Living Lab project brief – Coastal Restoration : Carbon Assessment

Key SRS contact for this project (name, role, email)

Kim Vender, Coastal Restoration Project Coordinator, kvender@ed.ac.uk

Academic supervisor, if known (can be assigned by student researcher's school if not)

To be assigned by school

Description of the paper

This paper provides a brief overview of a potential project that could usefully inform the SRS Department's work.

This paper is in essence a template for a potential **dissertation** Living Lab project that a member of staff would like to propose. The question and research is intended to inform and/or make recommendations to the SRS Department's work areas. It should also align with one or more of the Sustainable Development Goals (see below for more context).

The Vision for Change:

The outputs of this research will inform the further scope for planning and implementation of the University's Coastal Restoration Project regarding Blue Carbon and a methodology for monitoring.

Draft research question

How can we most effectively measure carbon sequestration in coastal and marine habitats with a focus on seagrass in Scotland?

Background

This project is aimed at creating a carbon baseline and a suitable methodology for monitoring carbon sequestration in a coastal area where saltmarsh and seagrass are present but in a degraded state and are planned to be restored. The area is predefined (Eden Estuary near St Andrews) and travel to the site for sampling will be part of the research. The student is asked to first do a literature review on the state of the art of assessing carbon sequestration potential for seagrass in the UK/Scotland context and critically discuss the drawbacks and benefits of the methods and methodologies with regard, but not limited to, time and costs, effectiveness and accuracy – also in light of climate change impacts.
Based on that, the student will be asked to make an informed selection of the most suitable methodology and methods (e.g. number and depth of sediment cores, how to assess accumulation rates, the role of grain size, the role of nitrogen, organic carbon below and above ground, how to assess and account for the carbon source), which will then be used for the predefined site to form a carbon baseline. The study design can also be comparative regarding methodology. Data should be generated by the student. Material for data sampling and facilities for data analysis can be prepared by the University's respective

laboratories (https://www.ed.ac.uk/geosciences/about/facilities) and the SRS Coastal Restoration Project Coordinator can support with providing contacts and covering some of the research costs.
The outputs of the project should include appropriate data on the selected indicators, for which data collection can be replicated by others in a monitoring strategy. For that, guidance and explanations and/or training material provided by the student for SRS use would be an additional benefit of the project. The project contributes to SDGs 10 (reduced inequalities), 13 (climate action), 14 (life below water), and 15 (life on land). It contributes significantly to the planning and implementation of the University's Coastal Restoration Project, which is an innovative strand of the University's efforts to address the twin crises of climate change and biodiversity loss as set out in the upcoming Climate Change Strategy.

Objectives

- Identify and highlight key SDG issues related to **coastal and marine habitat loss and restoration** to highlight the problem.
- Identify and assess alternative solutions in relation to **carbon assessments in coastal and marine habitats.**
- Assess the practical implications of **carbon assessments in coastal and marine habitats.** Will there be any significant cost or operational implications?
- Make recommendations to the University regarding any options recommended within the project.
- Identify how the project or recommendations could be replicable across other universities around the globe e.g. the Global South, to ensure solutions are deliverable where they are needed most/in the shortest amount of time.

Data set provision

Data needed for this project (delete as appropriate)	Data sets available from and contact information (delete as appropriate)
NatureScot Commissioned Report 957 - Assessment of Blue Carbon Resources in Scotland's Inshore Marine Protected Area Network	URL: https://www.nature.scot/doc/naturescot-commissioned-report-957-assessment-blue-carbon-resources-scotlands-inshore-marine
NatureScot Commissioned Report 761 - Assessment of carbon budgets and potential blue carbon stores in Scotland's coastal and marine environment	URL: https://www.nature.scot/doc/naturescot-commissioned-report-761-assessment-carbon-budgets-and-potential-blue-carbon-stores
Blue Carbon – Scottish Parliament	URL: https://digitalpublications.parliament.scot/ResearchBriefings/Report/2021/3/23/e8e93b3e-08b5-4209-8160-0b146bafec9d
Assessing blue carbon resources: Ensuring coastal protection and climate change mitigation through Scotland's natural carbon sinks	URL: https://www.rgs.org/about-us/what-is-geography/impact-of-geography/assessing-blue-carbon-resources-ensuring-coastal-protection-and-climate-change-mitigation-through-s
Scotland's Marine Assessment – Marine Scotland	URL: https://marine.gov.scot/sma/assessment-theme/what-assessed
Briefing: Blue Carbon March 2022 – The Climate Change Committee	URL: https://www.theccc.org.uk/wp-content/uploads/2022/03/CCC-Briefing-Blue-Carbon-FINAL.pdf

The Blue Carbon Forum – Research Outputs	URL: https://www.bluecarbon.scot/publications

