Peat and Carbon

IUCN | National Committee United Kingdom

Peatland Programme

Establishing carbon monitoring in the Falkland Islands

Katy Ross

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GREIFSWALD MIRE CENTRE

Peatland distribution

peatland distribution

peat in soil mosaic

Boundaries: United Nations Geospatial, 2021. The boundaries and names shown, and the designations used on this map do not imply official endorsement or acceptance by the United Nations.
Peatland distribution: Global Peatland Database, 2022.
Elevation: Jarvis et al. 2008. SRTM for the globe version 4.

UN environment programme

Global Peatlands Initiative

Supported by:
Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection
based on a decision of the German Bundestag

IKI INTERNATIONAL CLIMATE INITIATIVE

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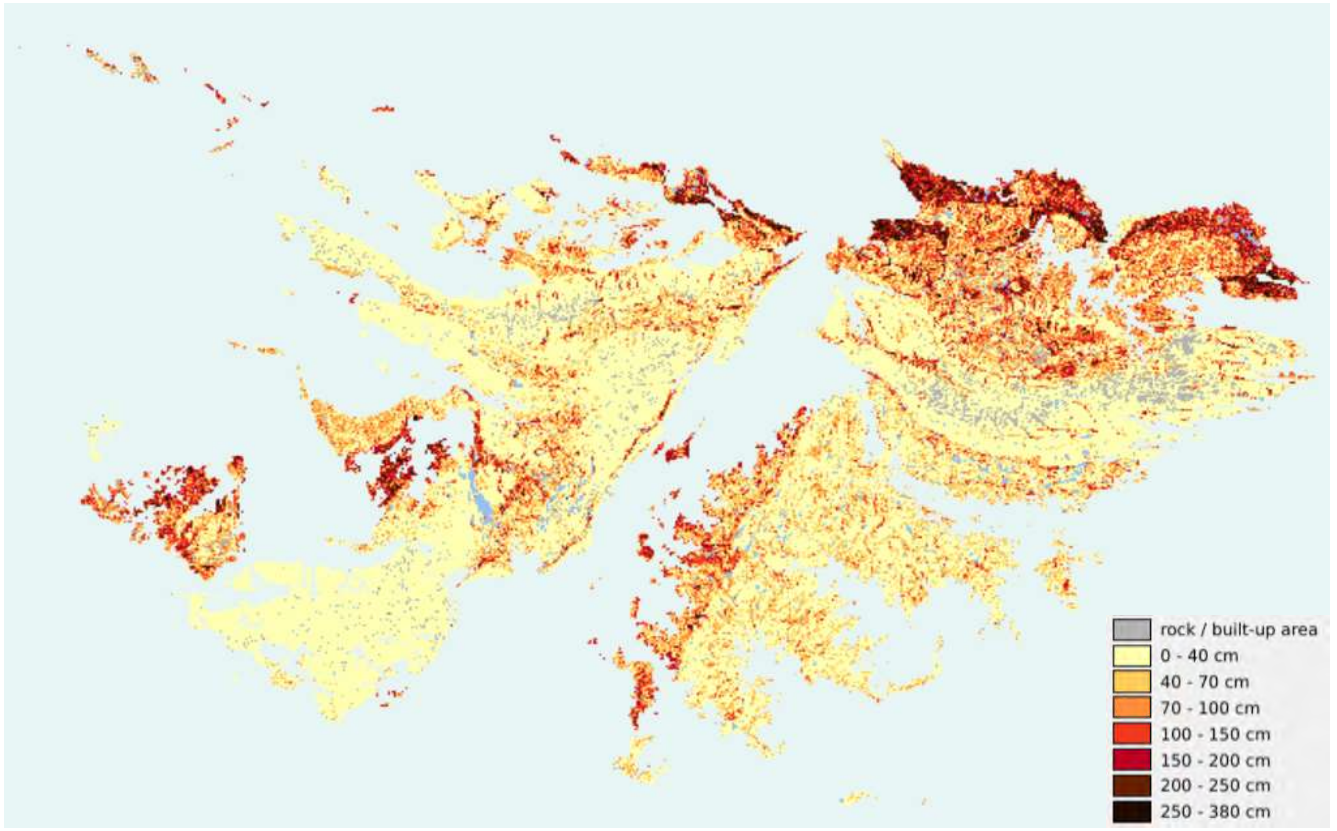
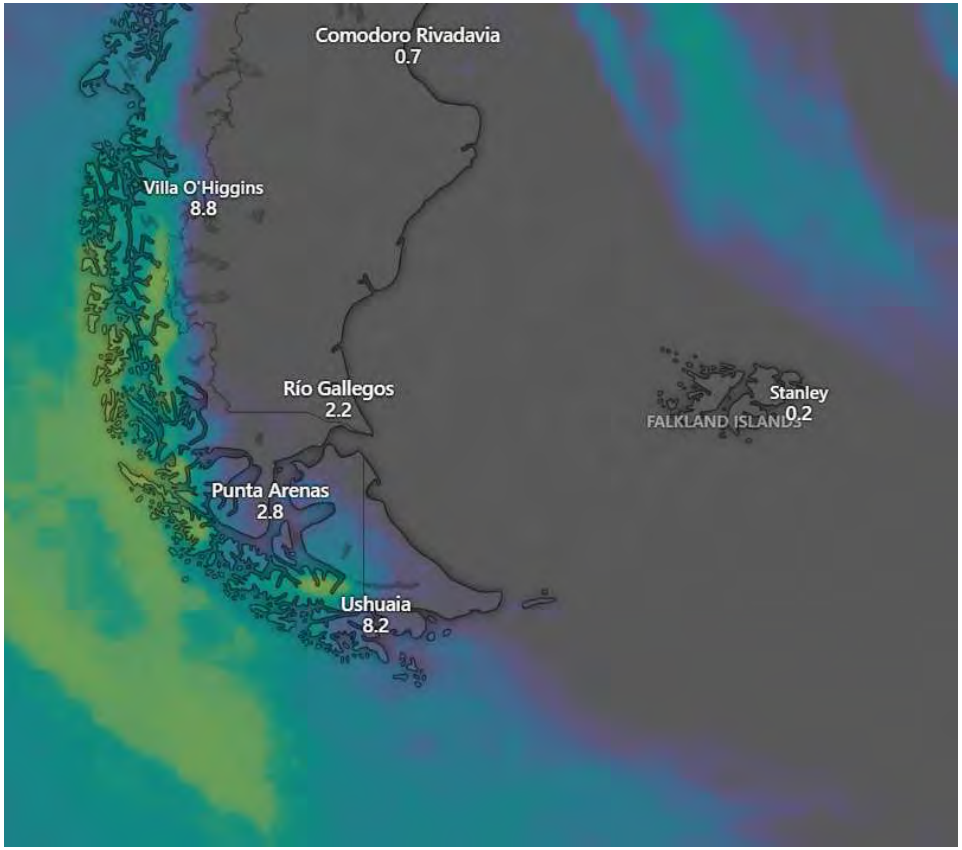


Phillips 2005, Carter 2019



5 day rainfall accumulation (mm) www.windy.com

Cortaderia egmontiana

2.6 g m^{-2} yr^{-1}

Payne 2019

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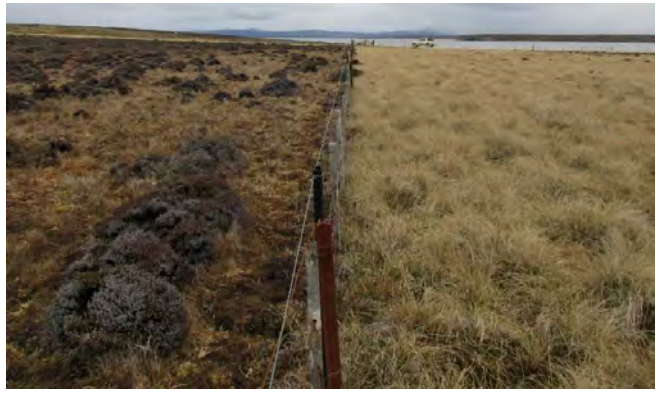
FIG 2023, Payne 2019, Otley 2008



Set stocked

Holistically grazed

Rotationally grazed

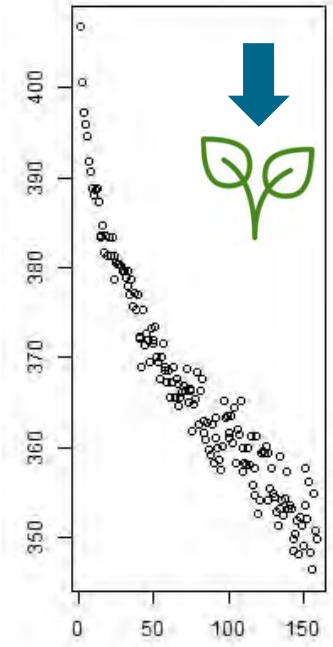
Not grazed

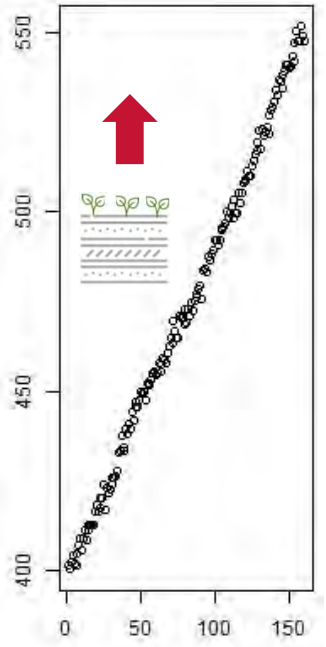
Bare peat

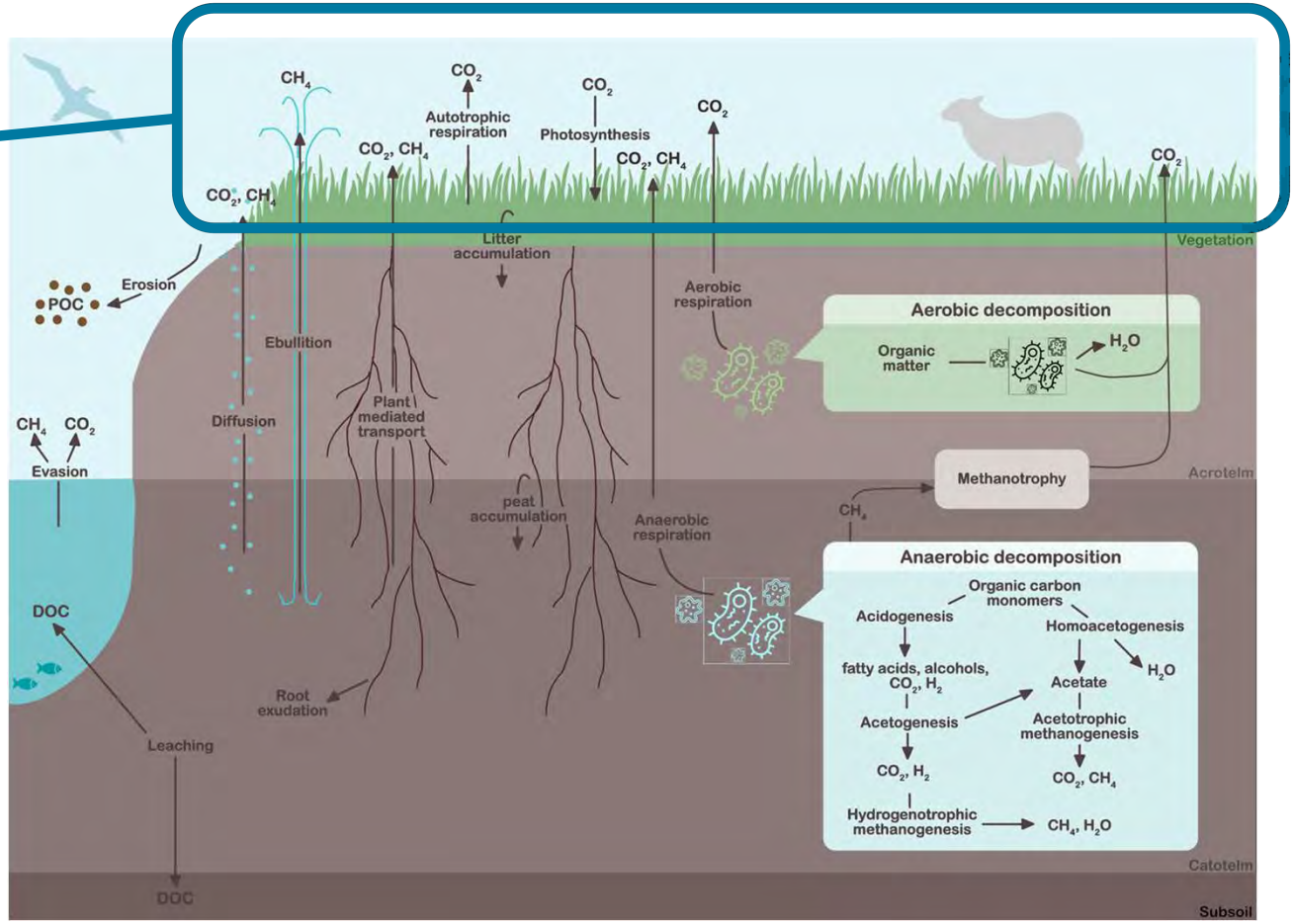
Vegetation communities

Non-native species

Gould 2022


400
390
380
370
360
350
0
50
100
150


550
500
450
400
0
50
100
150

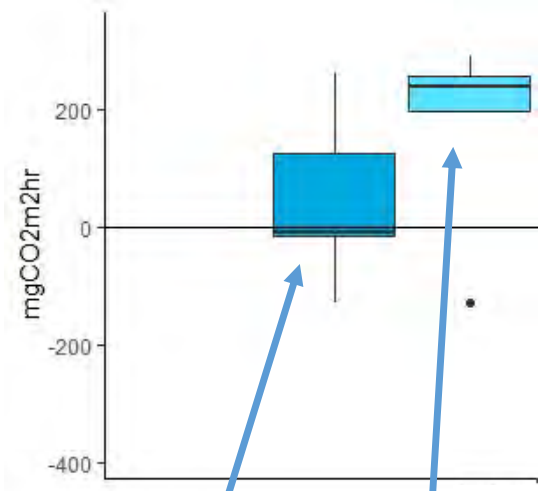

CH4
CO2
Autotrophic respiration
CO2
Photosynthesis
CO2
CO2, CH4
CO2, CH4
CO2, CH4
CO2
Vegetation
Litter accumulation
Erosion
POC
Ebullition
Diffusion
Plant mediated transport
Aerobic respiration
Aerobic decomposition
Organic matter
H2O
CH4 CO2
Evasion
peat accumulation
Anaerobic respiration
Methanotrophy
Acrotelm
CH4
Anaerobic decomposition
Organic carbon monomers
Acidogenesis
Homoacetogenesis
fatty acids, alcohols, CO2, H2
H2O
Acetate
Acetogenesis
Acetotrophic methanogenesis
CO2, H2
CO2, CH4
Hydrogenotrophic methanogenesis
CH4, H2O
DOC
Root exudation
Leaching
Catotelm
DOC
Subsoil

