

Aquaculture for a Thriving Future

Biodiversity, Innovation,
and Economic Sustainability
in the UK

CONFERENCE PROCEEDINGS



The
FISHMONGERS'
Company's

FISHERIES CHARITABLE TRUST

Fishmongers' Hall, London Bridge
30 November 2023

KEY MESSAGES

- The UK's low-trophic aquaculture sector farms an array of shellfish and seaweed species.
- Shellfish and seaweed are nutritious food sources that can support food security, combat malnutrition, and have a rich social history in the UK.
- Shellfish and seaweed can provide an array of ecosystem benefits, such as nutrient-uptake and carbon sequestration if unharvested, or harvested for products that store, avoid, or suppress greenhouse gas emissions.
- Funding for research and development is needed to explore new products that can be derived from shellfish and seaweeds, such as livestock and aquafeed ingredients.
- Advocacy is needed to drive policy changes, regulatory improvements, and financial incentives that support the low-trophic aquaculture industry's growth and recognise its ecosystem benefits.
- Regulations should prioritise ecosystems and industry development should focus on restoring degraded environments.
- Collaboration and creative thinking are required to design private financing arrangements that reduce risk for investors and increase access to financing.





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ACTIONS FOR GOVERNMENT

- Confirm their commitment to developing the low-trophic aquaculture sector.
- Recognise the efficiency of low-trophic aquaculture in producing food and its restorative benefits.
- Increase representation of low-trophic aquaculture in food systems policy discussion and integrate land and marine products into national food and drink strategies.
- Form a designated entity for liaison between government and the low-trophic aquaculture sector.
- Streamline and support application processes for new and expanding businesses.
- Maintain and update spatial plans to mitigate conflict and maximize the value of aquatic resources.
- Recognise the role of LTA products in decarbonising food systems and create financial incentives that monetise their ecosystem services, such as carbon reduction credits.
- Support new businesses by developing public ports and harbours that meet the requirements of local LTA farms.

THE CURRENT STATUS: LOW-TROPHIC AQUACULTURE IN THE UK

THE UK IS EXPERIENCING RAPID GROWTH IN THE LOW-TROPHIC AQUACULTURE (LTA) SECTOR

Low-tropic aquaculture refers to the farming of non-fed aquatic species, like shellfish and seaweed, which feed on suspended particles and nutrients already circulating in marine waters. The UK currently farms mussels, oysters, and a variety of seaweed species. Growth is evident in terms of seaweed biomass produced, but also in terms of the number of species cultured, and the location and types of facilities.

Increased interest and value-recognition is evidenced by increased inquiries into LTA. Unilever, for example, is beginning to show interest in seaweed products and will be looking for a large and consistent supply. Overall, the seaweed industry alone is estimated to reach 1.18 million tonnes worth €1.3 billion and create 11,900 jobs by 2030.

HOWEVER, CURRENT PRODUCTION OF SEAWEED AND SHELLFISH IS LIMITED BY MARKET ACCEPTANCE AND LOW DEMAND VOLUMES

The UK has especially low seaweed and shellfish consumption compared to its European neighbours. In contrast, meat consumption is expected to increase with the growing and increasingly affluent population. Advocacy, education, new products, and supply-chain developments are required. For seaweed, this will include determining best uses for seaweed, researching market demand for the variety of seaweed product offerings, and understanding development drivers of year-round activity.

For shellfish, this will include branding shellfish as planet-friendly, ensuring product quality and consistency, and investigating alternative value-added products and markets. Concerns regarding heavy metal concentrations in shellfish as filter feeders will need to be addressed.

SEVERAL INITIATIVES AIM TO INCREASE CONSUMER DEMAND FOR LTA PRODUCTS

These initiatives are attempting to encourage consumers to choose shellfish and seaweed over other animal source foods. Firstly, they examine various formats (mince, powders) for direct human consumption. For example, seaweed has been powdered as a seasoning; shellfish have been value-added into 'convenient' formats, such as clam nuggets or mussel burgers. Taste test results found that people who never eat shellfish enjoyed these value-added convenience products. Secondly, they raise awareness among children through introduction of seaweed and shellfish in schools.

Increased awareness among adults is also being targeted through education campaigns about the nutritional value of seaweed and shellfish via, for example, celebrity chefs and easy-to-cook formats. Thirdly, they examine other potential applications for non-consumption goods (e.g., building materials, livestock feed ingredients, fertilisers). LTA product use in aquafeeds has a great potential due to their high concentration of omega-3 fatty acids; however, feed producers will need a secure and consistent supply of large quantities of ingredients.

