

# **Seafood CRC Research Travel Grant:**

Targeted meetings with key research providers and industry personnel in the UK relevant to SCRC projects 2011/703 and 2011/735

## **FINAL REPORT**

*Catriona Macleod*



AUSTRALIAN  
SEAFOOD  
COOPERATIVE  
RESEARCH CENTRE

**Project No. 2012/718**

Copyright Australian Seafood CRC, the Fisheries Research and Development Corporation and University of Tasmania 2012

This work is copyright. Except as permitted under the Copyright Act 1968 (Cth), no part of this publication may be reproduced by any process, electronic or otherwise, without the specific written permission of the copyright owners. Neither may information be stored electronically in any form whatsoever without such permission.

**ISBN:** 978-1-925982-38-1

*The Australian Seafood CRC is established and supported under the Australian Government's Cooperative Research Centres Program. Other investors in the CRC are the Fisheries Research and Development Corporation, Seafood CRC company members, and supporting participants.*

**Office** Mark Oliphant Building, Laffer Drive, Bedford Park SA 5042  
**Postal** Box 26, Mark Oliphant Building, Laffer Drive, Bedford Park SA 5042  
**Tollfree** 1300 732 213 **Phone** 08 8201 7650 **Facsimile** 08 8201 7659  
**Website** [www.seafoodcrc.com](http://www.seafoodcrc.com) **ABN** 51 126 074 048

### **Important Notice**

Although the Australian Seafood CRC has taken all reasonable care in preparing this report, neither the Seafood CRC nor its officers accept any liability from the interpretation or use of the information set out in this document. Information contained in this document is subject to change without notice.



**Australian Government**  
**Fisheries Research and  
Development Corporation**



An Australian Government Initiative



## **NON-TECHNICAL SUMMARY**

**PROJECT NO: 2012/718**

**TITLE: Targeted meetings with key research providers and industry personnel in the UK relevant to CRC projects 2011/703 and 2011/735.**

**PRINCIPAL INVESTIGATOR:** Catriona Macleod

**ADDRESS:** Institute of Marine and Antarctic Studies  
University of Tasmania  
Private Bag 129  
Hobart  
Tasmania  
7001

### **OBJECTIVES OF RESEARCH TRAVEL GRANT**

Targeted meetings with key research providers and industry personnel in the UK relevant to the following Seafood CRC projects:

- CRC project 2011/703 – Tracking methyl mercury contamination pathways in key commercially and recreationally fished species.
- CRC project 2011/735 – An evaluation of the options for expansion of salmonid aquaculture in Tasmanian waters.

### **NON TECHNICAL SUMMARY:**

The travel grant supported meetings with researchers and industry in the UK to underpin existing collaborations and develop/ extend research partnerships to support seafood CRC project outcomes. Key outcomes from this travel include:

- Confirmation of ongoing mercury and selenium analysis support from PS Analytical for CRC project 2011/703.
- Establishment of conjoint supervision arrangements with University of St Andrews and inclusion of Dr Mark James as a co-supervisor to support SCRC project 2011/735.
- Agreement for a formal data sharing arrangement with Marine Harvest (MH), Scotland, in which MH has agreed to provide data on their developmental sites as an international test case for analysis in SCRC project 2011/735.
- Agreement with PS Analytical, Marine Harvest, University of St Andrews and University of Plymouth to explore options and opportunities for ongoing collaboration and funding.

### **OUTCOMES**

Outcomes to Date: Extended collaborations and partnerships with opportunities into the future.

Outcomes Planned: Not applicable.

## **OUTPUTS DEVELOPED AS RESULT OF TRAVEL GRANT/ INDUSTRY BURSARY:**

***PROPOSED OUTPUT: A summary of the research interests associated with current project partners/ collaborators and the potential for future research collaborations.***

## **ABOUT THE PROJECT/ACTIVITY**

### **BACKGROUND AND NEED**

This trip will involve targeted meetings with key research and industry personnel to consolidate our existing relationship and secure ongoing research support for two Seafood CRC student projects as well as to advance the research agendas developed as part of those projects and establish ongoing international research partnerships. I also hope that through these meetings and subsequent partnerships, the respective Seafood CRC & UTas research groups will clearly establish an international reputation in the respective fields.

