Aquaculture Production Innovation Hub: Phase II – communication, extension and opportunities

Jennifer Cobcroft

Project No. 2012/756

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Table of Contents

Non-Technical Summary

Aquaculture Production Innovation Hub: Phase II – communication, extension and opportunities. Project Number 2012/756

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PROJECT OBJECTIVES:

1. Improve communication and increase collaboration among aquaculture producers and researchers
2. Delivery of key extension activities for the 'Finfish' and 'Breeding for Profit' Themes of Production Innovation Program
3. Develop a plan for continuation of successful communication activities beyond the life of the Seafood CRC

ABSTRACT
The Aquaculture Production Innovation Hub: Phase II was a continuation of the Aquaculture Innovation Hub (2008/902) managed by the NSW Department of Primary Industries, Port Stephens Fisheries Institute and Flinders University. The Phase II Hub focussed on research extension activities in the finfish, crustacean and shellfish sectors and increasing trans-Tasman communications among aquaculture producers and researchers.

The Phase II Hub conducted four workshops for national and international participants, engaging 144 delegates, to communicate recent research findings and technology developments for marine hatcheries, enhance understanding of community engagement and discuss aquaculture spatial planning processes. Technical exchanges were supported for two shellfish industry representatives to improve understanding of hatchery operations in interstate facilities. Improved hatchery management practices in water treatment and larval feeds have been applied in shellfish, crustaceans and finfish as a result of Hub activities. New Zealand and Australian researchers and industry have refined approaches to understanding the social acceptance of aquaculture and community engagement through the trans-Tasman workshops. The network of aquaculture producers, researchers and regulators has been strengthened through the Hub workshops. Novel communication platforms were trialled with two editions of the *What's Hatching* talking news and a webinar on social acceptability of the fishing industry and aquaculture.

The Hub maintained the two Hatchery Networks, one for Shellfish with 87 members and one for Finfish with 72 members, overall 113 individuals. The Hub formally and informally supported eight sessions at the World Aquaculture Adelaide conference in June 2014, showcasing SfCRC research and providing a platform for increased communication among SfCRC participants and industry stakeholders.

A continuation of the trans-Tasman workshops, especially with a salmonid focus, is a priority for the Tasmanian Salmonid Growers Association (TSGA). A mechanism to continue the

funding of these workshops remains to be explored by TSGA and FRDC. Likewise, Hatchery Network members are highly supportive of future workshops and the funding for facilitating those has been requested under the umbrella of the FRDC's new and emerging aquaculture opportunities Subprogram (May 2015).

OUTCOMES ACHIEVED

- Increased communication and co-operation in aquaculture between Australia and New Zealand; two workshops held with 42 and 26 participants, respectively.
- Increased communication and co-operation among Australian states and across aquaculture sectors; technical exchange in finfish and shellfish between five states involving 18 people; two workshops with 16 and 60 participants, respectively; two editions of video news viewed 224 and 92 times, respectively, by March 2015;
- Expanded hatchery networks (finfish and shellfish); membership increased during the project from 53 to 87 in Shellfish and from 36 to 72 in Finfish.
- Improved practices in oyster hatcheries re water management and treatment; adopted in two commercial hatcheries in SA and NSW.
- Improved efficiencies in prawn hatcheries based on connections made at previous hatchery workshops; survival to post-larvae increased by 15 to 30%, and production benefit estimated at >$175,000 p.a.; approach shared with other hatchery operators attending the June 2014 workshop.

LIST OF OUTPUTS PRODUCED

Workshop: 8 November 2012: *Early Weaning Techniques and Yellowtail Kingfish Research Update & Extension*. Training provided to 16 Australian hatchery technicians and managers on early weaning methods for marine finfish, and an update on Yellowtail Kingfish hatchery research: participants from industry (n = 11) and research (n = 5).

Technical Exchange: Shellfish Futures 11-13 October 2013 and shellfish hatchery visits. Two oyster hatchery technicians (from NSW and SA) were supported to attend Shellfish Futures 11-13 October 2013, Bruny Island, Tasmania, and to visit two Tasmanian shellfish hatcheries. One oyster hatchery technician will be supported to visit NSW DPI in 2015 and one PhD student will be supported to do an industry placement with RadAqua if possible in 2015.

