5 ha, Woodland Trust can help with design, creating a bespoke species mix, supply trees and tree protection, and cover up to 75% of costs.
https://www.woodlandtrust.org.uk/plant-trees/trees-for-landowners-and-farmers/morewoods/

Devon 'Right Place-Right Tree' guidance
Good, web-based guidance, with relevance also to other areas
https://www.devonlnp.org.uk/knowledge-hub/trees-and-hedges/right-place-right-tree/

Guardian Video 'How we get tree planting wrong'
Clear explanation of the pitfalls of planting just with carbon in mind (international and UK perspective)
https://www.youtube.com/watch?v=dhvOJrkhh8I

Yorkshire Dales National Park Woodland Siting and Design Guide
Covers woodland in the landscape, siting and design and sensitivities to forestry and new woodlands.
https://www.yorkshiredales.org.uk/wp-content/uploads/sites/13/2019/07/Woodland-siting-and-design-guide.pdf

Encouraging woodland creation, regeneration and tree planting on agricultural land: A literature review (NEER020) Oct 2021 Achieving new woodland planting isn't always limited by technical considerations. This literature review summarises the social and behavioural science evidence relevant to woodland creation in the farmed environment.
http://publications.naturalengland.org.uk/publication/4561957727502336

Hedgelink
Excellent guidance on managing hedges – large volume hedges with trees are better for both wildlife and carbon storage. https://hedgelink.org.uk/

Case Study - Nidderdale Woodland Opportunity Plan

Landscape scale maps to help landowners and land managers identify opportunities for tree planting. Also a great example of Story Map presentation (web page with images, text and interactive maps).

https://storymaps.arcgis.com/stories/4aca6e85c8e44721b73cf7094753e5bc

Case Study – Woodland creation in the North Pennines AONB

The North Pennines AONB Partnership has launched a tree and woodland support service and can offer woodland surveys, bespoke advice, and access to sources of finance, as well as providing support for improving the management of existing woods.

https://www.northpennines.org.uk/woodland-creation-project-launched-in-the-north-pennines/

Case study – Forest of Bowland AONB Trees, Woodland & Forestry Strategy, June 2021

Policies and guidance on looking after existing trees and woodland, and appropriate forms of new woodland creation.

https://www.forestofbowland.com/trees-woodland-forestry

Case study - Wye Valley woodland conservation

The AONB team has been working to conserve and enhance the area's nationally important limestone woodlands, with a range of projects to encourage greater diversity of native woodland flora and fauna. This work includes woodland management and creation, coppicing and glade management, deer & boar management, marketing the products of woodland management, survey and monitoring and interpreting woodland natural and cultural heritage.

https://landscapesforlife.org.uk/about-aonbs/Nature-recovery/nature-recovery-solutions/woodland-conservation

Case Study - Dedham Vale River Stour Enhancement Project

Working with Environment Agency, the project has planted hundreds of riparian trees and lots of riparian management projects which have changed shape of rivers and increased wildlife along the rivers. https://www.dedhamvalestourvalley.org/managing/projects/river-stour-enhancement/

Case Study - Shropshire Hills AONB Tree establishment guidance

Slides illustrating different types of woodland and integrating new woodland with the landscape. https://www.shropshirehillsaonb.co.uk/Documents/Mike%20Kelly%20Tree%20establishment%20for%20climate%20and%20nature.pdf

Coastal/Marine

For AONBs on the coast, there are a different range of habitats to consider. Saltmarsh found in estuaries is an important carbon store. Most coastal AONB designations do not extend into the marine zone, but AONB teams may nevertheless have involvement with partners and initiatives.

