A SUMMARY REPORT
DEVELOPING A UK SEAGRASS CARBON CODE

JUNE 2023

For more information, please see the full report.

© Lewis M Jefferies

WHY SEAGRASS?

Seagrass meadows are estimated to contribute as much as 20% of total ocean carbon sequestration (Duarte et al. 2013), making them extremely valuable in mitigating climate change. Seagrasses are aquatic flowering plants (i.e., not macroalgae or 'seaweed') that capture carbon primarily in underlying sediment. Seagrasses accumulate carbon by trapping particles as water flows through the meadows. The seagrass rhizome and root systems also stabilise sediment and can contribute to the carbon-rich marine sediments. If undisturbed, low oxygen in sediments reduces the breakdown of organic matter, which can lead to carbon preservation over millennial timescales.

Seagrass restoration provides a range of benefits beyond carbon sequestration (Nordlund et al. 2016). Seagrass supports biodiversity as important habitat for fish and invertebrates, including nursery habitat for commercially significant fish species. Seagrass meadows can also protect shorelines from erosion and storm surges, both through stabilising sediments and dissipating wave energy. Seagrasses can also improve water quality and reduce excess nutrients. These ecosystem services underpin significant benefits to people resulting in high social and cultural value of seagrass meadows.

Furthermore, restoring seagrass to a prior, healthy state can avoid environmental risks that may be present in geo-engineering ocean carbon dioxide removal approaches such as alkalinity enhancement, iron fertilisation or artificial upwelling. In the UK, up to 92% of the native seagrass area has been lost (Green et al. 2021), suggesting significant areas ecologically suitable for seagrass restoration, and likely to provide durable carbon storage and ecosystem service provision.

A Seagrass Carbon Code would act as the voluntary standard for UK projects that restore and protect seagrass meadows for climate benefits, generating independently verified carbon units.

HOW CAN A UK SEAGRASS CARBON CODE BE ESTABLISHED AND WHAT ARE THE BENEFITS?

The emergence of carbon markets is creating new funding opportunities for nature-based solutions (NbS), including habitat restoration and protection. However, this requires a robust, science-based seagrass carbon code, accompanied by an appropriate financing framework to ensure there are no resulting negative consequences to nature or people. To create a UK Seagrass Carbon Code, it is essential to draw from the best practices of existing domestic codes for other habitat types and other international carbon credit programmes (Peatland Code, 2022; Emmer et al. 2021). While the process will be iterative, lessons learned from other countries and codes can help streamline development and reduce overall timelines for implementation of a UK seagrass carbon code. An integrated approach that balances simplicity and accuracy, will result in an efficient but robust UK Seagrass Carbon Code.

A UK-specific Seagrass Carbon Code reflective of the scale and carbon sequestration potential of UK seagrass meadows, and the UK's unique governance and management context would provide the most confidence in any credits generated. A bespoke code could also provide the framework to ensure integration and compatibility of seagrass restoration projects with other national offsetting/accreditation programmes.

By developing a well-structured and rigorous approach, a UK Seagrass Carbon Code can ensure that the benefits of restoring and sustainably managing seagrass ecosystems are reflected in national environmental targets, such as net-zero greenhouse gas emissions and reversing the decline of nature. Taking an integrated approach from the outset can also ensure that seagrass restoration is pursued in an ecologically-sound manner, avoiding some of the pitfalls seen in some land-based schemes where carbon removal has been prioritised above habitat suitability, biodiversity and resilience.

CHALLENGES THAT NEED TO BE ADDRESSED IN IMPLEMENTING A UK SEAGRASS CARBON CODE

There are numerous barriers to overcome prior to implementing a seagrass carbon code. Despite a significant international evidence base and robust physical understanding of seagrass carbon sequestration, there remain critical scientific data gaps. There is a large-range in the amount of carbon storage measured between seagrass meadows in different locations, and significant variation in sequestration rates measured globally with only a single measured value for the UK (and none in the peer-reviewed literature). It is therefore imperative that pilot projects directly measure baseline carbon and sequestration over time to inform UK-specific estimates for a UK Seagrass Carbon Code. Furthermore, as seagrass restoration may alter emissions of non-CO_2 greenhouse gases (e.g., methane), these emissions (for which there is no UK-specific data at present) must be monitored to ensure that the climate benefits of any seagrass carbon credits are accurate and not over-estimated.