Trans-Tasman Salmon Workshop 1: Communications and Engagement: 3-5 February 2014. 42 people attended the workshop, including seven from New Zealand, and 16 participants were from industry.

Trans-Tasman Workshop 2: Spatial Planning. Held on 12 June 2014. 26 people attended, including nine from New Zealand, and eight participants were from industry.

Hatchery Technology Workshop. Held on 12 June 2014. The workshop was attended by approximately 60 delegates from Australia and New Zealand including operators of Prawn, Rock Lobster, Oyster, Abalone, Mussel, Scallop, Atlantic Salmon, Flowery Rockcod, Barramundi and Striped Trumpeter hatcheries. All follow-up survey respondents (n = 24) indicated they would implement something learned at the workshop within 3 months.

What's Hatching series of aquaculture video news updates launched on YouTube. The talking news, "*What's Hatching*", provided research updates and described extension activities, and was distributed to over 640 Seafood CRC stakeholders (Episodes 1 and 2, May and October 2014), and episodes were viewed 224 and 92 times, respectively, by March 2015.

A webinar by Dr Nicki Mazur (Charles Sturt University and ENVision Environmental Consulting) entitled 'Environmental Values and Social Acceptability of the Commercial Fishing Industry' was hosted by the SfCRC Aquaculture Hub in May 2014, covering the social acceptability of the fishing industry with relevance to aquaculture. The video recording was made available on Seafood CRC website.

Evaluation survey results of Hub activities are included in the appendices and predominantly indicate adoption or application of workshop material in the workplace post-activities and provide positive suggestions for continuation of workshops and "What's Hatching" video news.

Acknowledgements

The activities of this project were supported by many individuals and organisations. The Hub project team would like to thank:

- Australian Seafood CRC Aquaculture Production Innovation Hub Steering Committee members, Dr Graham Mair (Program Manager - Production Innovation, SfCRC), Ms Emily Mantilla (Program Manager - Communication, Education, Training and Extension, SfCRC), Mr Steven Clarke (Leader, Sciences Initiatives, SARDI Aquatic Sciences) and Dr Jennifer Cobcroft (Chair) for development and advice regarding the Hub activities.
- Australian Seafood CRC and the Fisheries Research and Development Corporation for their funding support and direction in targeting activities.
- Dr Gay McKinnon co-ordinated Hub activities in 2014, and Ms Karri Hartley provided administrative assistance and research support in 2013 and 2014. They are both thanked for their enthusiasm to provide engaging workshop programs, efficient liaison with contributors, and embracing new technologies for the webinars and *What's Hatching* talking news.
- Tom Lewis, Ray Murphy and Maree Fudge of RDS Partners are thanked for organisational support and facilitation of the first Trans-Tasman Workshop, and compiling and distribution of *What's Hatching*.
- Australian Seafood CRC researchers, Dr Catriona Macleod, Prof Abigail Elizur, Dr Jennifer Cobcroft, Dr Pollyanna Hilder, Matthew Bansmer and Dr Wayne Knibb, are thanked for contributing to the *What's Hatching* talking news episodes.
- All of the presenters and participants of the Trans-Tasman Workshops are thanked for making these events a success. We particularly thank Dr Catriona Macleod (IMAS-FAC) and Dr Adam Main (CEO, TSGA) for their inspiring vision for these workshops and persistence in bringing them to fruition.
  Many organisations supported the workshops, including: Ministry for Primary Industries New Zealand (MPI-NZ), Marlborough District Council, Waikato Regional Council, Cawthron Institute, Aquaculture NZ, NZ King Salmon, NIWA, Marine Farming Association (NZ), New Zealand Oyster Industry Association, Aquaculture New Zealand, TSGA, IMAS, FRDC, SfCRC, Tassal, Huon Aquaculture, Petuna, Van Dieman Aquaculture, Skretting, Ridley, Austral Fisheries, Sydney Fish Market, National Aquaculture Council (Australia), Tasmanian Department of Primary Industries, Parks, Water and Environment (DPIPWE), Primary Industries and Regions SA (PIRSA), South Australian Oyster Research Council and South Australian Oyster Growers Association, CSIRO, ENVision Environmental Consulting, KAL Analysis, IAP2 Australasia, Australian Southern Bluefin Tuna Industry Association, Rural Solutions SA, and SARDI.
  Material kindly provided by Nicki Mazur, Kate Brooks, Richard Gerathy, Carla Leversedge and Daniel Casement has been incorporated in the relevant workshop reports.
- The Organising Committee of the second Trans-Tasman workshop on Spatial Planning brought together stimulating background material and presentations to

