SEAFISH

A review of the services provided by Seafish in relation to the UK aquaculture industry

Project Code: 9321301

INTERIM REPORT

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Submitted by

Maritek Worldwide Ltd

TABLE OF CONTENTS

1 INTRODUCTION AND SCOPE OF THIS INTERIM REPORT, AND OVERALL STATUS OF THE ASSIGNMENT 5

1.1 INTRODUCTION 5
1.2 OVERALL PROGRESS OF THE ASSIGNMENT 5

2 REVIEW OF THE ROLE OF SEAFISH 7

2.1 THE "ARDTOE" PERIOD 7
2.1.1.1 The role of Ardtoe in the development of UK marine fin fish farming 7
2.2 THE "POST ARDTOE" PERIOD 10
2.2.1 Corporate Plans 10
2.2.2 Annual budget spend on aquaculture 12
2.2.3 Seafish Publications relating to aquaculture 12
2.2.4 Forums 13

3 LEVY 15

3.1 INTRODUCTION 15
3.2 HISTORICAL ANALYSIS OF LEVY GENERATION 16
3.3 INCOME & EXPENDITURE ON AQUACULTURE 18
3.4 SUMMARY 20

4 STAKEHOLDER CONSULTATIONS 22

4.1 INTRODUCTION 22
4.2 SEAFISH STAFF QUESTIONNAIRE 22
4.3 TELEPHONE QUESTIONNAIRE 24
4.4 ONLINE SURVEY 35
4.5 SUMMARY &KEY RECOMMENDATIONS 37

5 OVERVIEW OF R&D 44

5.1 SUMMARY OF R&D ACTIVITIES IN THE UK 44
5.2 LIST OF EXPERTS 44
5.3 OPPORTUNITIES FOR SEAFISH 44
5.3.1 Lessons to be learnt 46
5.3.2 Horizon scanning 47
5.4 RECOMMENDATIONS 49

6 PRODUCTION FORECASTS & IMPACT ON UK 51

6.1 PROJECTIONS FOR SPECIES PRODUCED OR IMPORTED INTO THE UK 51
6.1.1 Review of historical UK data 51
6.1.2 Projections and forecasts 52
6.2 HIGH LEVEL IMPACT ASSESSMENT 54
6.3 OPPORTUNITIES FOR SEAFISH 56
6.4 RECOMMENDATIONS 57

7 UK NATIONAL POLICY STATEMENTS ON AQUACULTURE 59

7.1 BACKGROUND 59
7.2 SCOTLAND 59
7.3 WALES 59
7.4 ENGLAND 59
7.5 NORTHERN IRELAND 60
7.6 EMFF 60

8 CONCLUSION 61

APPENDIX 1: SEAFISH STAFF QUESTIONNAIRE 62

APPENDIX 2: INDUSTRY STAKEHOLDER TELEPHONE QUESTIONNAIRE 63

APPENDIX 3: INDUSTRY STAKEHOLDER ONLINE QUESTIONNAIRE 64

APPENDIX 4: SEAFISH INVOLVEMENT IN WORKING GROUPS 65

Table of tables and figures

FIGURE 1: GANTT CHART (REVISED) 5
FIGURE 2: KPI REPORTING 6
FIGURE 3: IMPORT VOLUME AND VALUE OF VIETNAMESE FROZEN PANGASIUS FILLET AND BLOCK EXPORTS TO THE UK AND FORGONE LEVY REVENUE 2006-2013 19
FIGURE 4: GROWTH AND VALUE OF THE UK SHELLFISH SECTOR AND SHELLFISH R&D EXPENDITURE 1994-2012 45
FIGURE 5: UK AQUACULTURE PRODUCTION BY ENVIRONMENT AND LEVY CATEGORY 51

TABLE 1: KEY MILESTONES AND SEAFISH CONTRIBUTIONS IN THE DEVELOPMENT OF THE UK COD FARMING SECTOR 9
TABLE 2: COVERAGE OF AQUACULTURE IN SEA FISH INDUSTRY AUTHORITY'S (SFIA) ANNUAL REPORTS 11
TABLE 3: RELATIVE REPRESENTATION OF INDUSTRY INTERESTS ON THE SEAFISH SECTOR PANELS 11
TABLE 4: SEAFISH PUBLICATIONS RELATING TO AQUACULTURE (TOTAL = 158) 12
TABLE 5: SUMMARY STATISTICS FOR SHARE OF SEAFISH ANNUAL LEVY GENERATED BY COUNTRY, IMPORT-HOME LANDINGS AND CATEGORY 2003-2014 16
TABLE 6: SEAFISH LEVY, OTHER INCOME & AQUACULTURE SPEND 2003-2014 (£000'S) 17
TABLE 7: SUMMARY OF RESPONSES TO SEAFISH STAFF AND EX-STAFF QUESTIONNAIRE 23
TABLE 8: FREQUENCY OF TELEPHONE SURVEY RESPONSES ACROSS STAKEHOLDER & REGIONAL CATEGORIES (N=37) 25
TABLE 9: FREQUENCY OF TELEPHONE SURVEY RESPONSES ACROSS PRIMARY SPECIES GROUPS & REGIONAL CATEGORIES (N=37) 25
TABLE 10: FARMED SPECIES OF RELEVANCE TO ONLINE SURVEY RESPONDENTS (N=6) 36
TABLE 11: FREQUENCY OF USE OF SEAFISH SERVICES (N=6) 36
TABLE 12: SEAFISH SERVICES OF MOST USE TO THE RESPONDENTS BUSINESS OR ORGANISATION (N=6) 36
TABLE 13: SARF AQUACULTURE R&D SUMMARY FOR BOTH UK AND EC PROJECTS 44
TABLE 14: HORIZON 2020 AQUACULTURE FUNDING OPPORTUNITIES 48
TABLE 15: SHRIMP IMPORTS INTO THE UK (000'S TONNES) 2008-2013 55
TABLE 16: THE EMERGING MIDDLE CLASS IN ASIA 56
TABLE 17: UK PRELIMINARY INDICATIONS OF EMFF BUDGETARY ALLOCATION BETWEEN 5 UP'S 60

List of Acronyms

ACC – Aquaculture Advisory Council (EU)

ACIG – Aquaculture Common Interest Group

AFBI – Agri-Food and Bioscience Institute

AIPCE - The European Fish Processors Association

CEC – Crown Estate Commissioners

CLG – Common Language Group

CFP – Common Fisheries Policy

GFSI – Global Food Safety Initiative

CSR – Corporate social responsibility

DARDNI - Department of Agriculture and Rural Development Northern Ireland

Defra – Department for Environment and Rural Development (England)

EA – Environment Agency (England)
EFF – European Fisheries Fund
ESF – European Social Fund
EMFF – European Maritime and Fisheries Fund
ERDF – European Regional Development Fund
FSA – Food Standards Agency
GSSI – Global Seafood Sustainability Initiative
GSTP - Global System of Trade Preferences among Developing Countries
ICB – International Certification Body
IMTA – Integrated Multi-Trophic Aquaculture
IPSP – Importing and processor sector panel (Seafish)
KPI – Key performance indicators
LA – Loughs Agency (cross border NI and Republic of Ireland)
MASTS – The Marine Alliance for Science and Technology for Scotland
MGSA - The Ministerial Group for Sustainable Aquaculture
MMO – Marine Management Organization
NPS – None Public Sector
PO – Producer Organisation
POMS - Pacific Oyster Mortality Syndrome
RAS – Recirculating Aquaculture Systems
SAIC - Scottish Aquaculture Innovation Centre
SARF - Scottish Aquaculture Research Forum
SAMS – The Scottish Association for Marine Science
SSC – Sustainable Seafood Coalition
SIFT - Sustainable Inshore Fisheries Trust
SIP - Seafood Importers and Processing Alliance
SFIA – Sea Fish Industry Authority
SEPA – Scottish Environmental Protection Agency
SME – Small and Medium Enterprise
SNH – Scottish National Heritage
SSMG - Scottish Shellfish Marketing Group
SSPO – Scottish Salmon Producers Organisation
SVQ – Scottish Vocational Qualifications
TCPA – Town and Country Planning Act
UHI – The University of the Highlands and Islands
UoS – The University of Stirling
VASEP - Vietnam Association of Seafood Exporters and Producers

1 INTRODUCTION AND SCOPE OF THIS INTERIM REPORT, AND OVERALL STATUS OF THE ASSIGNMENT

1.1 INTRODUCTION

This interim report is submitted to Seafish as part of the assignment titled '**A review of the services provided by Seafish in relation to the UK aquaculture industry'**.

The preparation of this report represents Deliverable 3 of the assignment.
The structure and content of the report is based on previous agreement between the contractor and the client as presented in the inception report.
The contractors seek review, comments and approval from Seafish on this interim report.

1.2 OVERALL PROGRESS OF THE ASSIGNMENT

The bulk of the inputs planned for this assignment have now been completed (see table below on the Key Performance Indicators). The various reviews of relevant factors along with the stakeholder consultations have been finalised, and this interim report represents a very significant part of the envisaged final outputs. The final output of the contractors i.e. a draft strategy and policy recommendations for the future interaction and support provided by Seafish for the aquaculture sector, is expected to be quite brief and will provide policy recommendations for incorporation into the next Corporate Plan. While the final policy document will contain some detail not included in this interim report (e.g. detailed recommendations and objectives), the purpose of this interim report is to ensure that detailed justification of the policy proposed does not have to be repeated in the final document. We therefore envisage that the policy document to be submitted as the final output of this assignment will refer to the process used to come up with the policy e.g. Seafish's past and present interaction with the aquaculture sector, overview of the levy and UK R&D efforts, production forecasts and their high level impact on the UK aquaculture sector, National policy statements and stakeholder consultations, but will not repeat information contained in this report.

Figure 1: Gantt chart (revised)

Month	February					March				April					May				June				July				
Week number	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Phase 1: Inception period																											
Task 1.1: Preparation for, attendance at, and reporting on inception meeting																											
Deliverable 1: Inception meeting minutes			x																								
Task 1.2: Preparation of inception report																											
1.2.1: Project brief & draft short questionnaire																											
1.2.2: Draft questions for main questionnaire																											
1.2.3: Timeline																											
Deliverable 2: inception report					x																						
Phase 2: Main study period																											
Task 2.1: Seafish review (historical & current status)																											
Task 2.2: Levy (spend, projected income, methodology)																											
Task 2.2 Stakeholder consultations																											
2.2.1: Seafish Depts																											
2.2.2: Short questionnaire																											
2.2.3: Main questionnaire																											
Task 2.3: Overview of UK R&D																											
Task 2.4: UK Policy statements																											
Task 2.5: Aquaculture production forecasts & impact on UK																											
Task 2.6: Preparation of Interim Report																											
Deliverable 3: Interim report																						x					
Task 2.7: Interim meeting																											
Deliverable 4: Interim meeting minutes																							x				
Phase 3: Preparation of strategy																											
Task 3.1 Drafting of strategy																											
Deliverable 5: Draft policy strategy																									x		
Task 3.2: Seafish feedback on draft strategy																											
Task 3.3 Finalisation of strategy																											
Deliverable 6: Final strategy report																											x

Figure 2: KPI reporting

Key Performance Indicator	Report Date:	30th June 2014				
	Number completed at last report date	Completed since last report	Total completed to date	Total to be completed during project	Remaining to be completed	% still to complete
Project inputs						
Number of meetings held with client	1	0	1	2	1	50%
Seafish role review (number of documents & interviews)	0	9	9	9	0	0%
Number of consultations held with Stakeholders (Qualitative questionnaire)	0	43	43	20	-23	-115%
Man days used	8	16	24	31	7	23%
Project outputs						
Meeting minutes (inception, interim)	1	0	1	2	1	50%
Reports (inception, interim, draft strategy, final strategy)	1	1	2	4	2	50%
Stakeholder questionnaires prepared (qualitative, systematic online)	1	1	2	2	0	0%

Delays have been experienced due mainly to issues arising from the consultant's side and as a result the proposed revised date for completing this assignment is the 31st July 2014. It should be noted that in the event that a meeting between the contractors and Seafish is required following the submission of this report, the expenses associated with that have not been included in the project cost and it was agreed with the original project supervisor (Mark Gray) that the costs for attending any such meeting (and generally any additional travel related costs incurred in the performance of this contract) would be reimbursed by Seafish.

2 REVIEW OF THE ROLE OF SEAFISH

2.1 THE "ARDTOE" PERIOD

Whilst Seafish's historic involvement with the aquaculture sector back in the 1980's and 1990's was not governed by any apparent corporate vision at the time, it nevertheless tended to focus more upon addressing the technical constraints facing the industry both for the shellfish and marine fin fish sectors. R&D efforts for the latter were carried out at the research station at Ardtoe and it was this facility which came to embody Seafish's involvement with the aquaculture sector. Established in 1965 by the then White Fish Authority, the facility grew to become a focal point for aquaculture R&D for nearly four decades. During that time it was recognised as a pioneer in developing production techniques and technology for new or emerging species and was not just a focal point for UK aquaculture development but was also instrumental in providing inspiration and impetus to other marine aquaculture sectors. The knowledge bank that was built up over the years was then disseminated through the staff, students and visitors who passed through the facility. Between 1965 and 1999 nearly 500 staff and visitors were recorded at the facilities and more than 100 students carried our research projects at or in conjunction with the facility (J. Dye pers. comm). The value of the efforts and results emanating from the facility were multiplied by many orders of magnitude throughout the global marine aquaculture sector. Some of the more promising marine species that were the subject of initial development work and trials at Ardtoe went to become commercial opportunities as can be seen from the list below:

- Plaice
- Dover sole
- lemon sole
- sea bass
- brill
- turbot
- halibut
- cod
- haddock
- Pacific oysters
- Mussels
- native oysters
- King scallops
- Spiny lobsters
- European lobster

One example of that is the Mediterranean bass and seabream industry. During the early years much of the know-how and expertise was provided by expatriates who had been involved either at Ardtoe or its sister warm water facility at Hunterston and whom later relocated to Greece and Cyprus to pioneer the production of bass and seabream. In the early 1990's of the nine marine fish hatcheries operating in Greece, seven were being run by British expats who had benefitted, directly or indirectly, from the work originating in Ardtoe. A more recent and domestic example of this effect can be seen in respect to the development of the UK cod farming sector (see below).

2.1.1.1 The role of Ardtoe in the development of UK marine fin fish farming

Ardtoe investigated the potential for a number of marine fish species. Trails started with plaice in 1965 and then moved on to sole; both Dover (1967-1977) and Lemon (1970-1980). Thereafter efforts were focused on four marine fish species that went on to become commercially farmed. The first of these was Turbot (1970-1985), then Seabass (1978) followed by Halibut (1983 -2000) and then cod (1990-2005). The value of the pioneering work undertaken at the Ardtoe facility can be

seen by using the example of cod. This species was identified as having potential in the early 1990's however the relatively low priced supply from the wild fisheries prohibited any opportunities to farm it commercially. However, Seafish was in a better position than most to assess the medium to long term outlook and initiated a program to establish a domesticated breeding stock. By the mid 1990's concerns were raised about the state of wild cod stocks and this prompted efforts to investigate rearing techniques at the Ardtoe facility. Basic hatchery techniques were established (published 1997) and this success was closely followed by a demonstration project that concluded cod farming was commercially viable (Seafish report published in 2001). The commercial opportunity was further presented in one of the series of hyperbooks (2002) and thereafter more specific "near market" trials were carried out at Ardtoe focused on addressing additional production challenges including production techniques (2003), disease (published 2004) and other production related issues (published 2004). By 2002 the first commercial cod farming ventures had begun although many of these start-up companies relied heavily on the initial investigations and continued support (through egg supplies) of the Ardtoe team and facility. With the technical side well in hand, Seafish then turned its attention to the marketing side providing specific support through market research information (cod value chain analysis, 2004). Following the sale of the Ardtoe facility to SAMS in 2004 and then Viking Fish Farms in 2005, the facility continued to focus on the various challenges facing the development of cod farming but with a more commercial focus wherein the facility produced and sold cod juveniles to the industry.

Seafish's involvement in supporting the UK cod farming sector is a good illustration of the positive way in which the organisation could, and has, interacted with a range of entities across the seafood sector and was only possible through the existence of the Ardtoe facility and the knowledge (human capital) that was available through its specialised operations team. The cost to Seafish during the initial years when it was assessing and establishing the viability of commercial cod farming in the UK would have been relatively minor and with specific reference to the cod demonstration project that was undertaken (1999-2000), it is understood that the cost was a low six figure sum spread over the project's two year duration (with co-funding secured from HIE and some of the industry participants including Marks & Spencer whilst other participants also provided some in-kind contributions). Following on from this positive start, Seafish representatives were in discussions with industry partners to form a consortium which would be involved in establishing a commercial marine (cod) hatchery in Shetland. Seafish eventually pulled of the proposed venture (along with one other potential partner) due to issues concerning the local (Shetland) partner (who was an existing salmon farmer). However, one of the consortium partners went ahead and the project became a commercial success and whilst cod farming in the UK eventually collapsed, this was down to commercial factors and was beyond the reasonable foresight of Seafish

A brief analysis of the direct benefit (in terms of value at first sale of market sized fish) arising from the groundwork laid down by the Ardtoe facility shows that within a five year period (2004-2008) cod farming grew from an experimental level into an emerging sector with £6 million in annual sales from nearly 2000 tonnes of production. This development had associated spin offs benefits throughout the seafood value chain with farmed cod appearing in a major multiple retailer chain and additional opportunities through training, accreditation and vaccine development initiatives.

The cod farming example provides an important illustration of how Seafish could interact with and support the seafood sector providing cost-effective benefits across the value chain. The key role Seafish played was to carry out "near market" investigations that established the viability of cod farming slightly before the prevailing consensus recognised the opportunity. Furthermore it is highly unlikely that the work Seafish undertook pioneering cod farming would have been undertaken on the same scale and with the same level of expertise by the private sector as it was seen as being too risky at that stage and even after Seafish had established the viability of commercial cod farming the private sector struggled to secure funding from conventional sources.

Table 1: Key milestones and Seafish contributions in the development of the UK cod farming sector

Year	Up to 2000	2001	2002	2003	2004	2005	2006	2007	2008
Ardtoe outputs	R&D on production techniques & commercial demonstration trials (1998-2000)[1] Hosts marine finfish hatchery workshop (Yr. 2000)			Immunology & vaccine trials with Marine Labs (results published 2004)	Supplied (sold) cod eggs to commercial hatcheries.	NPP funded project for farmed cod	Sales of cod juveniles to commercial on-grower	Sales of cod juveniles to commercial on-grower	
Seafish Other departments		In discussions to be part of a 4 party consortium to develop a new cod hatchery in Shetland			Cod value chain presentation to British Marine Finfish Association (BMFA)				
Industry status	1st commercial hatchery established		2nd commercial hatchery established						
Industry volume[2] (T)		15			8	69	543	1111	1822
Industry value (£ M)[3]		0.031			0.026	0.228	1.771	3.332	5.954

[1] Study involved key sectors of the seafood industry including producers (Aquascot, Otter Ferry) feed suppliers (Trouw), food service (Cavaghan & Gray, formerly Young's Seafood then Northern Foods), retailers (Marks & Spencer), as well as government agencies (Marine Laboratory, Aberdeen). Resulting output (farmed cod) were sold in 2001

[2] Market size fish volume and value (value first sale) data from FAO, FishstatJ

[3] Value is in nominal terms and has been converted from US Dollar at relevant average foreign exchange rate for the year in question (using www.oanda.com)

With hindsight the Ardtoe facility could be accused of pursuing projects that had limited potential for commercial success. Examples include trials on the cultivation of haddock and turbot/brill crosses however such efforts either established or leveraged know-how that could be applied to other species and hence was justified on the basis that few if any commercial companies would have been willing to undertake the risk of investigating the potential of these candidate species. Nevertheless there was some criticism mentioned in the consultation responses from former staff and students that a technical bias and lack of commercial awareness on the part of some of the senior managers resulted in missed opportunities and efforts being directed down blind alleys (see Section 4). This latter point is perhaps borne out by the subsequent fortunes of the Ardtoe facility after Seafish disposed of it. Initial attempts by another independent research institution failed to provide a long term future for the facility and it was taken over by successive private investors with the facility now being owned by a publicly listed company which is likely to implement a different business model to the one that has been tried in the past.

2.2 THE "POST ARDTOE" PERIOD

The sale of the Ardtoe facility appeared to indicate the beginning of a new policy wherein Seafish moved away from direct 'near industry research' with the primary production sector. This development was not just limited to aquaculture since Seafish also disposed of its flume tank facility in Hull (replacing it with a collaboration agreement with the Norwegian research organisation SINTEF). This indirect approach to providing support was part of a new strategy that saw Seafish favour commissioning research from external providers. Nevertheless it is clear from the more detailed appraisal of how Seafish interacted with aquaculture (see sections 2.2.1 and 2.2.2) that the impact of the disposal of Ardtoe represented more than just the loss of a research facility; it appeared to signal a downgrading within the organisation of the importance of the UK aquaculture sector in general.

2.2.1 Corporate Plans

A review of the objectives, content and inclusion of aquaculture related activities and outputs based upon reports in the annual Corporate Plans from 2004 onwards, reinforces this impression. As Table 2 shows, aquaculture is never identified as a standalone objective or work stream in any of the Corporate Plans and is seldom mentioned in the annual reports. Instead it was incorporated into a variety of service areas depending upon the prevailing work streams in any specific year or period. Whilst it is accepted that this appeared to conform with new strategies and policies for engaging with the seafood sector that were implemented by Seafish in 2005 and 2010 and that the scarcity of specific references to aquaculture in the annual reports cannot be used as a reliable metric, the authors of this report nevertheless found it a striking oversight that aquaculture appeared to be afforded such a low profile in such an important publication of the organisation.

There appear to be some positive signs for future engagement with the aquaculture sector in the 2012-13 annual report. Inclusion of aquaculture representatives on two of the three sectors panels is a positive step given that these panels will provide advice to the Board on areas of work as well as consider the benefits of work programmes. However, assuming all panels and panel members are equal, there are still grounds for concern given that aquaculture (with 2 representatives) is falling well short when compared to the relative level of representation afforded to other UK seafood sectors in the overall constitution of the panels. Depending on upon the categories used, an indication of the relative representation of different sectors of the UK seafood industry on the three panels is shown in Table 3 below. The limitation of this analysis is that it has been constructed on the basis of information provided for each panel member on the Seafish website. In practice panel members may effectively represent a number of interests which cross over between different seafood sectors. For example some panel members from Producer Organisations would appear to have strong (historical) links to the capture fisheries sector and the same situation may be true for panel members representing administrative regions. What is clear though is that regardless of what

categories are used to pigeonhole the interests (and potential biases) of panel members, some sectors including aquaculture would appear to have very limited representation (and therefore influence) over the interpretation of how best to address and deliver the strategic objectives of the Seafish Board and this is likely to have a negative impact upon supporting aquaculture interests.

