Quantifying carbon sequestration in saltmarsh: data needs for tracking contribution to net zero

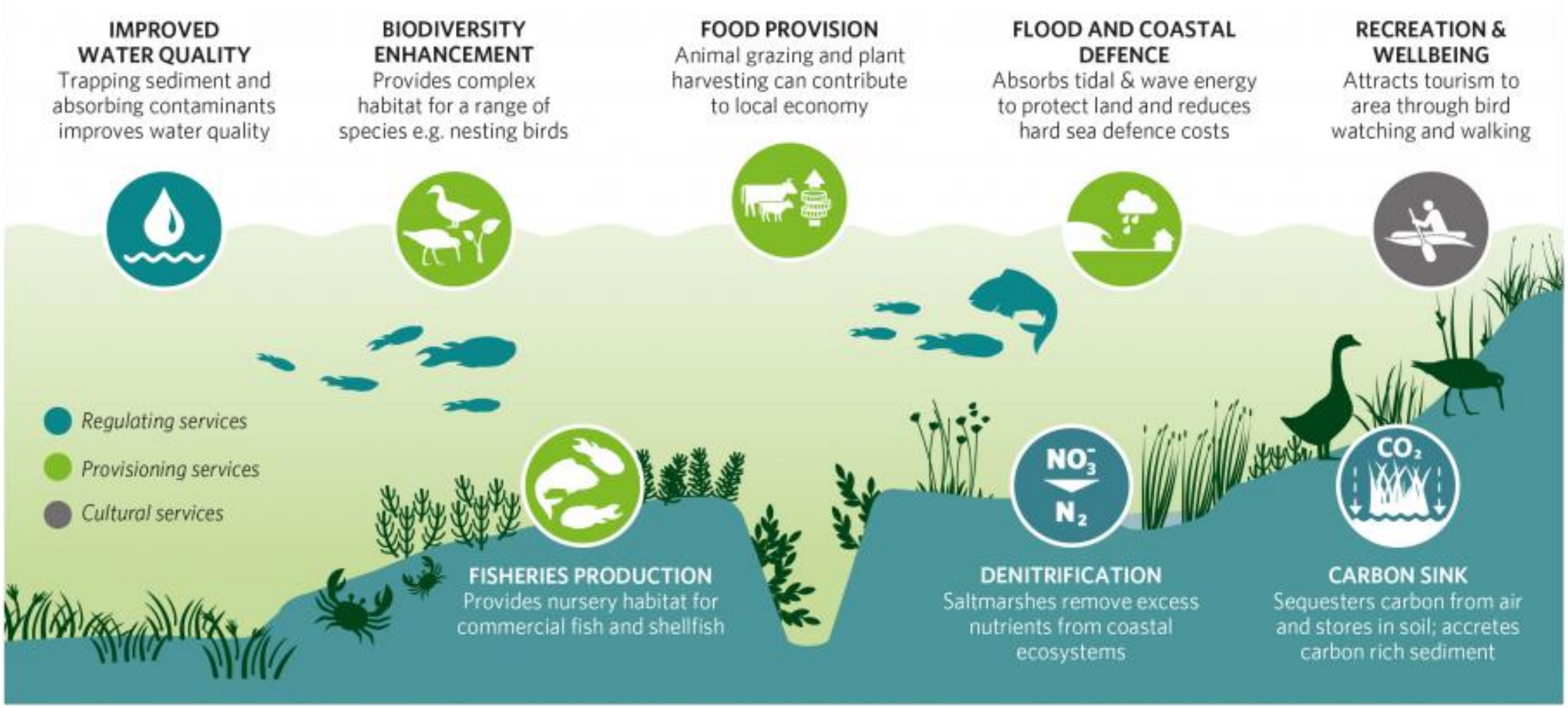
EPW conference

Annette Burden and Hannah Clilverd

28.02.24

UK Centre for Ecology & Hydrology

Ecosystem services provided by saltmarshes



Hudson, R., Kenworthy, J. and Best, M. (eds) (2021). Saltmarsh Restoration Handbook: UK and Ireland. Environment Agency, Bristol, UK.