open a productive discussion of aquaculture spatial planning in Australia and New Zealand. We thank the OC members: Rebecca Clarkson, Jill Coates, Jennifer Cobcroft, Daniel Lees, Catriona Macleod, Adam Main, Emily Mellor, Tony Thomas, Karri Hartley.

- Staff of Clean Seas Tuna Ltd, especially Dr Bennan Chen (Hatchery Manager), and Dr Matthew Bransden and Nick King of Skretting are thanked for hosting and presenting at the Early Weaning Workshop in November 2012 in Arno Bay.
- Wayne Hutchinson, Steven Clarke, and Prof Xiaoxu Li provided invaluable logistics support for the SARDI venues used for the Trans-Tasman and Hatchery workshops in June 2014.
- Aquaculture industry members, government staff (Australia and NZ), seafood industry representatives, aquaculture service providers, communicators and engagers are thanked for their contributions and participation in all Hub activities.

1. Introduction and Background

The Aquaculture Innovation Hub (2008/902), under the leadership of Dr Geoff Allan, was in operation from July 2009 to improve coordination and increase collaboration among aquaculture producers and researchers, and the project was wound up in June 2012 without achieving all its objectives. It was agreed by CRC and FRDC that there was still a role for a communication hub as a component of the Aquaculture Innovation research theme. At Australasian Aquaculture, May 2012, a meeting was held to discuss the future direction of the Hub and was attended by representatives of SfCRC, FRDC, finfish and shellfish industries, the PSFI team managing current Hub activities and other researchers. It was agreed at the meeting that the current project be wound up and a new project be put forward under the leadership of Dr Jennifer Cobcroft. This new hub project should maintain the same focus on participants as the first project with FRDC's contribution (via the remaining balance payable on the first project and a new investment of $20,000 in this project) ensuring that the activities of the hatchery networks extend to non CRC participants. This proposal is for continuation of many of the previous Hub activities, with a change in focus in some areas to incorporate delivery of key extension activities for the 'Finfish' and 'Breeding for Profit' Themes of the SfCRC Production Innovation Program. The CRC also requested this project to incorporate a previously agreed investment in Australian-NZ salmon dialogues and a planned extension project to develop a Yellowtail Kingfish hatchery manual (the latter was revised, at the request of industry, to be a brief summary of hatchery research). These two activities are sector specific but all other hub activities are assumed to be national in context.

2. Need

The Seafood CRC has made considerable investment in a diverse range of aquaculture production projects. The research has been prioritised and driven by industry needs, and it is critical to ensure the research outputs are communicated to industry. This is particularly the case where projects may be largely focused on one species or one industry sector, yet have broader relevance and application among Seafood CRC participants. Selected key extension activities for the 'Finfish' and 'Breeding for Profit' Themes of the SfCRC Production Innovation Program have been built into this project.

3. Objectives

1. Improve communication and increase collaboration among aquaculture producers and researchers
2. Delivery of key extension activities for the 'Finfish' and 'Breeding for Profit' Themes of the SfCRC Production Innovation Program
3. Develop a plan for continuation of successful communication activities beyond the life of the Seafood CRC

4. Methods

A Phase II Hub Work Plan was developed in consultation with project co-investigators and the Hub Steering Committee. Based on a late start to the project, with the final contract signatures in August 2013, and ongoing negotiation about the best approach to some activities, the Work Plan was revised in September 2013 (Table 1), and some items remain undelivered at the end of the project, 30 June 2014. Funds allocated to the outstanding activities will be returned to SfCRC for delivery through an alternate mechanism or redirected to other priority activities.