Eroded Modified Bog	Drained	0.85
	Undrained	
Heather Dominated Modified bog	Drained	-0.14
	Undrained	
Grass Dominated Modified bog	Drained	-0.14
	Undrained	

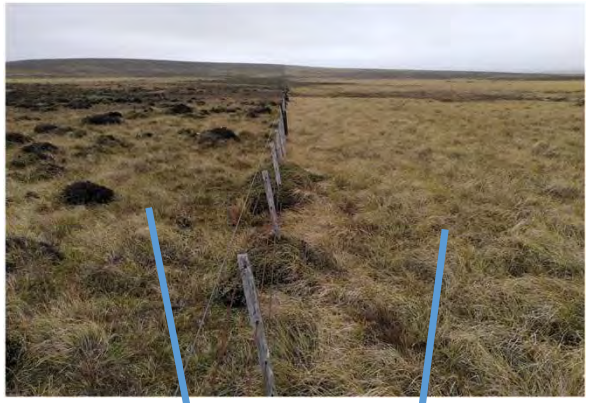
0.08
tonnes of CO_2
per hectare

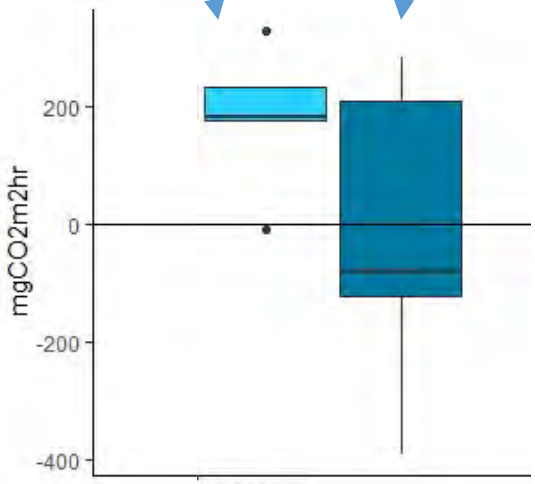
(-1.68 to 0.68)

Evans 2017



September





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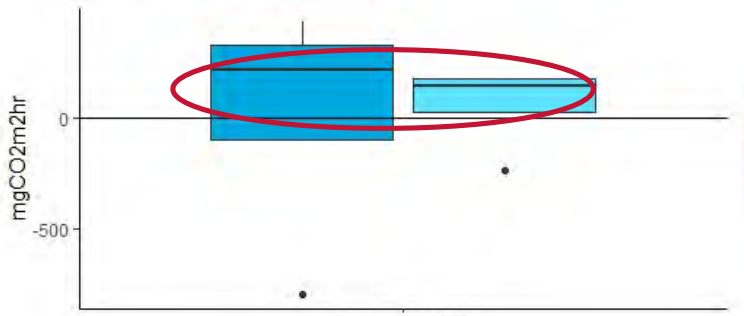

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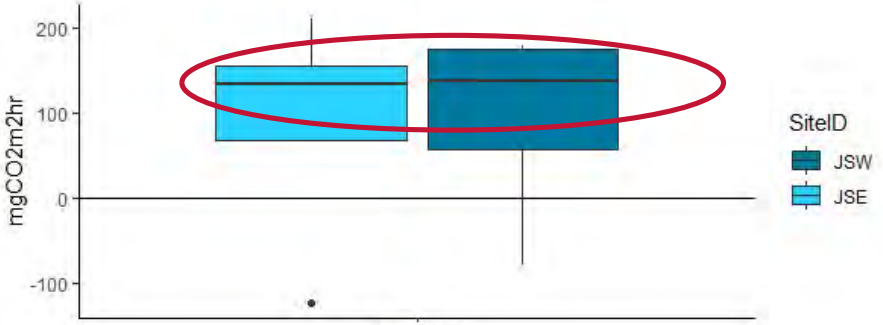

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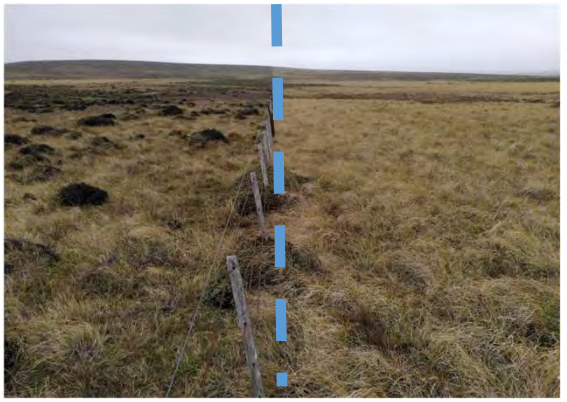
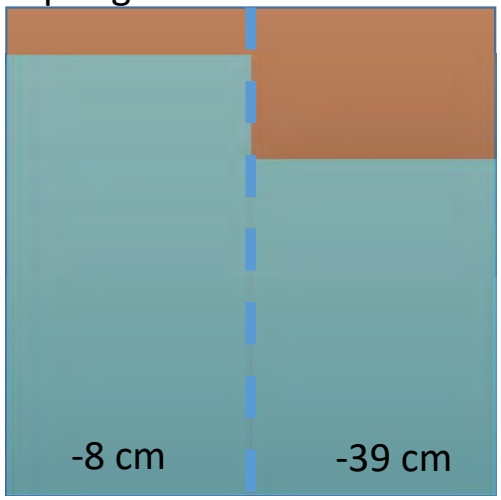
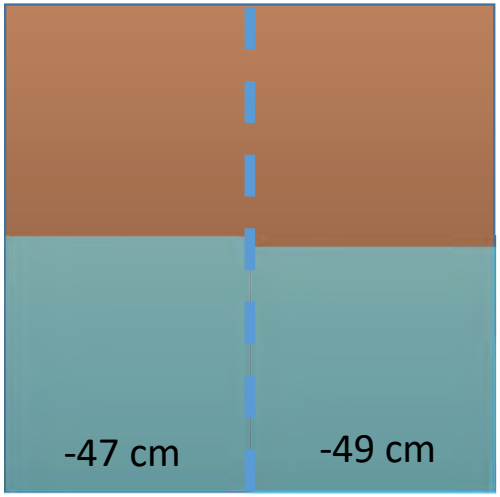


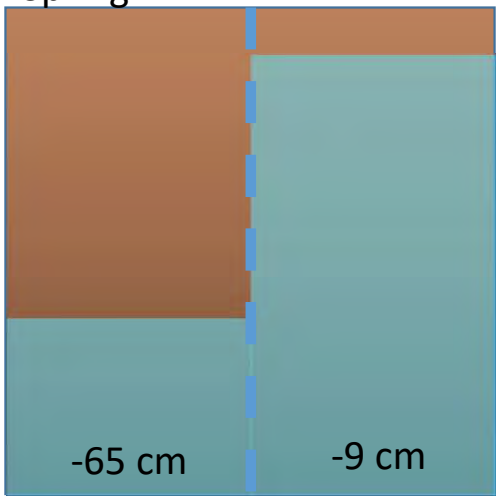
Spring



Summer



Spring



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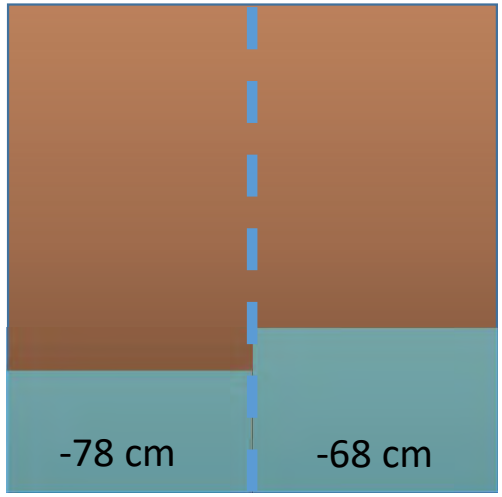
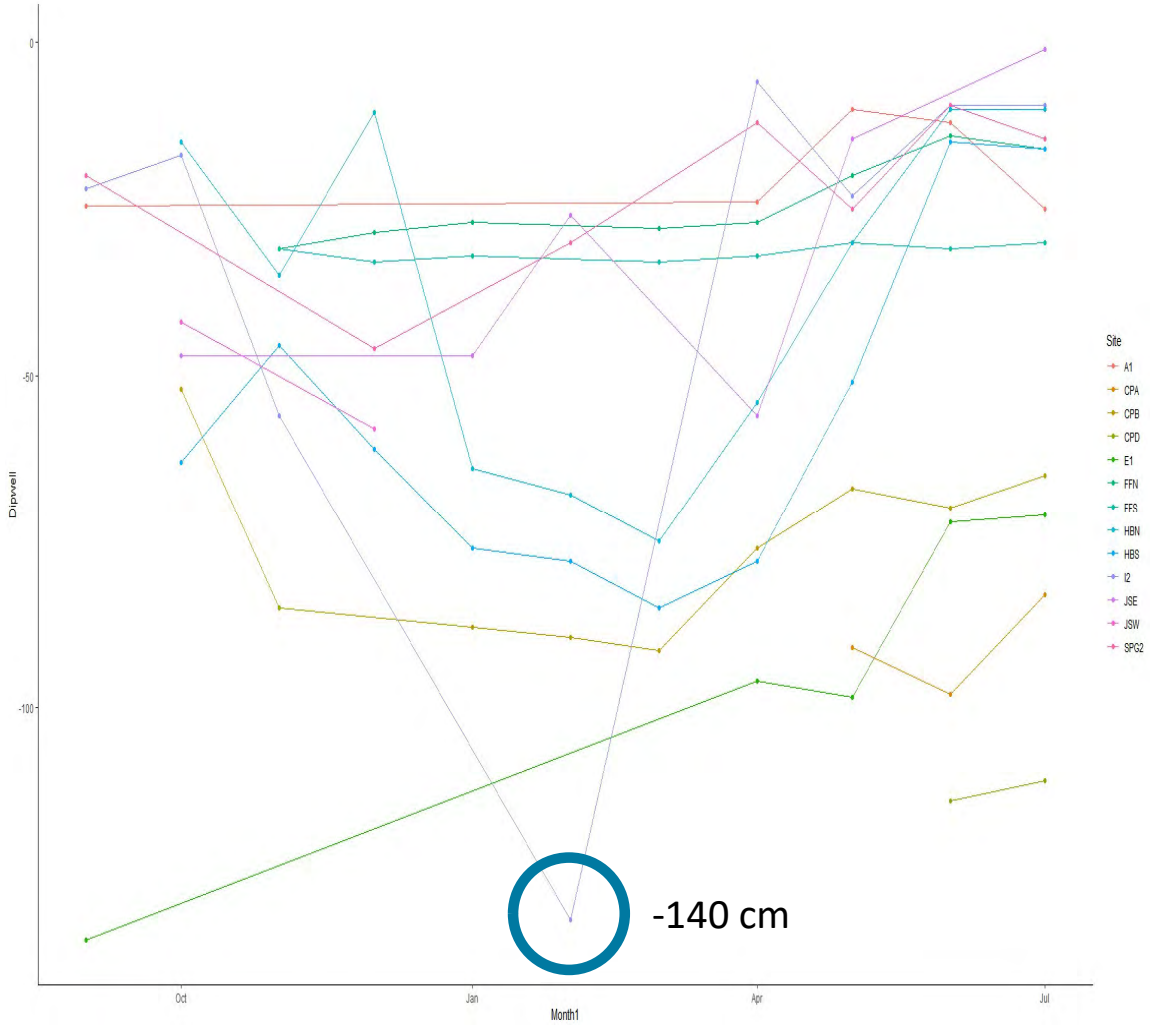
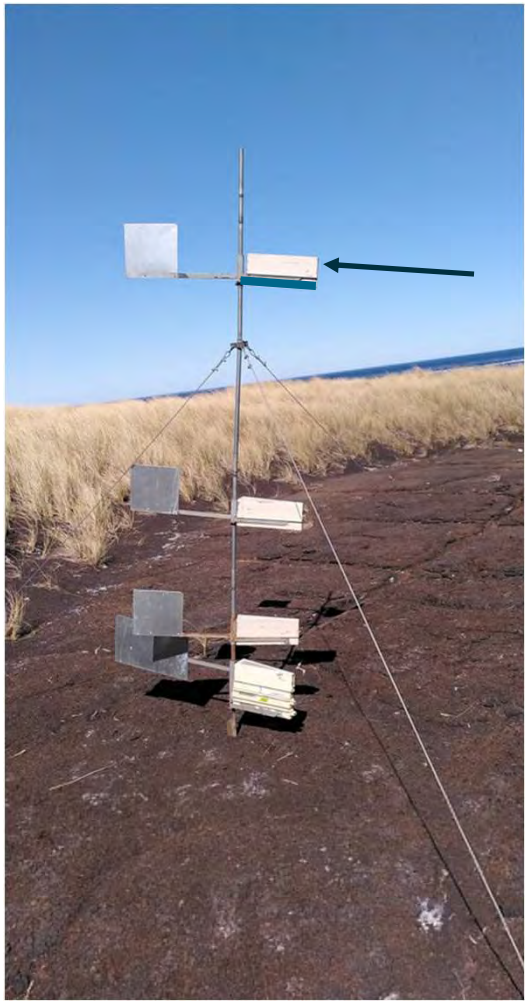
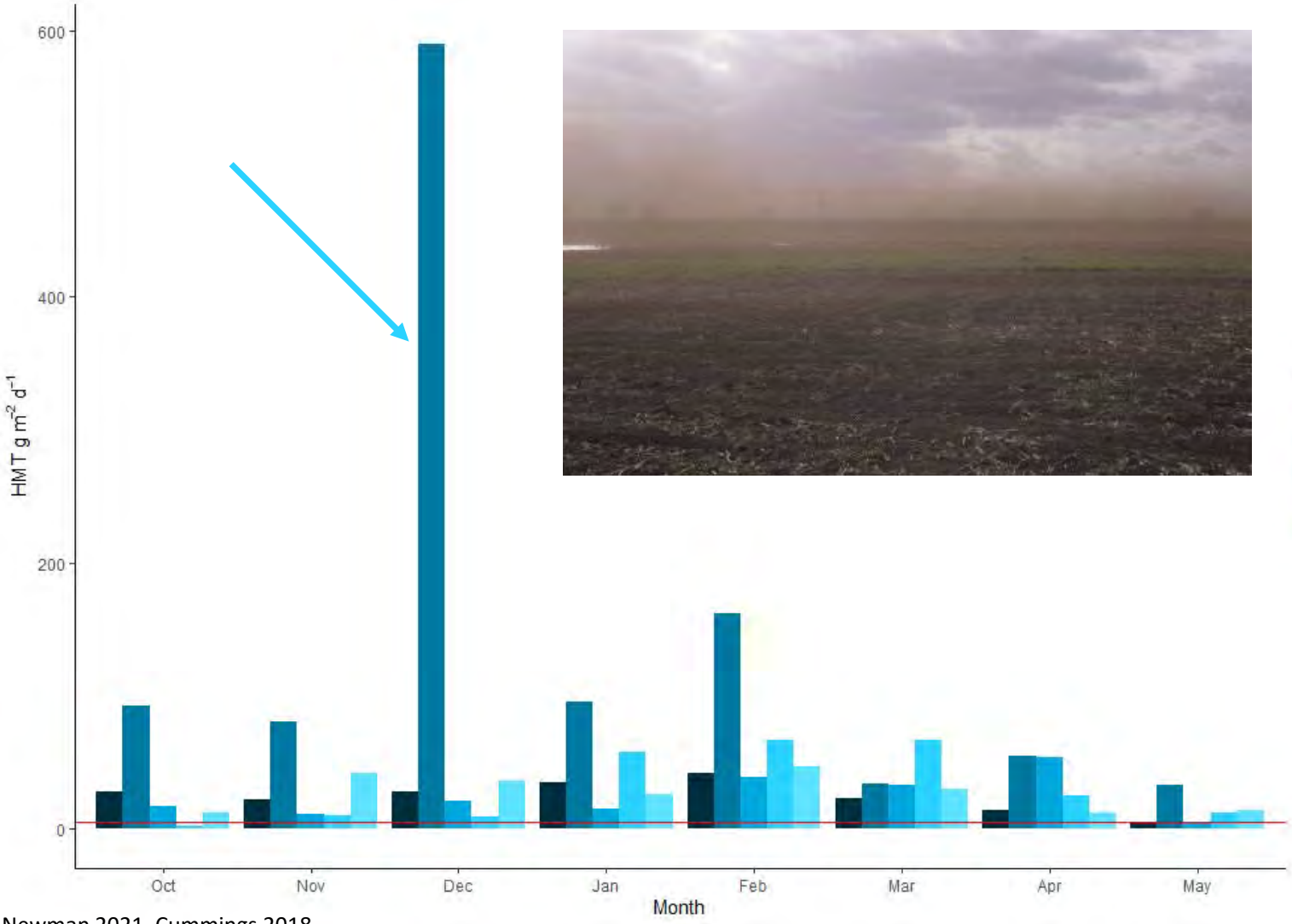
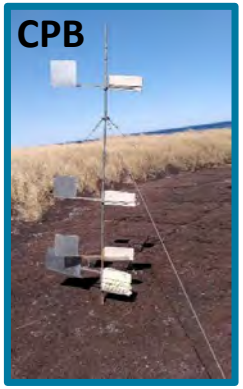
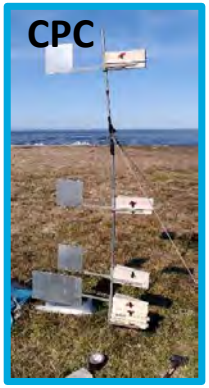