Table 2: Coverage of aquaculture in Sea Fish Industry Authority's (SFIA) Annual Reports

Annual Report Year	Number of aquaculture references	Aquaculture References & Comments
2004-05	4	Aquaculture embodied in new "Inshore Fisheries Group"; £200K allocated to aquaculture research; SAMS Ardtoe goes into administration
2005-06	2	Co-sponsor to aquaculture through Seafish Technology & Innovation Primer Awards. Defra & SARF aquaculture projects including appraising the shellfish industry (capture and aquaculture sectors) Note: As a result of a review (end of 2005), Seafish adopted a number of changes to its strategy, priorities and approach to interacting with the seafood sector
2006-07	0	
2007-08	5	Various mentions under the "R&D" work programme including Shellfish Industry Development Strategy and specific species related projects. Identifies a £50k contribution to SARF, inputs to the consultation on the Strategic Framework for Scottish Aquaculture and involvement in Defra's Inshore Fisheries Working Group
2008-09	1	Development of a "Toolkit for Environmental Impact Reduction"
2009-10	1	Aquaculture Common Interest Group (ACIG)
2010-11	3	ACIG, Environment (reducing the impact of poor water quality on aquaculture). Report mentions future plans to address environmental issues affecting the aquaculture sector Note: Impact of the final decision of Supreme Court (June 2011) re levy resulted in a further review of the future role and organisation of Seafish. A consultation document ("Sustainable Seafood; serving the seafood Industry 2010-2013") only specifically mentions aquaculture under the "Standards" service area and in relation to developing Codes of Practice and International Standards
2011-12	4	ACIG; Informing MPA's on Environmental Assessments; Reducing the impact of poor water quality; Removing proposal requiring aquaculture marker buoys around site
2012-13	4	ACIG; assist in writing of aquaculture policy for Marine Plans; mention of an "Aquaculture programme" involving dialogues with various NGO's & developing new expertise in "veterinary residues" Note: during 2013 a new Framework agreement was established setting out governance & accountability arrangements for Seafish. This distributes sponsorship evenly between 4 administrations and introduces 3 Sector Panels to provide advice on work priorities. Aquaculture is represented on 2 of the panels ('Domestic & Export' and 'Importing and Processing')

Table 3: Relative representation of industry interests on the Seafish Sector Panels

Panel	Capture Fisheries	Aquaculture	PO's	Importers	Processors Distribution & Marketing	Retail & foodservice	Export	Consumer	Panel Chair, cross sector or non-partisan
D &E	4	1	3	0	2	0	1	0	2
I & P	0	1	0	5	4	0	0	0	1
S&C	1	0	0	2	0	4	0	0	2

2.2.2 Annual budget spend on aquaculture

Section 3 reviews the levy and its relevance to the aquaculture sector in detail however in support of this sections focus on the role of Seafish and its historical and current interaction with the aquaculture industry it is worth noting that funding for aquaculture has seen a significant reduction from a level approaching 10% in pre 2003 (when Seafish owned and operated the Ardtoe facility) to approximately 1% in 2013

2.2.3 Seafish Publications relating to aquaculture

A review of publications on the Seafish website shows that some 158 are categorised as aquaculture related. Such publications represent or embody a cost and commitment of resources to the aquaculture sector and thus were presumably commissioned on the basis that they would provide support through the dissemination of knowledge and information.

Table 4: Seafish publications relating to aquaculture (total = 158)

Category	1985-1994	1995-2004	2005-2014	Undated[4]
Information	0%	2%	98%	0%
Feed related	0%	0%	100%	0%
Certification	0%	0%	100%	0%
Legal	0%	0%	100%	0%
Fish Health	0%	25%	75%	0%
Global Industry	0%	0%	100%	0%
UK Industry	0%	0%	100%	0%
Forums	0%	0%	100%	0%
Technical	3%	27%	41%	30%
Software	0%	4%	96%	0%
Market	50%	50%	0%	0%
Miscellaneous	0%	33%	67%	0%

It can be seen from the above Table that most (nearly 90%) of the publications listed are dated after the disposal of the Ardtoe facility and whilst it is accepted that this may be due (in part at least) to cataloguing related issues, it nevertheless suggests a shift in outputs in the post-Ardtoe era. The main exception is the technical publications many of which are likely to relate to work streams or activities associated with the Ardtoe facility. However, given the nature and volume of outputs known to have emanated from Ardtoe, one would have expected many more technical (and R&D) publications to be listed on the Seafish site yet only 37 technical documents are shown (which equates to 23% of the total number of aquaculture related documents listed)[5]. Of the other categories, the predominant ones (in terms of volume) are; Information (26%, and mainly consisting of aquaculture e-alerts), feed (22% and mainly consisting of feed and fishmeal reports) and software (15% mainly consisting of hyperbook related publications). These three categories all relate to keeping a target audience informed of specific areas of interest which is in line with the key current high level objectives of Seafish (Protect, Promote, Inform) however, given the proliferation of these information based outputs, it is worth pointing out that the act of disseminating information and providing knowledge should not be seen as a substitute for providing tangible and targeted support

[4] All undated publications are technical in nature and thus are assumed to most likely emanate from the Ardtoe era

[5] This anomaly has been attributed to a failure to digitise a significant number of reports by a member of the Seafish staff who was aware of this issue

to the aquaculture sector. To use a quotation from Peter Drucker[6] "The purpose of information is not knowledge. It is being able to take the right action"

2.2.4 Forums

Seafish has identified the importance of promoting and supporting the needs of the seafood sector in general through representation and interaction with other stakeholders and decision making bodies. This approach is also a key requirement for the aquaculture sector given that it is a relatively new industry and therefore is often prone to more scrutiny and criticism than other more established food production sectors. Furthermore the relatively small scale of most UK aquaculture businesses means they do not have the resources or stature to protect or further their interests on a national or international level. Seafish has been successful in fulfilling this need and is currently participating in thirty-six aquaculture related Working Groups in the UK (or one of the four administrations), and a further five Working Groups which are engaged with special interest groups (mainly NGO's). This represents a significant increase in resources dedicated to this area since historically Seafish was only involved in thirteen aquaculture related Working Groups. A complete list showing the nature and level of involvement in Working Groups is provided in Appendix 4

Key lessons of relevance for the future support of the UK aquaculture sector by Seafish

- The historical commitment and involvement of Seafish in near market research (through the Ardtoe facility) was on the whole a justifiable and worthwhile investment which directly or indirectly led to the development and commercialisation of a number of species both in the UK and elsewhere in Europe. In both cases this has resulted in payback through long term levy contributions (an example of this is the levy that has been collected for some 25 years on imported farmed bass and seabream). The decision to close Ardtoe was taken as part of a cost cutting exercise being the preferred option rather than raising the levy
- The impact Seafish had on the emergence of the UK cod farming sector is a clear and strong example of the sort of pro-active approach it was capable of under taking domestically to support and drive the development of emerging candidate species for aquaculture. The loss of such a capability (both in terms of infrastructure and human capital) has limited and undermined subsequent "coal face" interactions with the UK aquaculture sector.
- In the future, a pre-requisite for providing any direct or indirect support (including funding) to any production sector should be to first form an opinion (through a balanced, informed and transparent process and seeking any relevant expert inputs) as to whether the opportunity has reasonable prospects of becoming (or remaining if it is in relation to an already established sector) a commercially viable and sustainable operation based upon (i) market potential and (ii) technical feasibility.
- Funding initiatives aimed at increasing or facilitating increases in aquaculture production output are likely to provide cross sector benefits. Such funding support needs to be provided either directly to producers or to third parties who have the required expertise or capability to support producers and whose interests are firmly aligned with the production sector's needs.
- R& D related activities and initiatives must be industry led and should involve a bona fide industry partner or sponsor. They should support or address challenges prioritised by industry though an inclusive consultative process and provide measurable results and demonstrable benefits to industry. Projects must seek to avoid the disconnect which can often occur when the interpretation or implementation of the project's objectives is determined solely by a project's academic implementers. [In other words R&D activities should look to provide the sort of approach and results that historically were provided from the Ardtoe facility]

[6] Peter Drucker, economist and Nobel Laureate who also stated "Aquaculture, not the internet, represents the most promising investment opportunity of the 21st Century"

- Targeting a cross sector project can be one of the most cost-effective approaches with the potential to provide additional benefits throughout the seafood sector. In such a scenario, Seafish is now best suited to playing the role of a central “hub” of a project “wheel” drawing together parties across the seafood sector and coordinating the various efforts and interests of the stakeholders involved.

3 LEVY

3.1 INTRODUCTION

The statutory levy collected from the seafood industry contributes around 80% of Seafish funding with the balance accruing from research and other services commissioned by paying customers. The levy is payable on first UK, domestic, import or export sales of marine fish, shellfish and seafood products destined for human consumption. This also includes fishmeal imports for livestock feed formulation, predominantly salmonid aquafeeds. 'Imports' include product from other EU countries/ regions as well external 'third-countries'[7]. The levy covers both processed and unprocessed products with the following exemptions (species exemptions are considered later):

- Domestic products entering directly into the food service sector e.g. mussels sold directly to local restaurants
- 'Non-fish' processing additions e.g. glaze (saline/polyphosphate solutions) on frozen products and other ingredients of ready meals
- Canned, bottled products or those in 'hermetically sealed containers processed to inhibit microbial growth at ambient temperature' e.g. chilled ready meals

With minor amendments, levy inclusion and exclusion criteria are an enduring legacy of the prevailing historical conditions at the establishment of the 1981 Fisheries Act. The act exempts species with all or part of their natural life cycle in freshwater as well as migratory species with all or part of their life cycle in freshwater. This reference to the natural life cycle means there is no distinction between fish and fish products of farmed or capture origin consistent with Seafish's generic workstream structure and seafood promotion strategy. However, subsequent growth and evolution of the aquaculture production and the seafood market since inception of the Fisheries Act has created some significant anomalies with respect to which farmed species and therefore who should be liable. Rules designed to support what in 1981 was a relatively small and nascent domestic salmonid sector today result in exclusion of substantial volumes of farmed salmon/ trout and perhaps most significantly a growing volume of farmed seafood imported from Asia and other 'third-countries'.

Of particular issue is the categorisation of species with fresh and saline water life stages - or adaptive capacities. The existing definition means that the principle warm-water penaeid shrimp species; white-leg shrimp (*Litopenaeus vannamei*) and tiger shrimp (*Penaeus monodon*) farmed in saline water both incur a levy - although they can be adapted to near freshwater conditions in their main grow-out life stages. Conversely no levy is charged on 'freshwater' species capable of being cultured in saline or brackish water e.g. the giant fresh water prawn (*Macrobrachium rosenbergii*), freshwater crayfish (*Procambarus spp.*) or tilapias. Pangasius catfish are also excluded as an obligate freshwater species although they do practice major riverine breeding migrations in the wild. Levy attracting migratory fish species with fresh water life stages include anadromous species (e.g. salmonids) and catadromous species (e.g. eels). Asian seabass is an example of a catadromous species (which migrates from freshwater to seawater to breed) and they incur the levy.

[7] The levy is in addition to a third country UK tariff duty of 9.00 % on Imports from outside the EU though many major EU importers including Vietnam and for the time being Thailand benefit from waivers and reductions under the Global System of Trade Preferences among Developing Countries (GSTP).

3.2 HISTORICAL ANALYSIS OF LEVY GENERATION

The levy structure described in section 3.1 means most of the levy is paid by processors and seafood importers i.e. UK primary producers are responsible only for payments only on direct farm-gate exports. First sales of liable products incur a fixed-rate levy of £0.00903/kg of sold weight with a lower rate of £0.00258/kg for pelagic fish species e.g. herring, mackerel, sprats, sardines[8]. A 10% reduction in the standard levy-rate (i.e. to £0.0081/kg) proposed following a 2013 industry consultation was scheduled for implementation from April 2014[9]. However the proposal which would have been the first such reduction in 14yrs was recently dropped as industry opinion was divided resulting in a lack of consensus amongst the four UK fisheries administrations[10].

Total annual levy income over the ten years from 2003-13 ranged from £7.7 to £8.7 million (Table 6). Despite a 14% decrease between 2010 and 2012 (i.e. spanning the 2009-2011 importers court challenge to Seafish's levy raising powers), annual levy income showed greater stability than other corporate income over the same period; respectively averaging £8.3 million, SD £397,000 and £2.5 million, SD £413,000 (although inflation has eroded the 'value' of the levy over that period effectively resulting in a real-term cut in levy income as shown in Table 6). Historic annual levy data (not shown) also show remarkable relative stability in respect of the proportions of levy generation between the regional and domestic/ import categories listed in Table 5 (though these do not differentiate between aquaculture and capture fisheries – discussed below).

Table 5: Summary statistics for share of Seafish annual levy generated by country, import-home landings and category 2003-2014

Levy Groups	Min	Max	Average	SD[1]
Imports - home landings %				
Home landed	1.2	1.8	1.4	0.2
Imported	0.6	1.0	0.9	0.1
UK regions %				
N Ireland	1.2	1.8	1.4	0.2
Wales	0.6	1.0	0.9	0.1
Scotland	20.5	25.2	22.5	1.4
England	72.4	77.4	75.3	1.4
Product category %				
Home landed all fish	0.0	0.2	0.1	0.1
Home landed pelagic	3.7	6.8	4.8	0.8
Home landed shellfish	6.7	8.8	7.9	0.6
Home landed whitefish	10.9	15.7	12.6	1.4
Imported fishmeal	1.5	3.2	2.1	0.5
Imported pelagic	0.7	2.5	1.8	0.6
Imported shellfish	15.2	18.3	16.7	1.0
Imported whitefish	50.1	56.7	54.0	1.9

[1] SD = Standard Deviation

Most levy income originates from imports. Domestic production (farmed and capture) although remaining relatively stable, contributed only 23-27% (mean 25%) of the annual total between 2003

[8] A differential that dates back to the 1981 ban on herring fishing, concurrent low prices and the successful effect of a whitefish lobby intervention on behalf of the sector.

[9] http://www.undercurrentnews.com/2013/08/12/seafish-starts-debate-on-10-cut-in-standard-levy-rate/

[10] http://www.seafish.org/about-seafish/levy-and-funding

and 2013 (Table 5). Regionally, combined Scottish and Humberside/ Yorkshire landings and imports destined for processing contributed between 52-69% of annual levy whilst Wales and Northern Ireland averaged only 0.9% and 1.4% respectively over the same period.

Table 6: Seafish levy, other income & aquaculture spend 2003-2014 (£000's)

	Income			Aquaculture Costs				Inflation Correction	
Year	Levy	Other[1]	Total Income	Levy cost[2]	Budget[3]	A Levy %[4]	B Levy %[5]	CPI %[6]	Levy[7]
1999	7,426	2,616	10,042					100%	7,426
2000	7,672	2,690	10,362					99%	7,572
2001	7,988	1555	9,543					98%	7,820
2003	8,950	2,180	11,130	634	525	120.7	7.1	95%	8,538
2004	8,733	2,767	11,500	334	287	116.5	3.8	94%	8,209
2005	8,688	2,625	11,313	152	151	100.7	1.7	93%	8,054
2006	8,570	3,231	11,801	79	123	64.5	0.9	91%	7,764
2007	8,264	3,007	11,631	142	116	123.0	1.7	88%	7,297
2008	8,327	2,671	10,998	221	271	81.7	2.7	86%	7,161
2009	7,809	2,146	9,995	121	92	130.9	1.5	82%	6,435
2010	8,812	2,452	11,264	51	49	105.1	0.6	80%	7,067
2011	7,948	2,490	10,438	54	130	41.6	0.7	77%	6,113
2012	7,687	1,772	9,450	49	45	110.6	0.6	72%	5,568
2013	8,234	2,427	10,661	82	129	63.3	1.0	70%	5,731
2014				63	114	55.3			
Average	**8,222**	**2,474**	**10,723**	**165**	**169**	**93**	**2.0**		**7,197**
SD[8]	**481**	**448**	**769**	**170**	**134**	**30**	**1.9**		**922**
Total	**115,108**	**34,629**	**150,128**	**1,984**	**2,032**				**100,756**

[1] Other corporate income from commissioned work, research grants etc.
[2] Total contribution of levy income to aquaculture expenditure
[3] Total aquaculture budget (year to March)
[4] A: Levy expenditure as a percentage of the annual aquaculture budget
[5] B: Aquaculture levy cost as a percentage of total annual levy income
[6] % 1999 prices (=100%) depreciated by mean annual inflation calculated as the consumer price index (CPI[11])
[7] Annual levy income depreciated by cumulative annual (CPI) inflation since 1999
[8] SD = Standard Deviation

It can be seen from Table 6 above that once the effects of inflation are discounted over the period from 1999-2013 the total value of generated levy decreased from £115,108 to £100,756 i.e. representing a loss of 12% in real terms and a far less stable picture than is suggested by the uncorrected figures.

[11] http://www.ons.gov.uk/ons/datasets-and-tables/data-selector.html?cdid=D7G7&dataset=mm23&table-id=1.2

3.3 INCOME & EXPENDITURE ON AQUACULTURE

Income: Differentiating between capture and aquaculture levy contribution is complicated by poor discrimination of production sources in official import and export statistics and lags in reporting. However, it is probable that less than 5% of levy originates from aquaculture production with the share raised on imported product, most significantly warm-water prawns[12] being most significant followed by fishmeal imports. Fishmeal contributed 1.5-3.2% of annual levy (Table 5) between 2003-2014, with the share and revenue declining steadily reflecting a progressive substitution with plant-based proteins in salmonid aquafeeds over the same period. Imported shellfish accounted for £1.2 million (15.6%) of the annual levy In 2012/13, with some £900,000 of this total originating from around 85,000t of high-value prawn imports (averaged between 2008-2012; FAO 2012). This in turn consisted of £750,000 levied on wild-caught cold-water prawns and £450,000 on warm water prawns. Although it is difficult disaggregate the farmed and wild shares in the latter group – based on global production and trade trends, farmed products are likely to contribute more than half the total; farmed warm-water shrimp was therefore likely to have contributed upward of 80% of total aquaculture generated levy in recent years. Seabass and seabream imports, mainly from Greece and Turkey – categorized in official figures as 'other fish', currently raise a fairly nominal £30-40,000 per year. Due to the salmonid exclusion (Section 3.1), very little if any levy is raised directly on farmed UK finfish products though it would not be unreasonable to allocate the fishmeal levy contribution to the salmonid sector, being the main end-user. The largest UK primary production share of only around £15,000 per year comes from the mussel sector. Two mussel dredge fisheries in the Menai straits contribute the largest individual company shares (in the region of £1-2 thousand per year) whilst members of the Scottish Shellfish Marketing Group (SSMG) contributed the largest UK share as a group. The entire Shetland mussel sector including around 69% of the SSMG membership, contributed an estimated £11,800 in 2011[13].

Based on total production of around 165,000t in 2013 and a mean processing yield of 60%, the forgone revenue on UK salmon production was £894,000. Although relatively modest amounts of pangasius and tilapia are currently imported to the UK, they (and especially pangasius) are likely to become increasingly important as raw materials for value-added processing - as is already the case elsewhere in Europe. Figure 3 illustrates the consequences of the arbitrary exclusion (section3.1) of pangasius from levy duty in terms of forgone revenue generation. Including a discount for a 20% fillet glaze, total annual revenue would have risen from £9,000 to £96,000 over the eight years from 2006-2013, equivalent to a cumulative loss of £476,000 over the same period. Extrapolation of the highly linear 2006-20013 growth trend (R2=0.93) indicates that the volume of pangasius fillet imports will rise to 26,750t by 2020. Over the intervening 7 year period (2014-2020) projected revenue losses will rise from £117,000 to £193,000 per year – equivalent to an additional cumulative revenue loss of £1,085,000.

Although the inclusion of non-salmonid species under levy obligation would require amendments to the Fisheries Act 1981, Industry resistance to change is only likely to become more entrenched as the economic significance of these imports grows. In this respect it should also be noted that the levy represents or imposes a higher relative burden on lower value products such as pangasius[14]

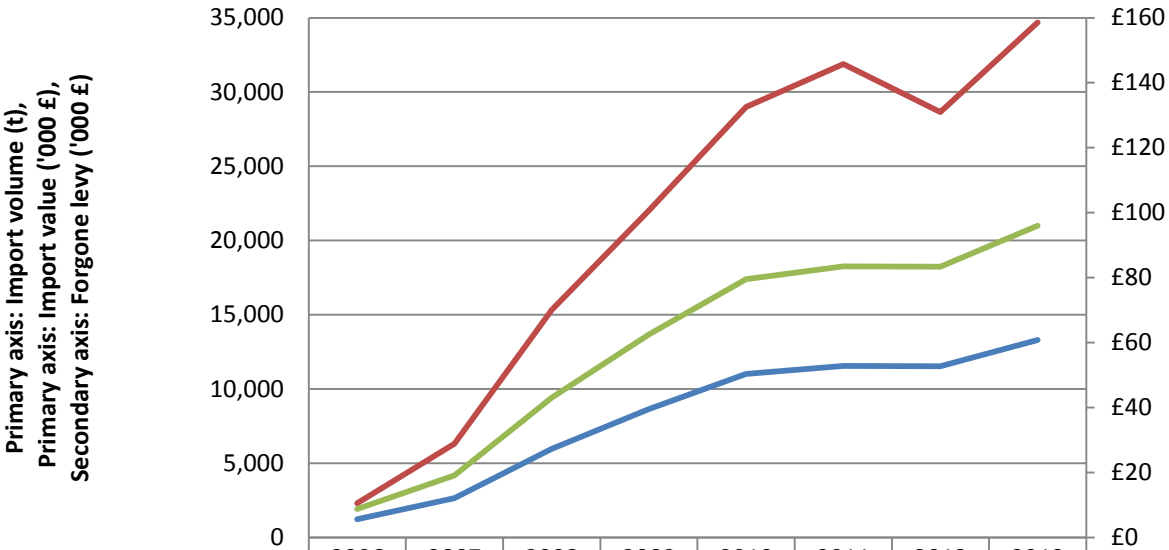
[12] 'Prawns' here used in a generic sense to include saline *Penaeid* shrimp and freshwater prawns (*Macrobrachium* spp.). The former group constitutes the majority of imports in this category.

[13] This represents 3.5% of a total of £333,000 raised on shellfish and fish landed by Shetland vessels in 2013 (SSMG pers. comm.).

[14] The mean annual price/ kg of frozen pangasius fillet (with an average 40% fillet yield and 20% glaze) ranged from only £1.89 to £2.76 from 2006 to 2013.

since the levy is based on product-weight rather than value i.e. it is a regressive tax. The most recent amendments to the Fisheries Act 1981 were incorporated as part of The Aquaculture & Fisheries (Scotland) Act 2013[15] - which included 'provision for charges to a number of fishery functions'.

