CALL FOR PROPOSALS

RESEARCH REQUIREMENT

PROJECT	SARFSP009	Technology and development of Exposed / Offshore Aquaculture in Scotland

Context:
Offshore aquaculture is a catch-all term which can be difficult to define when thinking about specific projects: how exposed is the farm site to wind, wave and tidal effects? Nevertheless the generic term has become common in recent years, and there are now many projects in different countries, looking at the technology and economics of 'offshore aquaculture'. Initially foreseen as a way to expand finfish pen production out of limited and more sheltered inshore sites, the concept offers possibilities but also challenges. The challenges include the harsh environments, difficulty in terms of routine access, and continuing concerns about the possible impacts of escapes. Shellfish and macroalgae production in more exposed locations are also topics of interest.

It is timely to consider a review of emerging offshore aquaculture technologies in the context of possible future growth of the Scottish finfish, shellfish and macroalgae aquaculture sectors.

Outline Research Requirement:
SARF requires a review of existing offshore moorings and related technology used for aquaculture (or other sectors) elsewhere that might start to inform scope for an offshore (or 'more exposed') aquaculture sector in Scotland including conditions likely to prevail offshore on the west coast. The research should consider the experiences of projects in 'more exposed' rather than offshore sites in Scotland, and investigate the degree to which 'more exposed' rather than offshore (as such) sites might be the most appropriate for consideration over the next 10-20 years in Scotland.

On this theme there is some value in looking at how an offshore or more exposed production facility might fit into a business model for finfish, shellfish or macroalgae production, in combination with inshore facilities.

There is a spectrum of exposure in terms types of aquaculture location, and it would be useful to have a clarification and definition of this: the terms 'offshore' or 'more exposed' are not necessarily sufficiently informative or descriptive.

The economic implications of offshore or more exposed aquaculture should be considered and modelled carefully, taking into account the technologies that might be required, and the likely operating characteristics of such sites.

The environmental and regulatory implications of offshore or exposed sites should also be considered carefully. Moving offshore would be of no stakeholder benefit if an increased chance of escapes were one of the results, for example. Environmental regulators will retain an interest in the fate and behaviour of discharges from any new aquaculture operation, but the question will become more complex if the sites are located out-with any legislative geographic boundaries.

Impact:
All SARF applied research projects must consider the opportunity for project outcomes to contribute to further activities that might, in due course, lead to measurable positive impacts on Scottish aquaculture production.
Potential subsequent uses of the proposed research include:

- The identification of possible options for future sustainable development of the Scottish aquaculture industry

Objectives:
The research objectives should be clearly set out in relation to the different requirements and themes outlined in the sections on Context and Research Requirement above. Specifically:

1. Review recent and current developments in technologies (main systems, moorings, access vessels, etc.) that are used for ôoffshoreôor ômore exposedôaquaculture, or for other industrial sectors in the marine environment (where there might be relevance to aquaculture). The requirements for, and approaches to, finfish, shellfish and macroalgae production may be different, and these should be identified separately where possible
2. Review the terminology used for ôoffshoreôor ômore exposedôsites in relation to degrees of exposure, and present options for clarification and definition of such sites
3. Identify, where possible, the costs associated with such technologies, and seek to create a range of financial models that might be applied to different types of aquaculture production in different types of more energetic locations
4. Identify how production (of any species) in such locations would integrate with other phases of production cycles, e.g. juvenile production, smolts, shellfish seedstock, etc. These phases will be integral components in the financial models developed under Objective 2
5. Review the regulatory and consenting implications of aquaculture in more exposed locations
6. Organise and deliver a workshop (industry, regulators, equipment suppliers, etc.) to discuss initial findings
7. Prepare a final report

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Approach:
This research is likely to involve desk-based literature research and critical review, together with comprehensive consultation with industry, regulatory and other experts. Technical and financial modelling will be key competences.

A workshop to present and discuss interim findings will be appropriate.

Project Management:
There will be a SARF Steering Group assigned to this project. (Applicants should factor the cost of attending 3 steering group meetings, probably in Edinburgh, into their applications)

Deliverables: A Draft and then Final Report

Anticipated Duration:	9 months
Maximum Cost:	
Proposed Start Date:	First Quarter of 2014
Commissioning Mode:	Open Competition
Deadline for Applications:	**27th September 2013**
Application Forms:	Application forms together with SARFôs standard terms and conditions of contract are available at: http://www.sarf.org.uk/downloads.html
Contact:	Richard Slaski ï email: r.slaski@sarf.org.uk Tel: 01387 740098 Alex Adrian ï email: Alex.Adrian@thecrownestate.co.uk Tel: 0131 260 6076