PROCESSING MAY BE KEY TO SCALING AND IMPROVING ENTRANCE TO MARKETS

Seaweed is comparable to sugar cane: the market demand for sugar cane is low, but the market demand for granulated sugar, molasses, and sugar fibres is large. Likewise, the demand for seaweed may be low, but the demand for its derived products is high. Examples of seaweed-derived products include protein for plant-based meats, fibre for gut health supplements, carageen for toothpaste, bioactive compounds for cosmetics, and construction materials. Even simply drying seaweed improves its shelf-life, lowers its transportation costs, and diversifies its potential uses. Expansion of these product offerings at larger scales could improve the consistency of supply.

Yet, research projects on product processing and stabilisation require more funding for enhanced development. In theory, scaling the production of these products could be executed by large-scale biorefineries, creating a link between seaweed farms and wider markets. Concentrated production in a biorefinery could improve efficiency of processing, reduce waste, and mass produce to achieve economies of scale. Biorefineries could also serve as data custodians to improve transparency. Siemens and Additive.Earth have recently partnered, aiming to transform lab processes into industrial-scale refineries. As no large-scale refineries exist elsewhere, the UK is pioneering this technology.

INTEGRATING LTA INTO THE CIRCULAR ECONOMY WILL RELY ON TRACEABILITY AS WELL AS SCALABILITY

Scalability is a particular concern when considering the use of LTA products as sources of fishmeal and fish oil for other aquaculture industries. Scalability may be limited by the environmental constraints of production (i.e., limitations on suitable farm spaces with good water quality).

But as the industry resolves barriers to scale, global standards and third-party certifications could support transparency and product quality. Well defined standards, enforcement, and increasing the number of certified farms is needed globally. To address this gap, the Global Seafood Alliance is currently developing a global standard for seaweed production.

SEVERAL BARRIERS HAVE PREVENTED THE UK LTA SECTOR FROM REACHING ITS POTENTIAL

These barriers include:

- Environmental constraints of production and complex social license to operate (i.e., Limitations on suitable farm spaces);
- Complicated and lengthy licensing processes under complex regulatory frameworks;
- Deficiency of suitable financial arrangements;
- Sparse human resources and skills deficit;
- Lack of offtake agreements and limited local value-chains;
- Limited access to 24-hour ports and harbours with cold-chain infrastructure.
- Insufficient technology for creating new products;
- A need for greater transparency and scalability for a reliable supply;
- A paucity of data on the impacts of seaweed products (particularly in comparison with conventional products it aims to replace); and
- Poor communication and knowledge-sharing that further prevents access to investment and technological support.

WWF's 'Seaweed Solutions Programme' is an example of one initiative that aims to address these barriers. Another is Additive.Earth's 'Aquaculture Enterprise Zones' (AEZ), based on well-tested cluster strategies used in other industries. AEZ could create supportive and inclusive environments for LTA development, helping LTA entrepreneurs navigate common barriers. AEZs would benefit from fast-track licensing processes, access to collaborative research and development projects, and shared infrastructure. Governments and investors would more easily engage with a single entity rather than each farm separately. Ten AEZs have been proposed in England and Wales by 2030, with an additional 20 by 2050.



THE CASE FOR GROWTH: BENEFITS OF LOW-TROPHIC AQUACULTURE IN THE UK

LTA CAN SUPPORT FOOD NUTRITION THROUGH PROVISIONING OF NUTRIENT-RICH FOODS

Seaweed and shellfish are nutritionally dense, and their importance cannot be understated considering the estimated £3.5 trillion spent on malnutrition and its consequences globally.

Seaweed and shellfish are excellent sources of heart-healthy omega-3 fatty acids and micronutrients such as iodine, magnesium, and selenium – nutrients which are commonly deficient in the UK.

LTA HAS ADDITIONAL SOCIAL BENEFITS

Seaweed and shellfish have a strong cultural heritage in the UK as textiles, foods, and other materials. Employment for coastal communities can be supported through LTA industry development. This can lead to diversified livelihood options and food products, both of which support community resilience and food security.

The social benefits to the industry's development can spill into other sectors; for example, regenerative aquaculture can support other sectors, such as fishing and tourism/recreation.