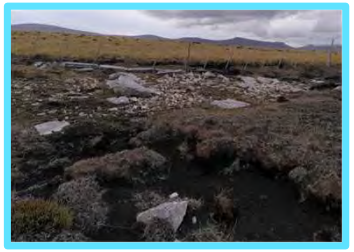

0
-50
-100
Dipwell
Oct
Jan
Apr
Jul
Month1
Site
A1
CPA
CPB
CPD
E1
FFN
FFS
HBN
HBS
I2
JSE
JSW
SPG2
-140 cm





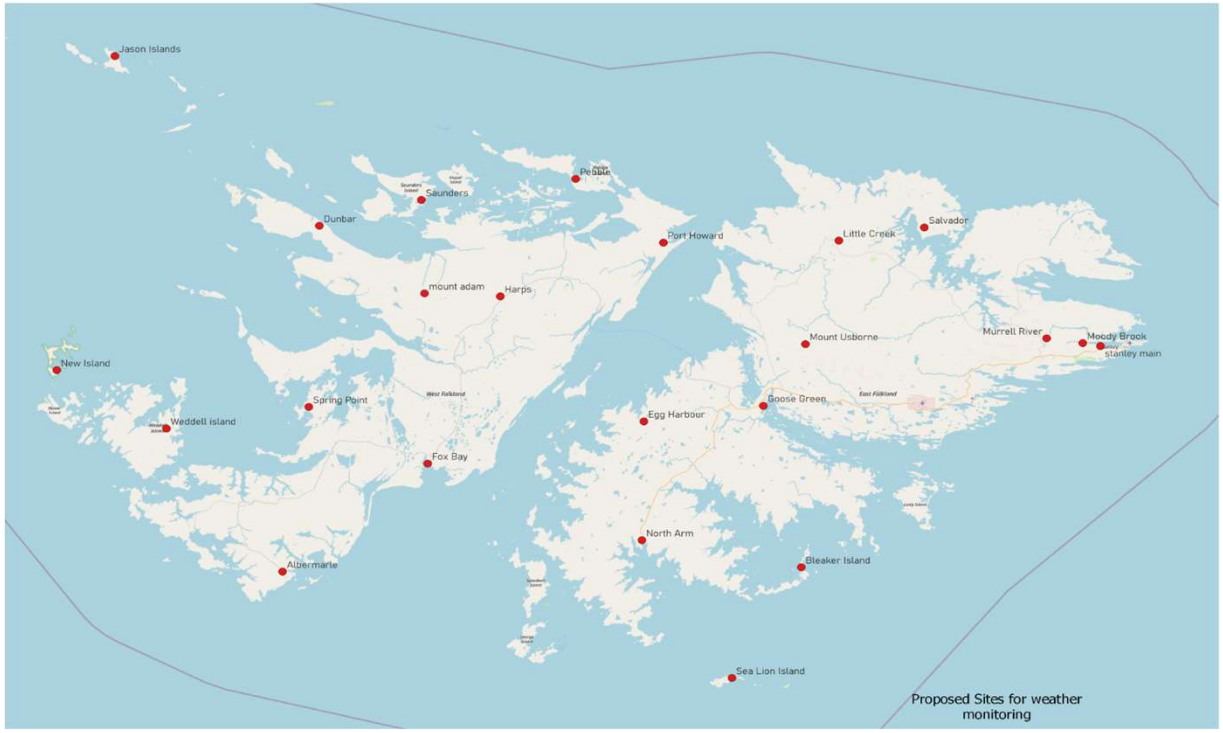






Newman 2021, Cummings 2018

$0.008\ \text{Mt}\ CO_2\,e\ yr^{-2}$



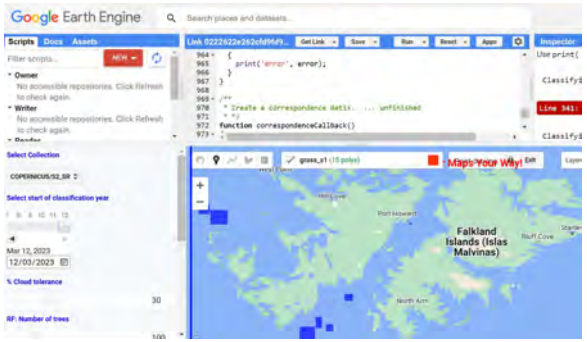
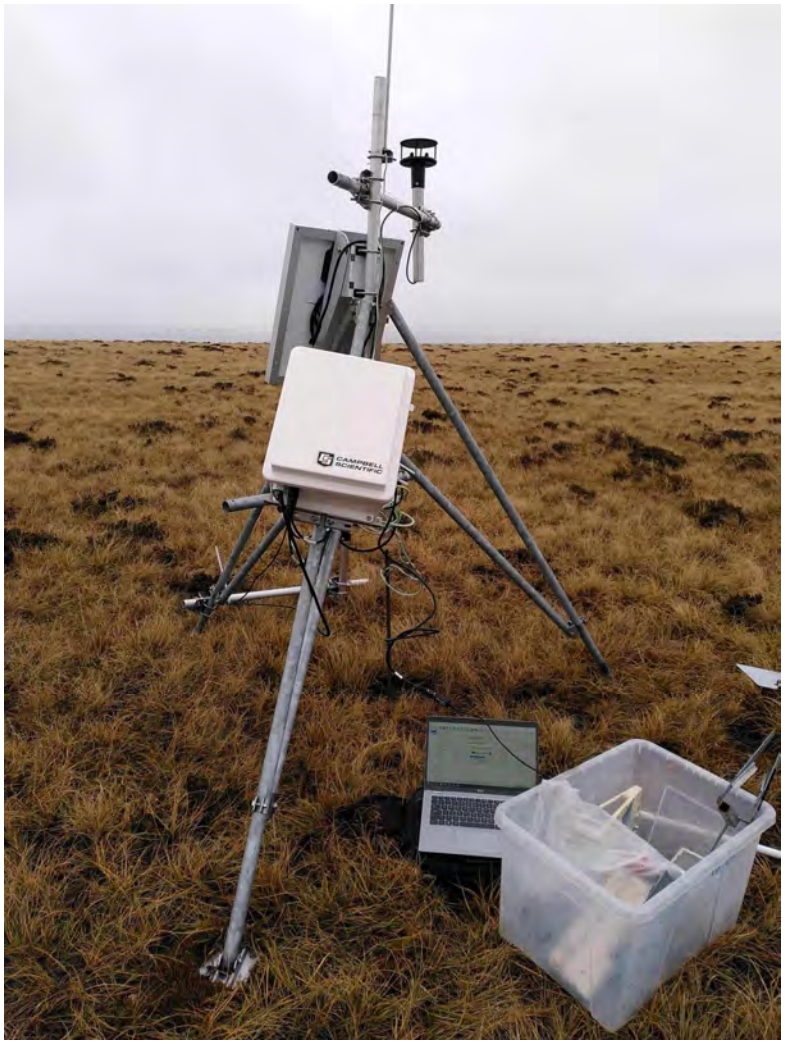
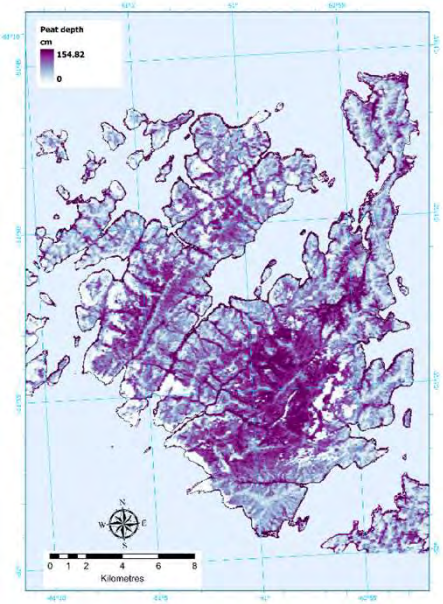


FIG 2023, TOMST 2018



Mary 2013



Mary 2013, Hazell 2023, JHI 2023

Thank you

Supervised by: Chris Evans, Steffi Carter, Susan Page, Arnoud Boom, Anne Jungblut, Ross Morrison

katros@ceh.ac.uk

@girl_in_a_bog

UK Centre for
Ecology & Hydrology

UK-FLUX: monitoring the carbon balance of UK peatlands

Ross Morrison, Chris Evans, Niall McNamara, Richard Pywell, Alex Cumming, Dan Rylett, Nick Cowan, Annette Burden, Hollie Cooper, Simon Oakley, Alanna Bodo, Brenda D'Achuna, Kate Blake, Jenny Rhymes, Dafydd Crabtree, Jonay Jovani, Jenny Williamson & others