### **RESULTS**

**Discussions regarding CRC project 2011/703 – Tracking methyl mercury contamination pathways in key commercially and recreationally fished species.**

- I met with Dr Warren Corns, (R&D Manager) PSA Analytical, and several of his research team in London on 15<sup>th</sup> June, this meeting was very productive. In particular, it gave me an opportunity to personally thank Dr Corns and his team for the contribution they have made so far and to acknowledge the significance of their support for Hugh's research when they enabled him to run his samples at their labs last year when the University of Plymouth equipment failed. Hugh has not only had access to their specialist equipment, but has been accommodated with desk and computer access in their labs/ offices. He has also had the additional benefit of being able to access their high level analytical expertise, which has been extremely useful in supporting the presentation and interpretation of his results. PSA have agreed to support Hugh's analytical requirements at significantly reduced costs (relative to their commercial rates) for the duration of this project.

In addition as a result of this meeting we were invited to participate in a workshop on Mercury analysis hosted by the University of Melbourne, and our contribution and developing expertise in marine/ estuarine mercury processes was clearly acknowledged. PSA have taken a real interest in this project and are showcasing Hugh's study in their promotional material (see press release from June this year – Appendix 1).

A further direct development from this meeting is a clear commitment from PSA to engage with the research team in future projects. The most recent example of this is the inclusion of PSA as a research partner in an expression of interest to the Strategic Industry Endowment Fund, Australia (July 2012), for a \$5M research initiative aimed at identifying the costs of coastal urbanisation. We have also agreed to an arrangement which will see PSA included as an industry partner in an ARC linkage application to be submitted later this year.

- I also met with Prof Geoff Millward, from the Marine Institute at the University of Plymouth whilst attending the Estuaries and Coasts Shelf Association conference in Venice and we discussed the relevance of Hugh's specific project in the context of current international mercury research. There appears to be a heightened focus on understanding potential pathways for mercury bioaccumulation, with evidence of mercury uptake in many higher order species having been found to be elevated beyond that which might reasonably be expected given background environmental loadings. At the ECSA conference there were 39 presentations (15 oral, 24 poster) specifically on metal contamination and bioaccumulation processes, with a number of these featuring mercury as a critical contaminant.

Prof Millward was quite critical of some of the modelling approaches currently being employed to determine mercury contamination risk, and expressed the view that the potential impacts associated with mercury contamination needed robust data of the sort we are establishing, to underpin predictive objectives.

Professor Millward was keen to discuss opportunities for partnerships in the future and we will follow this up through email correspondence, we will also both seek to identify specific funding opportunities for collaboration.

### **CRC project 2011/735 – An evaluation of the options for expansion of salmonid aquaculture in Tasmanian waters.**

I met with Mr Steve Bracken – Business Support Manager, Marine Harvest International, UK on May 30<sup>th</sup> and we talked at length about the value of the research being proposed in project 2011/735 and in Andrew King's PhD project specifically. We were able to identify numerous areas of common interest in the research objectives and it was proposed that it would be a very valuable addition for both parties if we could include Marine Harvest data as an international test of the options analysis being developed in this project. Subsequent communications have confirmed their continued interest in this approach and we are currently drawing up a formal plan for engagement. However, Mr Bracken indicated that it would be preferable to them if we could include a Scottish research group as a collaborator in the project. We proposed that we had already initiated discussions with the University of St Andrews and that suggestion was very well received.

I met with Prof. Dave Paterson, Executive Director of MASTS: The Marine Alliance for Science and Technology for Scotland, University of St Andrews, UK and Dr Mark James of both MASTS and the Scottish Aquaculture Research Forum (SARF) on 22<sup>nd</sup>/ 23<sup>rd</sup> June and we discussed the potential to include Andrew's project as a conjoint PhD. Everyone agreed this was a great project which they would be keen to support, it was determined that Dr Mark James would be the nominated co-supervisor at University of St Andrews. The conjoint supervision agreement for this has been drafted at UTas and the documentation should be signed and finalised by both parties within the next month.