The code must also fill the unique governance, financial, social and political needs within the UK and ensure social and ecological suitability and sufficiently flexible spatial planning to succeed across the diversity of coastal locations suitable for seagrass restoration. Nonetheless, given the clear interest across sectors in supporting seagrass restoration and protection for carbon offsets and other ecosystem benefits, the development of a seagrass carbon code is of critical importance.

KEY RECOMMENDATIONS

We provide seven key recommendations to develop and build upon existing work towards an implementable, feasible and rigorous seagrass carbon code (for full analysis of these recommendations, please see the full report).

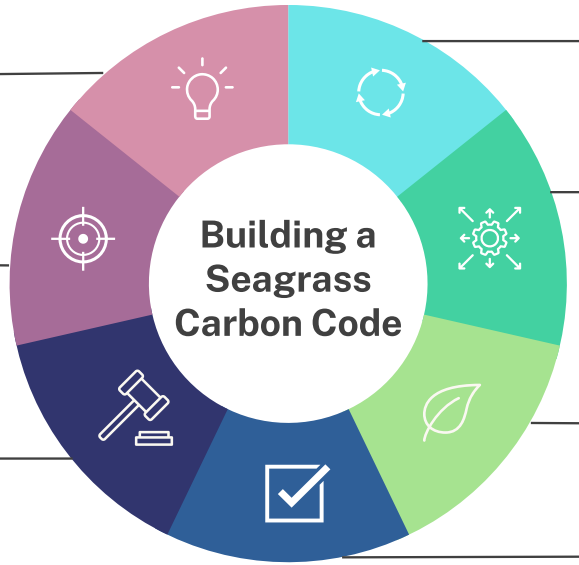
As the UK reaches for an adoptable seagrass carbon code, lessons from previously developed codes can aid in ensuring effective incorporation of the wider seascape, ecosystem health and consideration of the unique social and governance contexts in which a code must operate. If the UK takes a targeted, careful and coordinated approach to address the gaps identified herein when developing a code, the nation will be well-poised to channel funding towards domestic projects that enable the rigorous use of carbon credits, whilst supporting biodiversity and ecosystem services, and progress towards nature recovery and greenhouse gas emissions targets.

BUILDING KNOWLEDGE

Data gaps
Fill existing data gaps, both internationally & within the UK, on seagrass extent, restoration, carbon flux etc.

Prioritisation
Use seagrass mapping and site context information to prioritise restoration actions

Address barriers
Address policy & regulatory barriers to create an environment for enabling seagrass restoration



CODE DEVELOPMENT

Compatability
Ensure code compatibility with existing financial, regulatory & governance structures

Translation
Translate key components from evidence-based codes to seagrass habitats

Beyond carbon
Include criteria beyond carbon to benefit biodiversity, ecosystem health and people

Verification
Verify that credit purchasers are committed to reducing & avoiding emissions

ACKNOWLEDGEMENTS

This report is a condensed summary of "Developing a UK Seagrass Carbon Code", by Melissa Ward[1,2,3], Leanne Cullen-Unsworth[4], Karen Gray Geisler[5], Richard Lilley[4], John Lynch[2], Maddie Millington-Drake[7], Simon J. Pittman[1], Alison Smith[2], Sophie Taylor[6], Lisa M. Wedding[1], Rosalie Wright[1,7] and Nathalie Seddon[2]

[1] Seascape Ecology Lab, School of Geography and the Environment, University of Oxford, South Parks Road, Oxford, OX1 3QY U.K.

[2] Nature-based Solutions Initiative, Department of Biology, University of Oxford, 11a Mansfield Rd, Oxford, OX1 3SZ.

[3] Windward Sciences, LLC. San Diego, California, United States, 92103

[4] Project Seagrass, Unit 1 Garth Drive, Brackla Industrial Estate, Bridgend, CF31 2AQ, U.K.

[5] Green Blue Seas, Skybervean, Maenporth, Cornwall, TR11 5HL, U.K.

[6] ClimatePartner, Riverside Building, County Hall (5th Floor), Belvedere Road, SE1 7PB London, U.K.

[7] Blue Marine Foundation, South Building, Somerset House, London WC2R 1LA, U.K.

The work was supported by the Ofwat innovation fund, overseen by Ofwat for England and Wales and delivered by Challenge Works, supported by Isle Utilities and Arup. Additional funding was provided by Blue Marine Foundation and University of Oxford's ESRC (Economic and Social Research Council) Impact Acceleration Account, and further research and synthesis funded through the Agile Initiative [Natural Environment Research Council grant number NE/W004976/1].

Prepared by the Nature-based Solutions Initiative. Copyright 2023.
Please visit www.naturebasedsolutionsinitiative.org for more information.