LTA IS IMPORTANT FOR ACHIEVING CLIMATE CHANGE GOALS

Seaweed can offer resilience from climate change. Seaweed farming at scale can result in complex biochemical transformations, offering anti-eutrophication and carbon sequestration potential. UK seaweed farming could be scaled for promoting regenerative farming and increasing anti-acidification. However, the percentage of carbon sequestration is difficult to measure, and more research is needed to quantify carbon sequestration potential and ecosystem benefits more broadly. New research tools, like eDNA, might be helpful in measuring ecological impacts, but much of this technology is in its infancy and needs validation.

Shellfish offer direct mitigation of climate driven impacts, with oyster reefs providing natural protection for coastlines. They improve the roughness of the seabed, dissipating ocean energy, increasing sediment deposition, and decreasing coastal erosion. These natural structures would replace hard-engineered coastal defence systems that use concrete or sand materials. Supporting oyster reef development could be a strategy for mitigating the effects of climate change on coastal ecosystems.

LTA HAVE RESTORATIVE PROPERTIES IN DEGRADED ENVIRONMENTS

LTA farms can create diverse habitats for wild populations that support recovery of trophic systems. Novel research – now expanded into the ‘Ropes to Reefs’ project – found that mussel and seaweed farms, particularly when co-located, improve biodiversity and animal abundance in degraded environments. The farms act as Marine Protected Areas and sheltered nursery areas, with benefits that extend beyond the farm concession through spill-over effects. Monitoring and assessment methods including high resolution benthic mapping, acoustic tagging, and bioacoustics fisheries monitoring all illuminate how various species across the trophic web use the farm and its environment.

For example, lobsters become territorial around farm ropes and seabass use farms as a “fast food” stop along migration routes. However, these benefits do not persist after the mussel or seaweed farm is harvested. Harvest and consumption of LTA products may reduce the impact of their ecosystem services. Furthermore, while mussel and seaweed farms provide benefits to degraded environments, they are inferior to healthy natural marine environments. Farms should be positioned to create, replicate, or provide connectivity among MPAs, rather than substituting for them. Much of the North Sea is suitable as it has been historically degraded.

THE MESSAGING
AROUND LTA'S
ECOSYSTEM
BENEFITS SHOULD
BE CAREFULLY
COMBINED WITH
EFFORTS TO INCREASE
CONSUMPTION OF LTA
PRODUCTS

Shellfish have bio-filtration properties that can threaten food safety and consumers may be dissuaded from consuming animals that 'clean' the ocean. It is unlikely that shellfish intended for water quality restoration should also be used for human consumption. Similarly, seaweeds only offer carbon-sequestration and habitat creation benefits if not harvested. Their potential for carbon storage may rely on their use in products that reduce carbon from other sources. Seaweed could store carbon if transformed into bricks for construction, for example.

Seaweeds could avoid greenhouse gas emissions by replacing plastics, generating biofuel, and replacing conventional fertilisers. They could also suppress greenhouse gas emissions through their use as animal feed supplements, manure additives, or rice field additives. For example, cows fed seaweed had lower methane production than conventionally fed cows. Understanding the different benefits of seaweed and shellfish – when farmed for direct consumption or ecosystem services – should result in different trajectories for each sub-industry.



UK GOVERNANCE OF LTA

LTA ALIGNS WITH THE UK'S VISION FOR SUSTAINABLE FOOD SYSTEMS

Developing the LTA sector also aligns with the global agenda to increase investments in adaptive food systems. LTA development improves environmental resilience as well as sector resilience through diversification of product offerings. Certain shellfish and seaweeds have lower environmental impact than all other animal-source foods and even some plant-based foods like palm and olive oil. Thus, the UK is advised to adopt ecosystem-based approaches that recognise the role of Blue Foods in 'decarbonising' and improving the resilience of food systems.

This is particularly critical considering that an estimated one-third of greenhouse gas emissions are derived from food systems. Raising awareness of the link between Blue Foods, national climate change policies, and sustainable food systems can be achieved through advocacy. Advocacy should aim to embed blue foods in the climate agenda, as low-carbon foods that offer resilience.

AQUACULTURE ADVOCACY IS NEEDED IN THE UK – PARTICULARLY FOR LTA

Clearly, seaweed and shellfish are good for societal and environmental health. Yet, LTA is underrepresented and undervalued. Despite the existence of data on its benefits, LTA is rarely mentioned in food systems discussions. Public perception is generally negative, steered by references to the salmon industry and its negative externalities.