The interest in this project has been very strong and Andrew has been invited to provide an overview of the research at the MAST annual conference in early August. The collaboration with Marine Harvest has progressed with a nominated research contact identified (Dr Douglas Hunter) and Andrew will get access to data from key sites in NW Scotland whilst in the UK in August/ September. Marine Harvest Scotland will also provide very valuable research and industry contacts through their operations in Canada, Norway and Chile.

## **INDUSTRY IMPACT**

### **PROJECT OUTCOMES**

All of the anticipated contacts and connections were achieved.

#### **CRC project 2011/703 – Tracking methyl mercury contamination pathways in key commercially and recreationally fished species.**

This trip has achieved all of the outcomes we had anticipated - confirming our commitment to the research area and consolidating and expanding the ongoing analytical support of PS Analytical. In addition, discussions with Plymouth Univ. proposed ongoing communication to explore opportunities to collaborate in international research efforts associated with mercury bioaccumulation in marine and coastal systems. The first of these collaborations has been initiated with the submission of a multi-institutional research collaboration involving PS Analytical.

#### **CRC project 2011/735 – An evaluation of the options for expansion of salmonid aquaculture in Tasmanian waters.**

Similarly, this trip has achieved all of the projected outcomes for project 2011/735 – allowing us to bed down the partnership/ MOU with the University of St Andrews and develop a more formal mechanism for collaboration between experts in Scotland/ Australia.

### **SUMMARY OF CHANGE IN INDUSTRY**

This trip was not expected to change industry directly, but it very clearly has established mechanisms for communication of information to and from international research and industry partners.

These contacts will provide valuable information to improve our understanding of the effects of estuarine contaminants and the potential effects on estuarine fish in general, as well as mechanisms of metal and mercury toxicity specifically. The international connections to the salmon industry and the Scottish research community will provide a conduit for information exchange to that sector in particular and hopefully will lead to future collaborations both in the commercial and academic research and development.

In each area the collaborations defined on this trip will provide a much broader network for extension and uptake of SCRC research outputs.

### **WHAT FUTURE AND ONGOING CHANGES ARE EXPECTED?**

Greater international collaboration and communication.

### **WHAT BARRIERS ARE THERE FOR CHANGES TO OCCUR?**

Limitations to the opportunities for collaboration and lack of support for ongoing partnerships.

### **IF NOT ALREADY HAPPENING, WHEN WILL THE CHANGES OCCUR?**

Collaborations are already underway and will continue to develop.

### **WHAT IS THE LIKELIHOOD THAT THESE CHANGES WILL OCCUR?**

Very high.

### **WHAT BARRIERS ARE THERE TO ADOPTION OF THESE CHANGES AND WHAT ACTION COULD BE TAKEN TO OVERCOME THESE?**

There are no specific barriers to the proposed collaboration opportunities.

## **COMMUNICATION OF PROJECT/EXTENSION ACTIVITIES**

### **WHAT IS THE OUTPUT THAT NEEDS TO BE COMMUNICATED?**

Outputs to be communicated:

1. Researchers: There are significant opportunities for research collaboration with Europe and the research currently being undertaken in Australia is best practice standard in many key R & D areas.
2. Industry: That research and environmental practices here in Australia are world's best and the international community can learn a lot from Australia.

### **WHO IS/ARE THE TARGET AUDIENCE/S?**

The core target audiences are slightly different between the two projects.

In *CRC project 2011/703 – Tracking methyl mercury contamination pathways in key commercially and recreationally fished species* the core audiences are:

1. Researchers: Environmental scientists and estuarine fisheries/ recreational fisheries scientists.
2. Industry: Recreational fishers, estuarine fishers and estuarine fisheries managers.

In *CRC project 2011/735 – An evaluation of the options for expansion of salmonid aquaculture in Tasmanian waters* the core audiences are:

1. Researchers: Environmental scientists and aquaculture/ technology researchers.
2. Industry: Salmonid aquaculture industry, caged fin-fish industry and aquaculture environmental managers/ coastal zone planners.