Tools and guidance

Summary of blue carbon stocks and fluxes in UK marine and coastal waters
http://www.cmscoms.com/?p=25794

Nature-based solutions and adaptation at the coast – Natural Resources Wales
Useful consideration of NBS in relation to coastal defence.
https://naturalresources.wales/about-us/area-statements/marine-area-statement/nature-based-solutions-and-adaptation-at-the-coast/?lang=en

Restoring Meadow, Marsh and Reef (ReMeMaRe)
An ambitious habitat restoration initiative, aiming to address baseline shift and reverse centuries of decline of three of our priority estuarine and coastal habitats - seagrass meadows, saltmarshes and European native oyster (*Ostrea edulis*) reefs. Habitat restoration guides for these have been published.
https://ecsa.international/reach/tools-and-guidance

Saltmarsh Restoration Handbook UK & Ireland, November 2021. Authoritative handbook (one of the 3 referenced above) providing practical guidance, case studies and lessons on restoring and creating saltmarsh habitat, with lots of content on carbon storage and sequestration.
https://catchmentbasedapproach.org/wp-content/uploads/2021/10/Saltmarsh_Restoration_Handbook_FINAL_20210311.pdf

Case Study - Chichester Harbour AONB - nature based solutions for coastline management

Saltmarsh restoration and creation – Managed Realignment / Regulated Tidal Exchange / No Active Intervention schemes. Seagrass restoration projects. Collaboration on metrics for carbon sequestration etc for both saltmarsh and seagrass to feed into potential funding opportunities.

Water, wetlands and Natural Flood Management

The carbon storage and GHG gas emissions of water bodies and wetlands are complex, and include considerations of methane emissions where anaerobic conditions are found. This section concentrates more on Natural Flood Management as a climate change adaptation tool.

Tools and guidance

Environment Agency Working with Natural Processes evidence base
Highlights opportunities for a range of nature-based solutions https://www.gov.uk/flood-and-coastal-erosion-risk-management-research-reports/working-with-natural-processes-to-reduce-flood-risk

Government guidance - Use nature-based solutions to reduce flooding in your area
https://www.gov.uk/guidance/use-nature-based-solutions-to-reduce-flooding-in-your-area

Eden Rivers Trust - Natural Flood Management Measures: A practical guide for farmers
Locally tailored advice aimed at land managers
https://edenriverstrust.org.uk/wp-content/uploads/2021/01/11882_NFM_handbook_WEB.pdf
Natural Flood Management guide for farmers - Yorkshire Dales NP and Pendle Hill Farmers Network
Locally tailored advice aimed at land managers
https://www.pendlehillproject.com/sites/default/files/images/projects/tradboundaries/EXT_FOB_Pendle%20Hill%20Landscape%20Farmers%20Guide-14987.pdf

Stroud District Council - Technical film - Principles and methods of natural flood management in small streams and their catchments
https://www.stroud.gov.uk/environment/flooding-and-drainage/stroud-rural-sustainable-drainage-rsuds-project/stroud-rsuds-technical-film-principles-and-methods-of-natural-flood-management-in-small-streams-and-their-catchments

Case Study - Blackdown Hills Connecting the Culm project (illustrates Natural Flood Management, climate change adaptation and community engagement)

Connecting the Culm is a catchment based partnership project working to tackle some significant challenges faced by the River Culm in Devon, running from January 2019 until December 2022. It is part of a larger Co-Adapt (climate change adaptation through co-creation) project, part funded by EU Interreg 2 Seas. The partnership project aims to:

- Make the River Culm and its floodplain more resilient to flood and drought, using nature-based systems and approaches
- Improve water quality and biodiversity on the Culm (and consequently in the Exe and its estuary)
- Encourage people living in the catchment to feel more involved in decision-making and support the use of nature-based solutions to manage water.

The project will do this by:

- Improving local people's understanding of water management techniques and the function of the river / catchment ecosystem as an integrated whole.
- Creating new opportunities for people to collaborate in addressing water management, leading to communities cooperating more effectively to address the challenges created by climate change.
- Installing tangible demonstrations of appropriate nature-based solutions to build confidence, encourage cooperation and raise aspirations – these will be replicable and provide solutions that can be rolled out by the community.
- Developing a Blueprint for the Culm that will be the masterplan for the whole catchment for the next 25 years, co-created by the people that live and work within the catchment and the organisations that have a role in the area.

https://connectingtheculm.com/
Co-Adapt: Climate adaptation through co-creation | 2 Mers Seas Zeeën (interreg2seas.eu)

Case Study - River Darent restoration and resilience 'Where Ten Thousand Fishes Once Played'

Working on Natural Flood Management including managed realignment of the Upper Darent river in Kent, working with and using examples from partners in Holland (Interreg funding).
https://darent-valley.org.uk/projects/natural/where-ten-thousand-fishes-once-played-restoring-the-river-darent/