Figure 3: Import volume and value of Vietnamese frozen pangasius fillet and block exports to the UK and forgone levy revenue 2006-2013



	2006	2007	2008	2009	2010	2011	2012	2013
Volume (tonnes)	1,215	2,647	5,960	8,647	11,013	11,560	11,536	13,290
Value ('000 £)	£2,296	£6,301	£15,326	£22,018	£28,992	£31,889	£28,655	£34,691
Forgone levy ('000 £)	£9	£19	£43	£62	£80	£84	£83	£96

Source: VASEP

Note: 'Forgone levy' revenue is calculated at the standard £0.00903/kg rate, discounting for a 20% fillet glaze,

Expenditure: Annual levy expenditure on aquaculture almost halved in each of the successive years 2003 -2006 from a high of £634,000 in 2003 – following the transfer of the Ardtoe research facility to Scottish Association for Marine Science (SAMS) in 2004[16]. Levels then rallied again to £221,000 in 2008 before declining to historic lows of £49,000 – £51,000 from 2010-2012, years spanning the court challenge to the levy. Levels have since shown a modest increase (to £82,000 in 2012/13 and £63,000 in 2014) but remain low by historic standards. This hiatus spans a period when globally the aquaculture sector has been growing at 8% per year, dominating international commodity trade in value-terms and contributing the largest share of growth in seafood and animal protein production. However total aquaculture budgets also rose to £129,000 and £114,000 in the last two financial years i.e. with other corporate income contributing close to half (37% to 45%) of aquaculture spend over the same period. Although this appears consistent with corporate strategy, the distribution of seven deficit years (i.e. when levy costs exceed budgeted costs) over the last decade is too variable to confirm if this is a longer-term trend. Aquaculture spend as a proportion of total levy generation (Table 6: B Levy %) has exhibited a concomitant progressive decline, falling from 7.1% in 2003 immediately prior to the loss of Ardtoe to only 0.6-1% between 2010-2013.

No breakdown of direct aquaculture related costs were available, though with Seafish's divestment of its near industry services and infrastructure, in particular the Ardtoe facility, the largest

[15] http://www.legislation.gov.uk/asp/2013/7/enacted

[16] This divestment also resulted in an additional one-off cumulative loss of >£650,000 between 2003-2004

proportion of current aquaculture expenditure is likely to cover costs of nine full-time staff with varying levels of commitment to a range of aquaculture support activities. It should be noted this also represents a significant reduction in staffing levels and associated costs, total staff numbers being cut from 130 to 65 following Seafish's restructuring in 2011/12. Five of the aquaculture-related staff focus on regulatory issues including shellfish water quality and depuration, policy and legislation linked to marine planning and marine protected areas (MPAs), imports and international trade. Only one member of staff remains predominantly dedicated to technical support at production level whilst also providing numerous other aquaculture related services including advice on strategic development matters to industry and the devolved administrations. Three members also have a general aquaculture support mandate as part of their wider responsibilities. The work of 10 of the current total of 65 Seafish staff is routinely funded to an extent through grants which decreases the reliance on levy funding.

Seafish continues to support industry-level R&D though at a much reduced level through its grant support to the Scottish Aquaculture Research Forum (SARF). This support too has been reduced from an annual level of £50,000 from 2003 to £20,000 from 2011 equivalent to a decrease from 18% to 7% of SARF core funding. Although SARF focusses primarily on issues of concern to Scottish aquaculture a lot its research, especially on shellfish, brings indirect UK-wide benefits, whilst other research is commissioned from institutions across the UK on a competitive basis. However, the loss of the Ardtoe facility inevitably also increases regionalisation of research support to some degree.

Seafish's highly regarded Aquaculture Common Interest Group (ACIG) facilitates discussion and development of consensus on major sector challenges by a range of industry, regulatory bodies, NGO's and other interested parties. Seafish also provide financial and in-kind support for industry conferences and trade-shows including the annual Association of Scottish Shellfish Growers (ASSG) and Shellfish Association of Great Britain (SAGB) conferences and the Brussels Seafood Exposition.

Seafish's current institutional structure based on crosscutting workstreams and industry panels also means additional benefits beyond the budgets indicated in Table 6 are likely to accrue to aquaculture. Six of the seven workstreams are of particular relevance; reputation and integrity, responsible sourcing, international trade, industry research, information and interpretation', and 'promotion of consumption'. The latter being the most generic, whilst only 'fishing safety' has a primary focus on the capture sector though some mussel farmers questioned as part of the stakeholder consultation process (section 4) also valued this service.

3.4 SUMMARY

Key lessons of relevance for the future support of the UK aquaculture sector by Seafish

- The current levy cost to direct aquaculture support is only 1.4% of the annual total, pointing to a deficit spend on the sector in terms of the levy it already generates.
- However, this does not fully account for other benefits accruing from cross-cutting workstreams which aim to support the UK seafood sector as a whole through increasingly multi-skilled teams
- Accounting for the additional cost and benefits of these combined services is complex and beyond the scope of this report. In their 2012-2015 corporate strategic plan, Seafish defined seven key performance indicators (KPIs) to assess progress toward delivering strategic outcomes against each of seven associated workstreams. However, like the workstreams none of the KPIs are directly aquaculture specific.
- The lack a dedicated aquaculture workstream or similar explicit commitment appears inconsistent with the growing contribution of the sector to seafood production globally, a trend which appears set to accelerate going forward.
- The analysis indicates that largely due to historic exclusions, the UK aquaculture primary production sector contributes a negligible direct share of the Seafish levy i.e. <0.2% of the current annual total originating mainly from mussel landings.

- The historic justifications for these exclusions which today seem rather arbitrary, have had unforeseen consequences in the exclusion of important emergent freshwater import sectors such as pangasius catfish and tilapias from levy obligations. Our analysis suggests this situation is likely to result in significant revenue losses in the longer term.
- Salmonid producers effectively contribute an additional 1.5% (and declining) on fishmeal imports used mainly in their feed formulation.
- Seafood importers contribute the largest share on imported aquaculture products, mainly warm-water prawns (and a small share from seabass/ bream) accounting for an estimated 3% of the current annual levy total.
- Direct spend on 'near industry' R&D has declined significantly with the sale of the Ardtoe facility in 2004, a progressive decline in funding to SARF and significant reductions in overall staff numbers including those with technical aquaculture specialisations.
- Consistent with lower staffing levels and a wider seafood industry focus, spend has been increasingly targeted on Seafish higher-level strategic 'Protect, Promote and Inform' objectives and their related workstreams – and away from direct production sector R&D support.

4 STAKEHOLDER CONSULTATIONS

4.1 INTRODUCTION

Central to this review was a consultation of key stakeholders across aquaculture value chains and associated secondary stakeholders. The purpose of this effort was to ensure contemporary industry needs and the challenges they face are known and continue to be a core consideration for the provision of future Seafish services. The three separate survey instruments listed below were use in the consultation. The primary instruments; (i) and (ii) consisted of qualitative questions together with semi-structured elements to permit a wider scope for responses. Both these exercises commenced with introductory background questions on the occupation history and role of respondents in their respective organisations.

(i) Seafish Staff Questionnaire (Appendix 1; Section 4.3). As part of any review of the position and focus of Seafish with respect to the UK aquaculture industry it was considered a key requirement to canvas both current as well as former employees involved in aquaculture related activities within the organisation. The objective was to gain an insight of their views and perceptions on the past as well as current level and nature of support for the sector and try to identify where they thought the current approach was adequate or if not where any future efforts should be focused.

(II) Industry Stakeholder Telephone Questionnaire (Appendix 2; Section 4.4). The primary consultation effort took the form of a direct telephone (and occasionally face-to-face) questionnaire based on a sample-frame of respondents provided by Seafish (Section 4.4) covering seven key respondent groups (Table 8).

(iii) Industry Stakeholder Online Questionnaire (Appendix 3; Section 4.5). To open the consultation to all other interested parties a short (5-10 minute) self-enumerated online survey was prepared consisting mainly of multiple-choice responses along with a limited number of qualitative open-response questions.

All interviewees were assured that their individual responses were given under condition of anonymity (institutional identities are given only where express consent was given to do so). For this reasons responses to question 12 of survey (ii), 'willingness to be included in an inventory of expertise associated with the UK aquaculture industry' will be communicated separately to Seafish rather than being incorporated in this report.

4.2 SEAFISH STAFF QUESTIONNAIRE

Both current and former staff (and students) were consulted in this exercise; the purpose of the latter was to obtain a relatively unfettered input whilst the views of the former are likely to have a direct impact on any future aquaculture related strategy.

The process consisted on an emailed questionnaire (Appendix 1) with a subsequent follow up discussion in a few cases. The consultation consisted of 14 questions for current staff and 16 questions for former staff or students. The extra questions in the latter cases were an expansion of the last (14^{th}) question presented to current staff ("What aquaculture related issues do you think should be prioritised in the next corporate plan?") and focused more specifically on trying to draw out the issues and services that former staff (or students) believed should be prioritised in the next Corporate Plan. The added emphasis on this point in the case of former staff/students was intended to ensure a more considered set of inputs on this particular issue.

Fourteen responses were received, six from former staff or students and eight from current staff (of which three were senior managers). Responses to questions were assigned into six main categories the first three of which, where applicable, tried to reflect the main external factors from a business environment viewpoint that were most likely to impact upon the UK aquaculture sector (namely legal, technical or market related factors) whilst the last three categories were the same for all

questions namely; the answer was deemed to cover more than just one of the first three factors or, a different factor altogether was implicated, or the respondent didn't know or have an opinion on a particular question. For those questions where the first three factors weren't appropriate to the question being posed, they were substituted either by a straight forward "yes or no" option (or "maybe" as the 3rd option) or by choices that were specific to the question. For example, question 12 sought to identify from a number of competing sectors within the seafood industry which one from two opposing options (e.g. capture fisheries versus aquaculture) was perceived as receiving the greater level of support, relatively speaking, from Seafish under the current strategy. The answer options were; a) aquaculture or b) fisheries or c) a reasonable balance between the two.

The results were analysed on two levels, responses in general to the questions posed and responses given by different classifications of respondents. A summary of the responses is given in Table 7

The only question where all respondents were unanimous was questions 3a and 3b where all respondents confirmed they interacted with other (internal) staff and (external) entities.

Table 7: Summary of responses to Seafish staff and ex-staff questionnaire

		1	2	3	4	5	6
No.	**Paraphrase of question**	**Legal (or Yes)**	**Technical (or No)**	**Market (or Maybe)**	**More than one answer**	**Other factor**	**Don't know**
1	Role in Seafish	21%	48%	6%	19%	6%	0%
2	Has role changed (yes/no/maybe)	40%	54%	0%	0%	6%	0%
3a	Interactions with other Seafish dept./staff	100%	0%	0%	0%	0%	0%
3b	Interactions with outside entities	100%	0%	0%	0%	0%	0%
4a	Greatest need for industry support	15%	38%	6%	21%	21%	0%
4b	Least need for industry support	0%	8%	8%	0%	52%	31%
5	Is it changing (yes/no/maybe)	71%	23%	0%	0%	0%	6%
6	Which activity has greatest value	8%	31%	0%	27%	27%	6%
7	Could industry support be improved	63%	8%	0%	0%	17%	13%
8	Which actions were most beneficial	8%	46%	6%	13%	21%	6%
9	Which services have least uptake	0%	0%	0%	0%	38%	63%
10	Which services least valued by industry	0%	0%	6%	6%	33%	54%
11	Should support be proportional to levy contribution (yes/no/maybe)	0%	58%	13%	6%	15%	8%
12a	Which currently gets more support? Aqua/Capture Fisheries/Balanced	0%	71%	23%	0%	6%	0%
12b	Which currently gets more support? Production/Downstream/Balanced	15%	21%	44%	0%	6%	15%
12c	Which currently gets more support? Domestic/ Importers/Balanced	42%	15%	21%	0%	6%	17%
12d	Which currently gets more support? Large companies/Small/Balanced	33%	15%	21%	0%	6%	25%
12e	Which currently gets more support? New entrants/Existing/Balanced	8%	19%	15%	0%	13%	46%
13	Is there an overlap of services with other entities (yes/no/maybe)	21%	29%	13%	8%	8%	21%
14	What issues should be targeted for next Corporate Plan	17%	8%	13%	27%	29%	6%

For those questions where answers could be addressed using the three main factors (legal, technical or market related), current staff tended to identify issues as falling under legal factors whereas former staff and students identified technical factors which could be a reflection on how the focus or emphasis has changed over time. This theory is supported by further analysis of the responses to question 2. The majority (83%) of former staff or students responded that their role did not change whilst at Seafish whereas the majority (63%) of current staff indicated that their role had changed.

There was a clear consensus on which sectors were most favoured under existing Seafish policies; these were large domestic companies based either in the fishing or downstream (processing) sectors. There was a perception that the importer and aquaculture sectors received very little support and/or focus from within Seafish and whilst that may not be such an issue for larger importers capable of supporting their own development, many aquaculture companies are small and ill-equipped to deal with the many challenges they face in the business environment. It is assumed that this issue is recognised by respondents by the fact that the majority (58%) stated their belief that support from Seafish should not be proportional to levy contributions. In contrast to this level of awareness, the responses to questions 9 and 10 indicated that staff (both current and former) either were not aware or did not want to comment on which services provided by Seafish had the least uptake or were least valued by the end users. If the case was down to the latter reason that is more understandable however, if there was a genuine lack of awareness on this matter then that should be a cause for concern and may point at the existence of a non-participatory approach to support delivery where Seafish is single-mindedly focused on its policies and workstreams without soliciting sufficient connection with or feedback from end users.

Finally on the question of where the emphasis should be placed for the next Corporate Plan, the majority of respondents (65%) indicated that it should be focussed on one or more of the three main factors which affect the operating environment of aquaculture businesses (i.e. legal, technical or market related).

4.3 TELEPHONE QUESTIONNAIRE

The survey, which consisted of 15 qualitative questions (Appendix 2) solicited opinions on topics including: industry support requirements and consistency with current Seafish strategic objectives, Seafish service utilisation, and service duplication by other agencies, perceived conflicts of interest, Seafish responsiveness and distribution of effort between activities and regions. Questions were phrased to accommodate the diverse range of key informants listed in section 5. Generic terms such as '*the industry*' were replaced with more specific references relevant to the production, market or regulatory context of particular key informants as appropriate. Questions were designed to steer the general direction of the interview, however scope was also left for informants to digress to areas of interest relevant to themselves where not already fully covered by these topics i.e. contributing a semi-structured dimension to the exercise.

The survey, which typically took from 25-35 minutes was enumerated over 7 weeks during April and May 2014, either as telephone (30 cases) or where feasible (7 cases), face to face interviews. Interviewees were selected on a random-stratified basis from a sample-frame of 70 potential respondents provided by Seafish, trying to ensure adequate representation across the stakeholder, regional and species group categories listed in Table 8 andTable 9. Of a total of 65 email invitations sent out, 37 respondents were finally interviewed representing a non-response rate of 42% with private sector producers (Table 4: Cat 5b) and importers (Table 8: Cat 5c) having the highest rates. This necessitated inclusion of two importers out with the sample frame along with four additional respondents (national authorities, public agencies and certification bodies) engaged by the contractors at a Seafish ACIG meeting in April 2014. Academia (Cat 4), Producer Organisations (Cat 5c) and Production Companies (Cat 5b) each had 8 respondents, the highest number whilst National Authorities (Cat 1) and Importers (CAT 2) each only had 2. However, one of the importers was alone responsible for a considerable share of UK farmed seafood imports and also therefore the total

aquaculture levy income. The distribution of responses across species groups and regions essentially reflected industry concentration i.e. lead by Scotland and Wales with 16 and 5 interviews respectively. After multi-species stakeholders (20 responses), mixed-shellfish (5 responses) and mussel interviews (4 responses) lead the species groupings consistent with their leading contribution to levy income at primary-producer level (Table 9) No producers of native, pacific oysters or queen scallops could be interviewed though these groups were covered to varying degrees by the multi-species stake-holders. In the following sections interview responses are assessed by primarily by stakeholder category though with regional and species variations also considered in each group.

Table 8: Frequency of telephone survey responses across stakeholder & regional categories (n=37)

Cat	Stakeholder Group/ Region	England	Wales	N. Ireland	Scotland	UK (& Int.)	Total
1	National Authorities		1	1			**2**
2	Public Agencies	1			2	1	**4**
3	Certification Bodies & E-NGO's					5	**5**
4	Academia and R&D		2		5	1	**8**
5a	Private Sector; Producer Organisations				5	3	**8**
5b	Private Sector; Production Companies	2	2		4		**8**
5c	Private sector: Importers					2	**2**
	Total	**3**	**5**	**1**	**16**	**12**	**37**

Table 9: Frequency of telephone survey responses across primary species groups & regional categories (n=37)

CD	Species Group, system	England	Wales	N. Ireland	Scotland	UK (& Int.)	Total
MU	Mussels	1	1		3		**4**
KS	King Scallops				1		**1**
LB	Lobsters (hatchery)	1					**1**
SF	Shellfish (various)				4	1	**5**
SL	Salmon				2		**2**
SB	Sea Bass (& Bream)		1			1	**2**
TR	Trout					1	**1**
WP	Warm-Water Prawns					1	**1**
MS	Multi-species	1	3	1	6	8	**20**
	Total	**3**	**5**	**1**	**16**	**12**	**37**

Cat 1. National Authorities: Respondents with fisheries and aquaculture responsibilities (local and EU policy, legislation and farm licensing) for two national authorities, the Department of Agriculture and Rural Development Northern Ireland (DARDNI) and the Welsh Government were interviewed. Marine Scotland, who manage Scotland's marine resources were not interviewed although they did respond to the online survey (see Section 4.5).

In their responses both DARDNI and the Welsh Government observed that given the heavy regulatory burden faced by the UK aquaculture sector (i.e. linked to planning, licensing, effluent controls, navigational issues etc.) there should be a clear role for Seafish as a 'one-stop shop' for

interpretational support. They also perceived that this was one the principle competencies lauding the Seafish legal team. Both respondents were positive about the new regional Seafish staff appointments co-funded by Seafish and national government in N. Ireland. This effectively re-established Seafish's physical presence after the closure of their regional office in Bangor, County Down with loss of two officers following Seafish's recent restructuring (the appointees now share capture and aquaculture responsibilities).

The N. Ireland respondent felt the region had become relatively self-sufficient in terms of regulatory and other support during the 'hiatus of the Seafish court case'. The respondent doubted how far the wider industry were aware of Seafish and its role adding it is likely to take a few years for Seafish to re-establish its presence. The following examples were offered; since 1999 a 'very effective' cross-border 'Aquaculture Initiative'[17] has provided such support to farmers, providing regulatory guidance on existing and emergent legislation (e.g. on the Marine Spatial Planning, Shellfish Waters and Habitats Directives). The initiative also supported establishment of representative farmer groups to facilitate communication. Another cross-border body, the Loughs Agency (LA)[18] will also take over responsibility for aquaculture (principally shellfish) from DARDNI in Carlingford and Foyle Loughs. As the European Fisheries Fund (EFF) grant support for the Aquaculture Initiative is due to finish and further EMFF funding remains uncertain – the respondent felt there might be a role for Seafish in ensuring continuity of this service.

The Welsh respondent was somewhat more positive suggesting 'there has been a move toward greater partnership and strategic overlap' following appointment of the new regional staff member. This has helped assuage some prior negative feeling regarding perceived 'divergence in regional support and levy generation'. He felt service duplication was less of an issue in Wales than in Scotland for example, as it lacks strong producer organisations such as the Scottish Salmon Producer Organisation (SSPO) or inter-sectoral trade organisations such as Seafood Scotland (a regional Seafish delivery partner focussed on providing support to small and medium enterprises (SME's) along the value-chain). The respondent also felt that Seafish remain too capture orientated noting that aquaculture provides 'one-third to a half of total fisheries value' in Wales where it is a regional priority as reflected in aggressive targets in the 'Welsh marine and fisheries strategic action plan'. He also added that he had also not seen much evidence of effective promotion of aquaculture products in Wales.

Both respondents viewed Seafish primarily as a technical support agency rather than a lobbying body[19] and therefore saw no conflict of interest between its obligation to meet industry and government objectives. They also felt that this relative independence also afforded the organisation greater credibility in representing the industry against its detractors.

Cat 2. Public Agencies: Representatives of four public agencies with aquaculture responsibilities were interviewed: The Scottish Environmental Protection Agency (SEPA), the Crown Estate Commissioners (CEC) in Scotland, the Environment Agency (EA) in England and the UK Food Standards Agency (FSA).

Consistent with their primary public roles all responses in this group also stressed the need for Seafish to provide guidance and support on regulatory issues. Public health concerns and the associated economic risks to shellfish producer linked to contamination susceptibility were of particular concern to this group which they viewed as being closely aligned with Seafish's Inform and Protect objectives. Both the FSA and EA respondents suggested that through their engagement with

[17] Seafish worked in partnership with them during this time, providing much technical advice and viewed then, unofficially, as a highly cost-effective delivery vehicle for NI.

[18] Seafish had a dialogue with them during their inception

[19] i.e. consistent with Seafish' statutory prohibition against lobbying.

industry, Seafish could help ensure that responses to contaminant issues are proportionate and do not result in unnecessary adverse economic impact. The FSA respondent qualified that Seafish should not try to directly handle food safety issues themselves. The EA respondent observed that in balancing the needs of different stakeholders, shellfish producers require additional protections compared to fish framers given their particular vulnerability to poor water quality. Three respondents acknowledged Seafish's work with English water companies on risk modelling of shellfish bacterial contamination risk linked to sewage outfalls – again noting that their perceived independence afforded them a strategic brokerage role. However, one respondent observed that norovirus risk may be independent of bacterial contamination and that combined sewage outfalls (CSO) lacking telemetry systems in remote coastal areas of Scotland present a more complex notification challenge which should also be urgently addressed.

Continuous refinement of environmental deposition and dispersion models was a key SEPA focus and a task they felt that should not be left to industry. Seafish on the other hand were viewed as being sufficiently independent to collaborate on/seek joint funding for such research. This would be welcomed as they felt 'most such work goes to a few groups and there was a need for new blood'

The FSA respondent suggested Seafish might also assist with their regular industry data calls, which often receive a poor response. However, he added that FSA have a high public profile he felt they have good capacity to present a balanced media image themselves. He cited their measured response to a discredited farmed-salmon dioxin contamination study in 2004[20] and cautioning against the risk of over-responding. The FSA also formerly had responsibility for providing fish consumption advice but this task has since been reallocated to NHS choices[21]. The CEC respondent observed that access rights for aquaculture development are more complex and politicised in Scotland than elsewhere i.e. due to additional planning layers in the 2007 Town and Country Planning Act (TCPA) and an often-uneasy co-location of finfish and shellfish farms. He reiterated the point made by respondents in other groups that Seafish should have a clear role as a 'one-stop' shop advisory service for planning, leasing and other regulatory issues (- adding that regulators themselves are often not particularly good in advisory roles). Two respondents elaborated that consistent with their intermediary position between industry and government Seafish were in a good position to take a brokerage role, harmonising relations between different stakeholders - noting that industry sometimes struggles to voice problems effectively. One added that 'as a relatively new entrant, aquaculture is still seen as interloper and more effort is required to better integrate it into the seafood sector and the wider marine economy' e.g. by looking for aligned interests with fisheries for example in response to the increasing prioritisation of marine sites for wind farm developments. Good knowledge of local stakeholder cultures and interests were viewed as a vital part of this mission. One respondent noted that although reductions in frontline staffing numbers make regular interaction and this task more difficult, the fewer remaining staff 'punch above their weight' and the devolved Seafish staffing structure is also consistent with this need.