UK-FLUX community

UK-SCAPE
UK Status, Change and Projections of the Environment

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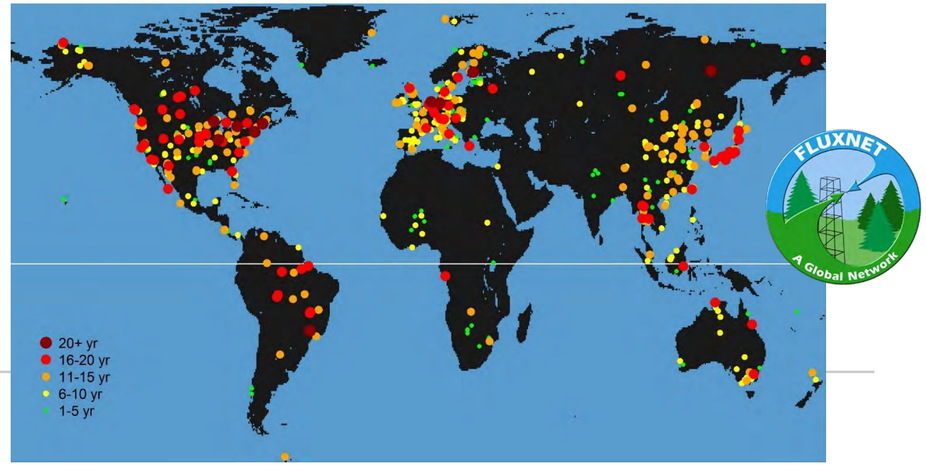
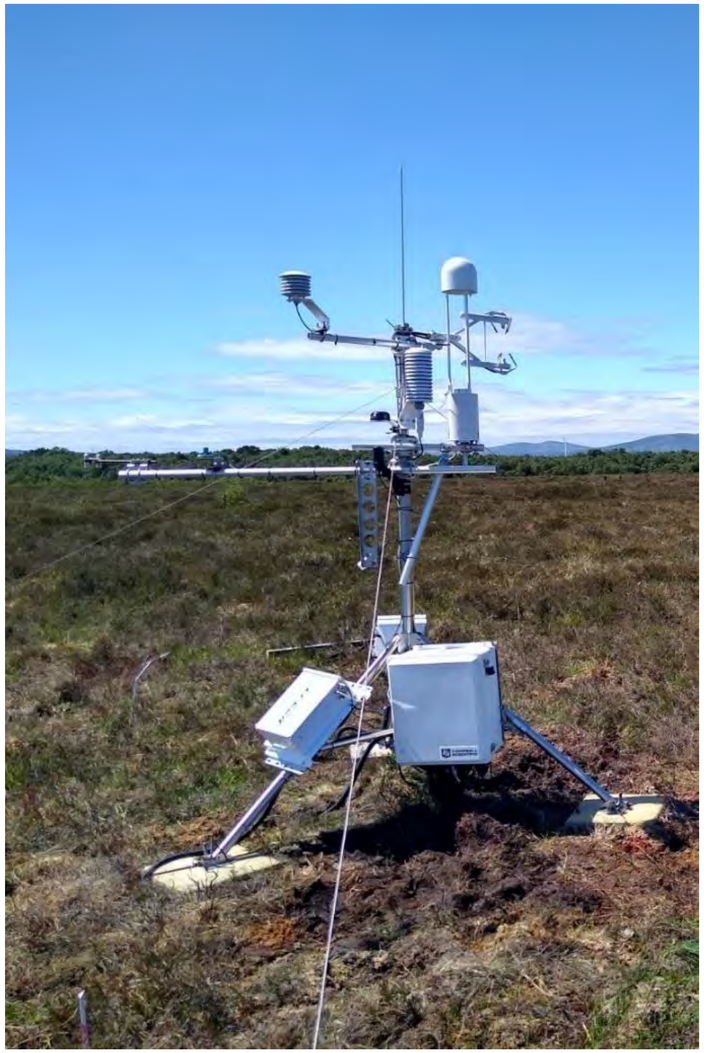


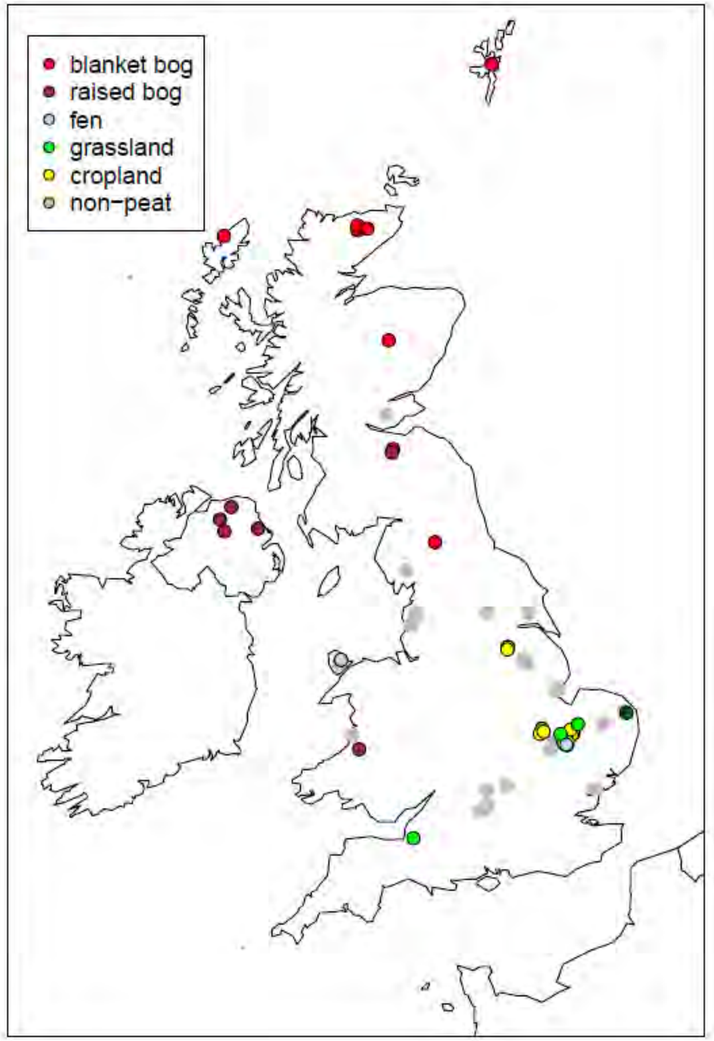
CAMPBELL SCIENTIFIC
WHEN MEASUREMENTS MATTER

UK Centre for Ecology & Hydrology

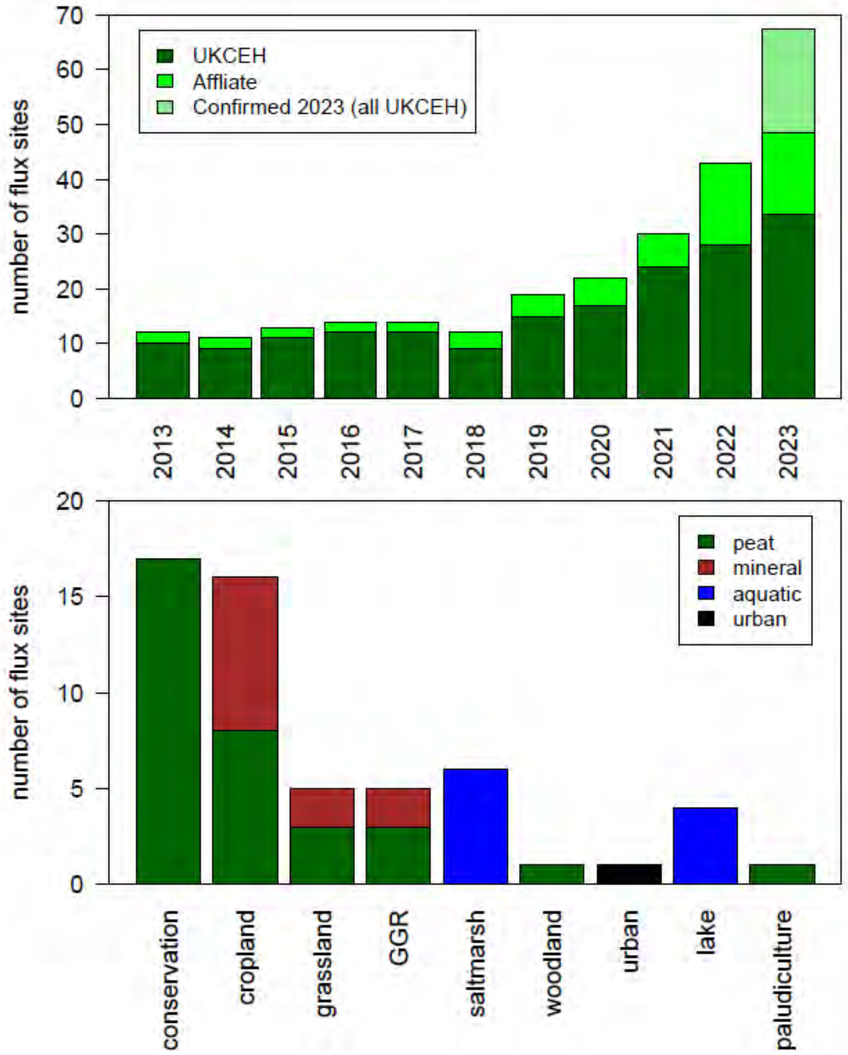
UK-FLUX: eddy covariance network

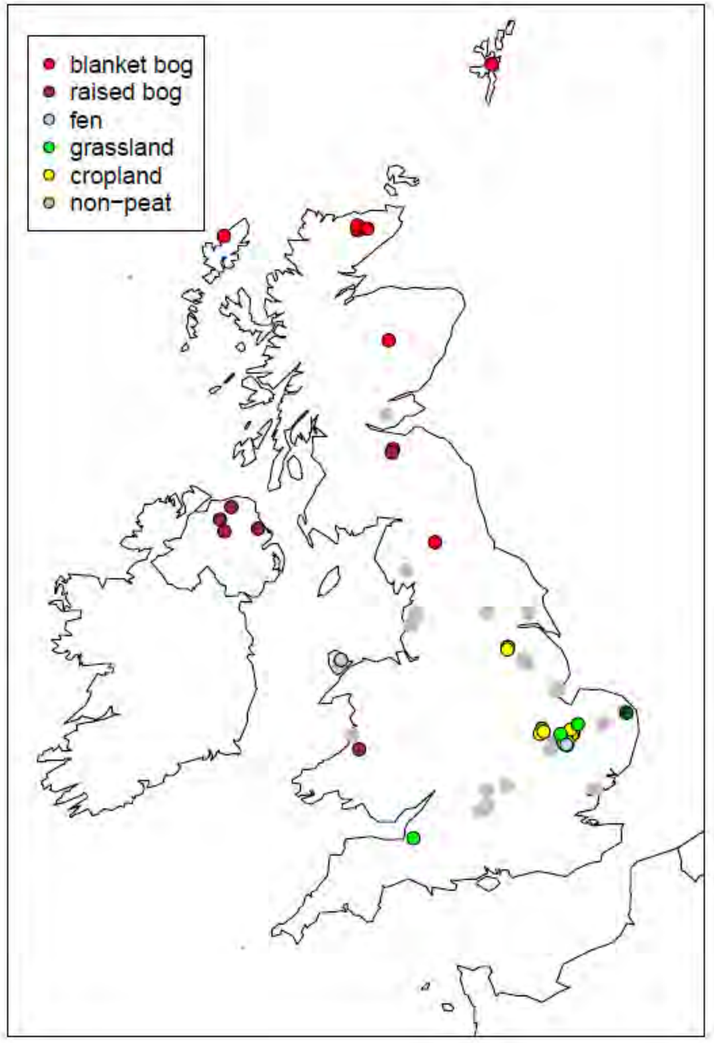
- What is the GHG balance of the land & water surface, how is it changing, what are the drivers?
- Can land system be managed for enhanced C storage and/or decreased GHG emission? What are the co-benefits and trade-offs?
- How permanent are C stocks under environmental and/or socio-economic change?
- Measurable, reportable, verifiable (MRV) for SFI, ELMS, Peatland Code, etc.