Yet, these criticisms starkly contrast with the benefits and advantages of LTA. Seaweed and shellfish aquaculture avoid so many of the pitfalls of finfish aquaculture; for example, LTA is supplied with natural seed and has no ongoing input requirements, such as feed. LTA advocacy is needed to change public perceptions and champion its integration into policy discussions.

ADVOCACY EFFORTS SHOULD EMPLOY MULTI-STAKEHOLDER STRATEGIES, BOTH REGIONAL AND INTERNATIONAL

Stakeholders include policymakers, researchers, finance-providers, and industry – including those from the LTA sector and other marine sectors. The LTA sector is one of the many sectors that require access to the marine environment. Recognising marine environments as multi-use highlights the need for actions that prevent conflict and maximise resource use. At the public level, one key strategy is spatial planning. The UK's spatial plan delineates 'Strategic Aquaculture Areas', which are being developed by the Marine Management Organisation through science-based methods to determine suitability for 14 target species. These are dynamic living tools and will need to be updated with, for example, climate change.

At the private level, co-development strategies of LTA with other activities can create synergies and cooperation between sectors. For example, LTA researchers are partnering with offshore windfarms in the Netherlands to support the local ecosystem through the restorative properties of LTA. Co-development can be supported through multistakeholder coalitions, which will be critical in advocacy strategies. Indeed, achieving a Social License to Operate should be considered early in the development process for conflict management. Furthermore, co-development would facilitate a 'Natural Capital Approach' and wholistic monitoring that supports national and regional blue economy visions.

STREAMLINING LEGAL REQUIREMENTS COULD FACILITATE ENTRANCE AND GROWTH

The Marine Management Organisation has recognised a need for improved guidance for applicants during the licensing and application processes. Thus, the Seafish Aquaculture Toolkit is being developed to increase clarity for other regulators as well as applicants and includes list of information required, establishes expectations, and signposts resources. This system guides applicants first through scoping for location suitability within the Marine Spatial Plan.

Then, applicants enter a pre-application stage of gathering materials and self-assessing their proposal's compatibility with requirements. The applicant is then moved to the application stage for the marine license, the lease from the Crown Estate, local planning permission, SSSI consent (through Natural England), and the Water Framework Directive Assessment. Critically, applications for aquaculture must demonstrate consideration of its potential impacts and strive for sustainability.

REGIONAL REGULATORY BODIES HAVE ADDITIONAL ONGOING EFFORTS TO SUPPORT THE UK'S LTA SECTOR

The Crown Estate and Crown Estate Scotland recognise the role of LTA to protect the environment and biodiversity, support economy circularity in the face of climate change, diversify employment for communities, and support productivity, supply chains and infrastructure. They support the rapid growth of LTA by focusing on developing the necessary legal frameworks and other activities, including:

- Tailoring legal frameworks in recognition of each sub-sector (i.e., having specific regulations for finfish, shellfish, and seaweed);
- Encouraging “learning through doing” and pilot projects;
- Developing seabed access options, both technical and legal;
- Facilitating and streamlining legal licensing processes for legal framework compliance;
- Increasing partnership-building efforts between research, industry, finance, and policy;
- Being involved in strategies to develop payments for ecosystem services; and
- Direct funding and in-kind support.

GOVERNMENT HAS A ROLE IN SUPPORTING SUSTAINABLE DEVELOPMENT THROUGH FINANCIAL INCENTIVES

Public sector financial incentives will actualise recognition of LTA's ecosystem benefits and will drive the LTA sector development. Public financing systems should blend aquaculture development strategies with financial incentives that encourage sustainable Blue Food production. Valorising ecosystem services is important to achieving profitable LTA systems. Appraising LTA's benefits could occur through carbon credit schemes and other public financing arrangements. For example, nutrient credit trading programmes allow for exchanges in pollution allocation between sources and could compensate costs for LTA farmers.

A need exists for these benefits to be evidenced by increasing collaborative efforts in collecting, collating, and analysing farm-level data. This data would feed into existing methods for valorising ecosystem services. Several projects have used proximate analysis and modelling of farms to evidence their impact and quantify their value. The United States has successful examples of this, where shellfish improved water quality in Cape Cod, Massachusetts, and in Chesapeake Bay. In the United Kingdom, oyster beds in Solent and Drum Bay significantly improved water quality. Ecosystem Service Assessments can also serve as regulatory tools for measuring ecosystem impacts.