Three respondents stated that Seafish would be missed/have to be re-invented if it did not exist. However it should be noted that much of this justification was based on perceived benefits to third parties, particularly smaller enterprises along the seafood value-chain. Three respondents in this category indicated that they made relatively little use of Seafish services themselves beyond occasional website use and ACIG attendance. One respondent summarised this thus; 'my dealings with Seafish tend to have been more reactive than proactive'. The fourth respondents put a much higher value on their direct use of Seafish services in regard to shellfish aquaculture adding that they

[20] http://www.sciencedaily.com/releases/2004/01/040109072244.htm

[21] Who promote the '2x 140g portions per week message for women of child bearing age, 4 portions for others' message – amplified in Seafish promotions.

would like to see aquaculture as an independent workstream. All felt that Seafish services needed some tailoring to different regional requirements and aquaculture ambitions.

A range of future industry needs were identified by the group. Shellfish businesses were seen as being particularly vulnerable to water quality problems imposed by other resource users and in need of special protection. Seafish should continue to demand more pragmatic /evidence based policy making from Europe with regard to sampling requirements and their interpretation. Taking a longer term view, one respondent felt that in the longer term the introduction of new species in response to climate change will bring new challenges and a recurrence of old one e.g. contamination issues linked to new feed stuffs noting these risks will be greater for fish species with higher oil content. The regulators in this group supported aquaculture growth, but only within the confines of adherence to the Marine Spatial Planning directive and the Water Framework Directives for salt and freshwater environments respectively.

One respondent concluded that as public research funding becomes more constrained it is increasingly important for aquaculture, particularly the salmon sector to shoulder a greater share of applied research costs. He added that this sector is 'more likely to benefit from publically funded initiatives e.g. The Marine Alliance for Science and Technology for Scotland (MASTS), the Scottish Aquaculture Research Forum (SARF) and the forthcoming Scottish Aquaculture Innovation Centre (SAIC)' – finally noting that the sectors exclusion from the levy essentially makes it a regressive tax on smaller businesses.

Cat 3. Certification Bodies and E-NGOS: Representatives of five such bodies were interviewed: two of the major international multi-species aquaculture certification bodies and three UK and international e-NGOs providing retailer responsible aquaculture sourcing/labelling advice and/or consumer recommendation schemes.

Respondents in this category were on the whole very positive toward Seafish, particularly the two international certification bodies (ICBs). All shared a primary concern with sustainable production and sourcing with varying degrees of emphasis on environmental (all) and social criteria (some). Consistent with these aims all indicated Seafish's main role should be to support collaboration between all stakeholders (Governmental, Development and Industry) in order to promote sustainable aquaculture through reduction of environmental and social impacts. Both ICBs felt there were more complementarities than duplications in their approach. Four of the five respondents welcomed the Seafish decision to support existing certification equivalence initiatives such as the Global Seafood Sustainability Initiative (GSSI) rather than independently developing 'another' index of farmed seafood sustainability and sourcing risk (an opinion also endorsed by the two importers interviewed: Cat 5b).

Opinion was divided on the balance of Seafish sectorial support. One ICB respondent commented 'they now stand up for seafood be it farmed or wild, the balance is about right, they must just do more across all workstreams!' He also endorsed Seafish's growing interest in international trade, especially pangasius and shrimp over the last 3 years – ranking this as their most significant improvement. His philosophy was that equality is best served through trade rather than aid and he felt Seafish had also come to recognise this. Conversely others felt Seafish had not yet fully defined its role with respect to aquaculture and particularly international trade in farmed products. One cited Seafish's attempt to arrange a buyer mission to pangasius producers/processors in Vietnam stating 'there were no takers as this capacity already exists in-house'. Another called for greater clarity on the division of support to levy-generating UK and foreign value-chain segments.

Responses on potential conflict of interest in respect of Seafish's industry and governmental responsibilities were also divided and sometimes contradictory. One opined they should aim to be more like a trade association taking on a convening role for other industry bodies e.g. on policy issues and especially EU legislation. Another, perhaps more realistically observed Seafish were 'in a bit of straitjacket, being answerable to both industry and public servants' and - 'as a national organization that must deal with international trade they must continually determine what they are

allowed to respond to'. Others pragmatically observed that Seafish should not try to be an industry body, being mindful of the risk of 'treading on the toes of existing trade organisations', particularly as 'the UK already has strong producer organisations in key sectors!'

One added the main requirement for independence is in the collation of industry data and seafood trends for EU aquaculture sectors and beyond - alluding to the importance of this function as endorsed by all the respondents in this category.

The two ICBs noted that apart from salmon much of the aquaculture industry remains fragmented and remains in need of good external coordination. One went on to contrast aquaculture with the still highly fragmented fisheries sector with its multitude of representative bodies which, they argued, has even greater sector-wide requirement for coordinated support to achieve any consensus. This need is further amplified by the scale of the fisheries sector relative to the unconsolidated segments of the domestic aquaculture sector i.e. principally bivalves and trout. One noted that despite this need, the smallest organisations are least likely to be receptive to Seafish's provision recounting his own time as a commercial fisherman: 'then I didn't even know what Seafish was!'

All singled out the industry forums; the ACIG and CLG and (especially) the associated bi-monthly emailed newsletters for particular praise. One respondent noted that by getting 'most of the right people around the table', including producers, retailers and regulatory bodies, these two groups provide a highly useful forum for information exchange and discussion of salient aquaculture issues, especially with respect to reputation and integrity and attainment of consensus on responses to single-sided media campaigns. One of the ICB actively uses the ACIG to coordinate responses to such campaigns stating 'greater impact is achieved by lumping rather than splitting messages - we should look for mutually desirable over-arching goals reflecting common interests' – 'both capture and aquaculture are badly portrayed'.

Promotional needs were ranked highly for two of the three bodies with consumer-facing labels or seafood buying guides/traffic light systems. However one recalled that although Seafish origins were also in the promotion of seafood consumption, he questioned the relevance of this role today as it is particularly well served by retailers, food service, branded suppliers (e.g. Birdseye) and even producer organisations (e.g. the SSPO). He also felt previous promotional work was not particularly well directed; 'they are not marketers and probably don't give value for money for this activity'.

One suggested that promotion messages should refer to fish and shellfish rather than just seafood where possible, as there is a tendency to associate messages with finfish alone. Trout also tends to be over looked and the same respondent called for improved coordination between the salmon and trout sectors and a unified approach across sectors generally i.e. consistent with Seafish's current promotional strategy. One specifically endorsed Seafish's fact sheets on farmed species

On responsiveness, one respondent observed that being a parastatal agency comes with a level of bureaucracy meaning they will inevitably be less responsive than a trade-body. Another personally sensed that 'they are more dynamic than in the past being more responsive and on the ball'. Another answered from a reputational perspective: 'the perfect response to media storms can never always be ready - always having a person ready to speak is a tall order and there is also a danger of over-responding'.

Three respondents individually stated that they would like to collaborate more closely with Seafish and this might best be achieved through joint aquaculture projects e.g. through EMFF funding. Though one of the ICBs felt that the divergence in scope referred to above could make this difficult for them in practice. Zonal-management and support for on-going attempts to increase substitution of fish meal in aquafeeds were identified as urgent responses to disease and environmental issues (though clearly the latter also implies a loss of levy revenue to Seafish).

Cat 4. Academia and R&D: Aquaculture specialists from eight institutions were interviewed; two from Welsh Universities, three from Scottish Universities and research institutions, one industry

research consultancy and two Scottish research support bodies (a fully grant-funded research consortium and one independent body). Specialisations ranged across salmonid and shellfish species (principally mussels and pacific oysters) and disciplines (including fish health, husbandry, environmental monitoring and aquaculture policy).

An academic with a background in aquaculture vocational training regretted Seafish's divestment of the Ardtoe facility and the loss of opportunities that went with it in regard of shellfish training. There is currently only a market for SVQ training to the salmon industry where there is clear career structure and commercial demand for qualifications that are valued in the job market. Shellfish producers are more likely to rely on their own local knowledge and there tends to be less mobility between companies. Without the type of inputs Seafish used to provide and/or changing legislation i.e. with respect to auditing of training requirements, this is unlikely to change. There is still a legacy of very useful Seafish information but key areas e.g. linked to public health/ depuration need revision. Turnover in environmental health inspection staff is a major frustration for experienced shellfish farmers as each brings a slightly different interpretation of EU-regulations. He suggested that Seafish have lost a great deal of profile on the West of Scotland since the loss of Ardtoe and reductions in staffing - to be responsive, they need to be more focussed with their remaining resources.

Several respondents added many training and research roles have since been taken on by National Universities and research institutions e.g. the University of the Highlands and Islands (UHI providing SVQ training), the Scottish Association for Marine Science (SAMS), the University of Stirling (UoS e.g. AquaTT[22]), the University of Aberdeen (UoA; distance learning), Lantra Sectorial Skills Council (aquaculture vocational apprenticeships[23]), larger companies such as Marine Harvest have developed their own internal training programme and the new SAIC programme will also provide training opportunities. Consequently they could see little or no future role for Seafish in this regard.

Whilst acknowledging the pioneering role of Ardtoe in development of alternative marine species, several respondents observed that the small industries initiated from Seafish R&D struggled to become established in the UK and have subsequently been scaled-up overseas. A more durable legacy lies in the staff trained at Ardtoe including many project students 'it was a very useful training centre'.

Others agreed that the salmon sector requires no technical support from Seafish – one pointing out that a strong industry body; the SSPO raises its own funds through voluntary contributions; has good support directly from the Scottish Government and additional research needs will be met by the new Scottish Aquaculture Innovation Centre (SAIC). The EU has also funded a long line of research projects on health issues and dietary plant/fishmeal substitution (most recently the ARRAINA project[24]) with parallel University and industry collaboration. One respondent suggested that even the introduction of a specific Seafish aquaculture work stream would be construed 'as interference' by salmon sector. He added only Seafish health promotion benefits might have spill-over benefits adding that the SSPO also address this issue themselves.

Three respondents with policy experience concurred that Seafish should continue to focus its primary UK support on a fragmented/unconsolidated capture fisheries, shellfish and trout aquaculture sectors where market-failures remain most evident. The shellfish sector in particular would benefit from regulatory and technical support in order to achieve the Government growth targets. One worried that if even if the Government target of doubling shellfish production by 2020 was achieved, the industry would still be small and would face many of the same issues experienced

[22] http://www.aquatt.ie/

[23] http://www.lantra.co.uk/News-Media/News/New-Aquaculture-Modern-Apprenticeship-Frameworks.aspx

[24] ARRAINA - Advanced Research Initiatives for Nutrition & Aquaculture (FP7) www.**arraina**.eu/project/project-4

over the last few decades with regard to hygiene, planning and risk-reward ratios. Critically they felt that the numerous national and regional shellfish trade and marketing organisations with their own remits often pulled in different directions – a single well-resourced organisation would have the leverage to bring net benefits to the entire sector in production and marketing. In Wales a previous attempt to initiate a regional, multi-sectoral aquaculture association met with limited response from local government despite engagement by the most proactive industry representatives (across shellfish, freshwater/marine finfish, and niche sectors) - who remained simultaneously involved with sectoral association groups (e.g. BTA, SAGB). The same (Welsh) respondent also favoured reducing regional distinctions, as far as possible observing that workstreams 1, 2, 4, 5 and 6 (from the Protect and Promote objectives) could assist all sectors whilst streams 3 and 7 (under the Inform objective) could be tailored to specific sector, depending on need/demand.

The same respondents agreed that Seafish inevitably faced conflicts of interests associated with its statutory and industry obligations. Although direct lobbying for the industry (and especially individual companies) was clearly problematical they advised that with its unique position as a formal intermediary between industry and government it does need to have a role in what one called 'considered advocacy' and another 'backroom support'. One respondent asked for greater clarity regarding the working relationship between Seafish and Seafood Scotland.

Four key areas highlighted where the Welsh aquaculture sector required support were (i) advice on regulatory compliance (ii) supply-chain marketing support including value-addition strategies (iii) technical and health and safety training (iv) knowledge (R&D) dissemination and advocacy. Although they identified many potential service providers for these activities they were heartened to see investment in a local Seafish officer (and quarterly e-alerts). They viewed Seafish objectives generally as complimentary to their own – identifying the 'Inform' objective work streams 7: Industry research, information and interpretation and 3: Regulation as the Seafish actions most relevant/ useful to them. They would also welcome (a) further grant or R&D collaboration and networking to fulfil the applied industry research needs, for example exploiting forthcoming EU structural funding (EMFF, ERDF, ESF) opportunities (b) assistance/signposting to relevant R&D organisations to make better use of grant opportunities. These observations were consistent with Welsh Fisheries Strategy 2007/8[25].

The main needs/problems facing the salmon industry going forward were viewed as: stagnation of production due to health problems, site availability, over-complicated planning procedures, bureaucratic environmental control restrictions, equipment improvement (e.g. robust cages for exposed sites), avoidance of risk to wild fish populations e.g. through improved fish lice treatments and triploidy programs. He saw no immediate major need for genetic improvement 'the industry should avoid the battery-farming image'. He also noted that although Scotland has the largest UK aquaculture sector, Brussels deals directly with Defra who are less committed to aquaculture development. This is particularly frustrating as aquaculture is central to CFP reform.

Cat 5a. Private Sector; Producer Organisations: Representatives of eight aquaculture producer organisations were interviewed: one associated with feed inputs, two with salmon and trout and five with shellfish (including a shellfish marketing body). These had a range of international, UK and in five cases exclusively Scottish remits. Three of the Scottish shellfish interviewees were, or until recently had been, farmers in their own right.

The SSPO respondents reiterated earlier comments that only the shellfish, other 'minor' UK aquaculture sectors and capture sectors need support. The Scottish salmon industry does not, this would only be a duplication of effort and they did not believe Seafish had the relevant expertise anyway. They also perceived that previous Seafish efforts to support the shellfish sector had no demonstrable benefit. They added that they/the industry did not welcome any 'interference'

[25] http://www.fisheries.org.uk/080801walesfisheriesstrategyen.pdf.

pointing out that Seafish already has a levy on fish ingredients fed to salmon which represents an indirect levy on salmon farmers (Section 3.2). Furthermore Seafish's constitution means they cannot promote UK products at the expense of imported products. SSPO's voluntary funding structure means they can 'be much more focused on member's needs'. To increase levy Seafish need to target importers but they felt that would also be to the detriment of domestic producers. They endorsed Seafish adoption of key performance indicators in its last corporate plan, as hitherto it has been difficult to objectively assess their performance. Any SSPO collaboration with Seafish was limited to marketing and fish consumption promotion through Seafood Scotland. They added that although the ACIG forum was originally set up for processors & retailers to interact with aquaculture, few processors actually attend these meetings. Consistent with the above sentiments and their own strong position, they also favoured industry support being based on sectoral rather than regional or national boundaries. They cited the attempt of the local meat industry to emulate the SSPO when they tried to establish 'Red meat - quality meat Scotland' (QMS).

The shellfish respondents felt their sector has particular need of Seafish support, acknowledging its role in taking on the responsibilities of the old MAFF Lab at Conway following its closure around 15 years ago i.e. continuing their depuration research at Ardtoe. One respondent added that most practical technical advice available to shellfish producers, though often of very good quality (e.g. Seafish Hyperbooks produced 10 years ago) is now out of date. However, several respondents agreed that today the main problem for shellfish producers is the regulatory burden they face linked to planning applications, environmental and food safety regulations. They added this can only resolved through proactive government policy and appreciated Seafish support in this respect.

Although the SAGB is the National voice of the sector it has relatively few subscription paying members due to the fragmented nature of the industry. Consequently, 'despite being the first port of call for a very diverse range of farmed shellfish species', they struggle with funding and are currently only able to prioritise Norovirus depuration research under an FSA tender. The respondent pointed to a particular deficit in the area of novel depuration techniques and a general lack, rather than any duplication of, direct support to the industry. Although ASSG members were nominally also part of the SAGB there is less contact now than in the past as Scotland has become more devolved. He felt that amalgamation of the bodies would only increase costs as separate engagement is required with national regulatory bodies. He also felt the English sector suffered as a consequence of Defra's low prioritisation of aquaculture and regretted Seafish's inability to lobby directly on their behalf. He added that 'aquaculture is central to CFP reform, so Defra's lack of engagement is particularly frustrating'.

Cat 5b. Private Sector: Production Companies: Representatives of eight such companies were interviewed (11 with the three farmers included in Cat 5a): three mussels farmers in England, Wales and Shetland, an English lobster hatchery, a Scottish scallop farm, a Welsh RAS bass producer and two provider of commercial research and multi-species juvenile production services.

Once again many shellfish respondents in this group acknowledged earlier Ardtoe research efforts - but added that Seafish was no longer in a position to offer direct up-to-date technical support. Many also endorsed earlier statements regarding a perceived lack face to face contact with Seafish staff at 'the coal face'. This sentiment was particularly strong amongst the Shetland respondents.

One shellfish respondent also felt that the Seafish prohibition on lobbying that also limits its ability to support individual companies in investment brokerage. This was viewed as a particular constraint for emergent shellfish sectors such as scallop farming where there is currently little or no competition and investment is required to support initial new business growth. The respondent attributed a perceived back-peddling on brokerage commitments by Seafish to this prohibition, adding that ultimately their company had achieved their own media coverage which secured the desired investor interest as well as positive engagement from the Sustainable Inshore Fisheries

Trust: SIFT[26] who were previously resistant to Shellfish farming. Another respondent contrasted what they felt was an over-bureaucratic Seafish approach with more straightforward matched funding support options available from the HIE (whilst also critiquing their investment brokerage efforts).

Most of the shellfish respondents referred to a looming 'spat-crisis' facing the oyster sector and to a lesser degree other shellfish sectors as result of interacting environmental and disease problems. Availability of oyster spat has also been constrained by demand for disease free UK hatchery spat by French producers severely affected by the outbreak of Pacific Oyster Mortality Syndrome (POMS) since 2008. These problems have lead industry to seek funding support for multi-species hatchery development. A redundant Government Marine Laboratory facility on Loch Ewe was identified as a candidate for such development - with industry lobbying the Scottish Government to lease out the facility rather than place it on the open market. Opinion was divided on the viability of such a project – one respondent felt that even assuming that the shellfish industry reached the Scottish Government 2020 growth targets it would still be too small to justify such significant investment. However this ignores opportunities for spat export alluded to above. One respondent also regretted that Ardtoe researchers were very close to establishing 'small scallop hatcheries' immediately prior to their closure. One (mussel) respondent called for more research into the reasons underlying the decline in spat fall. Generally respondents felt that diagnostic support linked to shellfish toxins and bacterial contamination and depuration was well catered for by other agencies including CEFAS.

Shetland mussel farming respondents were most negative in their attitudes toward Seafish. However this is perhaps indicative of an enviable level of self-organisation in production and marketing already collectively achieved by these farmers. Cooperation extends across fisheries and aquaculture coordinated by effective local industry institutions including Seafood Shetland[27] and Shetland Seafood Auctions[28] (both of which are supported by Seafish albeit it at low levels). In addition the Scottish Shellfish Marketing Group (SSMG)[29] now has 36 members including all but 3 of Shetlands 22 mussel farms (producing 65% of Scotland's rope-grown mussels) together with 11 mussel and 6 oyster farms located along Scotland's west coast. Through its recently acquired Glasgow Bellshill processing facility (ex Scot Trout) the SSMG consolidates its member's production and manufactures value-added products to supply major UK retail multiples. The Shetland respondents were confident in their own promotional efforts (and those of their customers) and their collective ability to deal from a position of strength with retail multiples through these associations. They were also proud of their instrumental role in gaining the Marine Stewardships Council (MSC) eco-label for environmental excellence - for themselves and most of the rest of the Scottish mussel farming industry in 2012[30]. The industry has also worked closely with local government in Shetland where shellfish site licences and production are now limited according to carrying capacity assessments. One respondent suggested that this could be offer a national model, though the concentration of farmers in Shetland probably also made this more of an immediate local necessity.

One respondent also felt the export advice offered by organisations such as Seafish, Seafood Scotland and Scotland Food and Drink are often not very consistent with market realities adding that their ability to deal with multiple agencies is also very time-limited. He explained that despite some inconsistent success in the middle-east, it is very difficult to compete on many of these markets due

[26] http://www.sift-uk.org/PageProducer.aspx

[27] http://www.fishuk.net/seafoodshetland/ (the result 2003 amalgamation of Shetland Fish Processors' Association (SFPA) and the Shetland Shellfish Growers' Association (SSGA).

[28] http://www.shetlandauction.com/Home.aspx

[29] http://www.scottishshellfish.co.uk/

[30] http://www.shetnews.co.uk/news/4994-local-mussels-gain-eco-label

to regulatory and other barriers. Consequently the SSMG focus has been very much on developing domestic markets. However they acknowledged that this market is growing very slowly (by only around 1% per annum) and at the current rate of supply growth they expect it to be saturated by 2020. The SSMG currently operate a so-called 'remaindering strategy' involving the sale of surplus production to other EU markets (Spain, Sweden) to avoid depressing local markets. Although mussel famers are not always happy with this response, he adding that neither are they usually very good at diversifying into other shellfish species.

Cat 5c. Private Sector: Seafood Importers: Two respondents, both with seafood sourcing responsibilities were interviewed, one employed by a specialist importer with a primary interest in farmed bass and bream, the other by a major UK importer with a primary interest in farmed warm-water shrimp. Both agreed services provided by Seafish are necessary to the industry as a whole, but questioned the value of direct benefits to themselves. The smaller company challenged the distribution of resources, referring specifically to a lack of investment in aquaculture. The same respondent noted aquaculture is a rapidly expanding industry, with imported products in particular representing an ever-increasing share of their business. They would like to see more specific mention of aquaculture in the Seafish Strategy and particularly within the supply chain and consumer panel.

The larger company suggested most seafood importers already have their own highly developed responsible sourcing schemes supported by third-party certifiers where necessary meaning Seafish activities in this area were of little value to them. However, the smaller producer suggested more support/ advice on 'accreditation against major standards' and corporate social responsibility (CSR) strategy. Both referred to excessive duplication in the provision of third-party certification, but also concurred that equivalence schemes with significant industry buy-in were already well underway, citing the Global Food Safety Initiative (GFSI) and the Global Seafood Sustainability Initiative (GSSI) working with the major standards holders. They supported Seafish's decision to support these existing harmonisation initiatives rather than trying to implement their own.

The larger importer cited the Seafood Importers and Processing Alliance (SIPA) as an example of how larger European importers were cooperating to service many of their own needs in areas including food safety, (EU) trade information, tariffs and reputation protection. This self-funded organisation has also sponsored scientific research around some of these issues e.g. on veterinary residues and DNA analysis for provenance testing. The organisation also accepts non-industry members, Seafish for example have a member on the board. The respondent suggested many smaller importers who are less likely to be members, free ride on these activities. The same respondent also felt that the information gathering remit of Seafish's new staff placement in Brussels duplicates existing roles of the Food and Drink Federation (FDF) and the European Fish Processors Association (AIPCE). They concluded by saying 'if I have a problem, 99% of the time I will go to SIPA or the FDF who invariably suggest/provide suitable courses of action and representation.