UK-FLUX: eddy covariance network





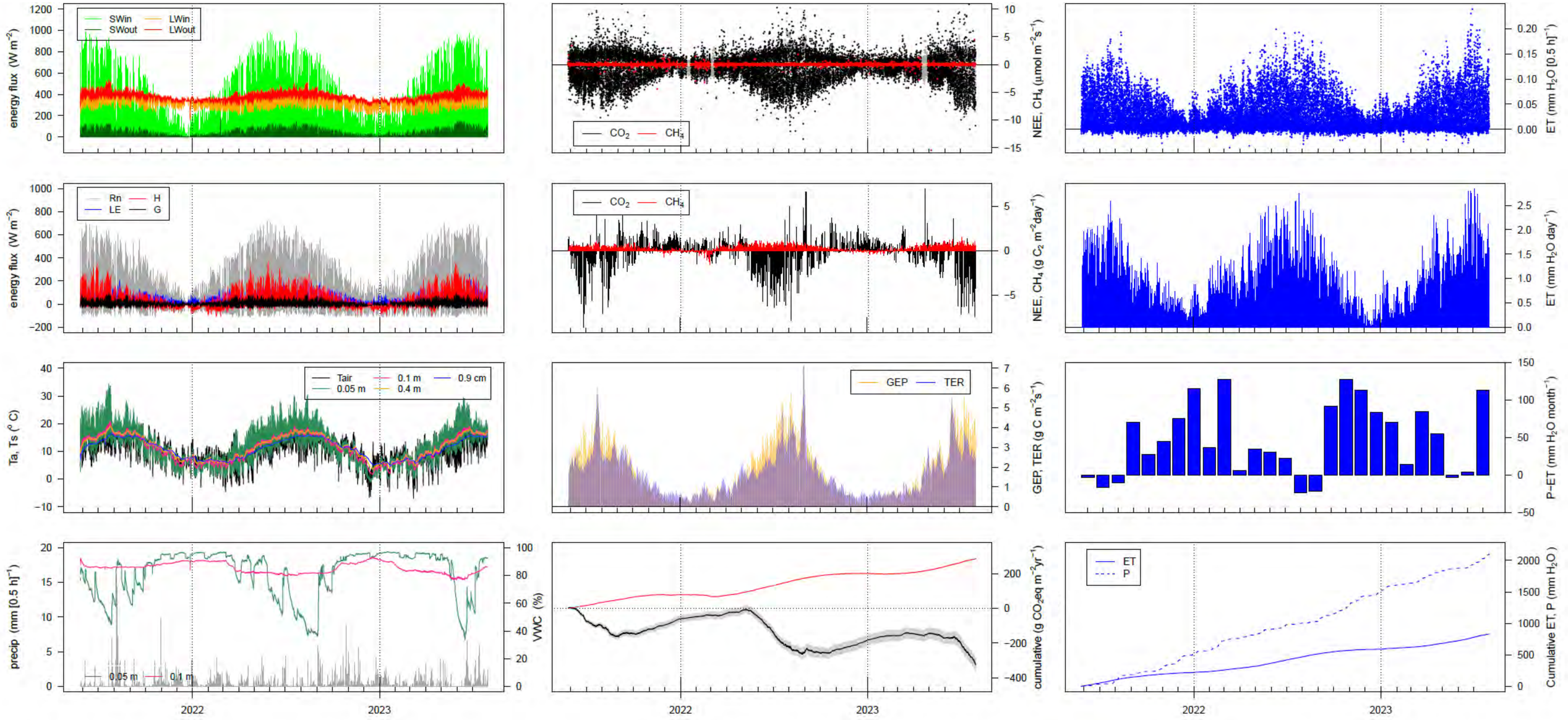
UK Centre for
Ecology & Hydrology

Ballynahone, NI

Department of Agriculture, Environment and Rural Affairs

PEAT MOTHERSHIP

UK-SCAPE
UK Status, Change and Projections of the Environment



Raised bogs (2022)

Department of Agriculture, Environment and Rural Affairs

PEAT MOTHERSHIP

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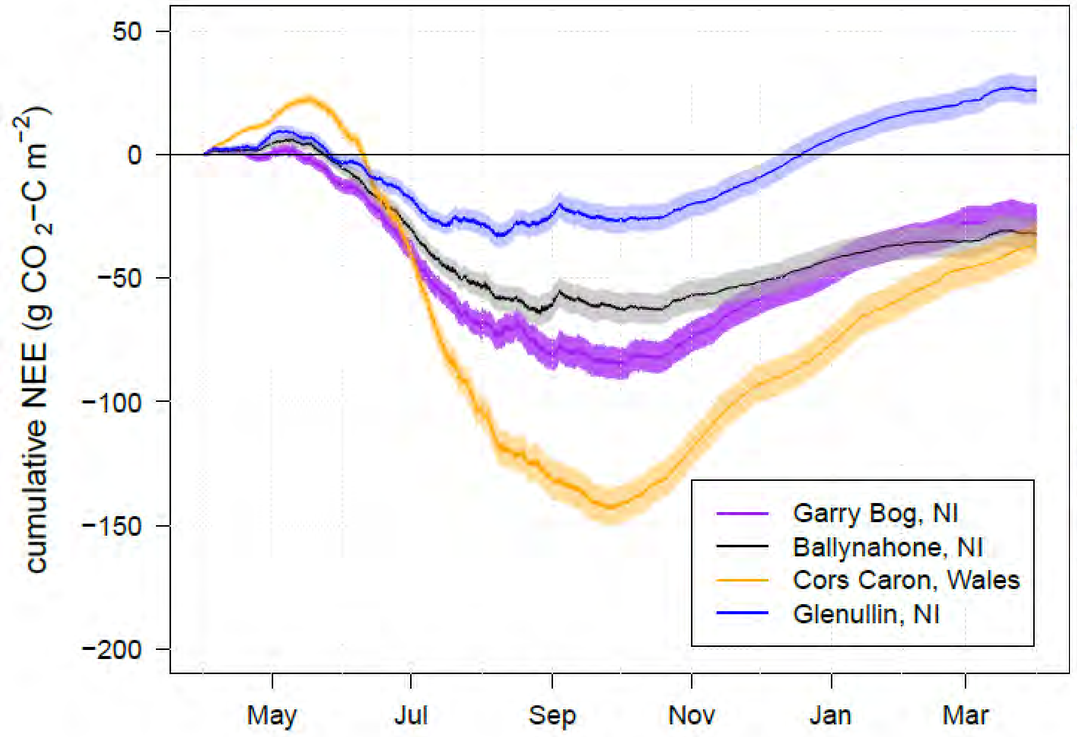
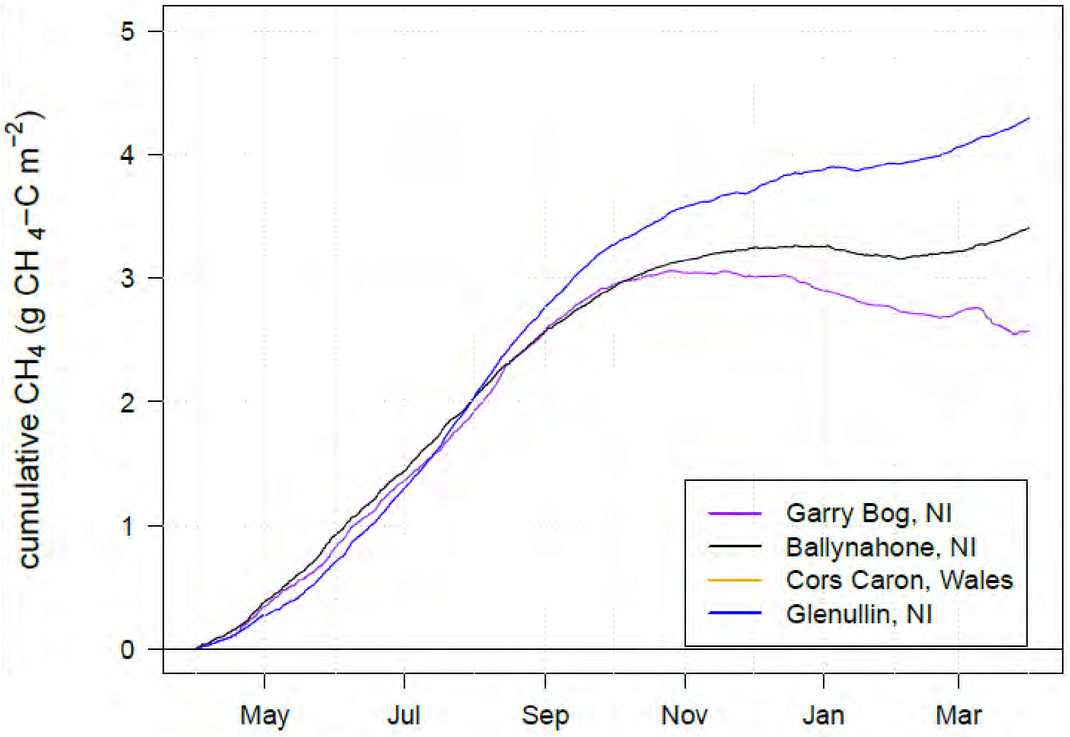
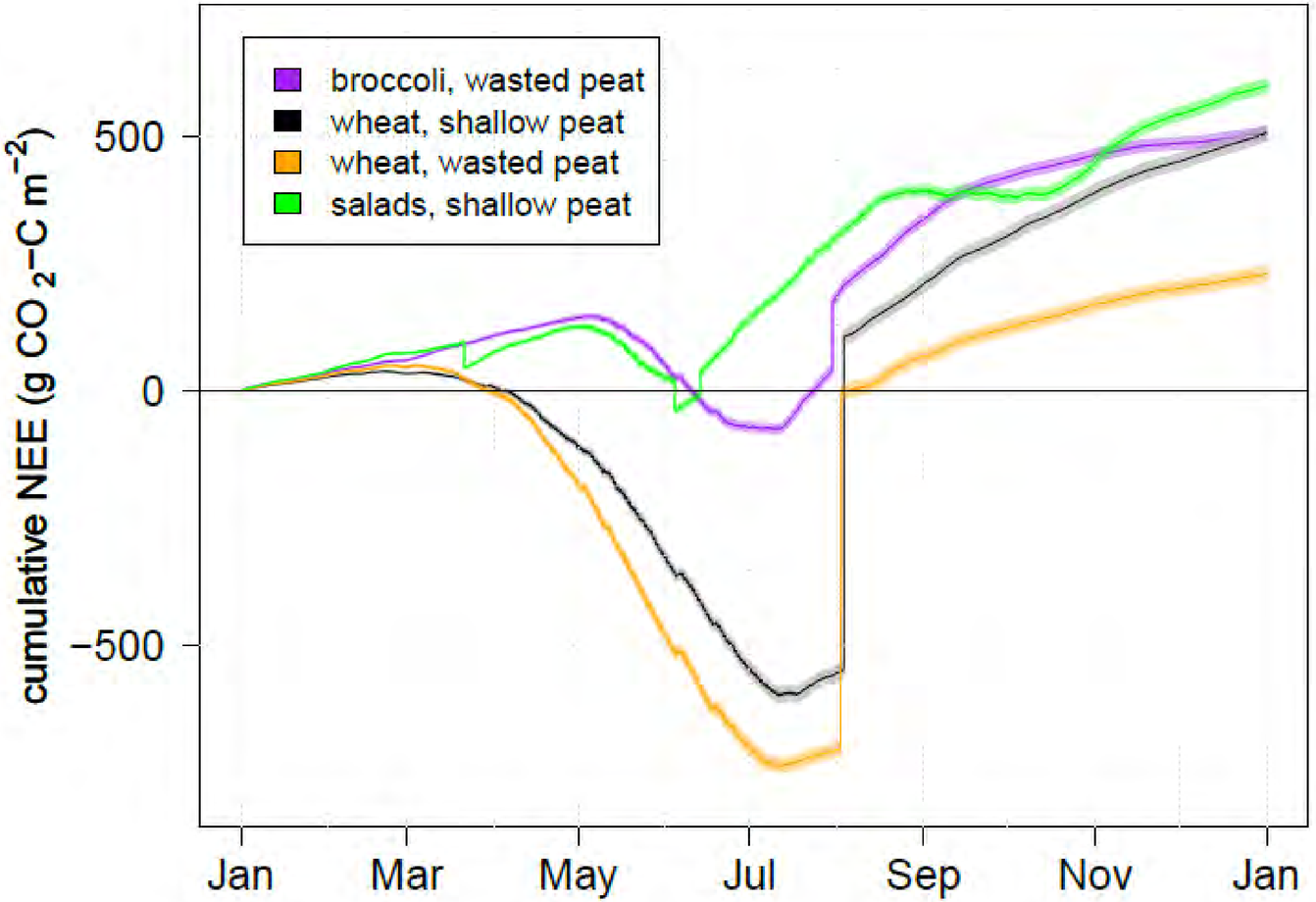
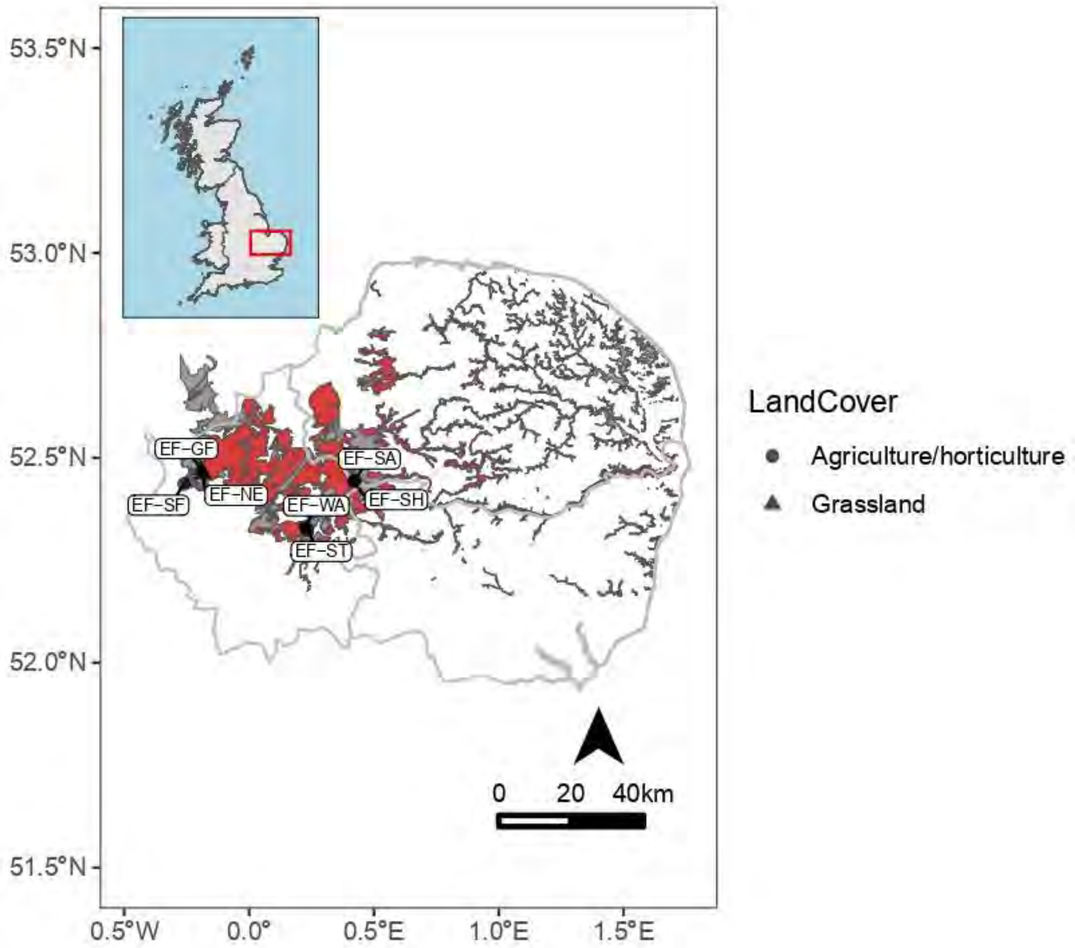