Case Study - Shropshire Hills AONB Brook Vessons headwater restoration project

Ditch blocking and fracturing of land drains was carried out on 15ha of upland pasture adjacent to a nature reserve, restoring a more natural hydrology to this area of catchment headwaters.
https://www.shropshirehillsaonb.co.uk/Documents/Brook%20Vessons%20Case%20Study%20191121.pdf

Case Study - Level Up

Good example of joint working through Green Recovery Challenge Fund. Sub-projects in 3 AONBs are different but learning is going on across all partners.
https://www.mendiphillsaonb.org.uk/2020/12/10/level-up/

Grassland and heath

Permanent grasslands and heathlands are important for carbon, particularly in undisturbed soils. The level of storage is lower than for peatland and woodland habitats (see Appendix 1), but grasslands are much more extensive so an important store overall. Carbon storage and sequestration on grassland and heath is closely linked to agricultural practices, and as livestock are normally used, the emissions from these will typically be the most significant factor in the carbon flux of the land. The Agriculture sub-group has been working on these topics, and the Nature-Based Solutions group has concentrated mor eon other topics. Linkages between the topic areas of the two groups will be explored further.

Tools and guidance

NAAONB guidance on farm carbon toolkits generated by the Agriculture sub-group.

Case study - Northern Upland Chain LNP Hay Meadows Best Practice website

Resources to support management of flower-rich meadows, including an interactive map of projects and how to obtain tailored advice.
http://lnp-meadows.nuclnp.org.uk.testing.scape3.default.countryscape.uk0.bigv.io/

Other tools we need to help build nature-based solutions to climate change into our nature recovery work

This section captures output and ideas from workshops at the 2021 AONB Conference, not all of which have been explored further or fleshed out. The section will be developed further to set out next steps for AONB work on Nature-based solutions.

Carbon storage and flux by habitat across AONBs – Audit of carbon in soils and vegetation.

This NAAONB contract with Cranfield University to provide an audit and metric for carbon stored and sequestered in soils and vegetation in all English AONBs will complete in April 2022. The project is using pre-existing datasets including Natural England's work on priority habitats, plus land cover and soils data, on which Cranfield is a leader. (Note that carbon emissions from how the land is managed, especially through livestock, but also fuel etc, is not included in the Cranfield audit, which only looks only at carbon storage and flux relating to the vegetation and soils). Some ground truthing is being done with AONB teams who have other local spatial data on soil organic matter.

For most AONBs, the information from this contract will be a considerable step forward in available data and understanding. The aim is not so much to derive a 'bottom line' carbon figure for each AONB, or to compare AONBs, but more for each AONB team to have a clearer understanding of where the significant carbon stores are and where the best opportunities are to support activity to reduce emissions and increase sequestration.

Guidance/tools to guide NBS delivery (carbon, nature) in Farming in Protected Landscapes

Nature Recovery Plans – show how nature-based solutions fit with nature recovery

Prioritisation tool. Landscape spatial framework identifying how we prioritise?

Tools to facilitate engagement with farmers & land managers – appropriate language, etc- developed with input from farmers?

Tools to help engage communities

Guidance for AONB Management Plan review – how to put climate central in Plans, and weave climate objectives into our nature recovery work

Measures to track our progress including to link with National Parks and others

Natural Flood Management – good tools out there. Adaptation etc too. Integrate with carbon, nature

Local Nature Recovery Strategies (statutory)

Biodiversity Net Gain (statutory)

Funding and collaboration opportunities for AONB partnerships

This section captures output and ideas from workshops at the 2021 AONB Conference, not all of which have been explored further or fleshed out. The section will be developed further to set out next steps for AONB work on Nature-based solutions.

There are many funding sources available – we are not here trying to list them all.

Farming in Protected Landscapes programme – how to get the most from this. Some consultancy work on maximising Climate outcomes from FiPL has been commissioned and will be circulated.

Nature for Climate Fund - Peatland Restoration grant and Discovery Grant, and trees.