PRIVATE-SECTOR FINANCING FOR LTA

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WHILE PLENTY OF
PRIVATE-SECTOR
FINANCE EXISTS,
APPROPRIATE
FINANCING
ARRANGEMENTS
THAT CONSIDER THE
VALUE OF POSITIVE
EXTERNALITIES ARE
LACKING

To meet the UK's environmental goals in the next ten years, an estimated £44-97 billion are required. Considering this context, Finance Earth and WWF are raising a £400 million fund to support green businesses, including LTA.

This green fund is already backed by a £30 million insurance programme, reducing risks for investors.

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TO SECURE
INVESTMENTS,
PRIVATE INDUSTRY
MUST BE ABLE TO
DEMONSTRATE
PROFITABILITY

Without profit, businesses are unsustainable. To understand profitability, research efforts should be designed and executed with commercial application (e.g., pilot studies) and financial value-chain analysis. Big businesses and investors should be encouraged to visit seaweed farms to increase investor experience and understanding of their operations.

In addition, value-chain optimisation could also support the industry; for example, methods for valorising shell waste using circular economy principles could provide additional income streams for farmers.



REDUCING RISK IS ALSO CRITICAL FOR ATTRACTING INVESTORS

Perhaps most obviously, reducing risk will rely on making sound decisions concerning the farming scope (e.g., selecting appropriate locations, scaling development for contributing meaningful biomass to production targets). But equally critical for investment into the sector is increasing transparency and trust. Understanding aquaculture businesses and their potential risks can be difficult for investors without prior experience in aquaculture ventures, as aquaculture is a relatively young industry. The development of “Finance taxonomy” aims to define the characteristics of sustainability for each sector to assuage investors’ concerns of ‘greenwashing’.

The Green Finance Taxonomy project aims to develop standards and definitions for ‘sustainability’ across different sectors. The taxonomy is a reference tool that allows investors to compare between companies or even sectors to invest in truly sustainable operations. While 47 countries are developing these taxonomies, the UK is the first to develop one for aquaculture. The UK aims to use their aquaculture taxonomy to advise global standards, based on criteria and metrics.

PRIVATE INDUSTRY IS ADVISED TO ATTRACT AND PREPARE FOR INVESTOR INTEREST

Industry was encouraged to think about potential questions to prepare responses, gather evidence in support of their responses, and prepare risk mitigation strategies. In preparation for meetings, entrepreneurs should be aware that investor criteria often include:

- Operational dynamics (location, cage structure, water quality parameters, etc)
- Impact assessment (ESG management, direct and indirect impacts, impacts on value chains, etc)
- Commercial considerations (customer concentration and diversity, patents, etc)
- Financial analysis (data availability, transparency, etc)
- Paperwork (licenses, approvals, etc)
- Management experience (complementarity of the management team, collaborations, diversity, etc)

CONCLUDING REMARKS

Low-trophic aquaculture is a small sector that has a great potential in the UK. It includes nutritional, social, and a wide variety of environmental benefits with restorative functions. Challenges include a low consumer demand, conflicting messaging between its nutritional value versus its restorative ecological role, underdeveloped value-chains, complex regulatory systems, and a lack of appropriate public and private financial arrangements. This conference discussed the benefits, challenges, and opportunities of the UK low-trophic aquaculture sector, with key calls to action for policymakers to better support growth.

This document was prepared by Alexandra Pounds (alexandra.pounds@stir.ac.uk) based on presentations and discussions held during the 'Aquaculture For a Thriving Future' Conference at Fishmongers' Hall, London on 30 November 2023.

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CONFERENCE AGENDA

SESSION ONE The UK Aquaculture Vision

Chair: *John Goodlad*

9:30-9:40	Welcome	<i>Eleanor Adamson</i> <i>Fishmongers' Company</i>
9:40-10:00	Blue Economy and Aquaculture, International Perspective	<i>Stefán Jón Hafstein</i> <i>Aquatic Food Coalition</i>
10:00-10:10	Aquaculture and Blue Growth – The Crown Estate Perspective	<i>Caroline Price</i> <i>The Crown Estate</i>
10:10-10:20	Scottish Blue Economy Vision	<i>Anneli Hill</i> <i>Crown Estate Scotland</i>