New data: Croplands on lowland peat (2022)





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defra Department for Environment Food and Rural Affairs

Department for Environment Food & Rural Affairs

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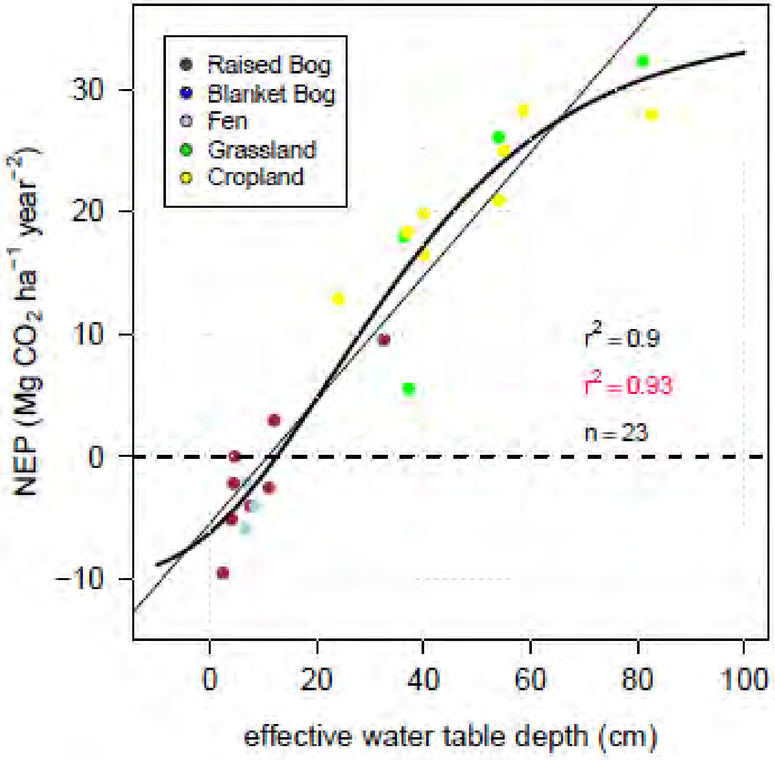
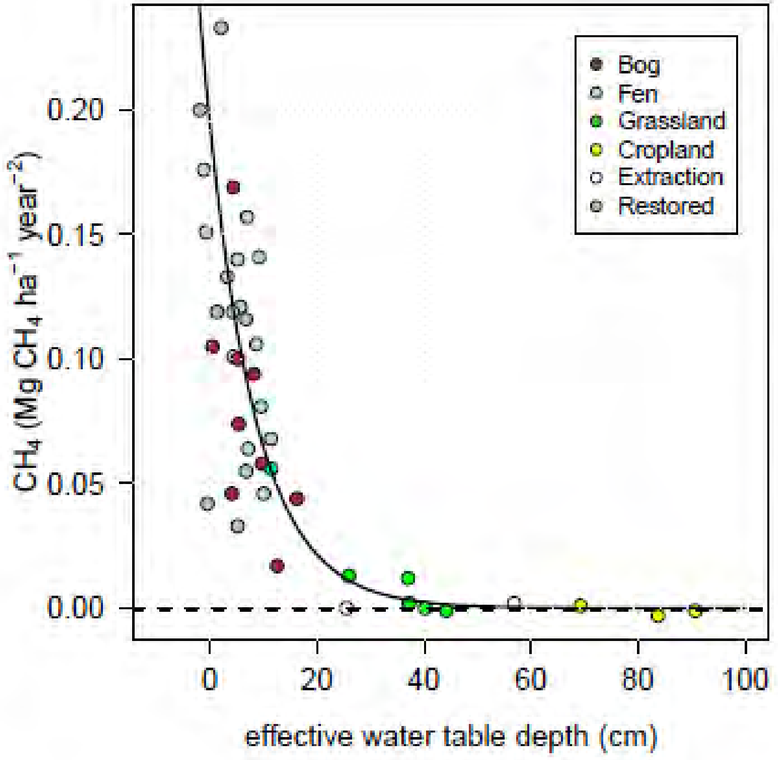
Article

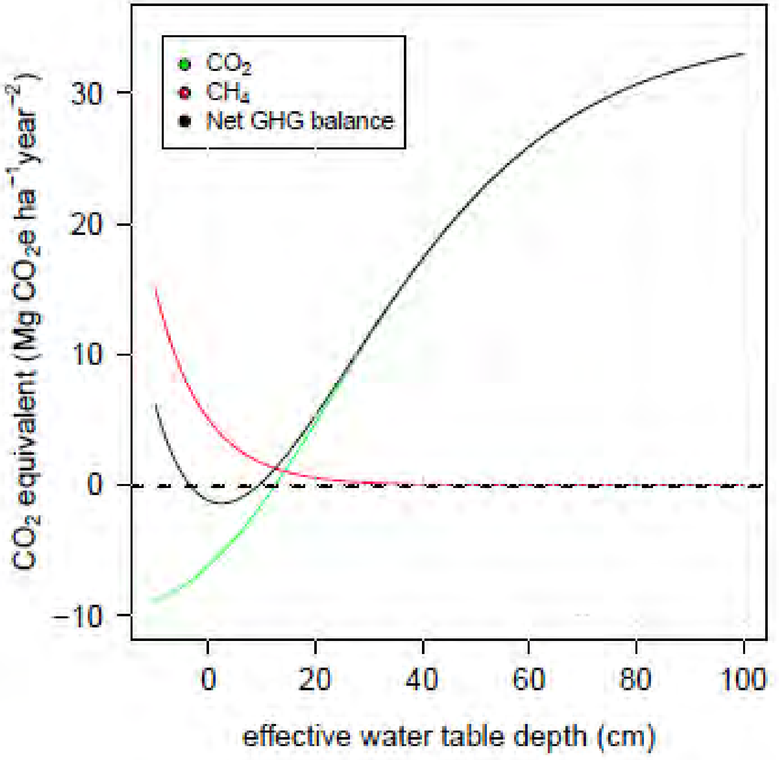
Overriding water table control on managed peatland greenhouse gas emissions

https://doi.org/10.1038/s41586-021-03523-1
Received: 6 November 2020
Accepted: 8 April 2021
Published online: 21 April 2021

C. D. Evans[1,2✉], M. Peacock[2], A. J. Baird[3], R. R. E. Artz[4], A. Burden[1], N. Callaghan[1], P. J. Chapman[5], H. M. Cooper[6], M. Coyle[4,6], E. Craig[1,7], A. Cumming[8], S. Dixon[6], V. Gauci[9], R. P. Grayson[3], C. Helfter[6], C. M. Heppell[10], J. Holden[3], D. L. Jones[7,11,12], J. Kaduk[13], P. Levy[6], R. Matthews[14], N. P. McNamara[15], T. Misselbrook[14], S. Oakley[15], S. E. Page[13], M. Rayment[7], L. M. Ridley[7], K. M. Stanley[16], J. L. Williamson[1], F. Worrall[8] & R. Morrison[3]







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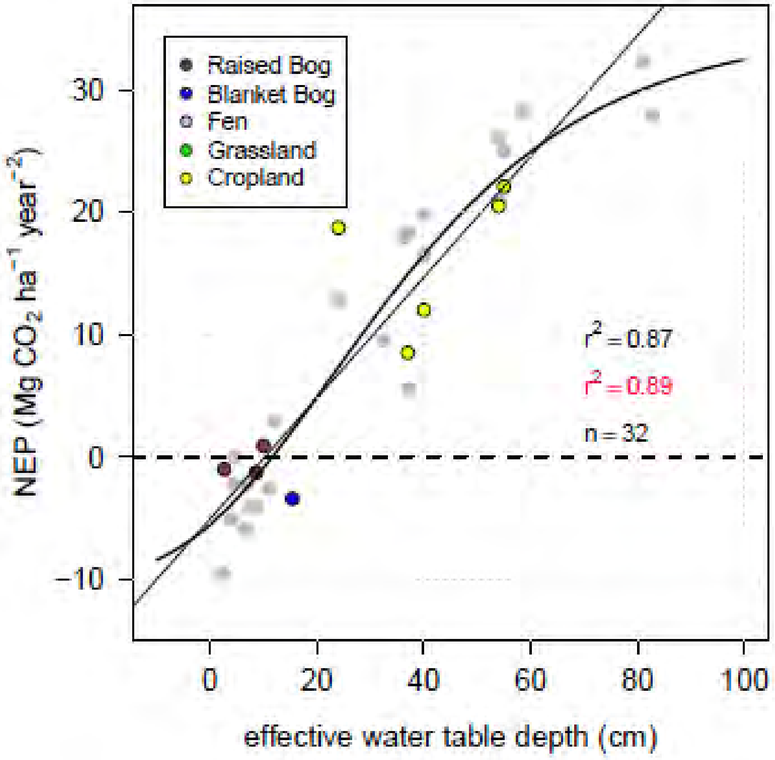
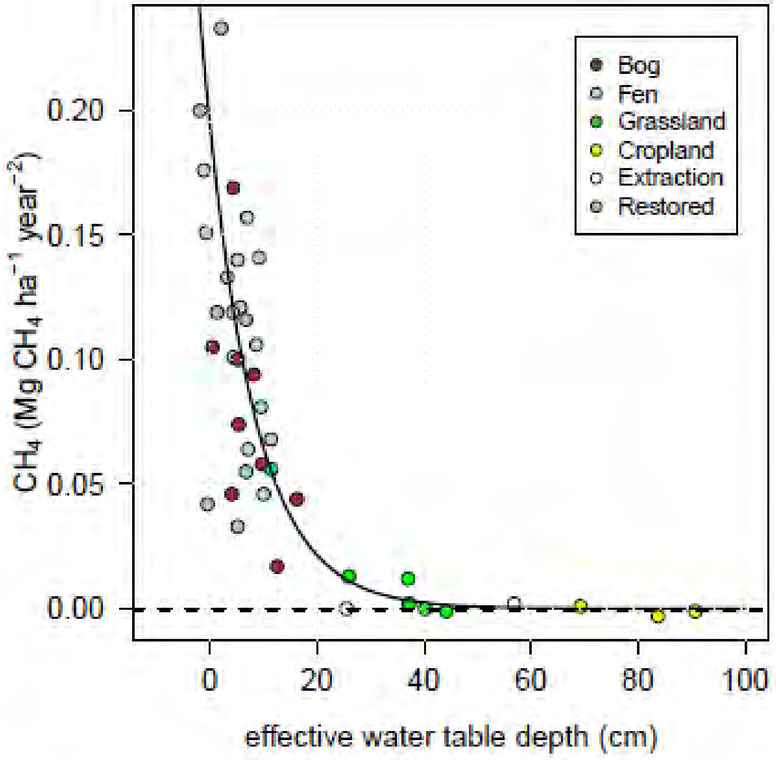
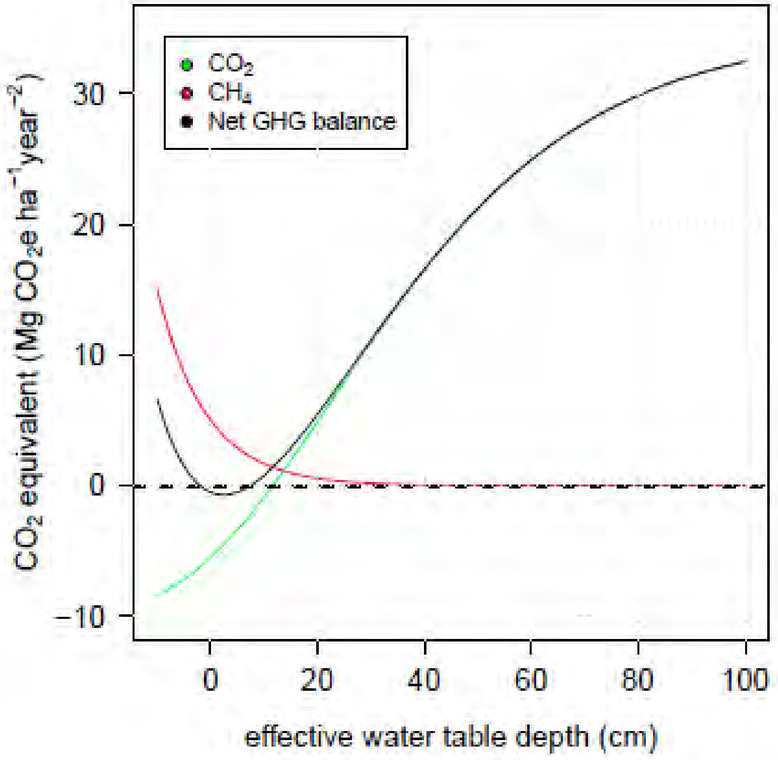
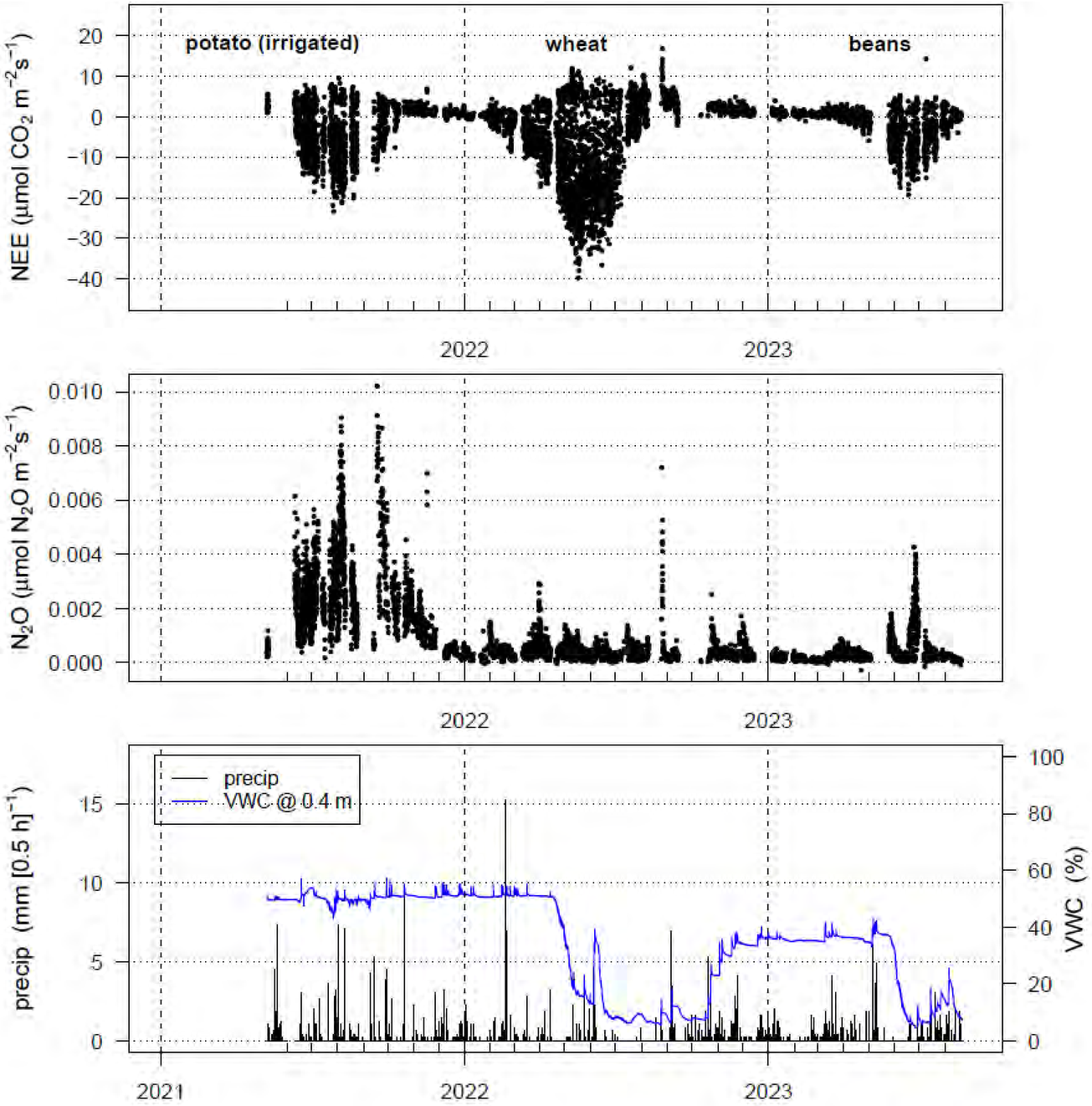