Blue Carbon in net zero policy

UK level

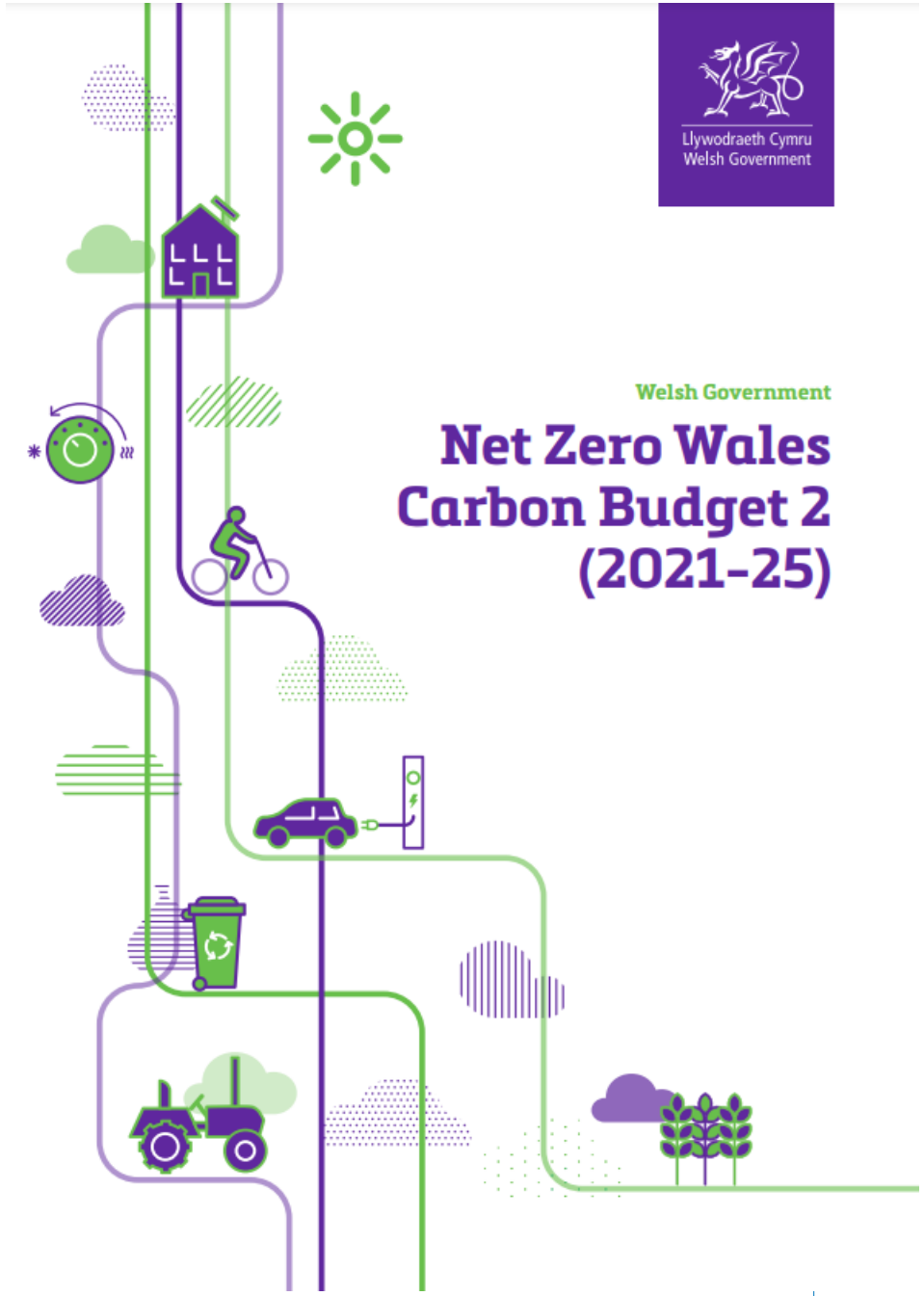
“Protecting, restoring, and sustainably managing other natural resources such as soils or blue carbon habitats like saltmarsh and seagrass, can provide benefits for biodiversity and climate adaptation, as well as for carbon sequestration”.

Wales

“Blue carbon habitats such as seagrass and saltmarsh habitats [also shellfish beds and subtidal sediments] sequester and store large amounts of carbon in Welsh waters for the long term.