Outputs

*The project write up or dissertation will be a researchers own piece of research. They will decide what they think the results show and draw their own conclusions. An additional **secondary output** is required of all SRS living lab projects. This output will be shared with colleagues within and out with SRS, so that we can try to make operations changes based on the researchers recommendations.*

Output format	Insert not applicable or Yes (with further detail)
Presentation to a number of stakeholders	**Yes, to the SRS department and if possible the GreenShores Project team**
Mixed media resource for reuse	**Yes, tables, graphs, and pictures and/or audio/video for succinct presentation; guidance/training material for use of carbon monitoring methodology by lay audience**
Report with operational recommendations	**Yes, state an appropriate methodology for carbon baselining and monitoring**
Resources for staff/student behaviour change	**n/a**
Resources for staff/student training	**Yes, guidance how to apply the methodology**
Other, please specify	**n/a**

Transformational change with the SDGs

The Sustainable Development Goals showcase 17 things humanity must do to ensure peace and prosperity for people and the planet, now and into the future.

The information in this table was obtained with permission from the UN sustainable goals website, https://www.un.org/sustainabledevelopment/sustainable-development-goals/

The Sustainable Development Goals for 2030	Yes (x), sub-SDG (s)	The Sustainable Development Goals for 2030	Yes(x), sub-SDG (s)
Economic growth must be inclusive to provide sustainable jobs and promote equality.		**The food and agriculture sector offers key solutions for development, and is central for hunger and poverty eradication.**	
Ensuring healthy lives and promoting the well-being for all at all ages is essential to sustainable development.		**Obtaining quality education is the foundation of improving people's lives and sustainable development.**	
Gender equality is not only a fundamental human right, but a necessary foundation for peaceful, prosperous and sustainable world.		**Clean, accessible water for all is an essential part of the world we want to live in.**	
Energy is central to nearly every major challenge and opportunity.		**Sustainable economic growth will require societies to create the conditions that allow people to have quality jobs.**	
Investments in infrastructure are crucial to achieving sustainable development.		**To reduce inequalities, policies should be universal in principle paying attention to the needs of disadvantaged and marginalised populations.**	**X**

	**There needs to be a future in which cities provide opportunities for all, with access to basic services, energy, housing, transport & more.**			**It's about doing more and better with less and decoupling economic growth from environmental degradation.**	
	**Climate change is a global challenge that affects everyone, everywhere.**	**X**		**Careful management of this essential global resource is a key feature of a sustainable future.**	**X**
	**Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss.**	**X**		**Access to justice for all, and building effective, accountable institutions at all levels.**	
	**Revitalise the global partnership for sustainable development.**				

The Social and Civic Responsibility Delivery Plan.

The SRS department delivers upon the social and civic responsibility aspect of Strategy 2030. To deliver Social and Civic Responsibility at the University of Edinburgh, we have chosen three strategic objectives and one cross-cutting theme outlined in the table below.

Strategy 2030 can be found here:
https://www.ed.ac.uk/about/strategy-2030

The Social and Civic Responsibility Delivery Plan can be found here:
https://www.ed.ac.uk/files/atoms/files/social_and_civic_responsibility_delivery_plan_2020.pdf

Social and Civic Responsibility Delivery Plan – Objectives and one cross-cutting theme	**Briefly describe the project's link to the objectives, how it is relevant and how this project works towards those objectives.**
We will become a zero carbon and zero waste university - Increasing opportunities and raising aspirations by making education and employment an achievable goal for more people in Scotland and globally.	The project will help raise awareness and aspirations about the importance of the connection between land and seas and help educate people on related climate change issues.
We will widen participation in higher education and support inclusion - Increasing opportunities and raising aspirations by making education and employment an achievable goal for more people in Scotland and globally.	The project will indirectly enable lay audiences such as coastal communities to learn about carbon assessments and monitoring in their immediate natural environment.
We will work together with local communities - to contribute to improve the lives of people across the Edinburgh City Region and beyond.	Based on the outputs of the project, local communities in Scotland will be able to contribute to carbon monitoring in coastal restoration.
Cross cutting theme: In our operations, research and teaching we will engage critically with, and contribute to the Sustainable Development Goals - including the promotion, protection and respect for human rights.	The project has the scope to critically discuss how the links between land and sea in carbon assessments for coastal and marine habitats have been addressed (or not) in existing research and methods. This allows the student to link to the

	SDGs regarding the “people factor”, and new thinking such as “from source to sea” and “seascape” approaches and what they mean for sustainable development.

Students interested in taking part in this project should email the SRS Project Coordinator for Living Labs and the Sustainable Development Goals lpatters@ed.ac.uk. Include your program of study, dissertation timeframe, and a short summary of why you want to take part in the project.