What about N_2O?



UK Centre for Ecology & Hydrology

Department for Energy Security & Net Zero

Department for Business, Energy & Industrial Strategy

Solutions: Pymoor Re-wetting Field Trials & Demonstration

Aim: Assess a wide range of possible native vegetation and crop endpoints for peatland re-wetting in terms of GHG emissions, carbon capture, biodiversity and food production

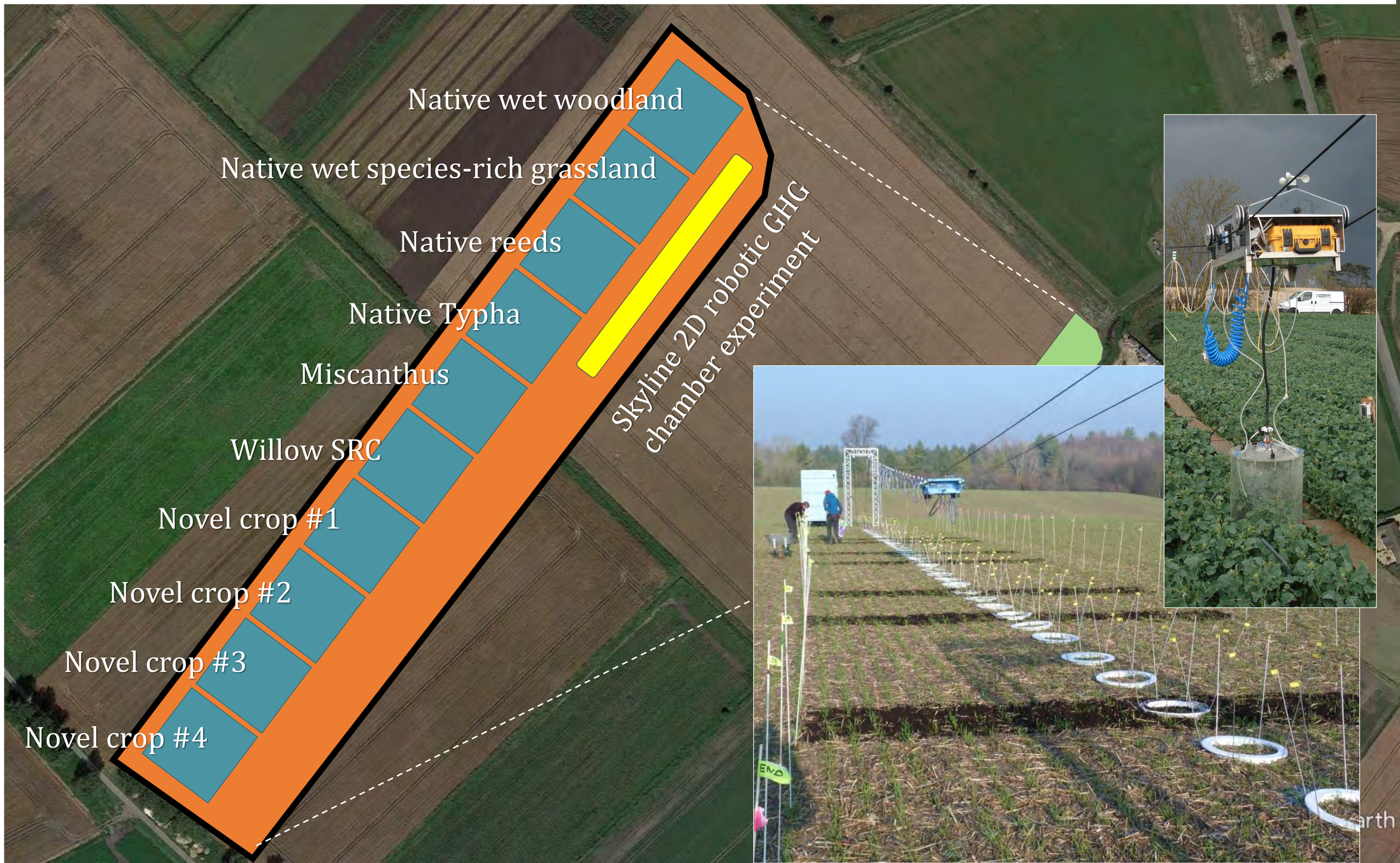
Three sites (replicates)
Each site c.150m × 20m
Peat lined with PVC liner to ensure re-wetting
Water table +/- 10cm below surface
Seasonal draw down (TBC)
Manual GHG measures using chambers all plots
SKYLINE 2D robotic chamber experiment for high temporal frequency GHG measures (Site 1)

AgZero+

Oxwillow
Biodiversity recovery

UK Centre for
Ecology & Hydrology

Solutions: Pymoor Re-wetting Field Trials: Potential Treatments



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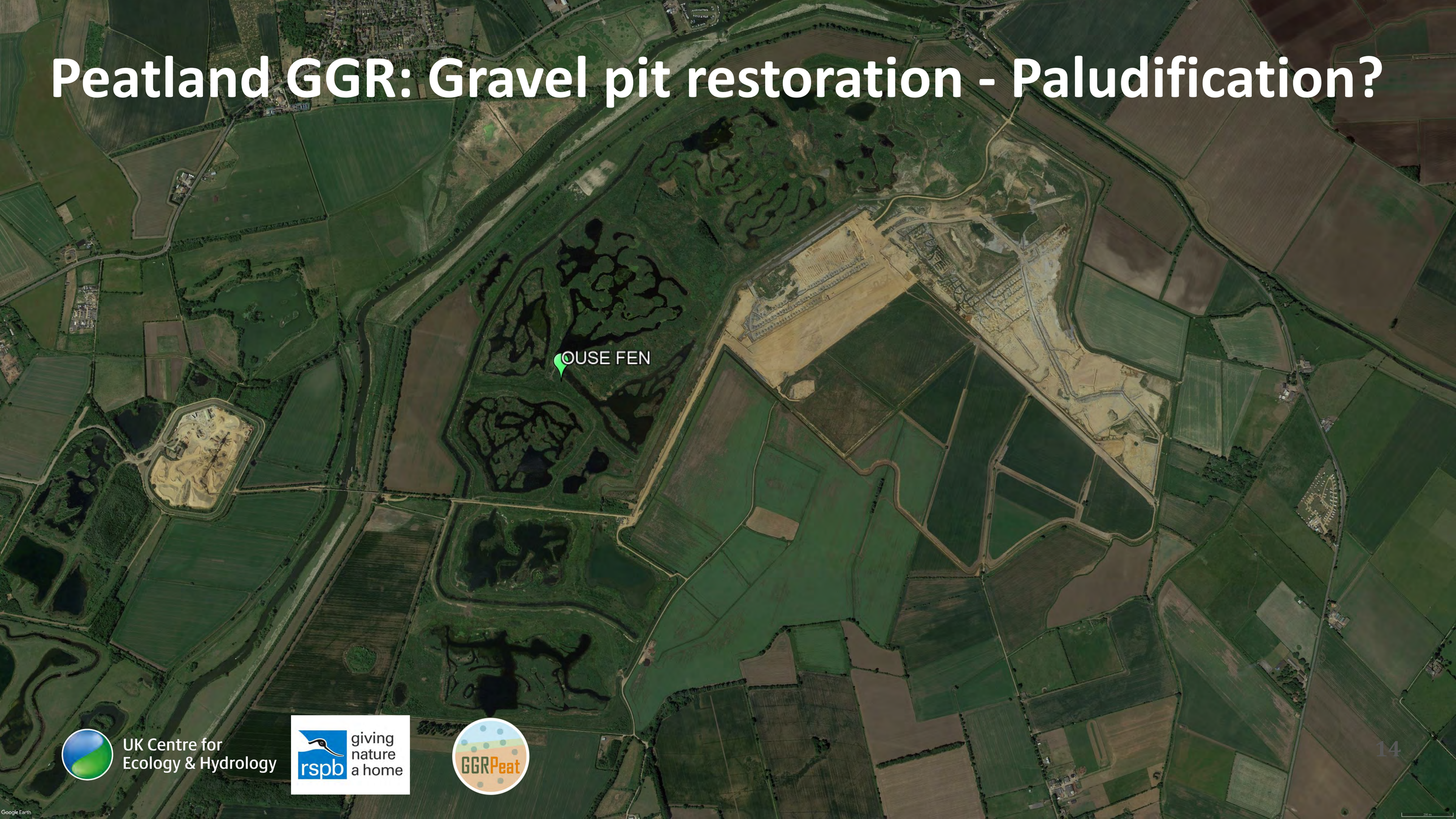
Peatland GGR: Gravel pit restoration - Paludification?