We will begin targeted restoration of these habitats to capture and store carbon”.

Proposal 36 - Investigating the potential contribution of blue carbon to achieve net zero



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Principles of the voluntary Code and the Greenhouse Gas Inventory (GHGI)

Commonalities

Both seek to determine the carbon/greenhouse gas (GHG) emissions and removals that occur as a result of land-use change

Emission factor/measurement x *Activity (area)*

= *Emission or Removal*

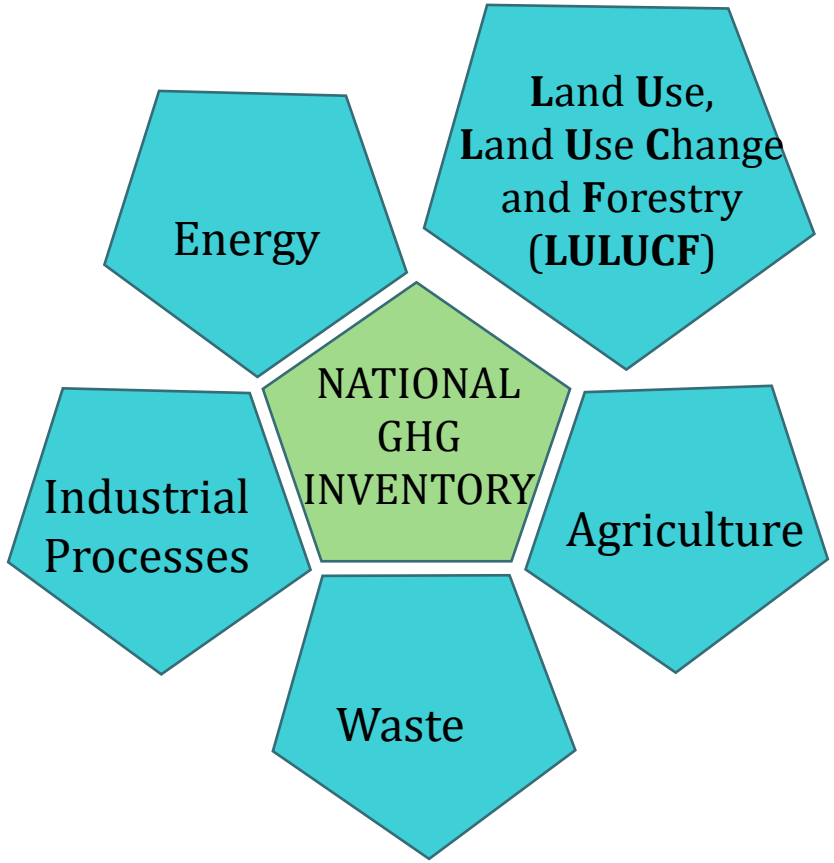
Differences

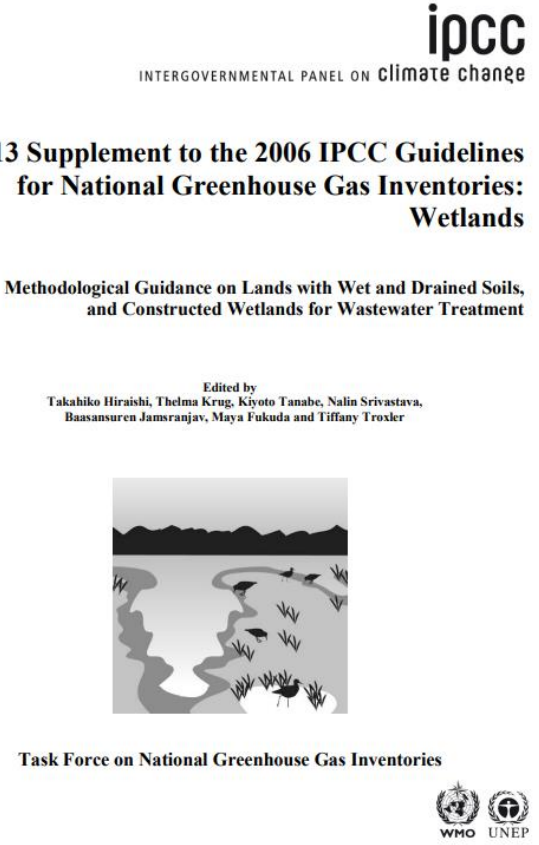
Arise primarily due to the scale of application; a Code is designed for application at a project level, whereas the Inventory has to be implementable at a UK/individual country scale.