1. Improve communication and increase collaboration among aquaculture producers and researchers

Activities to improve communication between Aquaculture producers commenced prior to the contract finalisation date, starting with an 'Early Weaning' workshop for marine finfish hatcheries held in South Australia in November 2012 for 16 delegates (Appendix 5). Several meetings were held with Atlantic Salmon producers from January 2012 to progress the trans-Tasman workshops (Table 2), beginning with one on 'Communications', 3-5 February 2014 with 40 delegates (Appendix 3). The second trans-Tasman workshop on 'Spatial Planning' took place on 12 June 2014 in Adelaide with 22 people attending (Appendix 4). The Phase II Hub funded seven participants to attend the Spatial Planning workshop, and most participants also engaged with 'Social Licence to Operate', 'Spatial Planning' and policy sessions at World Aquaculture Adelaide 2014 (WAA14), enhancing the value to both the conference and participants in terms of information exchange and increased networking, culminating in a successful workshop on 12 June 2014. In addition, the Hub co-funded with the National Aquaculture Council and WAA14 one of the Plenary speakers, Charlie Arnot (The Center for Food Integrity, USA), presenting "Ethics, values and science - building trust in today's aquaculture", as this was an important contribution in the context of the two trans-Tasman workshops. Mr Arnot was also a Panel member in the Social Licence to Operate (SLtO) session, providing an opportunity for the Australian and New Zealand delegates to gain from US agri-sector experience of SLtO, again building on the network established at the first trans-Tasman workshop.

At the Australian Prawn and Barramundi Farmers Conference in July 2013, industry representatives stepped forward to take an active role in the Shellfish and Finfish hatchery networks, culminating in significant contributions to the Hatchery Technology Workshop program on 12 June 2014 that enhanced cross-sector information exchange. Over 60 people attended the Hatchery Workshop (Appendix 6). There was a request for a tropical finfish hatchery workshop which was not undertaken due to the focus on the June 2014 workshop. Two oyster hatchery technicians were supported on a technical exchange to attend Shellfish Futures in October 2013, and to visit Tasmanian hatcheries to enhance communication and the exchange of knowledge in shellfish hatchery operations (Appendix 7).

Table 1. Work Plan approved by the Aquaculture Production Innovation Hub: Phase II Steering Committee, 30 September 2013.

	Activity	WORK PLAN - Nov 2012-Dec 2013				KEY: Planned Duration			Workshop		TENTATIVE PLAN - Jan-Jun 2014					
		Oct-12	Nov-12	Dec-12		Aug-13	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14
		5	6	7	...	15	16	17	18	19	20	21	22	23	24	25
0	HUB Admin					MS1			MS2					DFR		FR
1	Workshop: Aust-NZ Salmon industry. Communications & community engagement															
1.1	Participants invited															
1.2	Venue arranged															
1.3	Materials summarised & distributed															
1.4	Workshop dates											Sal 1				
1.5	Report															
1.6	Short Communication															
1.7	Fact sheets															
2	Workshop: Aust-NZ Salmon industry. Spatial planning and IMTA															
2.1	Participants invited															
2.2	Venue arranged															
2.3	Materials summarised & distributed															
2.4	Workshop dates															Sal 2
2.5	Report															
3	Aquaculture Genetics Product Packages - species sectors: Aquaculture Producers Hatchery Managers Aquaculture Business Managers Researchers															
3.1	Fact sheets - content, print, distribute								FS1 Def	FS2		FS3		FS4		
3.2	Training program HM - workshop, webinars							Gen1	Gen/SF1	Gen	Gen	SF Gen	PR/FF2	PR Gen		FF Gen
4	Workshops: Hatchery Health															
4.1	Shellfish								SF1							
4.2	Finfish											Gen1/FF - tropical				
4.3	Biosecurity in land-based facilities															SF2/FF3
5	Workshop: Response planning for aquaculture disease outbreak – Case study: Pacific Oyster Mortality Syndrome (POMS)								SF1							
6	Bi-monthly webinars of interest to aquaculture industry							Oysters	Gen	Gen	Gen	SF Gen	PR Gen		FF Gen	
7	Coordinate technical exchange															
8	Workshop: Highlights of CRC Production Innovation															P1 @ WAS
9	Workshop(s): Production methods for Yellowtail Kingfish		FF1										FF2			
10	Finfish Deformity Classification								FS1 Def							
11	Cryopreservation									?Webinar						? WAA session
12	YTK Hatchery Manual												planning W'shop			WAA ppt
13	Cobia production methods (Webinar:FS?)								?Webinar							WAA ppt
14	PhD Internships															
15	Finfish and Shellfish Hatchery Networks - monthly blog/newsletter and annual workshop		FF1 - early weaning						SF1			Gen1/FF	FF2			