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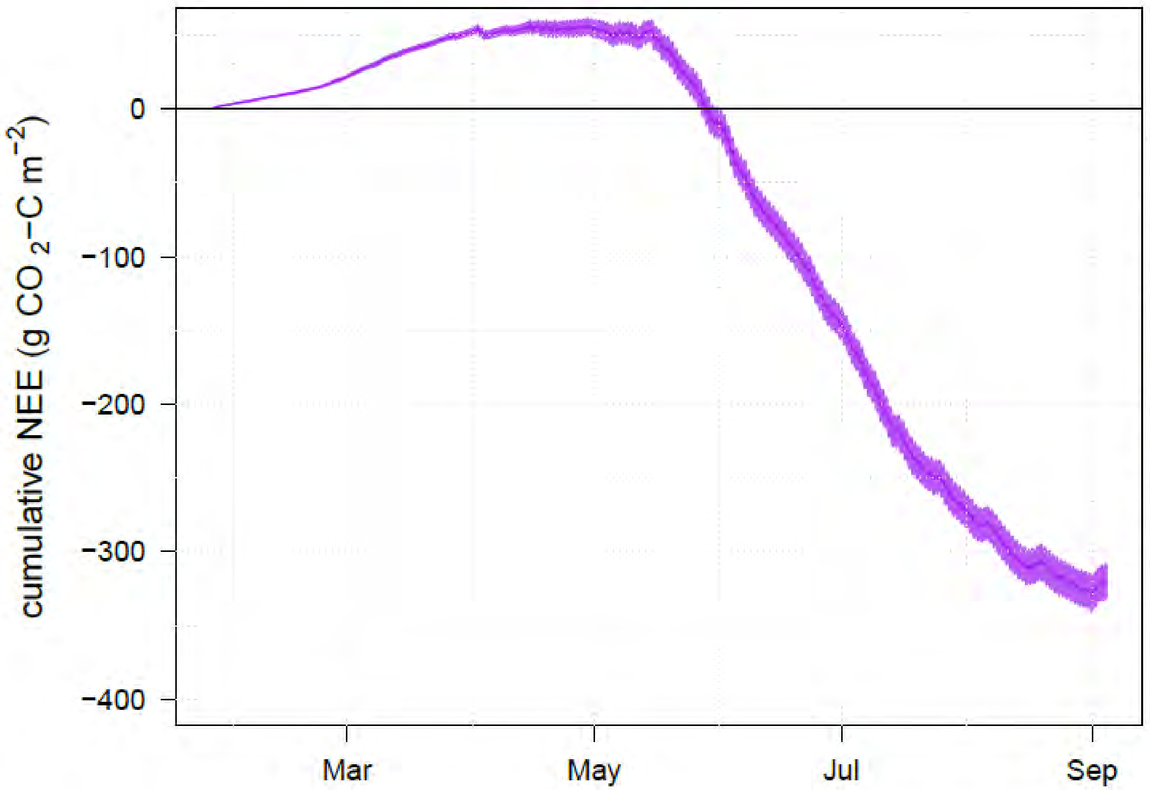
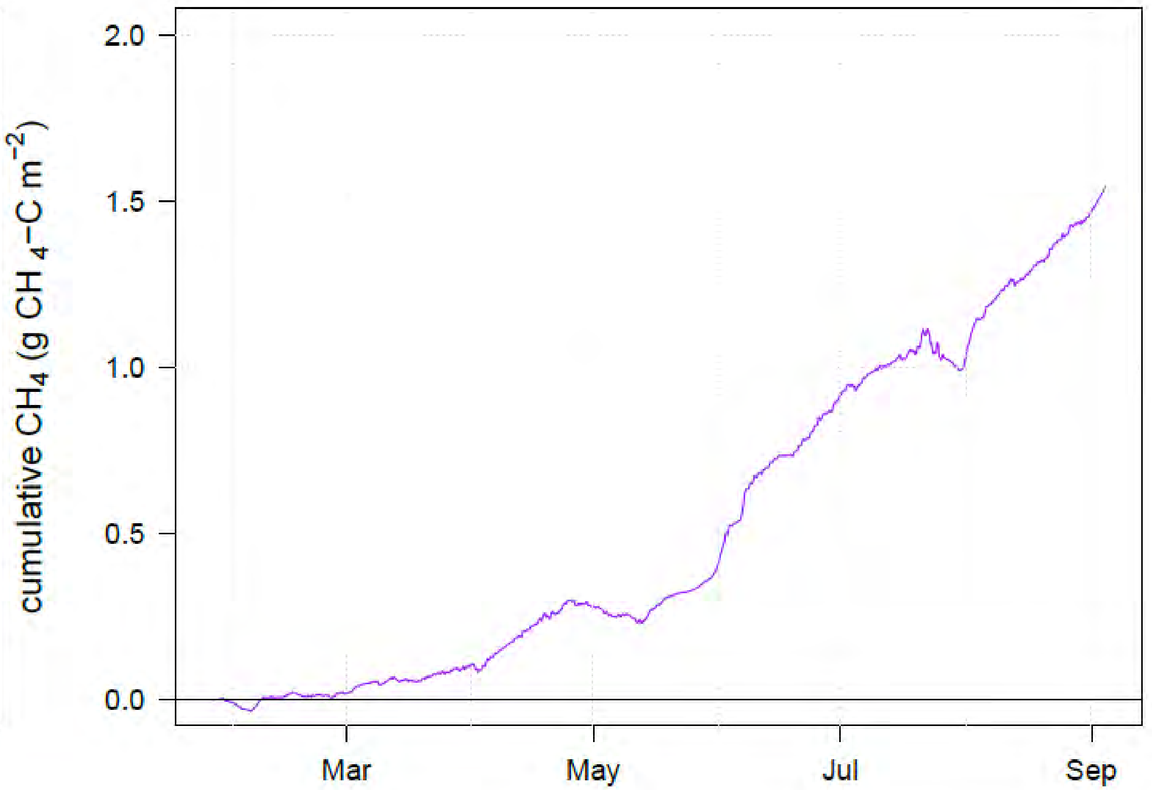
rspb giving nature a home

GGRPeat

Peatland GGR Gravel pit restoration - Paludification?





Summary

- UK-FLUX network continues to grow, particularly for peatlands
- New data from a range of sites, including N_2O from lowland agricultural peatlands
- Relationship between water levels and C GHG emissions seems robust
- Establishment of trials focusing on lowland peatlands, including wetter farming and paludiculture

Peatlands and Methane

Hans Joosten,
Greifswald Mire Centre

The case for enhancing carbon storage in peatlands

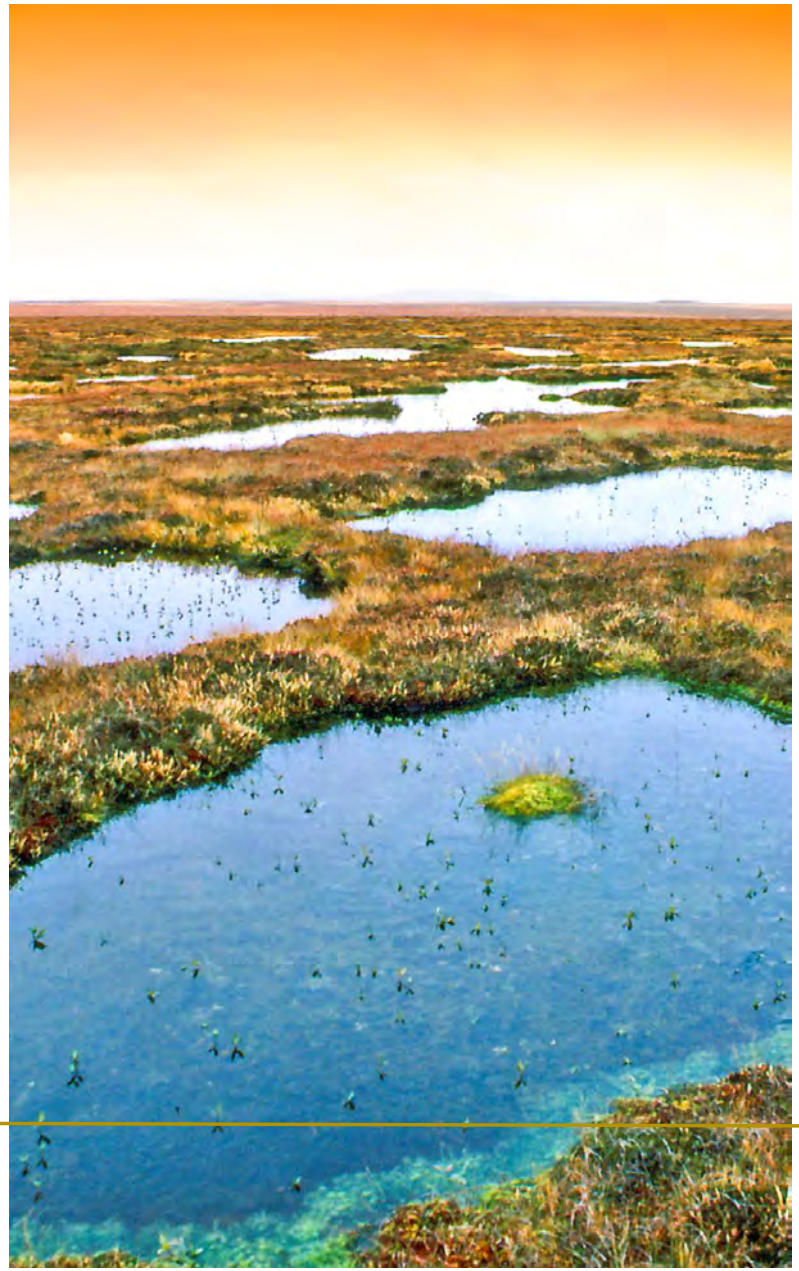
Thanks to: Julian Small, Emily Fearns-Nicol

Date:
Sept 26, 2023

Peatland Code – Data Gaps

Quick summary of data requests for Paludiculture and Forest to Bog

Garance Wood-Moulin, Peatland Code Development Manager, IUCN UK Peatland Programme



IUCN National Committee United Kingdom
Peatland Programme

Peatland Code Ambitions

Paludiculture
Forest to Bog
Fens

At the moment Paludiculture and Forest to Bog are not eligible as a condition category under the Peatland Code.

Paludiculture Data Needs

Our call for evidence includes:

Water Table depths

We need water table depth measurements pre and post baseline

Site History

Site location, details of site preparation and planting method

Specific Crop

We need to know the success of establishment, crop harvest, productivity

GHG Fluxes

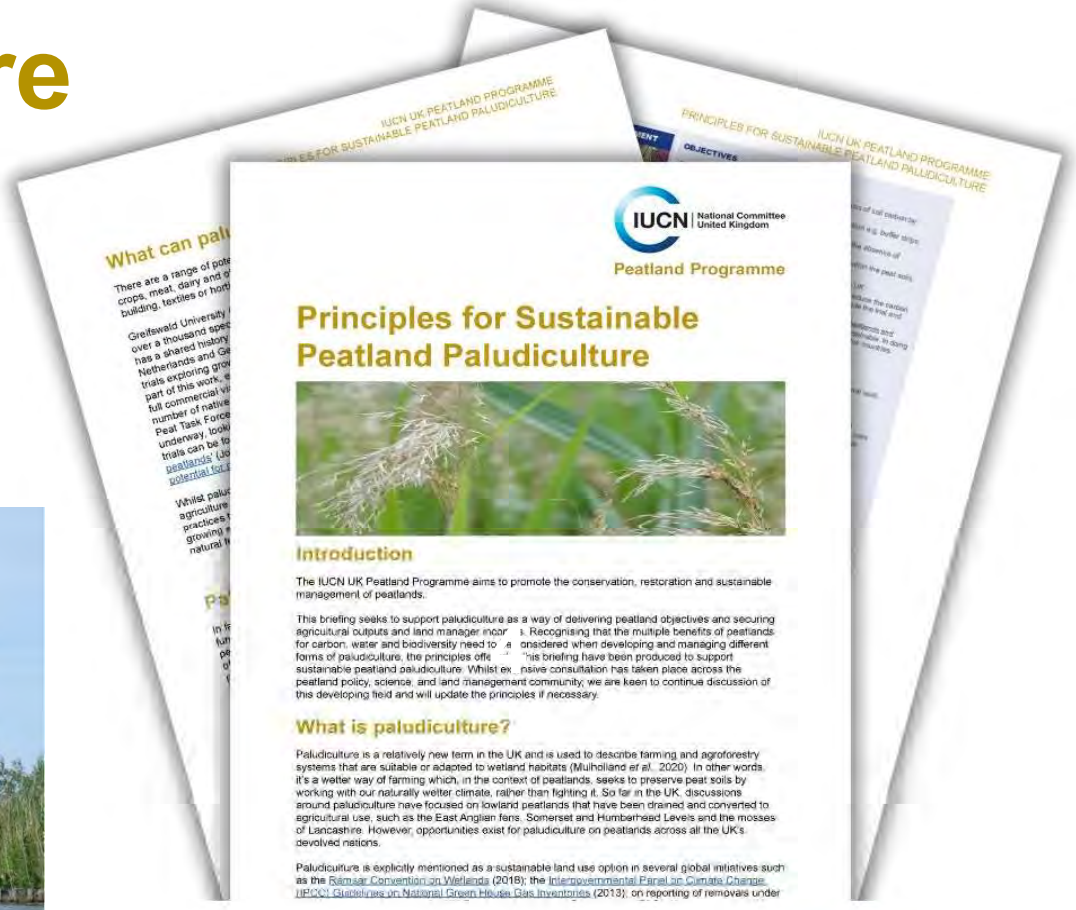
We need to measure the GHG flux before and after harvest

Principles for Sustainable Paludiculture

Paludiculture is one of the tools to help deliver peatland objectives

We set out five principles which should be considered, in the UK context, for sustainable paludiculture:

1. Strategic
2. Rewetting
3. Catchment
4. Value
5. Nature



Fens

- Water table depth to help define condition categories
- We need more data for Modified Fen as don't have enough data for category emission factors.

Forest to Bog ambitions

Co-ordinated Research

Further build data sets on forest to bog restoration under different management prescriptions across the UK.

Policy Alignment

Overcome some of the policy challenges in the way forestry and peatland restoration is accounted for in the LULUCF inventory

Conclusion



Data, Data, Data

We need more data

Get in Touch

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PEATLAND CODE

IUCN National Committee United Kingdom
Peatland Programme

Peatscapes

Knowledge Controversies in Peat Restoration

Dr James Palmer

Dr Kärg Kama

Aneurin Merrill-Glover

Roosa Rytkönen

University of BRISTOL

UNIVERSITY OF BIRMINGHAM

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Questions

1. How do emergent peatland restoration efforts interact with pre-existing knowledges and lived experiences of peatlands?

2. How does knowledge about peatlands circulate, and how is it integrated with new techniques of measuring and restoring peatlands?

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Study Areas

Two study sites in the UK:

1. Honeygar Nature Reserve
2. The Great Fen

Two study sites in Estonia:

1. Lavassaare Peatlands
2. Kolga-Jaani Peatlands

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Methods

Walking Interviews

Desk-based Interviews

Photovoice

Grey Literature

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Outputs

Four peer-reviewed articles in human geography or social science

Guidelines for scaling-up peatland restoration

Project Website, Interview Archive and Photovoice Gallery

Interdisciplinary Symposium

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Thank you for listening!

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