The annual Greenhouse Gas Inventory (GHGI)

- Required for the UK's submission under the 1992 UN Framework Convention on Climate Change (UNFCCC).
- It satisfies the UK's legal obligations under the UNFCCC's Kyoto Protocol.
- Also used for setting carbon budgets under the UK Climate Change Act (2008) and equivalent legislation in the Devolved Administrations.

- **Nationally Determined Contributions** (NDCs) are national plans detailing how countries will reduce emissions and adapt to the impacts of climate change.





https://naei.beis.gov.uk/reports/

Roadmap for potential inclusion of saltmarsh habitat in the UKGHGI

Key data gaps:

Activity data

1) Basemap – needed to start reporting

A collation of the available mapping data was started as part of a BEIS rapid review conducted by Burden and Clilverd, 2021.

2) Tracking restoration – for long term monitoring of success

UKCEH EO pilot study explored using satellite data to assess vegetation cover changes

Emission Factors

3) Literature review and meta-analysis

Work underway - Defra/EA-funded project to develop a GHG database, a living archive for developing and updating emission factors.

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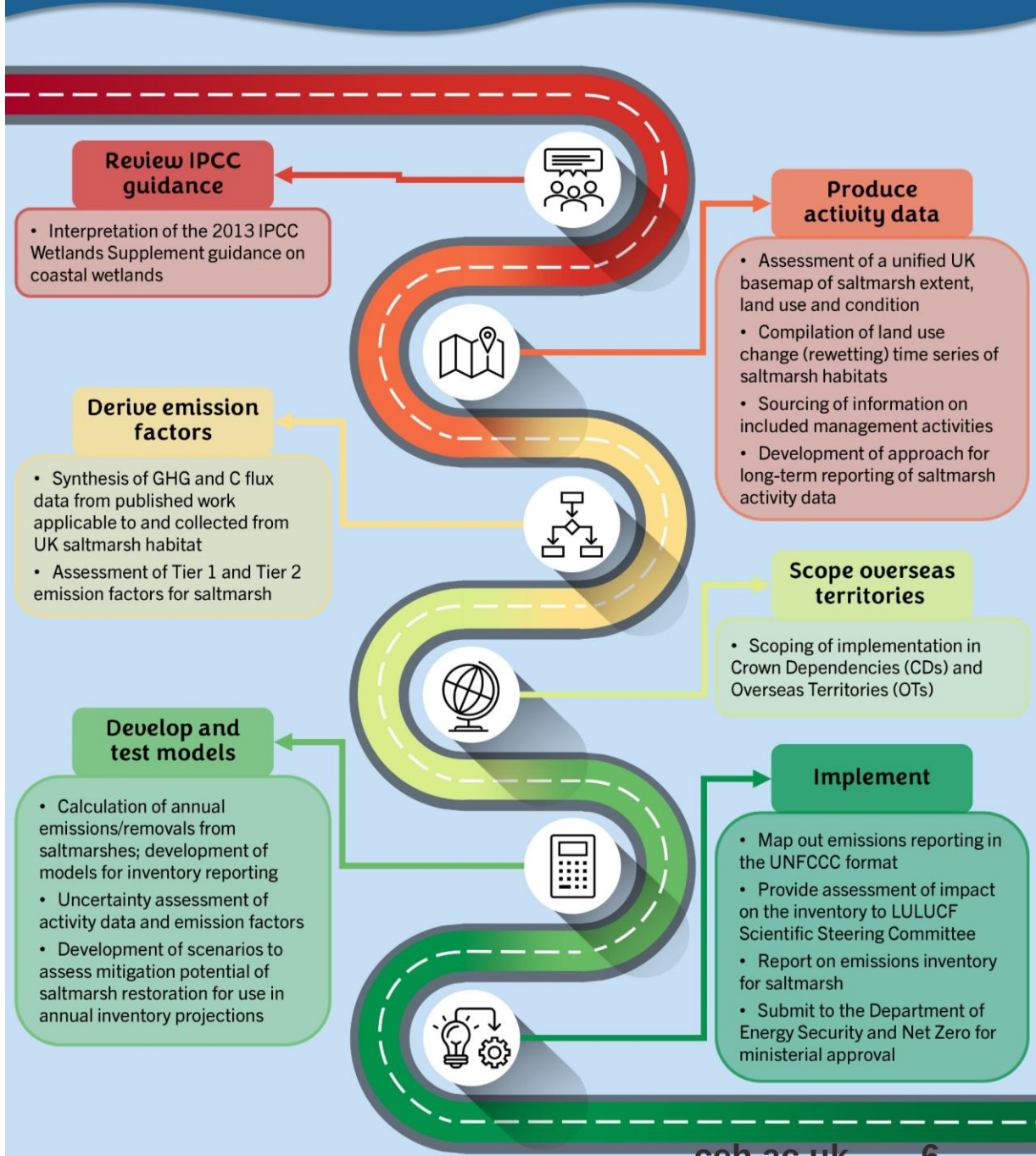