	Abbreviation	Activity	Abbreviation	Activity
LEGEND	Sal 1/2	salmon workshop 1/2	MS1	Milestone report 1
	FS1-4	Fact Sheet 1-4	MS2	Milestone report 2
	Gen	Genetics	DFR	Draft Final Report
	FF	Finfish	FR	Final Report
	SF	Shellfish		
	PR	Prawns		
	P1 @ WAS	CRC Production Program at WA 2014, Adelaide		

Planned Duration
Workshop
activity

Table 2. Aquaculture Production Innovation Hub: Phase II meetings 2013-2014.

Committee	Meeting Date
Aquaculture Production Innovation Hub Work Plan Meeting	31 May 2013
Aquaculture Production Innovation Hub Work Plan Meeting	28 June 2013
Aquaculture Production Innovation Hub Steering Committee	30 September 2013
Communications Workshop Meeting 1	15 August 2013
Communications Workshop Meeting 2	22 August 2013
Communications Workshop Meeting 3	23 August 2013
Spatial Planning Workshop Organising Committee Meeting 1	8 April 2014
Spatial Planning Workshop Organising Committee Meeting 2	6 May 2014
Spatial Planning Workshop Organising Committee Meeting 3	21 May 2014
Spatial Planning Workshop Organising Committee Meeting 4	28 May 2014
Spatial Planning Workshop Organising Committee Meeting 5	June 2014

Note: the Steering Committee Minutes are in Appendix 10, and other minutes are available on request.

In addition to workshops, The Phase II Hub initiated the talking news "*What's Hatching*", which was distributed by email and to mobile phones to over 640 Seafood CRC stakeholders, providing research updates and describing extension activities (Episodes 1 and 2, May and October 2014).

One webinar was facilitated by the Hub, delivered by Dr Nicki Mazur (Charles Sturt University and ENVision Environmental Consulting) entitled 'Environmental Values and Social Acceptability of the Commercial Fishing Industry' in May 2014, covering the social acceptability of the fishing industry with relevance to aquaculture. Unfortunately the second planned webinar was cancelled, and Hub administration shifted focus to workshop planning and facilitation. This is a successful communication strategy utilised by FRDC's Aquatic Animal Health Subprogram (FRDC 2012/001), and remains to be tested in the communication of aquaculture production research.

The Finfish and Shellfish Hatchery Networks have been maintained through the Hub, with the Hatchery Technology workshop being the most recent focal activity.

2. Delivery of key extension activities for the 'Finfish' and 'Breeding for Profit' Themes of Production Innovation Program

In relation to the Finfish theme, meetings with the SfCRC Managers of the Production Innovation Program, and Communication, Education, Training and Extension Program have identified several areas of focus for extension. These were 1) a revised technical hatchery manual for Yellowtail Kingfish, 2) presentation and fact sheet communication of Cobia production in Australia, and 3) a fact sheet or booklet regarding skeletal malformation classification for several finfish species cultured in Australia. After discussion with the key industry stakeholder (Clean Seas Tuna in Nov 2013), the revised technical hatchery manual for Yellowtail Kingfish was replaced with a brief report to summarise the key findings of the SfCRC-funded YTK hatchery research. Cobia research was communicated through presentations at WAA14, and contributions to the Hatchery Technology workshop in June 2014.

The proposal for the extension of 'Breeding for Profit' theme research was for the SfCRC Program Manager to work with selected Hub co-investigators to identify and outline content of a series of training modules and webinars, with individuals or organisations recommended to deliver those. There are two levels of training needed, the first is at the technical, hatchery management level, and the second is for people already involved in breeding programs. The extension plan was not finalised by the end of the Hub Phase II project and the extension of the genetics research will be conducted with the guidance of the SfCRC Program Manager. This has commenced with a workshop open to all SfCRC Participants run by CSIRO and ASI in November 2014, and future genetics extension will be managed by Nick Robinson and the SfCRC.

Other communication of 'Finfish' and 'Breeding for Profit' theme research was undertaken through the *What's Hatching* video news, presentations at WAA14, and contributions to Hatchery Workshops.

