Evaluating and maximising the environmental benefits of seaweed farming in the South West

SWEEP-affiliated PhD student Sophie Corrigan is already delivering significant benefits for industry partners and is informing UK policy and best practice around seaweed farming. This aquaculture PhD project aims to assess the ecological impacts of seaweed farming for fish species of commercial and conservation importance while working closely with farmers to develop sustainable, ecosystem approaches to this emerging UK aquaculture sector.

Informing Government policy: **1**St comprehensive review of the habitat provisioning of seaweed farming

Why it mattered?

Seaweed cultivation is an emerging, highly profitable industry, with the potential to boost food and energy security, and biodiversity.

As the UK Government and Seafood Industry sets to grow the sector, quantifying wider ecosystem services, alongside food production, will further support the case for sustainable aquaculture production.

Sophie's research sits at the cutting edge of this emerging field and focuses on how commercial seaweed farms influence local biodiversity, physical conditions and dissolved nutrient chemistry in the South West:

• Understanding how seaweed farms support local biodiversity i.e., by creating a novel nursery ground habitat which could enhance Influencing thinking and enhancing operational procedures at <u>3 businesses</u>

recruitment of fish species that are of conservation or commercial importance to benefit the wider area.

 Understanding how seaweed farms may influence the wave dynamics and chemistry of the bay area i.e. by absorbing excess nutrients and increasing sedimentation rates.

What Sophie did

Working with <u>Prof Charles Tyler</u> and <u>Dr Ross Brown</u>, using novel camera techniques to monitor fish species of conservation and commercial importance, Sophie is evaluating habitat provisioning by seaweed (and shellfish) aquaculture installations, to determine the extent to which farms provide ecological stepping stones for Marine Protected Area networks and fish nursery areas.



Porthallow Seaweed Farm, Cornwall. Credit: Cat Wilding

£25k of secured new funding and accelerating licence application approvals

Sophie works closely with her four partner organisation funders – the Marine Biological Association (MBA), the Centre for Environment Fisheries and Aquaculture Services (CEFAS), the Fishmonger's Charitable Trust and the Cornish Seaweed Company - and other key business partners including BIOME Algae and Westcountry Mussels of Fowey building and maintaining strong working relationships and exchanging new knowledge to benefit their operations.

Sophie's ongoing environmental surveys are conducted on BIOME Algae's farm.

Corrigan et al (2022) <u>Quantifying habitat provisioning at</u> macroalgal cultivation sites

Corrigan et al (2023) <u>Development and Diversity of Epibiont</u> Assemblages on Cultivated Sugar Kelp (Saccharina latissima) in Relation to Farming Schedules and Harvesting Techniques

We recognise that aquaculture, in particular algae aquaculture, is a relatively novel industry in England and therefore there are a number of knowledge gaps."

Abbey Pennington, Marine Management Organisation





Long line system suspending seaweed droppers. Credit: <u>BioRender.com</u>

Impacts & benefits delivered

Sophie's work directly benefits the operations and profits of the seaweed farming businesses she works with. This also helps to advance the UK and European seaweed farming industry.



Informing best policy and practice: She is a lead contributor to Natural England's commissioned report on the potential environmental effects of seaweed farming. Further, Sophie has published the first comprehensive review, and novel recommendations, for monitoring the potential habitat provisioning by global seaweed farming in Reviews in Aquaculture. She has also enhanced their knowledge on the environmental impacts of seaweed farming to inform their licencing process.

Organisational Function



Securing funding for industry

development: Sophie's work has directly contributed to BIOME Algae securing £25K funding from Devon Environment Fund, which will extend its seaweed farming business, making it competitive in the European marketplace.

Attitudinal/Capacity

Influencing thinking and enhancing operational procedures at the Cornish

Seaweed Company (CSC): to ensure optimal growth, harvesting and profits. Sophie works closely with CSC to maximise their biodiversity value and crop yields, while minimising biofouling which ruins crops and introduces allergen risks into products. She has been investigating biodiversity development at the farm over and beyond the growing season and trialling new partial harvest techniques with the farmers.

Attitudinal/Capacity

Wider stakeholder bene its: Westcountry Mussels of Fowey Ltd. who hosts CSC and BIOME Algae, is also benefiting from Sophie's research on the environmental benefits of integrating seaweed and shellfish farming. Working with Sophie and the University of Exeter ensures that BIOME Algae delivers positive environmental benefits and can continue to grow as a sustainable independent business, providing robust evidence to licencing bodies."

Angela Mead, BIOME Algae



Looking to the future

There is a great potential for wider impact from Sophie's work going forward as her papers and research are distributed and used more widely amongst other stakeholders not only in the South West, but in the UK and beyond.

- Sophie's paper in Reviews in Aquaculture attracted global attention, reaching 22,404 impressions on Twitter, 360 clicks, and is subsequently in the top 5% of research outputs ever tracked by Altmeric.
- Sophie's project contributes to the South West Network, comprising 120 members who represent aquaculture businesses, regulators and researchers.
- Sophie's work was included in a University of Exeter panel discussion video 'A Blue Recovery: How can we protect and restore our marine environment? which has been viewed 1,500 times on YouTube.
- Sophie has been contracted to write an article for Bloom magazine, 20,000 Instagram followers, on the South West farmers she works with and her collaboration and research with them.

About SWEEP

The South West Partnership for Environmental & Economical Prosperity (SWEEP) is a partnership between the University of Exeter, the University of Plymouth, and Plymouth Marine Laboratory. Funded by the Natural Environment Research Council and stakeholders together to solve key challenges faced by those working with our natural resources. **www.sweep.ac.uk**



Natural Environment Research Council