SESSION TWO Marine Policy and Blue Investment in the UK

Chair: *Jen Ashworth*

10:20-10:30	Restorative Aquaculture – A CES Perspective	<i>Alex Adrian</i> <i>Crown Estate Scotland</i>
10:30-10:45	New Seaweed Aquaculture Marine Licensing Guidance and Marine Planning Updates	<i>Fern Skeldon & Ben Coppin</i> <i>Marine Management Organisation</i>
10:45-11:00	UK Green Finance Taxonomy – defining nature positive activities as a green investment	<i>Sandie Gene Muir & Ryan Jude</i> <i>Green Finance Institute</i>
11:00-10:10	Sustainable Aquaculture – an investor's perspective	<i>Alice Millest</i> <i>Finance Earth</i>
11:10-11:20	Q&A	

SESSION THREE

Ecological Enhancement and Environmental Gain

Chair: *Nicki Holmyard*

11:40-11:50	Regenerative Ocean Farming	<i>Mollie Gupta</i> <i>World Wide Fund for Nature</i>
11:50-12:00	Ecological interactions of an offshore, longline mussel farm and its conservation potential as a de facto MPA	<i>Llucia Mascorda Cabre</i> <i>University of Plymouth</i>
12:00-12:10	Biodiversity monitoring at seaweed farms	<i>Sophie Corrigan</i> <i>University of Exeter & Marine Biological Association</i>
12:10-12:20	Farmed oysters: ecosystem engineers that provide food and flood protection	<i>Michael Steinke</i> <i>University of Essex</i>
12:20-12:40	How can we increase the climate change mitigation benefits of seaweed?	<i>Rod Fujita</i> <i>Environmental Defence Fund</i>
12:40-12:50	Q&A	

SESSION FOUR Market Innovation: Food and Beyond

Chair: *Nicki Holmyard*

13:30-13:40	Can mussels save the planet? Innovation for novel low carbon, healthy food ingredients	<i>Lewis Le Vay</i> <i>Bangor University</i>
13:40-13:50	The contribution of aquaculture to the circular economy – the use of by-products in marine ingredient production	<i>Emily McGregor</i> <i>MarinTrust</i>
13:50-14:00	Icrystal Clear	<i>Mike Berthet</i> <i>Global Seafood Alliance</i>
14:00-14:10	OCEANIUM: maximising the value and versatility of seaweed	<i>Jessica Thorne</i> <i>Oceanium</i>
14:10-14:20	Can Payments for Ecosystem Services encourage shellfish industry growth?	<i>Anton Immink</i> <i>ThinkAqua</i>
14:20-14:30	Payment for Ecosystem Services – Bivalves	<i>Konstancja Woźniacka Seafish</i> & <i>Suzanne Bricker NOAA</i>
14:30-14:40	Q&A	

SESSION FIVE Frontier Thinking: Recognising Opportunity

Chair: *Melanie Siggs*

15:00-15:15	Ropes to Reefs – a partnership to promote sustainable aquaculture that delivers ecosystem and fisheries benefits	<i>Emma Sheehan</i> <i>University of Plymouth</i>
15:15-15:30	Experiences from nature enhancement projects in Offshore Wind Farms	<i>Eline van Onselen</i> <i>De Rijke Noordzee</i>
15:30-15:45	Structural Solutions to Unlocking the UK's Aquaculture Potential	<i>Rob Passmore</i> <i>Additive.Earth</i>

SESSION SIX Panel Discussion: Opportunities, Challenges, and Collaboration in the UK's Aquaculture Sector

Chair: *Melanie Siggs*

15:45-16:35	<p>An expert panel discussion dissecting the present scenario, challenges, and avenues for collaboration in the UK's aquaculture landscape.</p> <p>Session 5's speakers will be joined by:</p>	<p><i>John Holmyard</i> <i>Offshore Shellfish</i></p> <p><i>Oliver Hicks</i> <i>Algapeligo</i></p> <p><i>Martin Sutcliffe</i> <i>Centre for Innovation Excellence in Livestock</i></p> <p><i>Jon Parker</i> <i>Food, Farming & Countryside Commission</i></p> <p><i>Emma Sheehan</i> <i>University of Plymouth</i></p> <p><i>Eline van Onselen</i> <i>De Rijke Noordzee</i></p> <p><i>Rob Passmore</i> <i>Additive.Earth</i></p>
16:35-16:45	Closing remarks	<i>John Goodlad</i>

WITH CONTRIBUTION FROM