3. Develop a plan for continuation of successful communication activities beyond the life of the Seafood CRC

Surveys were conducted to follow-up each of the Hub workshops, and the *What's Hatching* video news, gauging the support of stakeholders and interest in the continuation of research communication, extension and trans-Tasman industry networking. Survey results are included in the appendices. As part of the FRDC's national priority initiative (2015-2020 strategic plan) to invest RD&E in support of new and emerging aquaculture opportunities, a new subprogram will continue the communication and extension of aquaculture production research, and the Hatchery Network activities from July 2015.

5. Results

The results and progress of activities listed in the Work Plan are reported below and numbered according to the Plan. Additional information is found in the milestone reports, workshop reports and technical exchange reports (Appendices 3 to 9).

1. Trans-Tasman Salmon Workshop 1 - Communications & Community Engagement, 3-5 February 2014. RDS Partners was engaged to work with the workshop organising committee (Jennifer Cobcroft, Catriona Macleod and Adam Main) and facilitate Day 1 and Day 2 with a PR and communications consultant leading Day 3. The Participants opted to make a brief report publicly available (Workshop Report in Appendix 3), and the detailed report was distributed to workshop participants only. 42 people attended the workshop from 3-5 February 2014, including seven from New Zealand, six of those funded by the Hub to attend.
   The priority issues for community engagement/ social acceptability of salmon aquaculture were defined, and workshop participants committed to actively work on positive communication approaches for the salmon farming industry, individually and where possible co-operatively, in their respective situations. A trans-Tasman network of colleagues was established for follow-up of communications issues and to progress more workshops that will improve the sustainability of the aquaculture industry in Australia and New Zealand.
   Feedback from industry indicated within-company actions were implemented immediately as a result of the communications scenario session to reduce the risk of incidents and prepare to respond in a crisis. Regulators and researchers also refined survey design to assess community acceptance following the workshop.

2. Trans-Tasman Aquaculture Workshop 2 - Spatial Planning, 12 June 2014. An organising committee with representation from Tasmania, SA and New Zealand planned the workshop focus and content, and advised on participants. 26 people attended the workshop on 12 June 2014 at SARDI Waite Campus in Adelaide, including ten from New Zealand, six of those funded by the Hub to attend (Workshop Report in Appendix 4).
   The group considered three case studies of spatial planning, in Tasmania, South Australia and New Zealand, and then discussed the strengths and weaknesses of various spatial planning approaches. The elements in the process of the ideal spatial planning system for aquaculture were defined, and workshop participants prioritised those to actively work on in their respective employment positions.
   At the end of the workshop, the group identified a topic for a third trans-Tasman aquaculture workshop: “defining what level of information or parameters are needed for spatial management (tools)”. The organising committee members agreed to work toward a mechanism to facilitate and seek funding for future workshops.

3. Aquaculture Genetics Production Package.
   Due to negotiations around the appropriate mechanism and approach to this activity, it was not undertaken by the Phase II Hub and allocated funds were returned to SfCRC.

4. Workshops: Hatchery Health.
   The Hub funded Ian Anderson as a key speaker at the Marine Hatchery Workshop on 12 June 2014 at SARDI West Beach in Adelaide. He presented to an audience of about 60 people on: microflora; diagnostics; health issues in prawn and finfish larval

rearing; screening prawn broodstock as specific pathogen free (SPF); disinfectants (see Appendix 6).

Biosecurity in land-based facilities was also a subject of the Hatchery Workshop on 12 June 2014, for multi-sectors (shellfish, crustaceans and finfish). Examples of new and upgraded water treatment systems in commercial facilities were presented and discussed. (Contacts: Michel Bermudes (Shellfish Culture), Tony Charles (Australian Prawn Farms), Sagiv Kolkovski (Dept of Fisheries WA), Jennifer Cobcroft (IMAS))

Discussions were held with:

- the shellfish industry in relation to a shellfish biotoxin workshop – to demonstrate and discuss available commercial test kits that may be used as practical tools by farmers to inform harvest management from various sites. This activity was proposed as a complement to a planned project to validate the test kits, but was not undertaken by the Hub. (Contacts: Phil Lamb and Ali Turnbull).
- a tropical finfish hatchery workshop was proposed with input from high technology facility managers in south-east Asia. This was not undertaken by the Hub (Contact: Justin Forrester)