The voluntary carbon market

Where carbon credits are purchased by organisations for voluntary use rather than to comply with legally binding emissions reduction obligations.

A voluntary certification standard to attract private funding for habitat restoration projects in exchange for climate benefits.

Evidence-based approach, providing assurances to buyers that climate benefits are real, quantifiable, additional, and permanent

Woodland Carbon CO_2de

PEATLAND CODE

UK Centre for Ecology & Hydrology

bsi.
The Nature Investment Standards Programme
A high-integrity standards framework for UK nature markets

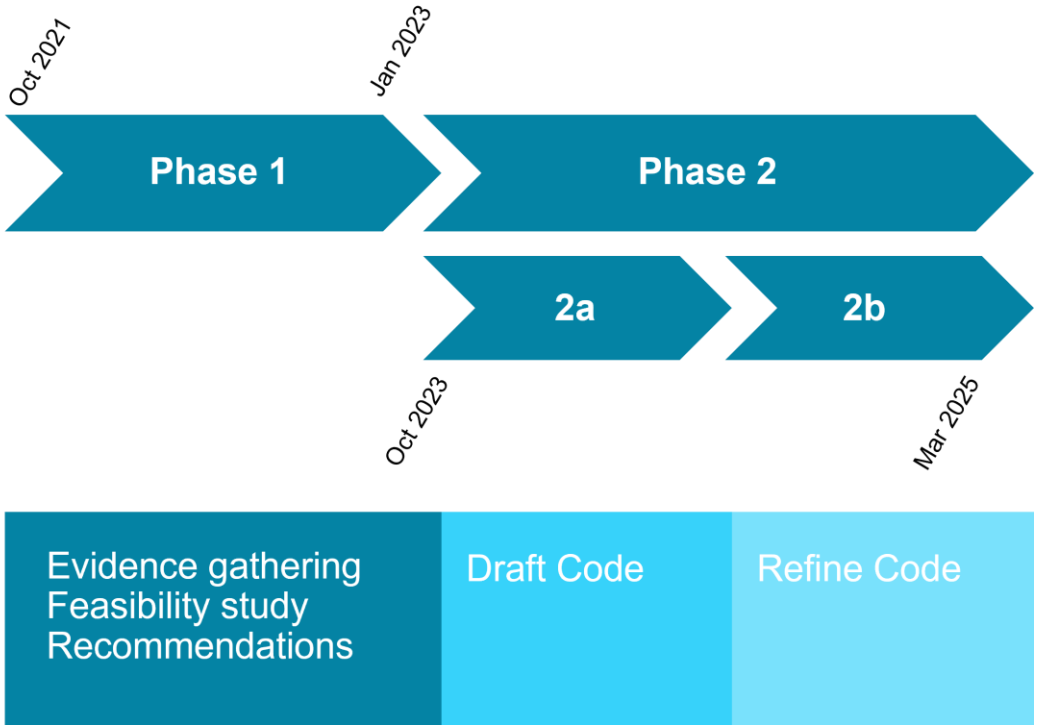
The UK Saltmarsh Code: Project overview

The project team:

A consortium including scientific, conservation delivery, and investment finance experts across the charity, finance, and academic sectors.

