



CALL FOR PROPOSALS

RESEARCH REQUIREMENT

SEDIMENT SULPHIDE RESPONSE TO ORGANIC LOADING

Context:

SEPA uses the deposition model AutoDEPOMOD in order to predict the environmental impact of the fish farming industry on the benthos in Scottish coastal waters. The model simulates the distribution of solids deposition to the benthos and estimates the benthic response expressed by Infaunal Trophic Index (ITI). The ITI response relationship is empirical and has a significant error margin in the region around SEPA's environmental quality indicator threshold - this is presumably because benthic response is determined by more factors than just solids flux. It is considered likely that a more robust analytical relationship may be established to estimate sediment sulphide concentrations in response to organic enrichment. The sulphide response has been examined in Canada and in-situ sulphide concentrations are used as the main screening tool for monitoring the impact and sustainability of aquaculture operations, as these provide an immediate and cheap assessment.

It is important to note that SEPA does not necessarily believe that sediment sulphide readings can completely replace benthic biology (such as ITI) in all aspects of aquaculture monitoring, but that its use as a possible regulatory and/or screening tool might reduce cost and time burdens in some circumstances. This belief is echoed by at least one industry practitioner, who is concerned that a single 'number' for sulphide, if unexpected at a site, is less easy to interpret than a single ITI score, where that score could be further investigated by revisiting the detailed taxa/species/number data that caused it.

Outline Research Requirement:

Research is required that will examine the relationship between sediment sulphide measurements and organic enrichment, as normally measured by other methods including benthic biology.

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 use of the proposed research include reduced industry monitoring costs (to some degree) because of the use of a less costly tool (sediment sulphide) as a replacement for a more costly and time consuming tool (ITI) in some circumstances.

Objectives:

1. Develop and validate a model of sediment sulphide response to organic enrichment
2. Propose a mechanism and examine the practicality of using sulphide response as a surrogate for ecological response as a means of regulating fish farm developments to ensure sustainability
3. Produce a Sediment Sulphide Module for use in conjunction with the new version of AutoDEPOMOD
4. Develop field protocols for audit and monitoring surveys.

Approach:

The project will:

1. Undertake an analysis of SEPA held datasets relating to the impact of fish farms upon the marine environment
2. Re-examine datasets dealing with Benthic Biology and Slice residues previously analysed during the SEPA Data Review Project to provide explanations for changing trends in these data

Identify other suitable field study candidate areas and validate the analysis of the datasets in the field, with the aim of improving the regulatory and monitoring approaches used by SEPA.

Project Management:

SARF will conduct 3 project monitoring meetings with the contractor during the course of the project, and these will be open to attendance from any interested SARF Board member.

Deliverables:

A written report, with recommendations for possible amendment to management and/or monitoring procedures. The report should be written using MS Word, and presented to SARF electronically in both draft and final versions.

Anticipated Duration: 18 months

Maximum Cost: £100,000 + VAT

Proposed Start Date: **During the first quarter of 2012**

Commissioning Mode: Open Competition

Deadline for Applications: **7th October 2011**

Application Forms: Application forms together with SARF's standard terms and conditions of contract are available at: <http://www.sarf.org.uk/downloads.html>

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