5. Workshop: Response planning.
   This activity was replaced by the shellfish biotoxin workshop discussed above.

6. Bi-monthly webinars.
   On 8 May 2014, the SfCRC Aquaculture Hub hosted a webinar by Dr Nicki Mazur entitled 'Environmental Values and Social Acceptability of the Commercial Fishing Industry'. Dr Mazur is co-author of recent reports 'Let's Talk Fish: Assisting industry to understand and inform conversations about the sustainability of wild-catch fishing' (2012/301) and 'Engagement Strategy Foundations for Australia's Wild-Harvest Professional Fishing Industry'. The webinar was recorded and made available to Seafood CRC Participants interested in taking a closer look at environmental values and community engagement in the fisheries policy and management context.
   A second webinar was planned by Anna Crosbie in May 2014, but cancelled due to communications policy development by MPI NZ.
   While this is an established and successful communication strategy, e.g. through FRDC's Aquatic Animal Health Subprogram (FRDC 2012/001), Hub administration focussed on workshop deliver in the final two months of the Hub project, and a regular series was not established. Webinars may prove a successful communication tool in aquaculture production extension, but this remains to be more thoroughly tested, likely through the new aquaculture opportunities Subprogram of FRDC (from 2015).

7. Co-ordinate technical exchange. The first two technical exchanges were completed 9-13 October 2013, and an open call round in March 2014 resulted in a third award.

Reports from Rod Grove-Jones (EP Shellfish) and Kyle Johnston (Fisheries NSW) are in Appendix 7. The third award to Andy Day of Shellfish Culture has been deferred until mid-2015, due to commercial production commitments.

8. Workshop: Highlights of CRC Production Innovation.
   The Hub added value to information exchange and increased networking at the WAA14 conference and associated workshops through:
   - funding seven participants from New Zealand to attend the Spatial Planning workshop on 12 June 2014, with most participants also engaged in the 'Social Licence to Operate', 'Spatial Planning' and policy sessions at WAA14
   - contributing to the chairing and organisation of the 'Social Licence to Operate' and 'Spatial Planning' sessions at WAA14
   - co-funding with the National Aquaculture Council and WAA14 one of the Plenary speakers, Charlie Arnot (The Center for Food Integrity, USA), presenting "Ethics, values and science - building trust in today's aquaculture". Mr Arnot was also a Panel member in the Social Licence to Operate (SLtO) session
   - the Hub Leader as WAA14 Program Co-Chair, encouraging SfCRC research presentations.

   In addition to the Hatchery Workshop and second Trans-Tasman Aquaculture Workshop, there were several sessions within the World Aquaculture Adelaide 2014 conference, that showcased SfCRC Aquaculture research, including:

   - Tuna Propagation and Tuna Ranching (SfCRC-sponsored session)
     1. The current status of tuna propagation in Japan; Manabu Seoka (SfCRC sponsored speaker)
     2. Linking larval feeding behaviour with the morphology and spectral sensitivity of the visual system in Southern Bluefin Tuna and Yellowtail Kingfish larvae; Pollyanna Hilder, Stephen Battaglene, Nathan Hart, Shaun Collin and Jennifer Cobcroft (IMAS)
     3. Effect of rotifer enrichment on survival of Southern Bluefin Tuna *Thunnus maccoyii* during early larval rearing; Ben Nan Chen, Wayne Hutchinson, David Poppi, Craig Foster, Graham Mair (Clean Seas Tuna)
     4. Technologies to assist reproductive performance in finfish aquaculture; Abigail Elizur (University of the Sunshine Coast)
     5. Towards developing a germ cell transplantation framework for Southern Bluefin Tuna (*Thunnus maccoyii*); Andre Smith, Abigail Elizur, Yutaka Takeuchi, Goro Yoshizaki, Ido Bar and Erin Bubner (University of the Sunshine Coast)
     6. Development of molecular tools to establish germ cell transplantation technology of Southern Bluefin Tuna *Thunnus maccoyii* spermatogonial cells in Yellowtail Kingfish *Seriola lalandi* surrogate hosts; Ido Bar, Andre Smith, Goro Yoshizaki, Yutaka Takeuchi , Erin Bubner, Scott Cummins and Abigail Elizur (University of the Sunshine Coast)