Both respondents indicated that they made relatively little regular direct use of Seafish services, in part as result of the relative lack of relevant information on the exotic farmed species they increasingly import. Both agreed Seafish were good at providing and presenting market data including import statistics, retail and food service data. However, whilst the smaller company valued Nielsen data obtained through Seafish which they would otherwise be unable to afford, the larger importer procured all necessary data directly by themselves. The former respondent pointed to a gap in the provision of more qualitative data on consumer behaviour and preferences. Although the smaller importer derived little further value from Seafish website he suggested it would benefit them to have more information on 'EU guidelines, standards accreditation and CSR agendas available to their suppliers, retailers and consumers'.

Both were particularly critical of Seafish's consumer activities (benefiting from an investment of approximately £3.2 million over 3 years), stating that they felt the flagship '2 portions (of fish) per week' campaign had not been a demonstrable success in terms of increasing fish consumption. One

suggested better communicated and more targeted messages for specific core consumers groups are required along with an appropriate means of assessing their penetration with respect to consumption frequency. They added that Seafish may be trying to do too much/is spread too thin with its current strategy and/or may not be using the right marketing agencies. They also opined that industry panels may not be doing what is best for the greater market citing excessive spend on the "Fish and Chips channel".

Both gave high praise to Seafish's two industry dialogue groups; the Aquaculture Common Interest Group (ACIG) and the Common Language Group (CLG), noting that the latter had been particularly effective in galvanising the industry (both processors and retailers) to respond together to perceived misinformation presented in Hugh Fearnley-Whittingstall's 2010 'Fish Fight' campaign. For the larger importer this was the single most important service provided by Seafish – with 'a large gap' thereafter.

The larger importer indicated that communication with Seafish had deteriorated over recent years, blaming both parties for this and suggesting they should re-engage with Seafish in constructive discussions on how they might get better value for money going forward. However they also pointed out that with their company's increasingly strategic focus on core business activities, less time was available for senior decision-makers to attend an ever-growing number of industry committees and they had been disappointed by historic engagement attempts.

Consistent with the opening comments, both felt that to be useful to their increasingly global business, Seafish also need to become more globally focussed – where as they viewed their current focus as being primarily national.

4.4 ONLINE SURVEY

The self-enumerated online survey (Appendix 3) circulated to recipients of the bi-monthly ACIG newsletter attracted only 6 responses (suggesting further promotion would have been beneficial). Respondents included one commercial organisation, involved in RAS design/ installation, hatchery production and grow-out of various finfish and shellfish species. Two were academics, one with an Ardtoe research background and the other a vocational training specialist, one e-NGO involved in aquaculture farm-standards development, one a seafood retailer - mainly of imported farmed products and one a member of staff of the MMO with aquaculture planning responsibilities. Only one respondent, the retailer was a levy payer (and was also the only respondent that declined to be included on the Seafish aquaculture expertise inventory). Four claimed moderate knowledge of Seafish services whilst one (the MMO respondent) was very knowledgeable. Table 10 shows a broad spread of exotic species of relevance to the respondents, with exotic farmed species (warm-water prawns/ shrimp, tilapia, pangasius, seabream and bass) taking precedence over domestic species (Table 11).

Industry research and interpretation and sector representation to Government were the most frequently valued services, followed by professional working groups (e.g. the ACIG and CLG) and regulatory support (Table 12). The retailer identified improved awareness of reputational risks in aquaculture (e.g. labour conditions, raw material input issues and disease) and appropriate mitigation strategies as key industry needs going forward. The academics and the eNGO stressed more general industry and market research needs whilst MMO identified spatial information needs. The eNGO representative also stressed governmental representation/ lobbying, industry networking opportunities and project funding support.

Table 10: Farmed species of relevance to online survey respondents (n=6)

Answer Choices	Responses	
Mussels	33.33%	2
Oysters	50.00%	3
Cockles	16.67%	1
Salmon	33.33%	2
Trout	50.00%	3
Charr	33.33%	2
Sea bass	66.67%	4
Sea bream	66.67%	4
Pangasius catfish	50.00%	3
Tilapia	66.67%	4
Farmed shrimp	66.67%	4
Other (please specify) Responses	50.00%	3
Total Respondents: 6		

Note: 'Other (please specify)' refers to seabass, turbot, barramundi and sole which are all of relevance to the RAS specialist

Table 11: Frequency of use of Seafish Services (n=6)

Answer Choices	Responses	
Most weeks	33.33%	2
Most quarters	33.33%	2
Every year	16.67%	1
Less frequently	16.67%	1
Total		6

Table 12: Seafish services of most use to the respondents business or organisation (n=6)

Answer Choices	Responses	
Market research and interpretation	33.33%	2
Industry research and interpretation	66.67%	4
Responsible sourcing advice	33.33%	2
Professional working groups & networking forums	50.00%	3
Promoting consumption of seafood products	33.33%	2
Sector representation on national strategic plans, ministerial groups etc	66.67%	4
Supporting sector reputation and integrity	16.67%	1
Advice and support on regulatory issues	50.00%	3
Project funding support	16.67%	1
Training provision	0.00%	0
Total Respondents: 6		

4.5 SUMMARY &KEY RECOMMENDATIONS

In this section we summarize the stakeholder consultation findings and make recommendations (bold ***italicised*** *text*) in regard of the two key review questions:

a) Where should/could Seafish be focusing on aquaculture, both domestic and imported
b) How could Seafish most appropriately invest in aquaculture technical and information needs and what are the potential gains from such investments?

These questions were originally meant to form the conclusion section of this report however, given the importance of stakeholder views, they have been addressed here.

(i) Where should/could Seafish be focusing on aquaculture both domestic and imported?

As a statutory body with parafiscal-tax raising powers Seafish has to navigate a number of potential conflicts of interest in its day to day operation. First and foremost, whilst industry sits on their board and provides levy funding they must also serve ministerial requirements across four regional UK Administrations and these same ministers sign-off their accounts. Although many respondents, particularly at producer level called for Seafish to be more like a producer organization (PO) in their representation, even assuming this was desirable it is not feasible under its current funding structure. This means they are not in a position to lobby government in the same direct manner as POs and although they can promote dialogue their ability to take a stand is constrained. Furthermore as their position is ultimately predicated on demonstrating value for money they must not be perceived to be competing with or duplicating the roles of effective existing producer organizations such as the SSPO.

On the other hand many respondents felt their statutory constitution gave Seafish a high degree of independence and credibility, particularly in its dealing with high-level stakeholders (nationally and at EU-level) as well as in its promotional efforts. Its intermediary position between government and industry affords it unique opportunities to improve information flow between these two groups. One respondent noted 'regulators are often not very good at communicating with those they regulate' whilst another observed 'industry is often not very good at communicating its concerns effectively'. Regulatory bodies valued Seafish's capacity to advise on the proportionality of their regulatory responses (particularly with regard to contaminants) on the basis of their first-hand industry knowledge.

Supportive government policy requires direct support by civil servants; Seafish sits on high-level ministerial groups (such as the Ministerial Group on Sustainable Aquaculture development[31]). All though unable to lobby, they have the power to influence through what one respondent described as 'considered advocacy'. ***Seafish should represent aquaculture interests to government and legislators at both UK and EU dialogues in order support favourable policy and legislation outcomes.***

Another potential conflict of interest arising from Seafish's roots in the 1981 Fisheries Act is that Seafish have no levy raising powers in the two largest UK aquaculture sectors; salmon and trout (these farmers are taxed indirectly through levy on fishmeal imports for diet formulations though this contribution is also falling with improvements in protein-substitution). Seafish support must therefore strike a balance between achieving the greatest public good whilst attempting to prioritise the needs of its primary indirect and direct levy-paying constituencies; namely UK shellfish producers and farmed seafood importers/processors. Here too there are potential conflicts to navigate – Seafish cannot be seen to promote domestic products over imported products. Fortunately perhaps then, most European bivalve trade is intraregional with limited supply from only 13 other authorised 'third' countries due to strict public health regulations on fresh, frozen and live

[31] http://www.scotland.gov.uk/Topics/marine/Fish-Shellfish/MGSA

products (this compares to well over 100 countries authorised to sell fresh/frozen finfish products into the EU).

Our analysis also indicates that Seafish raises more than 80% of its aquaculture levy on imported farmed products, mostly warm water shrimp. In purely financial terms, this makes seafood importers Seafish's most important aquaculture constituency. Our analysis suggests similar conditions pertain at this and the producer value-chain levels with respect to industry consolidation and Seafish support requirements. Like the SSPO, larger importers (i.e. paying most levy), were increasingly self-sufficient with respect to current Seafish objectives, whilst smaller importers less well-resourced for accessing market intelligence, navigating regulatory issues, or responding to adverse media representations derived more direct benefit. Although there are no easy answers, Seafish should continue to engage proactively with importers to see how it might add greater value. Although they and retailers participate actively in the CLG dealing mainly with capture issues, they are less active in the ACIG. There was also evidence of disengagement of the larger importers in importing and processing sector panel (IPSP) intended as the main mechanism for high-level engagement.

These observations point to a wider reality; although Seafish is a national organization with primary accountability to the UK seafood industry and consumers, it operates in an increasingly globalised seafood market. The EU now imports around 70% of its seafood from 'third' (mainly developing) countries and there are complex supranational issues linked to food security and the longer-term sustainability of these sources. For example, demographic changes are already increasing domestic demand for 'export-quality' seafood in many exporting countries – raising the question how long can they be relied upon. From this perspective, Seafish's recent strategic shift from a more narrow production to a wider value-chain focus appears enlightened. For example by complementing a 'responsible sourcing' workstream under the 'Protect' objective - with 'international trade' under a separate 'Promote' objective.

Environmental certification bodies (CBs) and e-NGOs were most positive towards this focal shift, also evidenced by their active engagement in Seafish discussion forums such as the ACIG. Larger CBs and e-NGOs are promoting equivalence schemes (such as the GSSI) as a response to the international proliferation of e-standards, whilst Client Earth is collaborating with UK retailers on development of voluntary codes of conduct for clearer labelling of sustainability attributes and responsible sourcing under their Sustainable Seafood Coalition (SSC)[32] initiative. Respondents in this category endorsed Seafish's decision to support these existing initiatives, though some also expressed concern regarding possible duplication given Seafish's plan to start its own 'responsible assessment for sourcing seafood' (RASS)[33]. ***Consequently there is a need to articulate more clearly what concrete actions will be taken under the responsible sourcing workstream. Currently there are four responsible sourcing guides for farmed species; Atlantic salmon, pangasius, tilapia and warm-water shrimp compared to 34 capture species. Seabass and Sea bream RSGs should be added to the farmed list as a matter of priority[34].***

From the producer perspective the merger of aquaculture across workstreams was less desirable and favoured its re-introduction as a separate workstream. ***However from a global value-chain perspective integration of aquaculture and capture fisheries across work streams makes clear sense.***

[32] http://sustainableseafoodcoalition.org/

[33] This was also an outcome of a recent EU-funded FP7 large-scale collaborative research project Sustaining Ethical Aquaculture Trade (www.seatglobal.eu 2009-2014). SEAT focussed specifically on major farmed commodity species (shrimp/ prawns, pangasius catfish and tilapias) with growing volumes of trade between Asia and the EU

[34] Farmed seabass is referenced in the RSG for wild-capture seabass, but should treated as a separate aquaculture entity.

Other respondents with first-hand experience of the workings of the Seafish panels (including the Importing and Processing Sector Panel) also remarked on a general lack of dialogue on aquaculture related issues in these forums and the dominance of capture concerns. ***Whilst we feel the existing structures have their virtues – some effort must be made to address this problem either through changes in the facilitation or composition of the panels.***

Some respondents (mainly in the academic and R&D category) argued that the Seafish shift from a production to market orientation approach still had a journey in terms of effective operationalization and internal acceptance. This raises the question of how value for money from Seafish services could/should be evaluated. Some argued exclusively for economic impact evaluations (on industry). However given the mix of public and private sector interests that Seafish tries to address together with the high costs and complexity of tracking economic impacts across these benefit streams on a recurrent basis – we suggest Seafish's use of key performance indicators (KPI) is appropriate. Results are reviewed twice each year by industry panels. Whilst the KPIs for each of the six aquaculture-related workstreams appeared relevant and easy to understand, no information was available regarding the reliability and accessibility of information required to assess them or on the outcome of assessments. ***Currently there is only one high-level KPI for each work stream; we suggest more specific, measurable sub-indicators designed to capture multiple-dimensions of impact are also incorporated. We also suggest that these indicators are developed with the active participation of key stakeholders (this could be one mechanism for improving engagement of importers and processors).***

From a simple accounting perspective, as a proportion of total levy generation, direct expenditure on aquaculture has seen a significant decline over the last decade, falling from 7.1% in 2003 immediately prior to divestment of the Ardtoe research facility, to only 0.6-1% in the years from 2010-2013. We estimate that aquaculture currently generates at least 5% of the annual levy, which suggests that aquaculture income may be cross-subsidizing non-aquaculture activities. However disaggregation of costs and benefits is complicated by Seafish's crosscutting workstreams designed to promote seafood on a more holistic basis.

As aquaculture is also likely to derive benefit from at least six of these seven workstreams the above accounting allocations becomes far less clear-cut (the aquaculture spend data provided to the contractor would appear to account primarily for staff costs and specialized aquaculture projects/ grants.

Aquaculture interests, particularly those at primary production level clearly would wish for more to be spent on their sector. Growth of the sector is also an EU-priority under CFP reforms and a national government priority in at least three of the UK regions (Scotland, Wales and N. Ireland). The question then arises on what actions should additional investment be made and how benefits would manifest themselves practically? Consolidated sectors such as the salmon industry, represented by a single effective PO, are confident in their ability to service most of their own needs and as a result, guard their autonomy fiercely - including their levy derogation (several respondents argued that they should invest more in their own research requirements and receive less cross-subsidy from public sources consistent with their economic status). Arguably then, the salmon industry could be viewed as development model for other sectors, at least in economic terms.

Other UK aquaculture sectors i.e. shellfish and trout remain far more fragmented and consequently less well resourced. PO representation is also very fragmented in the case of the shellfish sector. These are exactly the pre-conditions for market failures that Seafish was created to deal with. However these sectors remain very small i.e. compared to a domestic capture sector that has similar structural problems. The trout sector takes an intermediate position between salmon and shellfish in terms of its configuration. Although subject to increasing consolidation, it is still dominated by smaller producers. Consequently its industry body is less inclusive and much more poorly resourced than the SSPO. Greater investment in the trout sector could attract free-riding criticism by major

levy payers – though this could this can be countered to some extent by their indirect levy contribution on fishmeal in trout diets.

The ACIG and associated CLG and bi-monthly industry newsletters achieved almost universal acclaim and high participation levels amongst our responder group. Collectively these forums appear to do an excellent job at promoting dialogue between a wide and relevant range of industry, NGO and regulatory bodies (though importers processors and retailers are less well represented on the ACIG). This regular engagement also serves to promote interest and participation in larger periodic forums supported by Seafish. The Humber Seafood Summit and Seafish support of the bi-annual World Seafood Congress, led by the International Association of Fish Inspectors (IAFI), are now recognized as key industry events.

Following the disposal of Ardtoe and Seafish's restructuring and associated staff reductions (40% in the last 5 years) thereafter, many respondents at the primary production level felt that personal contact had become less regular and Seafish more distant. At the same time they praised the commitment of remaining staff who were said 'to punch above their weight'. To many at the producer level, these staff are the face of Seafish. Other respondents, especially representatives of the shellfish sector put a high value on the work of the regulatory and legal team – saying they were 'unsung heroes!'

Seafish's approach of having both centralized office space and to support home-based operation of increasingly multi-skilled staff supports this efficient use of fewer human resources. Currently only 9 of 65 full-time Seafish staff are fully or partially committed to aquaculture support activities. ***To create further efficiencies Seafish could set up an Aquaculture Task Force; a multidisciplinary team with its own budget and additional staff resources. Species expertise based personnel would provide the best level of support for the industry, though this may also require strategic location of home-based staff to mitigate excessive travel requirements.***

Respondents had mixed opinions on Seafish promotional activities. Some felt that its promotion of seafood health attributes gained added-weight and credibility (i.e. not just another marketing strategy) because of its independence from industry. Others reasoned that most consumers would not be able to make this distinction; 'most place trust in supermarket brands whilst buying mainly on price'. Certification bodies with overlapping reputational integrity objectives were most positive toward these efforts. However more market-orientated respondents questioned the relevance of this role, which they felt is particularly well served today by branded suppliers, retailers and larger POs.

One respondent felt previous promotional work was not particularly well directed and that Seafish's influence on the supply chain should be a higher priority. Another felt maintaining the Seafish farm-to-fork linkage across entire value chains was vital – but also noted quality of promotion provision 'was a separate issue'. ***We suggest Seafish should take further steps to assess the value for money resulting from these activities – the workstream-2 KPI ('raised awareness of fish in the target market of fish is the dish') should be further refined to increase its precision.***

Some shellfish PO respondents felt shellfish was unfairly tarred with negative environmental perceptions associated with finfish (especially salmon) production because of the shared aquaculture tag; 'the positive environmental and health attributes of shellfish (omega-3 levels in crab brown-meat are as high as oily fish) are 'under-sold.' Others observed a tendency for consumers to associate seafood promotion messages with finfish alone. ***We recommend that promotion messages should refer to fish <u>and</u> shellfish rather than just seafood***

Seafish must also deal with major regional differences in Government support and ambitions for aquaculture. This is reflected in the content of multi-annual national plans which will help determine access to EU funding, particularly the European Maritime and Fisheries Fund (EMFF) successor to the European Fisheries Fund (EFF). On one hand the Scottish, N. Irish and Welsh governments have developed aggressive targets and pro-active strategies for aquaculture development in their plans.

This sits in contrast to a much less proactive (some respondents would say obstructive) role taken by England's Defra (not interviewed). Defra also has primary responsibility for engagement with Brussels in formulation of a UK-wide aquaculture strategy. At worst, this could limit the ambitions of other regions; it also establishes another potential conflict of interest for Seafish being answerable to all four administrations.

Opinion was divided on how Seafish should respond to these challenges. Smaller producers and their respective trade organization felt that it was Seafish's role to provide greater technical and promotional support to the (shellfish) sector – regretting the loss of Ardtoe - and as earlier indicated felt it was Seafish's role to lobby government on their behalf as levy payers (either not accepting, or failing to appreciate Seafish's statutory prohibition in this respect). Standards setters and responsible sourcing agencies were more likely to seek an overarching seafood support role for Seafish – consistent with their existing high level Protect, Promote and Inform objectives.

Shellfish producer organisations were more sanguine about the imposition of a statutory levy as their industry configuration makes it more difficult to collect voluntary levy. However they also felt that Seafish should channel some of the levy back to them – as their closeness to producers would allow them to use funds more efficiently – particularly where direct technical support is still required. They felt it would be good for Seafish to have a specific aquaculture strategy/ workstream as the requirements for the sector are very different to capture fisheries.

(ii) How could Seafish most appropriately invest in aquaculture technical and information needs and what are the potential gains from such investments?

Whilst the Ardtoe research facility supported high-quality research and trained a considerable body of aquaculture specialists, its commercial legacy in the UK is very limited despite considerable investment. The British Halibut Association (which subsequently became the British Marine Finfish Association) established by Ardtoe supported the pilot industry contributing to the establishment of Otter Ferry and Kames farms but there has been no significant UK growth in this or other invested sectors e.g. turbot, cod scallops & mainly mussels etc. These attempts at species diversification research were driven by perceived over-reliance on a few farmed species as well as climate change concerns over and above market realities. Several respondents felt diversification would be necessary in the longer term. Others disagreed, citing the lack of adverse consequences in terrestrial feedlot systems with no significant diversification. From a processor perspective farmed products are 'raw-materials' for whom 'diversification' is more aligned to potentials for value-added processing. One respondent recommended Seafish should focus on improving what they currently do, and on what is farmed already. ***Given this history of limited commercial success and high associated costs we suggest that further investment in species diversification research should not be a priority at the present time. The decline in availability of wild spat (mussels, oysters and scallops) is a major constraint facing the shellfish sector and addressing the technical needs of the shellfish sector could be a strategic area for Seafish R&D support.***

Despite its limited track record and relatively small economic impact, shellfish stakeholders felt Seafish should be promoting its potential 'as it is an area of potentially fantastic growth and potential future income'. Conversely another respondent felt that because of the levy structure Seafish already has a disproportionate role in shellfish aquaculture'. Another questioned the distribution of shellfish investment between Scotland and England whilst yet another observed that shellfish aquaculture support is limited to one staff-member with commercial practical experience. ***Further market and socio-economic research is required to evaluate the strength of growth-potential claims and, if proven, should then be followed up with further support focused upon facilitating and enabling the expansion of the shellfish sector.***

With the transfer of the Ardtoe facility, most Seafish support to 'near industry research' comes through grant funding and/or collaborative research projects. One respondent commented that

Seafish's own funding schemes in the past 'were too small to be worth the paper work' and would prefer to see channelling of more consolidate initiatives through SAIC. At the same time Seafish direct grant funding to SARF has more than halved in recent years - now contributing around 7% of their core-funding. However many respondents expressed an eagerness to collaborate with Seafish on research proposals e.g. linked to the forthcoming EMFF or other EU structural funds and Horizon 2020 calls. As Seafish levies are considered non-public sector (NPS) funds they can be used where matched funding is required giving Seafish even greater flexibility in its partnering choices. There were also requests for support in the identification and notification of up-and coming R&D projects and grant calls. Seafish could also use such a service to engage with appropriate industry partners on applied problem solving projects. Part of its role should be dissemination of results to appropriate end-users in non-technical jargon-free language.

One respondent recalled Seafish hosting aquaculture related technical-working groups as part of their discussion forums. Revival of these forums may represent a cost-effective outreach strategy consistent with lower expenditure on aquaculture.

Shellfish POs felt Seafish support in dealing with regulatory burden is one their most significant contributions to the sector e.g. interpreting environmental and public health legislation linked to depuration, Marine Spatial Planning Directive and other environmental Directives. Seafish should continue this assistance working with stakeholders to develop user-friendly protocols that support environmental compliance and economic sustainability.

Many of the smaller producer organizations with limited budgets raised the issue of potential direct funding from Seafish in order to support R&D. However statutory funding to producer organisations is generally not practiced in the UK for reasons of potential conflict of interest (discussed above). One respondent suggested that Seafish could circumvent this limitation by using only core-funds for this purpose. This amounted to 37% of total expenditure in 2013 but year on year the share is highly erratic (see Section 3.2). It is not clear exactly what the legal situation would be given NPS status of Seafish levies, however for reputational reasons we think it wise for Seafish to accept this norm. However other funding routes may be possible. For example the UK European Fisheries Fund (EFF) Programme Monitoring Committee (PMC)[35] operational program board was established to support producer organizations (but only for ring-fenced projects rather than core funding). One PO representative felt Seafish should institute grant schemes for industry organisations 'better placed to spend levy income and smaller agencies with a hands-on role can achieve cost savings'.