England Woodland Creation Offer and other trees/woodland grants available nationally (Forestry Commission / Woodland Trust based on scale) and possibly locally/county level (linked to climate emergency / other initiatives)

Environment Agency funding for NFM initiatives

Carbon offsets - will need metrics - see the **Natural Environment Investment Readiness Fund** (NEIRF)

Biodiversity Net Gain through the planning system

Private investment Esmee Fairbairn hosted workshop recently with Triodos bank - where some pilot projects have been supported via investors- incl Wyre rivers trust and UU investor. ROI seen to be high for NBS in relation to flooding https://esmeefairbairn.org.uk/about-esmee/investments/

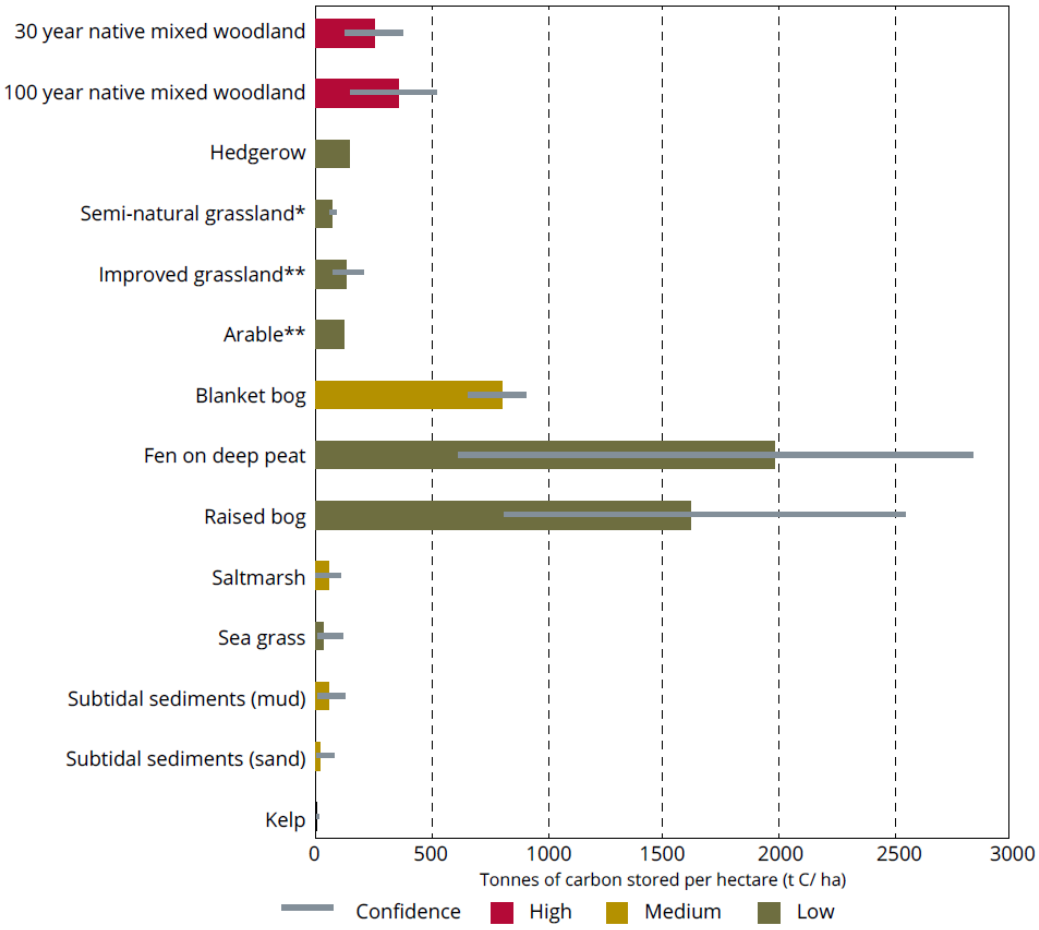
National Parks Partnership are engaging with Palladian to see how they might benefit from private sector and philanthropic funding for work of this nature (and others). It would be beneficial to see how we might engage with that too, if at all possible.

Highways England - Environmental Designated Fund

Is there an opportunity for a big scale AONB collaboration and funding package?
What would we do? Sharing and learning. Extrapolating from good practice. Engagement work linked to climate and carbon. Undermanaged woods?