### **WHAT ARE THE KEY MESSAGES?**

Key messages as a result of the meetings are:

- a) *CRC project 2011/703 – Tracking methyl mercury contamination pathways in key commercially and recreationally fished species*  
Mercury research still needs some fundamental research/ data to support viable management/ mitigation strategies and we need to work together internationally to achieve this. The implications of environmental conditions in characterising risk are just beginning to become understood. Modelling in this area is still in the very early stages.  
  
The ameliorating effects of selenium (with respect to mercury) are only just becoming clear. This has particular relevance in Australia, given the low levels of Se, and has potential to make our research of particular significance internationally.
- b) *CRC project 2011/735 – An evaluation of the options for expansion of salmonid aquaculture in Tasmanian waters*  
Discussion have clearly identified that the SCRC research efforts targeting

innovative approaches for aquaculture development and decision support mechanisms are of relevance to the salmon farming industry globally. In addition to attracting the support of Marine Harvest Scotland, this project has been given general endorsement by the International Salmon Growers Association (ISGA). Although offshore aquaculture and recirculation research have been targeted as R & D areas within specific companies, and have as individual development topics attracted research interest, there does not seem to be anywhere else that is looking at this in the context of a strategic management decision framework (i.e. looking at the holistic economic, environmental and health implications in the same way as proposed in the SCRC project). Consequently the initiative proposed through the SCRC has been very well received by the salmon industry internationally, who are eager to know the outcomes.

### WHAT IS THE CALL TO ACTION?

1. Researchers: I'd be happy for anyone who has an interest in developing an international collaboration or initiating contacts in this area to contact me as I can perhaps provide some advice and/or help in brokering those contacts.
2. Industry: The initial contacts have been established, it is now important that we maintain those relationships and show a willingness and commitment to work together on mutually beneficial projects.

### COMMUNICATION CHANNELS

<i>Channel</i>	<i>Who by</i>	<i>When</i>
<i>Article for Seafood CRC "Seafood Stories" if required outlining points of interest from the Estuarine and Coastal Sciences Association (ECSA) conference</i>	<i>Catriona Macleod</i>	<i>TBC</i>
<i>Milestone Report (CRC Project 2011/703)</i>	<i>Project PI - Catriona Macleod</i>	<i>March 2013</i>
<i>Milestone Report (CRC Project 2011/735)</i>	<i>Project PI - Catriona Macleod</i>	<i>June 2013</i>

### **LESSONS LEARNED AND RECOMMENDED IMPROVEMENTS**

#### WHAT IS YOUR FEEDBACK?

Not applicable.

#### FURTHER ACTION REQUIRED IN REGARDS TO COMMERCIALISATION?

Not applicable.



## **APPENDIX 1.**

### **PS Analytical Press Release – June 2012**

#### **PSA at the forefront of Mercury and Selenium Environmental Geochemistry Research Programs**

The PSA Millennium Merlin and Excalibur systems continue to be the instrumentation of choice for laboratories conducting environmental research programs. Our cold vapour and hydride generation atomic fluorescence systems offer sub part per trillion detection limits for mercury and the hydride forming elements (As, Se, Sb) and also the capability of speciation when coupled to liquid or gas chromatography. The AFS systems are attractive because of the low capital and operating costs compared to ICPMS and the ability to use instruments in the field with low resource requirements.

The PSA research team offer expertise and supervision to various PhD and research programs. We are currently collaborating with the University of Tasmania conducting analytical measurements of Hg and Se speciation to develop a better understanding of how Hg and Se bioaccumulates within food chains of the Derwent Estuary. This area is of particular interest because of the elevated levels of heavy metals that have been discharged as waste from industrial sources. Research into Hg bioaccumulation from the abiotic environment into biota continues to form the basis for providing a decision support framework to ensure that current and future management strategies minimise the possibility of human health effects and maintain environmental health. The antagonistic effects of Se in respect of Hg toxicity in the aquatic food chain are being investigated using speciation data generated at PSA using the Millennium Systems.