One respondent called for a holistic 'marine agronomy' approach, integrating the existing aquaculture species mix with other co-located industries e.g. seaweed, shellfish and finfish production. Another observed shellfish are the poor relation to salmon farmers in Scotland and the two often do not coexist happily pointing to a need for co-management solutions involving farmers and external agencies. Such strategies could exploit the benefits of polyculture for example by supporting alternating shellfish culture during fallowing of salmon sites. Certification bodies and E-NGOs were strong advocates of zonal-management to complement and overcome limitations of individual farm-level certification on the mitigation of environmental impacts. One cited the tripartite loch management agreements pioneered by the Scottish salmon farming industry as an example of best-practice that should be exported to developing seafood export countries to counter criticism regarding 'western' exploitation of the environmental goods and services of these countries. ***A similar approach, CLAMS[36] has been successively adopted by Irish shellfish farmers in more complex multi-stakeholder settings and is an option Seafish should consider applicability of this model in working with UK shellfish POs and other resource users.***

[35] http://www.marinemanagement.org.uk/fisheries/funding/documents/eff-pmc_terms.pdf

[36] http://www.bim.ie/media/bim/content/BIM_CLAMS_Explanatory_Handbook.pdf

Many respondents particularly those with shellfish interests valued the training opportunities formally provided by the Ardtoe facility. However vocational specialists interviewed were of the opinion that other providers were now serving this market. These included: universities, research institutes, sector training councils and in the case of some larger producers, internal schemes. Training is also a remit of the new Scottish Aquaculture Innovation Centre (SAIC). One respondent advised demand for formal qualifications e.g. SVQs is essentially restricted to finfish aquaculture with the small-scale and often owner-operated nature of many shellfish operations limiting the job market. ***Under these circumstances we advise that aquaculture vocational training should not be a priority area for Seafish in the immediate future, though it should continue to monitor provision, identifying needs gaps and market failures.***

Seafish's knowledge provision, especially its market intelligence and economic analyses were valued across a wide range of stakeholders and were perceived to be a highly cost-effective use of funds. Several described Seafish as a one-stop-shop for aquaculture related knowledge on both a local and international level. Seafish should maintain/consolidate its position as "go to" organisation for aquaculture information and could focus on becoming a web portal for the industry.

Generally, Seafish should look to position itself as a central aquaculture "hub" acting as a conduit - matching the needs of industry with appropriate solutions and information. This should include continuing practical support to the development of an English Aquaculture plan. Seafish should start an e-alert that is more focused on the aquaculture industry, together with a system that allows for continuous feedback from industry - so that issues can be flagged at an early stage. It should also look to represent the UK industry's needs on the new Aquaculture Advisory Council (ACC: the new EU body representing aquaculture in Europe as part of the reformed CFP), keep communication channels open with other industries and government authorities to fight for the aquaculture industry's interests (for example horizon scanning for proposed legislation and regulation issues).

Another initiative that could be considered would be to initiate an "Aquaculture Day" i.e. where once a year the focus is on everything to do with the industry - with the aim of both informing and engaging with the public to raise the industry profile but also to update industry with developments over the past year and looking to the near future. The format should be informal and inclusive.

5 OVERVIEW OF R&D

5.1 SUMMARY OF R&D ACTIVITIES IN THE UK

Since Seafish withdrew from direct involvement with the aquaculture sector following the sale of the Ardtoe Research facility the immediate emphasis turned to providing indirect support through the funding of aquaculture related R&D programmes. This was directed through the Scottish Aquaculture Research Forum (SARF) with an initial contribution of £200,000 in 2004-05 but diminished quickly having fallen to £50,000 by 2007. Whilst SARF is primarily focused upon Scottish issues, a lot of the benefits accrued across the UK especially with respect to the shellfish sector. In addition much of the research was commissioned in institutions across the UK as SARF looked to award contracts to the 'best' provider. This reflected a general move away from funding for the UK aquaculture primary production sector (see Section 3).

The assumption of funding SARF was that it was in the best position to assess UK R&D requirements and that by channelling funds through it would deliver the equivalent of up to eight times the value provided from the initial seed funding provided. A review of SARF's aquaculture R&D database gives an insight into the nature and scope of projects undertaken with records dating from January 1994 and includes projects that are still active and due to run until August 2019. A summary of the number and total cost of these is presented in Table 13. It should be noted that the time periods used to present the data provided below were chosen to include and reflect the involvement and then withdrawal of Seafish (at the end of 2003) from direct funding of UK aquaculture R&D although this is not meant to suggest there is any direct relationship between R&D aquaculture funding pre and post Seafish's ownership of the Ardtoe facility and rather it was down to the fact that the UK became more focused upon integrating their aquaculture R&D efforts into large multi-partner EC funded projects (for example less than 50 of the R&D projects started after 2004 accounted for a total of more than £200 million of the total cost of projects).

Table 13: SARF Aquaculture R&D summary for both UK and EC projects

Projects Started (by decade)	Total No. of Projects	Total Cost of Projects (in £millions)
1984	0	0
1994	284	£66.2
2004	561	£286.6
TOTALS	**845**	**£352.9**

5.2 LIST OF EXPERTS

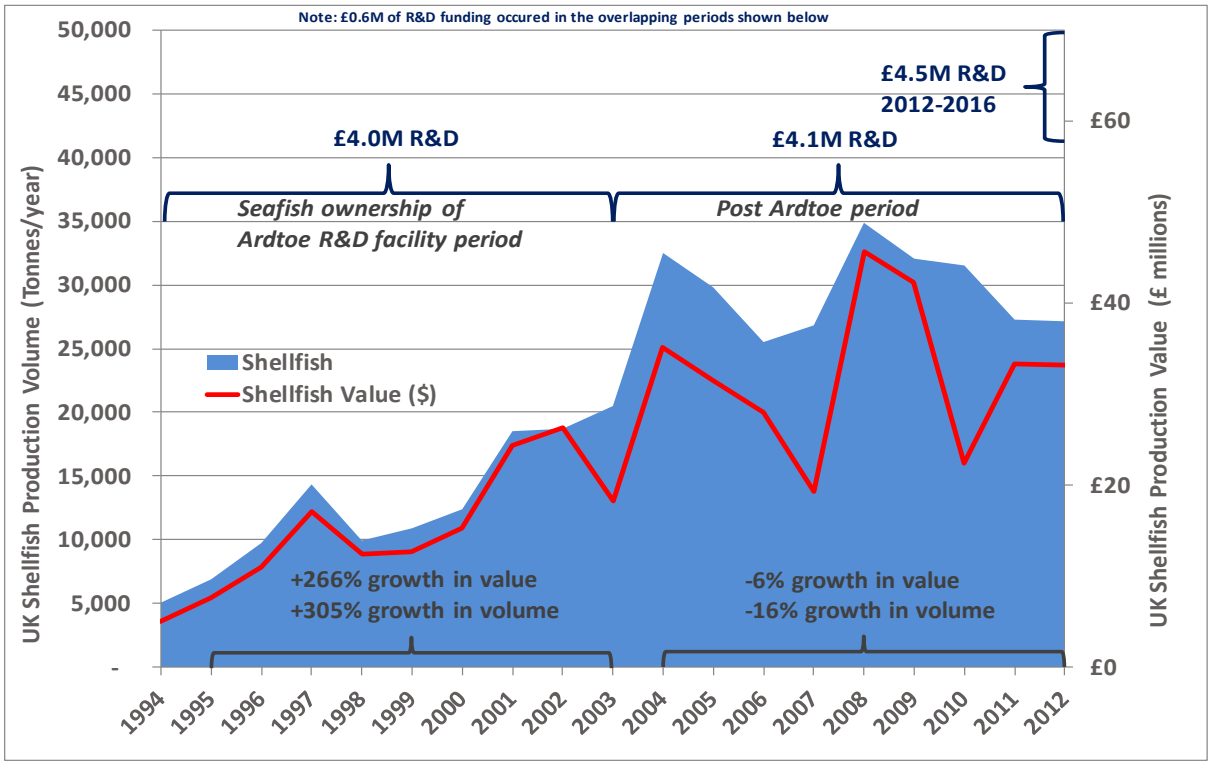
One of the ideas considered as part of this contract was to instigate a list of experts and their areas of expertise such that Seafish would be able to match enquiries for assistance with appropriate experts. To this end a question requesting a declaration of interest/involvement in such a list was included in the stakeholder questionnaire. However, following further discussions on the subject with Seafish, it was decided that this would duplicate an existing initiative coordinated by SARF and hence it would be more cost-effective and efficient if Seafish offers to provide the names of experts who expressed an interest in being involved to SARF so that they could be added to their database.

5.3 OPPORTUNITIES FOR SEAFISH

In terms of involvement in R&D opportunities, the potential for Seafish would appear to be limited and whilst it is assumed that any focus on this area would look to maximise potential returns for the UK aquaculture sector, the reality is that in order to leverage any funding provided by from Seafish, the nature of the projects supported is likely to take the form of a collaborative approach with other

EU partners in order to access external (EU) grant funding. As a first step it is important to assess what objectives Seafish would set and the associated criteria it would use to evaluate which areas and projects could be funded. Given the scrutiny that is likely to accompany any significant foray into funding R&D, one approach that could be used is to adopt a more commercial outlook and consider funding opportunities as an investment and expect all, or at least the majority, of projects that are looking for funding to identify the expected beneficial impact on industry. The rationale being that this would focus support on projects that should make a tangible difference to developing or sustaining the UK aquaculture sector which in turn should mean increased levy contributions for Seafish in the future. The need for adopting a more commercial approach can be seen from further analysis of the SARF R&D database. A review of shellfish related projects listed in the database shows that £13.3 million in funding was provided to facilitate 71 projects (with an additional 11 projects also being funded during this period but the cost of these projects was not given). The first one started in June 1997 and the last one is expected to be completed by June 2016 and although it is appreciated that not all of these projects were focused purely upon the needs and challenges of the UK aquaculture sector, it is not unreasonable to assume that the majority at least were undertaken on the premise that they would address issues relevant to the shellfish sector in general and that most would result in some beneficial effect trickling down to the UK shellfish industry and thus result in some marked gains (in value and volume outputs). Yet as Figure 4 shows, a snapshot of the sector at the beginning and end of each time period suggests that whilst the UK shellfish sector showed significant net gains in volume and value (+305% and +266% respectively) in the decade between 1994 and 2003 during which time some £4 million was committed in R&D funding, in the next period (2004-2012) the sector showed a net decline for both metrics (-6% in value and -16% in volume) despite an increase in R&D investment (£4.1 million). Looking forward further increases in R&D funding (£4.5 million) have been committed for the period 2012-2016 and whilst it is acknowledged that the trend has shifted from smaller UK centric R&D projects to large EC coordinated ones, it remains to be seen how much of a positive impact these will have on supporting the growth of the UK shellfish sector.

Figure 4: Growth and value of the UK shellfish sector and shellfish R&D expenditure 1994-2012



Proper analysis of the apparent lack of impact of R&D expenditure associated with the shellfish sector is beyond the remit of this report. However, the indicative disconnect between R&D funding and tangible gains in the development of the production sector are a potential cause for concern and may warrant further investigation. It may well be the case that current R&D efforts are focused on areas and issues which are of little direct or immediate benefit to the industry. However, perhaps it is not a coincidence that the two time periods presented in Figure 4 represent the change in emphasis for UK aquaculture R&D following the disposal of the Ardtoe facility in late 2003. A further indicator as to whether or not there was potential for the UK shellfish sector to perform better (in terms of growth in volume and value) during the period 2004 to 2012 can be seen from a review of unit prices since this should reflect potential market demand (and therefore production opportunities). Taking the 1994-2003 period, which coincided with significant growth of the sector, a snapshot of the unit price for farmed shellfish at the beginning and end of that period shows a decrease of 9% which, ignoring any distortions that may result from converting values from USD to GBP, does not seem an unreasonable outcome given the impressive growth performance of the sector (significant increases in production volume are usually accompanied by an associated (temporary) reduction in unit prices whilst market absorb the increased volume). In contrast the unit price appeared to rise slightly (+13%) during the second period (2004-2012) despite the sector recording a contraction (both in volume and value outputs), which suggests that whilst there was increased market demand for shellfish products, for some reason the production sector failed to respond to this opportunity which in turn raises the question what were the challenges that industry faced during that period that presumably prevented expansion of production and if these were R&D related issues then it would appear that the R&D efforts failed to adequately address the needs of the production sector and if the issues weren't R&D related, why was so much funding channelled into shellfish R&D projects?

5.3.1 Lessons to be learnt

The priority should be to assess which of the UK's established marine aquaculture sectors which lie within Seafish's remit has the most potential for development and then identify the challenges which they face and how these can best be addressed through a range of R&D related measures. A strong appreciation of the reasons behind the success (and failures) of other well established species and sectors within the industry can provide useful insights. The salmon sector provides a useful blueprint on how a sector can thrive with the right support provided at the right time. As it developed its needs changed from mainly technical issues to a market orientated focus. Key to the salmon sector's success was their ongoing ability to find technical solutions to address market issues (this was often driven by Norway where the government invested huge sums over an extending time period to support the industry's development). In particular the R&D focus was kept on solutions which would improve production efficiency (i.e. would result in a lowering of production costs) and this in turn enabled the sector to cope with the negative effects of cyclical price drops which were the temporary side effect of increasing production volumes. This ability allowed concurrent market development efforts to take effect so that with time, the sector returned to profitability. This cycle was repeated until salmon became established as a commodity product at which point the sector became more stable and capable of responding to market fluctuations. The Mediterranean bass and bream sector also had to overcome significant technical issues which it faced as an emerging sector in the 1990's however, unlike the salmon sector it failed to focus sufficiently on developing the markets such that as technical constraints were solved and production outputs increased with resulting price drops as the market reacted to what should have been a temporary oversupply problem, the sector was unable respond with the required technical (efficiency) gains thus condemning it to repetitive price collapses where the only instrument available to producers to combat these crises was to (temporarily) lower production output. These two examples demonstrate how important it is to maintain a focus on, and capability for, addressing both technical and market related challenges. However as both the nascent UK cod and halibut farming sector proved, even when the potential for developing new species looks promising, there can be no

guarantee of long term success but that should not be used as justification for withholding initial support from other opportunities in the future.

5.3.2 Horizon scanning

One of the issues that was highlighted through the stakeholder consultation process was identifying what role and contribution Seafish should target in its support for the UK aquaculture sector. Once a species sector is established, it is highly likely that the trade/producer organisation which represents it will want to play the major role in steering its future course. Such an approach is not surprising and suggests Seafish should focus its efforts from the production perspective on emerging species which, by definition, will be small-scale and fragmented yet in need of disproportionate levels of support. The shellfish sector epitomises such a scenario and whilst there is clearly potential for growth, the sector is also faced with significant challenges which include production related ones (e.g. the availability of seed and increasing disease risks) but perhaps more importantly, also include matters which they are powerless to address (e.g. legislative and regulatory issues). This highlights the importance of a holistic approach to supporting a species sector whereas providing R&D support in isolation is unlikely to result in the development of a new or emerging sector.

An outline of how such an approach could be applied under a loose interpretation of R&D related support is given below using the UK shellfish sector as an example:

- Resource related: most farmed shellfish are filter feeders and hence food availability (phytoplankton) will play a significant role in the production cycle yet there is little emphasis placed upon investigating the dynamics and extent of this resource. Establishing the carrying capacity of potential and existing sites around the UK in conjunction with specialist providers (e.g. SAMS) through remote sensing and modelling would provide invaluable information to both new and existing producers and provide a key metric for the industry. The French shellfish sector is an example of how ignoring this issue can adversely impact upon long term sustainability as many shellfish producing regions are now suffering from poor performance due to the high degree of exploitation of many sites and bays which in turn has resulted in food availability becoming a significant limiting factor that is undermining the competitive advantage that should result from their higher ambient seawater temperatures.
- Market research: a report[37] commissioned by the Shellfish Association of Great Britain looked to complete a value chain analysis for the Pacific oyster in the UK. However, it was apparent that there are significant gaps in the knowledge of the UK market which, if addressed, could perhaps provide additional opportunities for UK producers. Work was done some time ago via the hyperbook series to provide some useful insights into the value chain and this information should be updated to provide a current reference work. Such information is invaluable to assess the impact and value of aquaculture to the wider economy and can be used to estimate economic measures such as Gross Value Added (GVA).
- Market intelligence: up-to-date information on supply and demand related issues affecting key shellfish markets such as France would be of value to the UK producers. The supply shortages resulting from the oyster herpes virus had a significant impact on increasing export prices over the past five years and French efforts to mitigate the impact of the virus need to be closely monitored due to the potential implications of an oversupply situation when the situation is eventually resolved. Seafish could provide a portal for market prices and volumes.
- Boosting production: The objective for boosting production should include a strong emphasis on increasing operational efficiency. Given how varied conditions can be from site to site there is a need to establish a benchmarking system that will provide insights into best practices and the suitability of different technologies and systems. Seafish is well placed to act as a coordinator and facilitator for these types of programmes. Other opportunities include support for new

[37] http://www.dardni.gov.uk/pacific-oysters-issue-paper.pdf

production initiatives; an example is the renewed interest in boosting the production of native flat oysters in England, Scotland and Northern Ireland using novel approaches and new technology. This particular project is currently trying to secure funding and if successful is set to provide a significant boost to the shellfish sector with production target of 10,000 tonnes by 2020.

- Value-add: initiatives involving applied R&D could include a focus on what factors influence the quality of the final shellfish product that is sold to market (e.g. in France oysters are priced based upon their perceived quality and meat content). Subsequent collaboration with downstream sectors of the seafood industry could then help to build brand recognition. Scottish mussel producers have already been successful in this area and the quality of their product has resulted in them being able to obtain a premium price second only to the French bouchot mussels[38]
- Industry advocate: this should focus on defending the sector's interests and right to be treated fairly and equally along with other stakeholders (e.g. spatial planning). In addition whilst the public focus is often directed at the negative impacts of aquaculture, there is little information or appreciation of the value derived from environmental goods and services that are provided to the marine environment by the shellfish farming operations. Two key roles are water filtration and nutrient cycling and work done recently in Jersey on this topic suggests the value of these can be significant[39]. This subject matter is specifically identified as an area for R&D funding under the Horizon 2020 programme.
- Minimising the impact of proposed legislation and regulation: whilst this subject matter does not specifically come under R&D, the outputs arising from some R&D work steams could be used to try to ensure that an informed, evidence based opinion can be provided by Seafish in any discussions or consultations relating to proposed introduction of new legislation or regulation in order to try to prevent unnecessary, discriminatory or disproportional to the shellfish farming sector.

All of the above reinforce the idea that Seafish could act as a hub for identifying and coordinating interactions between various stakeholders but with the overriding objective of boosting aquaculture production in a sustainable manner.

Table 14: Horizon 2020 aquaculture funding opportunities

Topic	Call title	EU funding
Consolidating the environmental sustainability of European aquaculture	Sustainable Food Security	EUR 7.5 million
Forecasting & anticipating effects of climate change on fisheries and aquaculture	Blue Growth: Unlocking the potential of Seas and Oceans	EUR 5 million
Scientific basis & tools for preventing and mitigating farmed mollusc diseases	Sustainable Food Security	EUR 4 million
Supporting SMEs efforts for the development-deployment and market replication of innovative solutions for blue growth	Horizon 2020 dedicated SME Instrument Phase 1 -2014	EUR 50,000
Supporting SMEs efforts for the development-deployment and market replication of innovative solutions for blue growth	Horizon 2020 dedicated SME Instrument Phase 2 -2014	EUR 0.5-2.5 million
Supporting SMEs efforts for the development-deployment and market replication of innovative solutions for blue growth	Horizon 2020 dedicated SME Instrument Phase 1 -2015	EUR 50,000
Supporting SMEs efforts for the development-deployment and market replication of innovative solutions for blue growth	Horizon 2020 dedicated SME Instrument Phase 2 -2015	EUR 0.5-2.5 million

[38] Views expressed by chefs in the food service sector when surveyed as part of a value chain analysis in Jersey 2014

[39] Water filtration values were estimated at £117 million and Nitrogen cycling at up to circa £335, 000

5.4 RECOMMENDATIONS

Aim for collaborative research projects and public-private partnerships leveraging EU funding where possible

Increase aquaculture support capabilities – allocate an annual R&D budget and use an enhanced multi-disciplinary aquaculture team (an "Aquaculture Task Force") to help establish industry's R&D priorities

Provide assistance to companies wanting to access European funding programs. Publicise both proposed research projects as well as their results to industry through an e-alert approach so that they are aware of impending actions and can potentially get involved where appropriate. Disseminating results using non-technical jargon would also be of benefit to industry.

Prioritise the shellfish sector for support but in a holistic approach. The EU project Euroshell (FP7 project) provides useful background[40] on current EU led efforts to address the needs of the shellfish sector.

R&D efforts must focus upon industry needs and academic involvement should be as a conduit for achieving those objectives and not become the endpoint in itself. Industry shall continue to have need of scientific inputs and results to address the key challenges it faces. However, from the information presented in Figure 3 it would suggest that over the last decade and with respect to the shellfish sector at least, R&D spend and expansion of the industry (i.e. growth in production output) were not aligned leading to the conclusion that either the industry was not significantly constrained by the R&D issues targeted during those years or the R&D carried out has yet to filter down to benefit industry. In either case there is a need to ensure that future R&D spend is properly scrutinised to ensure tangible commercial benefits to industry.

R&D projects that can potentially add any value to existing revenue streams should be recognised and given merit. Examples could range from investigations into uses for aquaculture by-products and waste (e.g. oyster shells – use as potential agricultural fertilisers) to novel packaging or treatments which could potentially extend shelf life of live/fresh products. Even R&D into the viability of potential collaboration with other local industries (e.g. tourism; product tasting opportunities) might warrant consideration.

Projects that should be avoided (in terms of funding support) include pseudo industry orientated themes such as investigations to determine the cause of variations in natural spat fall. Whilst this is an important issue and an increasing issue specifically affecting the shellfish sector, using limited aquaculture R&D funding to investigate it is both inappropriate and of little value to the industry since the results obtained are unlikely to provide any practical and timely assistance in meeting industry's needs. Instead it would be better to just use the funds as direct support to increase hatchery capacity so that sufficient high quality seed is available for shellfish on-growers.

Introduce a benchmarking scheme which would provide anonymised performance data from one or more of the main industry sectors. This approach could help clarify and identify areas where assistance is needed and help prioritise support requirements.

The production processes which underlines all aquaculture operations are a potential gold mine of information, yet 99% of what data could be captured and analysed is ignored, overlooked or dismissed. The greatest contribution that the research sector could provide at this stage of the industry's development would be to focus (through data mining) on identifying key relationships, mechanisms and interactions that impact on the production process so that the industry could benefit from informed and objective insights which could eventually lead to emerging sectors of the aquaculture industry being based on science and not art.

[40] http://www.ebcd.org/pdf/en/494-Report_-_Euroshell.pdf and http://www.ebcd.org/pdf/en/494-Agenda_EUROSHELL-AAC.pdf

All of the above recommendations are meant to contribute towards positioning Seafish as the "go-to" source for aquaculture related information and support (including applied R&D). These would be delivered through a collaborative approach that maximises the potential for online delivery but is backed by experienced, knowledgeable and dedicated aquaculture team that is sufficiently resourced to deliver these objectives.