Appendix 1 Summary of carbon storage and flux by habitat

Figure 1: Carbon storage by habitat

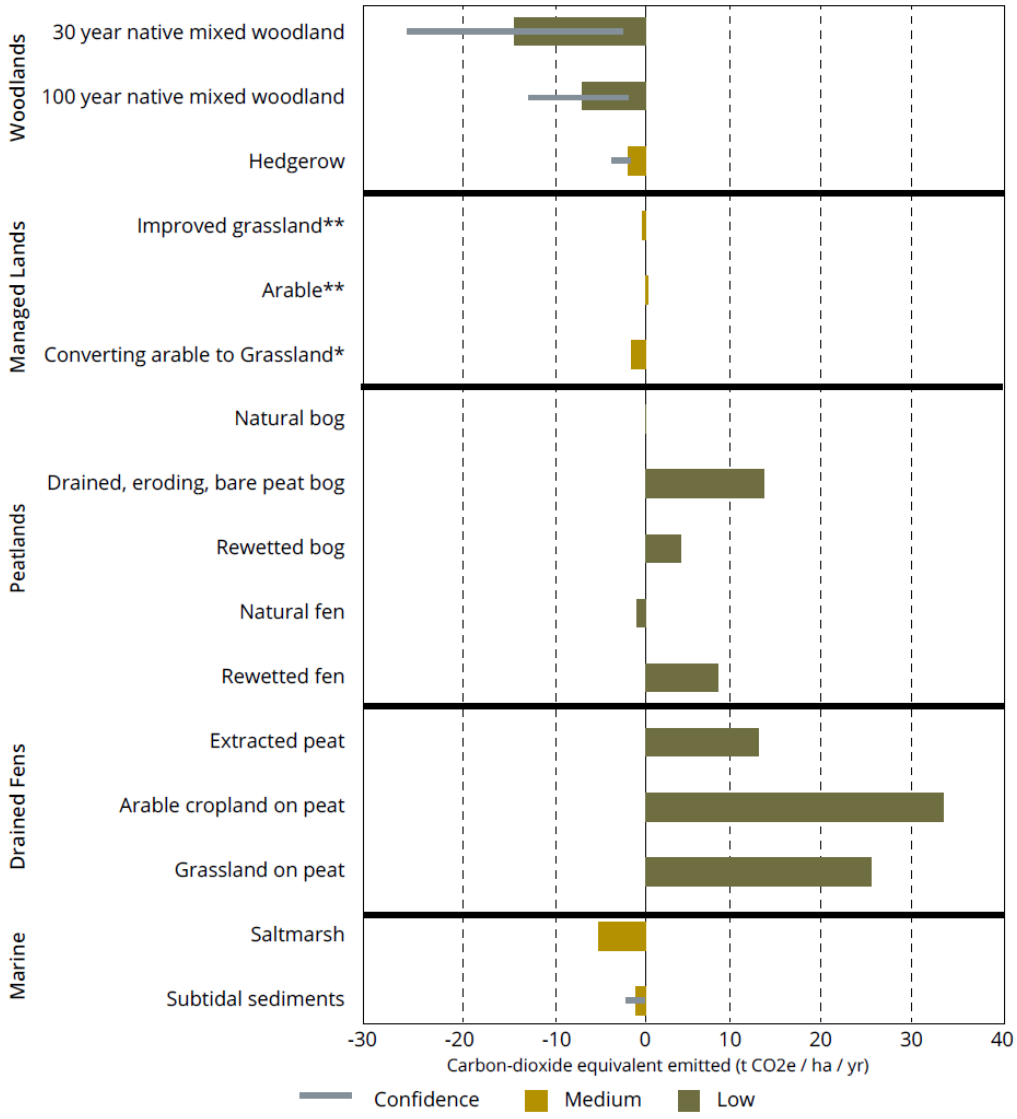


Source: Natural England, Natural England Research Report (NERR094) Carbon storage and sequestration by habitat: a review of the evidence, second edition (20 April 2021) pp 210–221: http://publications.naturalengland.org.uk/file/6726246198411264 *[accessed 12 January 2022] Colour-coding indicates the level of scientific certainty around this ecosystem, as assessed by Natural England. The grey bars illustrate the range of values measured across different sites by Natural England's meta-analysis, while the solid bar gives a best estimate. For most land ecosystems, these figures show soil carbon to the depth of the ecosystem and carbon stored in vegetation.*