UKCEH · Prifysgol Bangor University · SRUC · WWT · rspb · University of St Andrews · finance earth · IUCN · Jacobs

Project progress:



Funded by: Natural Environment Investment Readiness Fund · Department for Environment Food & Rural Affairs · Environment Agency · Natural England

The UK Saltmarsh Code

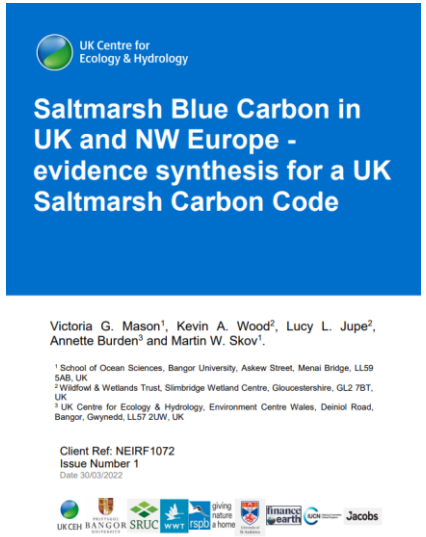
Key data gaps:

1) Limited data – especially GHGs, restored sites, longer time periods

2) Lack of metadata to develop models and proxy measures

3) Inconsistent terminology, e.g. sequestration or accumulation?

4) No standardised monitoring methodologies – data difficult to synthesise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Saltmarsh Blue Carbon in UK and NW Europe - evidence synthesis for a UK Saltmarsh Carbon Code

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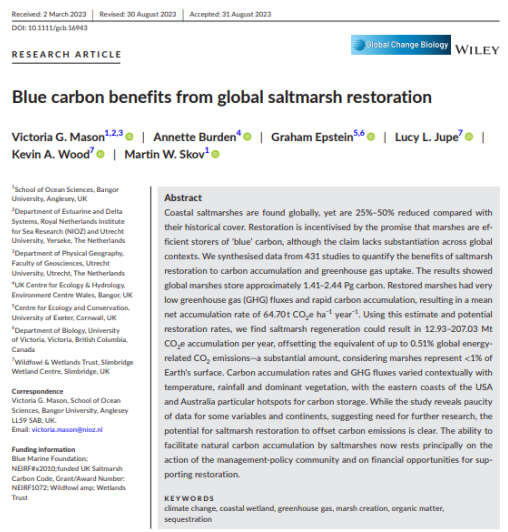
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RESEARCH ARTICLE

Global Change Biology WILEY

Blue carbon benefits from global saltmarsh restoration

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Abstract

Coastal saltmarshes are found globally, yet are 25%–50% reduced compared with their historical cover. Restoration is incentivised by the promise that marshes are efficient storers of 'blue' carbon, although the claim lacks substantiation across global contexts. We synthesised data from 431 studies to quantify the benefits of saltmarsh restoration to carbon accumulation and greenhouse gas uptake. The results showed global marshes store approximately 1.41–2.44 Pg carbon. Restored marshes had very low greenhouse gas (GHG) fluxes and rapid carbon accumulation, resulting in a mean net accumulation rate of 64.70 t CO_2e ha^{-1} $year^{-1}$. Using this estimate and potential restoration rates, we find saltmarsh regeneration could result in 12.93–207.03 Mt CO_2e accumulation per year, offsetting the equivalent of up to 0.51% global energy-related CO_2 emissions—a substantial amount, considering marshes represent <1% of Earth's surface. Carbon accumulation rates and GHG fluxes varied contextually with temperature, rainfall and dominant vegetation, with the eastern coasts of the USA and Australia particular hotspots for carbon storage. While the study reveals paucity of data for some variables and continents, suggesting need for further research, the potential for saltmarsh restoration to offset carbon emissions is clear. The ability to facilitate natural carbon accumulation by saltmarshes now rests principally on the action of the management-policy community and on financial opportunities for supporting restoration.

KEYWORDS
climate change, coastal wetland, greenhouse gas, marsh creation, organic matter, sequestration

BLUE MARINE FOUNDATION

WWT

UK Centre for Ecology & Hydrology

Welsh Blue Carbon Forum anyone?

Thank you for listening

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