Key lessons of relevance for the future support of the UK aquaculture sector by Seafish

- In the absence of the required infrastructure and expertise needed to provide direct R& D support; Seafish is best placed to act as a "hub" drawing together entities across the seafood sector to address the R&D needs of the industry.
- There is only one stakeholder group that is in a position to state what R&D or related support the aquaculture industry needs – and those are the producers. This holds true for most if not all aspects of support, bar perhaps the issues of legislation and regulation and even then producers are best placed to determine what is not needed.
- The definition of R&D should be extended to cover the provision of expert "on the ground" advice to the aquaculture sector by Seafish personnel with extensive, hands-on experience. There is a clear need for such a service particularly for small scale independent producers who tend to operate in relative isolation. This role is similar in nature to the one which many of the specialist marine hatchery feed companies sought to provide to their customers in the Mediterranean back in the 1990's and which proved an invaluable method of identifying issues and disseminating information directly to producers.
- Significant amounts of EU grant funding are available under the Horizon 2020 programme, the EMFF and efforts should be made to leverage Seafish funding by accessing such resources.
- There needs to be recognition and acceptance that supporting the R&D needs of the aquaculture sector is unlikely to provide immediate returns. This could result in issues of proportionality in terms of the allocation of levy funding however historical support of the aquaculture sector by Seafish has clearly been effective and provided long term gains across the industry.

6 PRODUCTION FORECASTS & IMPACT ON UK

6.1 PROJECTIONS FOR SPECIES PRODUCED OR IMPORTED INTO THE UK

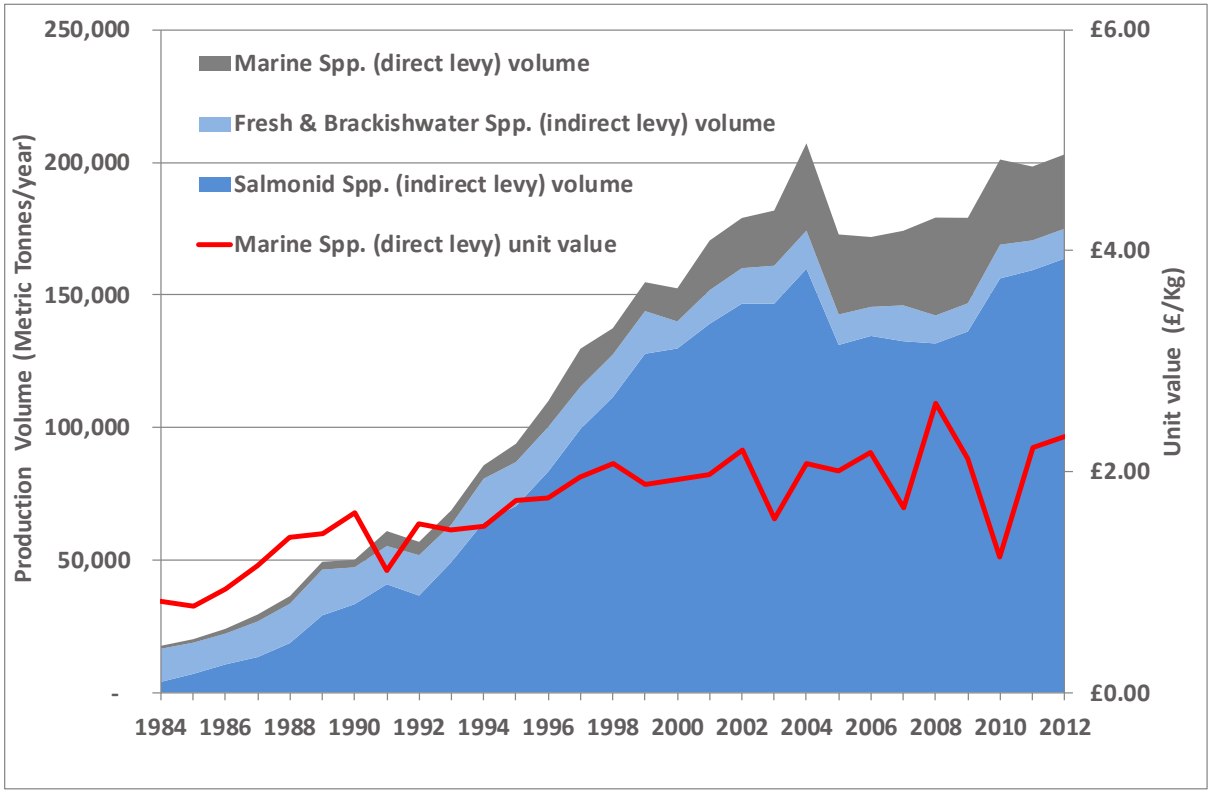
The rationale behind reviewing production forecasts is to gain an insight into potential changes in farmed seafood supplies to the UK market. The value is of being aware of production projections is threefold:

- knowledge of the production outlook for the UK aquaculture sector enables better planning and targeting of appropriate Seafish support policies
- it highlights potential market supply related issues (indicating potential threats or opportunities for the UK aquaculture sector)
- it can provide an early indication of any potential impacts on future levy contributions to Seafish

6.1.1 Review of historical UK data

Whist production forecasts are generated from time to time by relevant authorities and industry bodies on a national and international basis it is unclear how reliable and specific these publications are particularly when small and medium scale aquaculture operations are often subject to regional development challenges and constraints. Hence it is proposed that in the first instance, a review of UK aquaculture historic production related data is the best approach for providing a useful indication of recent trends and immediate indications for the potential outlook for the sector. Figure 5 gives a breakdown of UK aquaculture classified by production environment (fresh, brackish or marine waters) and levy contribution status (direct levy contributors and indirect levy contributors[41]).

Figure 5: UK aquaculture production by environment and levy category



[41] Indirect levy contribution is via the tariff applied to fishmeal which is used to produce feeds for marine fish species.

The largest component of the UK aquaculture sector is the salmonids and specifically the production of Atlantic salmon which accounted 162,600 tonnes (81%) of the total UK production of just over 203,000 tonnes in 2012. By contrast marine species, which contribute directly to the levy, accounted for only 14% of the total production volume. Analysis of the longer term performance (over the 28 years period shown in Figure 5) shows that whilst the marine species and salmonid sectors achieved reasonably similar compound annual growth rates (CAGR) of circa 12% and 14% respectively, the marine species sector achieved the highest growth in terms of value and unit value (16% and 3.7% respectively). This positive long term performance trend of the marine species sector suggests the outlook could be promising which is further reinforced when the data is broken down into shorter time periods (1984-1993, 1994-2003 and 2004-2012) as this shows it is the only sector which has a positive increase in unit values over the three time periods (78%, 4%, 12%). However, these positive attributes have recently been undermined by a 15% fall in production volume in the period 2004-2012. This decrease could be down to any number of issues such as; increased losses due to disease, a reduction in production capacity or a shortage of seed but closer examination shows that this downturn in production applied to eight out of the ten species in the marine species category during this period and included both shellfish and finfish species which suggests there may have been a common or non-species specific factor behind the fall in production volume.

6.1.2 Projections and forecasts

Production forecasts are based upon key drivers affecting the industry in general combined with the specific aspiration for the aquaculture sector at a national or regional level. Overarching general drivers include:

- Population increases (including inward migrations)
- Per capita increases in consumption
- Alternative supply sources (which includes wild fish landing and access to imports)

UK aspirations for aquaculture are expected to be encompassed in the Multiannual Aquaculture National Plan (MANP's) that EU member states are required to submit as part of the reformed Common Fisheries Policy (see Section 7). Only Wales and Scotland have so far published specific aquaculture target volumes with the former aiming at a doubling of both fish and shellfish production (to 2000 and 16000 tonnes respectively by 2020) whilst Scotland has declared a target of 210,000 for marine fish (an increase of 28%) and 13,000 tonnes for shellfish (a doubling from 2012 levels) with particular emphasis being placed on increasing mussel production outputs.

On an EU level, no specific aquaculture production targets have been cited for the region however aquaculture has been identified as one of the five main sectors with high potential for sustainable growth under the Blue Growth strategy and the focus for realising this opportunity shall be channelled through the reformed Common Fisheries Policy which will target:

- Reducing administrative burdens
- Improving access to space and water
- Increasing competitiveness
- Exploiting competitive advantages due to high quality, health and environmental standards

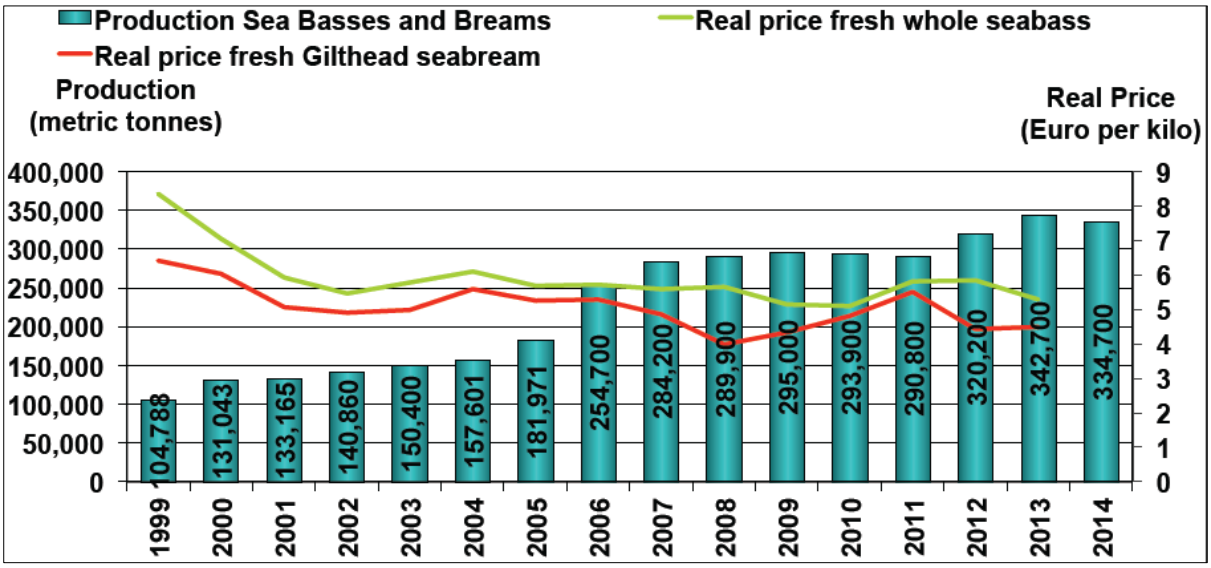
Obtaining these objectives will be supported through co-financing using European Structural and Investment Funds specifically the European Maritime and Fisheries Fund (EMFF) and National funding from Member States. The EMFF program runs from 2014-2020 and the UK's allocation is EUR 243.1 million which can be used to finance fisheries and aquaculture related projects.

On a global outlook, aquaculture is expected to become an increasingly important source of food (protein) production. Projections for production levels vary from different sources but all agree that aquaculture production will continue to grow but at a reduced rate compared to previous decades yet may be unable to satisfy the supply gap created by key drivers such as population growth,

increased per capita consumption and stagnating wild fisheries landings. Already some elements of the baseline scenarios from the earlier publications[42] have been surpassed and one of the most recent publications[43] follows the trend of revising projections upwards and suggests that aquaculture will increase by some 50% from its 2011 output to reach 93 million tonnes per annum by 2030 which would put it on equal footing with wild fish landings.

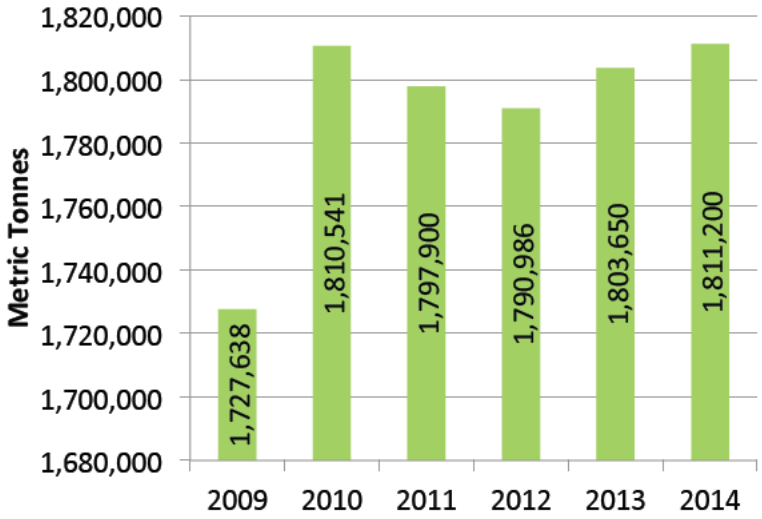
Short term production projections for selected species of interest to Seafish (in terms of levy contributions) show that supplies of bass and bream are unlikely to increase in the short term due to ongoing credit and oversupply issues affecting the sector. Farmed mussels appear to be returning to previous highs on a global basis however a number of adverse issues have been appearing on the horizon for EU & UK production in 2014 with a new disease outbreak having devastated mussel stocks in France and natural spat falls in the UK having hit an all-time low.

Figure 6: Historical production data and prices for bass and seabream & forecasts to 2014



Source: R. Tveteras. "Fish Production Estimates & Trends, 2013-2014". GOAL 2013

Figure 7: Historical global production of mussels & forecast to 2014



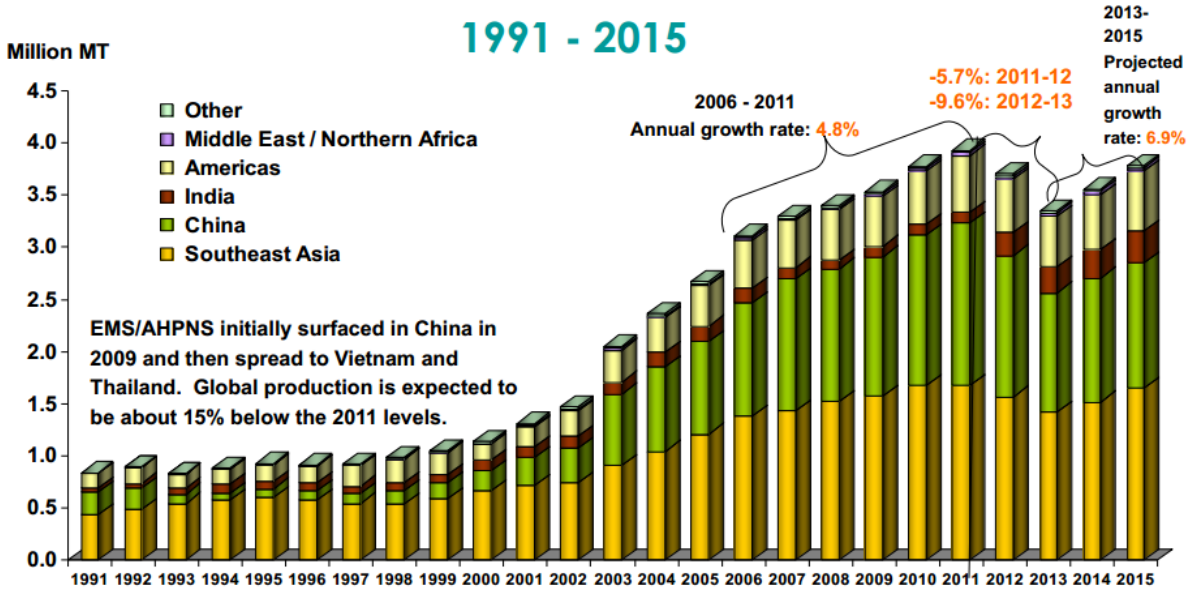
Source: R. Tveteras. "Fish Production Estimates & Trends, 2013-2014". GOAL 2013

[42] "Outlook for Fish to 2020, Meeting Global Demand". IFPRI and WorldFish Center, 2003

[43] "Fish to 2030, Prospects for Fisheries and Aquaculture". World Bank 2013

Farmed shrimp, which is one of the biggest import contributors to the Seafish levy, is beginning to recover following the significant drop in global production as a result of the EMS disease outbreak.

Figure 8: Historical global production of farmed shrimp & forecasts to 2015



Source: J. Anderson (2013) "Shrimp Production Review" GOAL 2013

On the whole it is evident that, regardless of potential (temporary) setbacks from disease outbreaks, aquaculture production is destined to continue to grow for all the major species currently being cultivated and it is inevitable that aquaculture is the future for seafood supplies with the success of the main species providing impetus and interest for additional species to be targeted as candidates for production.

6.2 HIGH LEVEL IMPACT ASSESSMENT

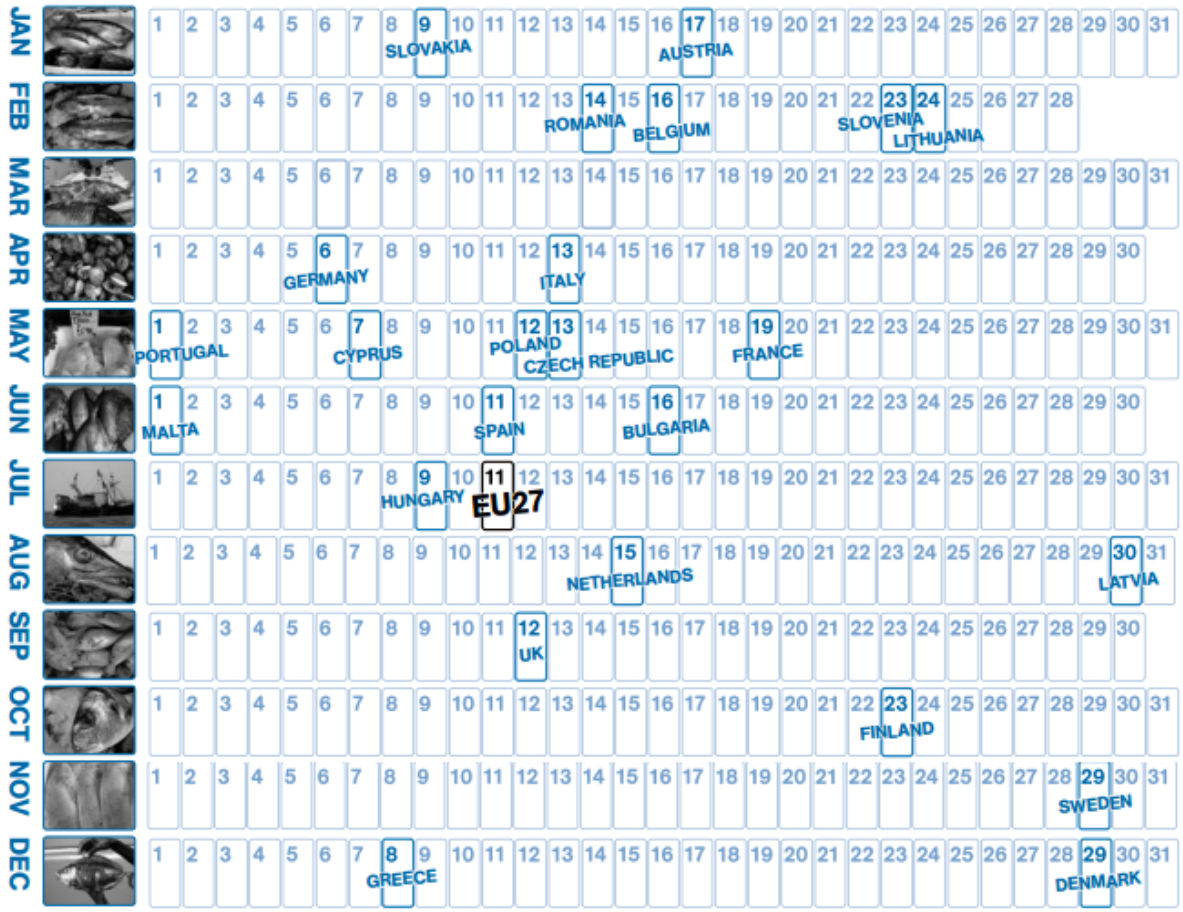
The seafood supply outlook and its potential impact for the UK can be broken down into regional (which includes domestic/UK and intra-EU) and international supplies. The reason for this distinction goes deeper than just the origin of supplies, as it has to do with the issues of a level playing field where the EU sets higher standards for its producers than it requires for exporters targeting access to its market, in other words the EU produce seafood at one standard but consume at another (lower) one[44]. This paradox means that the EU is going to be an attractive market to foreign seafood producers and suppliers since the burdens placed on EU producers means they will seldom be able to compete with imports. There are ample grounds for concern regarding an un-level playing field[45] ranging from food safety and feed ingredients to environmental and animal welfare issues on top of economic transgressions (direct subsidies by some governments to support their seafood sectors); all of which equate to third countries not being subject to the same terms and conditions (and associated costs) that have to be met by EU producers. The situation is further complicated by the fact that addressing this imbalance is not particularly in the interests of authorities; at EU level the policy of free trade appears to take precedence over ensuring fair access and competition for seafood products supplied to the EU market. Even at National level there is an apparent inability to address these issues; in the UK for example, Seafish gains most (approx. 80%) of its levy income

[44] European Parliament Hearing, Committee on Fisheries March 2008

[45] http://www.feap.info/Docdownload.asp?ID=C80C84C1CC07060401E6
http://www.ebcd.org/pdf/presentation/190-Mr_Chaperon.pdf
http://www.eatip.eu/Docdownload.asp?ID=B488944A4D07060000CD

(circa £6 million) from seafood imports and hence it has no incentive to "rock the boat" yet when there is a call for increased support to the UK aquaculture industry, the issue of proportionality surfaces which highlights that the levy needs to be allocated in proportion to approximate sources and contributions thus ensuring domestic producers are hit by a double whammy scenario.

Figure 9: The date EU Member States run out of domestic fish supplies in 2014



Source: New Economics Foundation (2014). "Fish Dependence – 2014 update"

Table 15: Shrimp imports into the UK (000's tonnes) 2008-2013

Country of Origin	2008	2009	2010	2011	2012	2013
Thailand	9.8	13.2	17.0	19.6	20.7	15.2
Canada	8.1	8.3	9.1	9.4	10.2	11.3
India	8.3	8.6	8.1	8.4	8.6	10.4
Denmark	9.6	9.8	9.4	8.2	7.3	7.9
Bangladesh	4.9	6.8	6.1	7.6	6.3	7.3
Viet Nam	3.8	5.5	5.8	7.7	5.8	7.3
Iceland	8.2	7.9	7.6	6.1	6.1	4.4
China	1.6	1.7	3.2	3.5	4.3	4.1
Indonesia	8.7	7.6	8.0	5.9	3.1	3.9
Others	17.2	15.4	11.7	13.9	13.4	13.2
TOTAL	80.2	84.9	86.0	90.4	85.8	85.0

Source: HMRC

Looking to the future, there are two potential developments that could change the supply profile of seafood products in the EU. The first is if the Commission takes action to formulate a European supply model for seafood which would include transposing the increasingly stringent EU rules that govern production onto those countries from which the EU imports. The second possibility is that other markets may become more attractive to some suppliers who currently export to the EU due to the strong economic growth that is being recorded in some countries. This scenario has already been seen in the farmed shrimp sector where, as a result of significantly reduced production levels following the outbreak of EMS disease[46], suppliers focused upon the Chinese market due to better profit margins. OECD projections suggest this trend could be set to accelerate with projections suggesting that by 2020 the Asia-Pacific region will have more middle class consumers than all the other regions combined and by 2030 it will hold two-thirds of the world's middle class consumers. More importantly this means greatly increased spending power in the region and research has shown that when incomes rises there is an associated shift to a greater protein content in the diet. With the added health benefits associated with seafood, it is highly likely that seafood suppliers will switch attention from Europe and North America to the Asia-Pacific region which already has a strong association with eating seafood.