**For grasslands, the data is shown for the top 15cm of soil only, and the range is across three types of semi-natural grassland—acid, calcareous, and neutral—for more information, see the Natural England report. **For the managed areas of arable and improved grasslands, only soil carbon to 1m depth is included, as the vegetation stocks are removed annually by management.*

Source: House of Lords Science & Technology Select Committee report 'Nature-based Solutions: rhetoric or reality? (referencing Natural England report NERR 094)

Figure 2: Greenhouse gas emission rate by habitat



Source: Natural England, Natural England Research Report (NERR094) Carbon storage and sequestration by habitat: a review of the evidence, second edition (20 April 2021) pp 210–221: http://publications.naturalengland.org.uk/file/6726246198411264 *[accessed 12 January 2022] Colour-coding indicates the level of scientific certainty around this ecosystem, as assessed by Natural England. The grey bars illustrate the range of values measured across different sites by Natural England's meta-analysis, while the solid bar gives a best estimate. These sites will vary in condition and age; the value given is an indicative estimate of the average sequestration rate for sites of this type. Negative values indicate that the habitat sequesters carbon.*

**For grasslands, the data is shown for the top 15cm of soil only, and the range is across three types of semi-natural grassland—acid, calcareous, and neutral—for more information, see the Natural England report. ***For the managed areas of arable and improved grasslands, only soil carbon to 1m depth is included, as the vegetation stocks are removed annually by management.*

Source: House of Lords Science & Technology Select Committee report 'Nature-based Solutions: rhetoric or reality? (referencing Natural England report NERR 094)

Appendix 2 Background data on peatlands in AONBs

Area of deep peat by AONB (England) (source: Landscapes Review Sept 2019)

	Deep peat (ha)	AONB area (ha)	% of AONB
North Pennines	85,740.72	198,516.99	43.19
Forest of Bowland	16,728.56	80,573.33	20.76
Nidderdale	12,567.45	60,117.42	20.9
Cornwall	2,751.37	96,403.17	2.85
Suffolk Coast & Heaths	1,707.49	40,537.33	4.21
Solway Coast	1,604.46	12,255.00	13.09
Arnside & Silverdale	948.31	7,587.26	12.5
Norfolk Coast	870.08	44,590.88	1.95
Cranborne Chase & West Wiltshire Downs	452.35	98,594.78	0.46
Dorset	90.08	112,933.07	0.08
Isle of Wight	60.13	19,137.05	0.31
Mendip Hills	50.44	19,846.97	0.25
Shropshire Hills	44.30	80,829.71	0.05
High Weald	34.45	146,173.78	0.02
Cotswolds	24.45	204,109.11	0.01
Kent Downs	22.31	87,900.44	0.03
Quantock Hills	14.88	9,916.75	0.15
East Devon	11.07	26,913.42	0.04
Cannock Chase	7.05	6,865.83	0.1
Surrey Hills	4.95	42,246.24	0.01
Dedham Vale	1.27	9,058.49	0.01
Howardian Hills	0.53	20,420.27	0
Lincolnshire Wolds	0.46	55,898.18	0
TOTAL	**123,737.16**	**1,481,425.47**	**8.35%**

Notes:

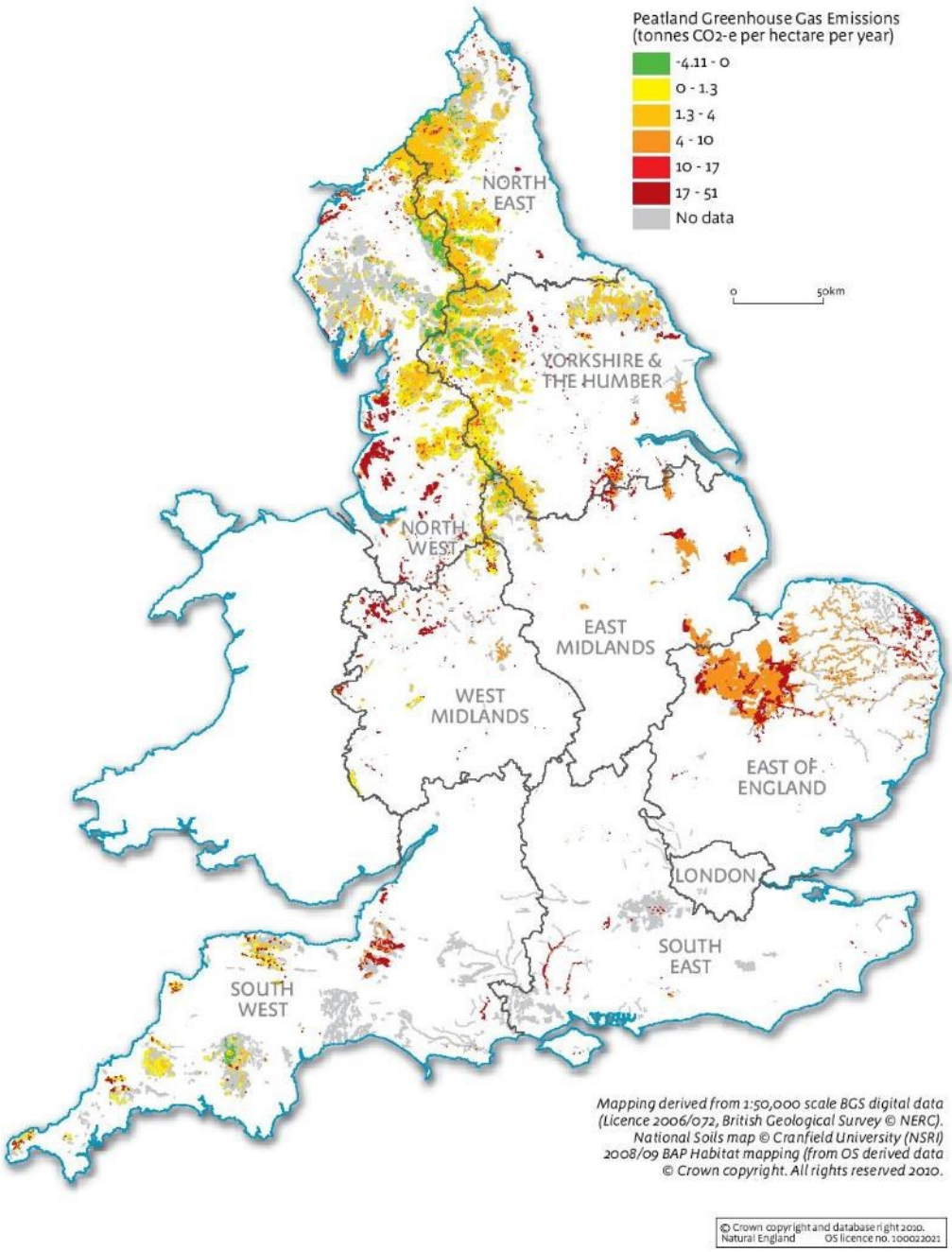
The North Pennines, Forest of Bowland and Nidderdale (highlighted) between them hold 93% of the deep peat found in English AONBs.

The Solway Coast and Arnside & Silverdale (highlighted) have a relatively high % coverage of deep peat, despite the modest area overall.