Table 16: The emerging middle class in Asia

	2009		2020		2030	
	Middle Class No. ($x10^6$) & global share (%)	Middle Class Spending power[1] ($x10^6$) & share (%)	Middle Class No. ($x10^6$) & global share (%)	Middle Class Spending power ($x10^6$) & share (%)	Middle Class No. ($x10^6$) & Global share (%)	Middle Class Spending power ($x10^6$) & share (%)
N. America	338 (18%)	5602 (26%)	333 (10%)	5863 (17%)	322 (7%)	5837 (10%)
Europe	664 (36%)	8138 (38%)	703 (22%)	10301 (29%)	680 (14%)	11337 (20%)
C. & S. America	181 (10%)	1534 (7%)	251 (8%)	2315 (7%)	313 (6%)	3117 (6%)
Asia-Pacific	525 (28%)	4952 (23%)	1740 (54%)	14798 (42%)	3228 (66%)	32596 (59%)
Sub Saharan Africa	32 (2%)	256 (1%)	57 (2%)	448 (1%)	107 (2%)	827 (1%)
Middle East & N. Africa	105 (6%)	796 (4%)	165 (5%)	1321 (4%)	234 (5%)	1966 (4%)
World	1845 (100%)	21278 (100%)	3249 (100%)	35045 (100%)	4884 (100%)	55680 (100%)

[1]Middle class (MC) spending in millions of 2005 PPP dollars
Source: The Emerging Middle Class in Developing Countries, OECD 2010

6.3 OPPORTUNITIES FOR SEAFISH

It is clear that Seafish derives a high proportion of its levy (circa 80%) from seafood imports particularly warm water prawns. If the supply of seafood products including those from aquaculture fail to continue to grow to match increasing demand then it is highly likely that the initial trade flow shift, that was seen in the shrimp sector as a result of unexpected supply limitations resulting from EMS, are likely to spread to other sectors and products particularly given the growing dominance of the middle class sector in the Asia-Pacific region. This means that taking a long term outlook, a

[46] http://www.gaalliance.org/cmsAdmin/uploads/goal13-nikolik.pdf

significant (critical) portion of levy income is potentially under threat in the future. The issue facing Seafish is that if this is a real possibility then it needs to act now to address the issue since it would take many years of forward planning to enable any focus on alternative sources to plug this potential funding gap to actually come on stream.

The solution indicated above effectively touches upon a food security approach where Seafish, in line with national and EU strategies, would look to support the development of domestic production capacity (with aquaculture being the only sustainable option from the fisheries sectors) or, support the development of UK owned aquaculture production in other countries similar to the approach taken by many Middle Eastern administrations which have limited resources to develop their own domestic production capabilities. The latter option is likely to be highly contentious and probably outside the authority of Seafish hence the only real option to find a sustainable solution is to support the development of the UK aquaculture sector.

6.4 RECOMMENDATIONS

It is important that the initial focus is targeted on existing opportunities where there is a clear short term opportunity so that some positive results can be generated. An example would be the shellfish sector for the following reasons:

- The basis already exists for building a premium brand product
- It is not cost-effective to transport live shellfish over long distances so the threat from external supplies is limited to imports of value added products
- Market opportunities already exist due to an on-going shortfall in supplies to the French market
- Initiatives are already underway to present development opportunities for the flat oyster

In line with recommendations elsewhere in this report (Section 2, 4 and 5) it is clear that Seafish need to increase its aquaculture related resources so that it is capable of addressing and delivering the required support to facilitate and provide an enabling environment to the UK aquaculture sector.

Diversification: review the potential for integrated approaches (IMTA) as well as co-production of new species alongside existing species. New candidate species or market opportunities could be based upon cultural factors associated the inward migration of people from other countries (e.g. trout farmers could consider carp production and fish producers could consider targeting the Chinese communities in the UK who favour purchasing live fish).

Foster and encourage cross sector involvement; i.e. production and downstream sectors on the basis of sustainable sourcing initiatives and carbon footprint issues.

Consider collaboration with other industries to create production opportunities and a win-win scenario for both sides. Examples include the wind and mussel farm pilot project that Seafish supported as well as the impending construction of several new power generation plants in the UK[47] which provide potential warm water production opportunities.

Where applicable do not try to re-invest the wheel – look for successful examples of how other countries have turned around their aquaculture industries[48]

[47] http://www.energy-uk.org.uk/energy-industry/electricity-generation.html

[48] http://www.seafish.org/media/636879/eacgsept2012_anewzealandstory.pdf

Key lessons of relevance for the future support of the UK aquaculture sector by Seafish

- It is clear that market opportunities exist to support the expansion and development of the UK aquaculture industry
- The key to success, as evidenced by the Scottish aquaculture sector, is to have an enabling environment so that opportunities can be seized and companies can focus upon their core activities.
- The future development and sustainability of the UK aquaculture sector will need the right mix of discussion and actions so that key issues and constraints can be identified and then addressed.
- Need to expand and develop a dedicated aquaculture team that can interact with and provide a focus for supporting efforts to expand aquaculture production
- Direct "on the ground" interaction with the aquaculture sector is vital to ensure a targeted and realistic feedback
- Seafish should seek to position itself as the key national representative of the UK aquaculture industry through participation on the Aquaculture Advisory Council – although according to the European Aquaculture Technology and Innovation Platform (EATiP) am interim executive committee has already been adopted[49]

[49] http://www.eatip.eu/Default.asp?CAT2=550&CAT1=489&CAT0=60&STA=1&IM=11&COM=635&MOD=0&SMD=0&ID=0

7 UK NATIONAL POLICY STATEMENTS ON AQUACULTURE

7.1 BACKGROUND

The driver behind each national administration developing a policy on aquaculture stems from the EC's recognition that aquaculture is one of five potential maritime related sectors that are capable of driving sustainable growth in the economy. This reflects a sea change in approach as previously the Commission has looked to continue focusing support on sustaining the capture fishing sector (through reducing catches using the instruments of scrapping capacity and imposing quotas). However, as is often the case, this approach looked to the past instead of looking to the future and supported a sunset industry rather than a sunrise one. This issue was partially recognised and addressed by the Commission in 2002 when they published "A strategy for the sustainable development of European aquaculture" however this failed to provide the desired results and whilst aquaculture continued to grow on a global basis, within the EC it stagnated and declined. Recognising this failure, the Commission published a new communication in 2009 entitled "A new impetus for the Strategy for the Sustainable Development of European Aquaculture" and these efforts were then further enhanced in 2013 by the Commission's focus on aquaculture[50] as part of the reformed Common Fisheries Policy (CFP) and its associated financial instrument the European Maritime and Fisheries Fund (EMFF). As part of this process and in order to receive associated funding from the EMFF, Member States were invited to submit multiannual national plans (MANP) covering the period 2014-2020

7.2 SCOTLAND

Scotland, with its strong association with aquaculture, embraced this development and through Marine Scotland it refocused the existing Ministerial Group on Aquaculture to become the Ministerial Group for Sustainable Aquaculture (MGSA). Following extensive consultations with industry, the MGSA set, as its MANP, the target of increasing marine finfish production to 210,000 tonnes (from 164,380 tonnes in 2012) and shellfish production (especially mussels) to 13,000 tonnes (from 6,525 tonnes in 2012). In order to achieve this, the MGSA has set up seven Working Groups which cover all the key areas needed to support the delivery of such a plan.

7.3 WALES

Wales released their 'Marine and Fisheries Strategic Plan' in November 2013 which sets out their strategy for achieving sustainable growth in the marine and fisheries sectors. Ambitious plans for aquaculture were included which targets the production of finfish rising from 761 tonnes (in 2012) to 2,000 tonnes by 2020 and shellfish from 8,376 tonnes (in 2012) to 18,000 tonnes in 2020.
The first step in achieving these targets will be through an initial Action Plan executed during 2014 which will consist of four thematic objectives:

Objective 1: A planned approach to guide the management of Welsh seas
Objective 2: Encourage sustainable, local and shared management of all marine activities in Wales
Objective 3: Ensure better evidence and understanding of our marine life
Objective 4: Increase profitability in the marine and fisheries industry.

The action plan is currently in draft-format and is expected to be finalised later this year.

7.4 ENGLAND

A consultation process was finally initiated by Defra which closed on 12th May 2014 and sought views on a discussion paper and associated supporting documents.[51] Whilst the document contains no

[50] http://ec.europa.eu/fisheries/cfp/aquaculture/official_documents/com_2013_229_en.pdf

[51] https://consult.Defra.gov.uk/fisheries/european-maritime-and-fisheries-fund-in-the-uk

clear statement of aquaculture production targets for England it implies that, based upon the targets of Scotland and Wales that the UK is targeting growth projections of approximately 27% in finfish production by 2020 and 66% increase in shellfish production by 2020. It is assumed there will be a clearer statement on the aquaculture production targets for England following an analysis of the responses from the consultation process.

7.5 NORTHERN IRELAND

In April 2013, the Northern Ireland Agri-Food Strategy Board published the "Going for Growth" Strategy. The Strategy which includes more than 100 recommendations is aimed at accelerating the growth of farming, fishing/aquaculture and food and drink processing to 2020 and beyond. Whilst it doesn't specifically mention individual targets for aquaculture it does quote that the 2010 value for wild fish landings was £20 million whilst aquaculture "landings" were £10 million with the aquaculture production coming from 81 licensed fish farms on 90 sites of which 58 were producing shellfish and 32 fin-fish. It then goes on to state the 2020 targets for wild fish and aquaculture are to grow turnover by 34% (to £90m), value added by 45% (to £22m), exports by 36% (to £75m) and employment by 9% (to 600 FTE's)

7.6 EMFF

Member States are required to select from a list of available measures those which are most suitable for addressing their strategic priorities. These measures are organised into five "Union Priorities" (UP) and in a consultation process initiated by Defra the four national administrations proposed that the budget was allocated between these five UP's as shown in Table 17. The five Union Priorities are:

1. Promoting sustainable and resource efficient fisheries and aquaculture related processing;
2. Fostering innovative, competitive and knowledge based fisheries and aquaculture including related processing;
3. Fostering the implementation of the CFP (this relates to the fulfilment of enforcement and data collection obligations);
4. Increasing employment and territorial cohesion in fisheries areas; and
5. Fostering the implementation of the Integrated Maritime Policy

For each of these UP's there is an extended list of measures that the UK intends to fund together with justifications and expected outputs and outcomes.

Table 17: UK preliminary indications of EMFF budgetary allocation between 5 UP's

	UP1	UP2	UP3	UP4	UP5
Scotland	28.2%	63.5%	Separate budget	7.3%	1%
England	55.5%	37.8%	Separate budget	4.9%	1.8%
Wales	22.7%	63.2%	Separate budget	7.3%	2.6%
Northern Ireland	40.0%	52.0%	Separate budget	7.0%	1.0%

The UK's allocation for EMFF funding is EUR243.14 million and that will be shared between the four administrations as follows; Scotland (46%), England (35.6%), Wales (8.4%) and Northern Ireland (10%)

8 CONCLUSION

This interim report has presented a very wide range of information on aspects of relevance to determining a future strategy for Seafish to provide services to the UK aquaculture industry.

Any new policy must be based on key stakeholder views and consultations, so that it is informed by a participatory process with particular emphasis on engagement of primary processors. Otherwise the outlook for the non-salmonid domestic aquaculture sector could change from one of stagnation to one of decline. This will serve to increase the likelihood of stakeholder buy-in for change. The consultations completed by the contractors have been extensive and we wish to thank all those who have provided their time and relevant information and data in support of these outputs. It is clear that there are a wide variety of stakeholder views on almost all topics pertaining to a future strategy for Seafish to interact with and support the UK aquaculture sector, and that considerable conflicts are present both within the sector, with other seafood sectors and between the sector and Seafish. These conflicts in large part stem from the very fact that there has not historically been a clear and transparent policy framework with regards to addressing the needs of the aquaculture sector since Seafish withdrew from direct support and interaction that was afforded through the Ardtoe Marine Research facility in late 2003. Indeed it is recognition of these conflicts and the divergent stakeholder views that has resulted in this consultancy assignment being commissioned by Seafish.

In moving towards a new strategy for the next Corporate Plan, the contractor has attempted to recognise the 'acceptability' to stakeholders of different strategy options for a wide range of issues affecting the sector. However, it is important that the final recommendations for a corporate strategy are based, as far is possible, not just on acceptability, but also on i) working within the constraints of the current and future strategy of Seafish for supporting the seafood sector in general and ii) identifying viable, sustainable and effective opportunities for Seafish to effectively support the UK aquaculture industry. For this reason, for a range of subject areas outlined in sections 2 to 5 of this report a number of options have been specified based on stakeholder views (summarized in Section 4.5) and the possibilities considered realistic by the contractors.

This interim report specifically does not intend to provide some of the detail associated with each of the recommended options for the different areas of interaction. For example, it is recommended that the Seafish expand its aquaculture team but while a number of suggestions how they can support the aquaculture sector have been highlighted, the job of actually detailing how Seafish could most appropriately invest in aquaculture technical & information needs along with an analysis of potential gains from such investments will fall under the work still to be completed during the final stage of the assignment.

On receipt of comments on this interim report, following any changes to it deemed necessary at that stage, the contractors will start work on the draft strategy report which would then be presented and discussed with Seafish before finalising the strategy.

APPENDIX 1: SEAFISH STAFF QUESTIONNAIRE

Employment Background

How long have you worked for Seafish

Do you have any experience in the aquaculture industry, if so please give details.

Questionnaire

1. What are your roles and responsibilities within Seafish in regard to support of the UK aquaculture industry?
2. How has this changed over time and why? [*Note: this question is focused primarily upon changes since implementation of the last corporate plan but if you feel there are also important observations to be made over a greater period of time, please indicate and include these*].
3. How do you interact with the following groups in provision of service delivery?
    - other Seafish staff/ departments
    - Outside agencies (industry, government, universities etc.)?
4. Where do think the greatest and least needs are for industry support?
    - Greatest
    - Least
5. How is this changing?
6. Which activities provided by Seafish do you think bring greatest value for money?
7. How could your ability to support the aquaculture industry (as a Seafish employee) be improved?
8. Can you identify one or two particular examples where you feel your services have been most useful (to anyone in any sector e.g. individual businesses, larger industry segments, administrations, regulators or other government bodies?)
9. Which Seafish services have had the least uptake and why?
10. Which services do you think are less likely to be valued by individual businesses?
11. Should Seafish support be proportionate to the levy contribution of different aquaculture sectors?
12. How balanced do feel Seafish support is between :
    - aquaculture and capture fishery sectors
    - production and downstream value-chain elements
    - domestic and import-focussed businesses
    - larger and smaller businesses
    - established and new or would be entrants
13. Where do you see greatest overlap of Seafish activities with those of other agencies and bodies that support aquaculture
14. What aquaculture related issues do you think should be prioritised in the next corporate plan?

APPENDIX 2: INDUSTRY STAKEHOLDER TELEPHONE QUESTIONNAIRE

1. What support does the aquaculture industry require of external agencies?
2. In which of these areas has Seafish offered these services to the aquaculture sector now and in the past?
3. Is there any duplication of this range of service provision by other agencies and industry bodies?
4. Where duplication exists how do you rate alternative providers?
5. Is there any conflict of interest between Seafish's obligation to meet industry and government objectives?
6. How far do you accept the proposition that Seafish services are necessary to the industry and for consumers – even where not directly relevant to your organisation?
7. Should/ how might the distribution of Seafish support be improved?
8. How responsive is Seafish to the needs and priorities of the aquaculture industry?
9. Rank the Seafish services currently utilised by your organisation in terms of their importance?
10. How have these rankings changed over time for your organisation?
11. How consistent are Seafish strategic objectives and work-streams to your own organisation? [S*ummary of current objectives & work-streams provided overleaf*]
12. What else would you like to see included?
13. How far should objectives be tailored to national, administrative or sectorial boundaries?
14. What do you think will be the most important future needs of your sector and the aquaculture industry as whole
15. Seafish is looking to draft a list of experts and expertise associated with the UK aquaculture industry, who in your field should be included in this list and what is their key expertise?

APPENDIX 3: INDUSTRY STAKEHOLDER ONLINE QUESTIONNAIRE

Q1: Tick the boxes which best describes your involvement or interest in aquaculture?

Hatchery	Distribution	Govt. advisory/ regulatory body
Juvenile production	Wholesale	Research organisation
Grow-out	Retail	Other service provision
Primary processing	Food service	Consumer
Secondary processing	Producer organisation	Other (please specify)

Q2: Which species are of greatest relevance to your company or organisation?

Mussels	Trout	Pangasius catfish
Oysters	Charr	Tilapia
Cockles	Sea bass	Farmed shrimp
Salmon	Sea bream	Other (please specify)

Q3: Are you a levy payer? Y/N

Q4: How knowledgeable are you regarding the services provided by Seafish?

Very knowledgeable	Moderately knowledgeable
Some knowledge	Little or no knowledge

Q5: How often do you/ your organisation actively use Seafish services?

Most days	Most quarters	Most years
Most weeks	Every 6 months	Less frequently
Most months	Every year	Never

Q6: Which Seafish services are most useful to your organisation or business?

Market research and interpretation	Sector representation on national strategic plans, ministerial groups etc.
Industry research and interpretation	Supporting sector reputation and integrity
Responsible sourcing advice	Advice and support on regulatory issues
Professional working groups & networking forums	Project funding support
Promoting consumption of seafood products	Training provision
Other (please specify)	

Q7: What is the single most important way that Seafish currently helps your organisation or business?

Q8: How could Seafish improve its level of service provision to your organisation or business?

Q9: What are the most important support requirements for your organisation or business going forward?

Q10: Seafish is drafting a list of experts and expertise associated with the UK aquaculture industry. If you would like to figure in this list please provide your contact details and area of expertise below - or mail to seafishreview@gmail.com.

APPENDIX 4: SEAFISH INVOLVEMENT IN WORKING GROUPS

KEY: Input (into groups); C = Current involvement, P = Past involvement

SCOTLAND				
Entity	**Input**	**Group Name**	**Sub-Group**	**Seafish role**
Marine Scotland	C	Ministerial Group for Sustainable Aquaculture		
	C		Shellfish	Regular member
	C		Capacity	As required
	C		Interactions	As required
	C		Farmed fish health and welfare	As required
	C		Wellboat	Seldom
	C		Containment	Seldom
Scottish Aquaculture Research Forum	C	Board of Directors		Board Member, Funder, Project steering groups member
Highland Aquaculture Forum	C			Member
Moray Firth Partnership	C			Member
Federation of Scottish Aquaculture Producers	C			Consultee
Association of Scottish Shellfish Growers	C			Board observer
Marine Scotland	C			Project reviewer
Scottish Seafood Partnership	C	Board		Board Member. Define policy and activity direction
Scottish Shellfish Training centre	C	SSTC	May become part of a Scottish seafood training hub.	Joint accreditation body with REHIS.
Marine Scotland	P	Ministerial Group on Aquaculture		Member
Association of Scottish Shellfish Growers	P	Steering Group		Member
SEERAD	P	Scotland fish waste		Member

		management group		
Fish Industry Training Association	P			FITA is no longer an active Seafish ATP for onshore sectors.

ENGLAND				
Entity	**Input**	**Group Name**	**Sub-Group**	**Seafish role**
Defra/Industry	C	England Aquaculture Consultation Group		Member Facilitated Sept 2012 workshop
Southern Shellfish Training Centre	C	SSTC	Independent approved provider	Joint accreditation body with REHIS
FSA/CEFAS/Seafish	C	FSA/CEFAS/Seafish Shellfish Working Group		Peter Wilson, Mandy Pyke and Lee Cooper provide the Seafish contribution to the 9 strong WG.
Defra	P	Marine Management Organisation		EFF Project Reviewer
Defra	P	Aquaculture waste R&D group		Member Input to research and trials
Shellfish Association of Great Britain	P	Committees		Chair of Committee, advisory role

WALES				
Entity	**Input**	**Group Name**	**Sub-Group**	**Seafish role**
Southern Shellfish Training Centre	C	SSTC	Independent approved provider	Joint accreditation body with REHIS
Seafood Training Network Wales	C			Emerging network of providers and employers managed by Holly Whitley and Lee Cooper
Welsh Government	P	Fisheries Advisory Group		Assist in development of Fisheries/Aquaculture Strategy & Action Plan; review/facilitate EU funded projects

NORTHERN IRELAND				
Entity	**Input**	**Group Name**	**Sub-Group**	**Seafish role**
Department of	C			EFF project reviewer/

Agriculture and Rural Development (DARD)				EFF facilitator working with aquaculture producers
Strangford Lough Fishermen's Association (includes aquaculture)	C	Fishermen's Association		Secretariat
Fisheries Sub group of the Agri-Food Strategy Board	C	InvestNI DETI		Sub Group member
Oyster Herpes project steering group	C	C-Bait		Member of steering group
DARD	C			Assisting DARD in supporting aquaculture sector (especially oyster farmers) in a variety of way- securing EFF funding for safety equipment, facilitating working group to decide on best ways to support oyster sector in light of herpes outbreak.
Queen's University Belfast	P	C-Mar		Steering Board Member

UK WIDE				
Entity	**Input**	**Group Name**	**Sub-Group**	**Seafish role**
Sea Fish Industry Authority	C	Aquaculture Common Issues Group		Facilitate
British Marine Finfish Association	C			Board observer
Solway Partnership	C			Member
LANTRA	C	Aquaculture Training Standards		Member
UK Aquaculture Forum	C			member
Shellfish Association of Great Britain	C	Committees	Mollusc	member
	C		Technical and training	member
	C		Crustacean	member

British Trout Association	C	Board		Board Advisor
Seafood Training Academy	C	STA partnership	6 Partners, expanding to around 10 by end of 2015.	Seafish in managing Partner.
Apprenticeship Providers	C	Seafish recognised apprenticeship providers	10 Providers covering all of the UK and supporting apprentices in Bivalve purification centres.	
Improve / F&D NSA	C	Fish and shellfish standards and funding	Seafood Academy is recognised Champion for the seafood network	member
British Marine Finfish Association	P			Founder, Board Member, Chair CoGP Committee

EU				
Entity	**Input**	**Group Name**	**Sub-Group**	**Seafish role**
EU	P	European Aquaculture Technology Innovation Platform		Member
EU	P	DG Mare		FP3, FP4, FP5, FIFG project reviewer

OTHER				
Entity	**Input**	**Group Name**	**Sub-Group**	**Seafish role**
Soil Association	C	Organic Aquaculture Standards Committee		Member
Organic Food Federation	C	Aquaculture Standards		Consultee
GSSI	C			Member
ClientEarth	C	Sustainable Seafood Coalition		Member of consultative working group
FAO	C	Committee on Fisheries (COFI)	Sub-committee on aquaculture	UK representative
Marine Conservation Society	P	Aquaculture and Fisheries Panel		Member