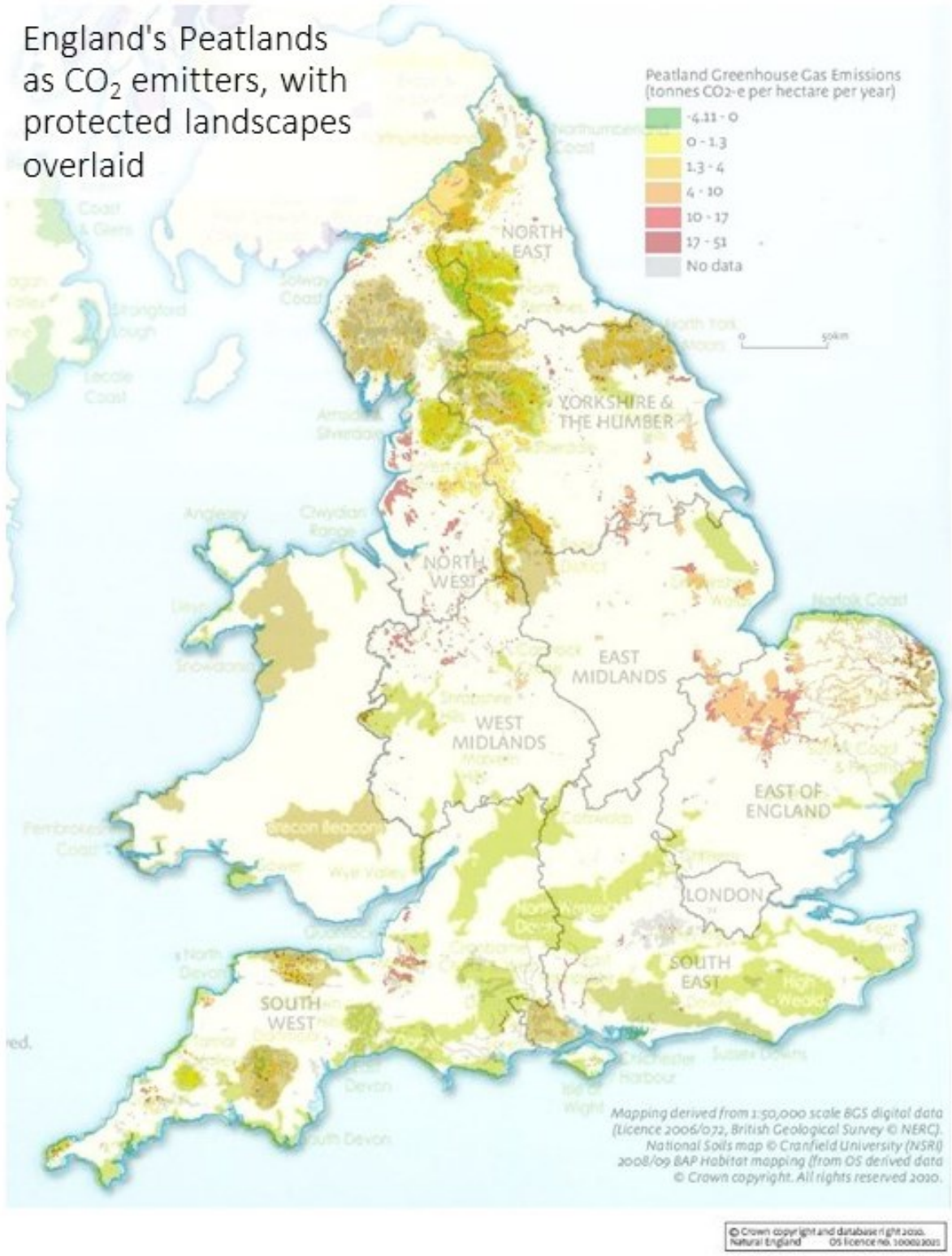
N.B. These figures exclude shallow and pockety peats, which can be significant, e.g. from recent local work the Shropshire Hills are estimated to hold c3,700ha of peatland overall, most of which is shallow (c.f. only 44ha of deep peat in table above, this may also be an underestimate).

Spring-line mires are also found in the Blackdown Hills. Small peat areas like this are not well represented in national data.

Peatlands in England by carbon flux, i.e. emissions (in red-orange-yellow) or sequestration (in green)



It is notable that only a tiny proportion of England's peatlands are actually sequestering carbon (green areas). The main focus therefore needs to be on stopping emissions from the remaining areas and protecting the vast carbon stores which remain in them. Sequestration rates from healthy peat are relatively low due to the slow accumulation of peat, but can continue more or less indefinitely, unlike other habitats which are more likely to level off in a steady state in relation to carbon.



The extensive northern upland peatlands are mostly within protected landscapes. Most are still emitting carbon, though not at the highest levels (lots in orange emissions category).

Many of the red (highest emitting) peat areas are outside Protected Landscapes (e.g. the Fens, Somerset Levels, Fylde/Lancashire, S Yorkshire, Lincolnshire, North Shropshire/Cheshire). Red areas inside National Parks include the Broads, SW of the Peak District and North York Moors. Those inside AONBs include the Shropshire Hills and Cornwall, plus Suffolk Coast & Heaths and Solway Coast. This map helps provide a rationale for priority action and collaboration.