7. Statistical multivariate analysis to identify potential spawning cues for captive Southern Bluefin Tuna, *Thunnus maccoyii*; Wayne Knibb, Adam Miller, Morten Deichmann, Rob Lamont, Yoni Zohar, Craig Foster and Abigail Elizur (University of the Sunshine Coast)

- Yellowtail Aquaculture – hatchery and ongrowing (SfCRC-sponsored session)
    8. Taurine supplementation of *Artemia* diets in Yellowtail Kingfish larviculture; Lindsey Woolley and Gavin Partridge (ACAAR)
    9. Effect of tank wall colour on larval Yellowtail Kingfish *Seriola lalandi* walling behaviour, jaw deformity and performance; Ben Nan Chen, Wayne Hutchinson, David Poppi, Craig Foster and Graham Mair (Clean Seas Tuna)
    10. The effect of dietary soybean meal and soy protein concentrate on the intestinal mucus layer and development of sub-acute enteritis in Yellowtail Kingfish (*Seriola lalandi*) at suboptimal water temperature; Matthew Bansemer, Rebecca Forder and Gordon Howarth, Georgina Suitor, Jenna Bowyer and David Stone (Flinders University)
    11. Dietary selenium in Yellowtail Kingfish nutrition; K.T. Le and R. Fotedar (Curtin University)
    12. Understanding safe and effective operating limits of hydrogen peroxide to treat yellowtail kingfish *Seriola lalandi* parasites; Erin Bubner, Trent D'Antignana, Marty Deveney and Charles Caraguel (Flinders University)
    13. Factors influencing formation of cold cataracts in yellowtail kingfish *Seriola lalandi* post harvest; Maximiliano Canepa, Trent D'Antignana and Erin Bubner (Flinders University)
    14. Resilience of Yellowtail Kingfish (*Seriola lalandi*) flesh quality attributes to harvest stress; Trent D'Antignana, Erin Bubner and Maximiliano Canepa (Clean Seas Tuna)
    15. Quantitative method to measure colour changes in Yellowtail Kingfish (*Seriola lalandi*) fillets; Trent D'Antignana, Erin Bubner and Mark Thomas (Clean Seas Tuna)

- Cobia in 'Other Marine Fish'
    16. Investigations into sexually dimorphic growth and early identification of gender in cobia; Luke Dutney, Abigail Elizur and Peter Lee (DAFF, QLD)
    17. Towards the commercial production of cobia in Australia – an update; Luke Dutney, Brad Callcott, John Moloney, Trevor Borchert, David Nixon and Peter Lee (DAFF, QLD)

- From Farm to Table – Understanding and Meeting Market Demands for Safe, Nutritious and Tasty Seafood (SfCRC sponsored session)
    18. Safefish – a partnership approach to managing food safety; Alison Turnbull (SARDI)
    19. Improving the management of the risk of human enteric viruses in shellfish at harvest; Anthony Zammit, Brenda Hay and Dorothy-Jean McCoubrey (NSW Food Authority)

20. Implementing electronic traceability in remote, high volume fisheries: issues and opportunities; Janet Howieson, D. Carter, B. Bell, L. Leyland, and E. Colquhoun (Curtin University)
21. Improved approaches for assessing product spoilage: Australian oysters – a case study; Thomas Madigan, Nathan Bott, Valeria Torok, Nigel Percy, John F. Carragher, Miguel A. de Barros Lopes, Daniel Cozzolino, Kerry Wilkinson and Andreas Kiermeier (SARDI)
22. Ensuring safe packaged seafood – a guide; Stephen Pahl, Sutasinee Anantanawat, Catherine McLeod, Tom Madigan, Ian Stewart, Karen McNaughton and Alison Turnbull (SARDI)
23. An assessment of packaging options and shelf life of fresh and cobia *Rachycentron canadum* including microbiological acceptability, consumer acceptability and sensory assessments; Andrew Forrest*, John Mayze, Carl Paulo, Heather Smyth and Sue Poole (DAFF, QLD)
24. Loss minimisation in farmed prawns through improvements in storage life and colour; Carl Paulo, Sue Poole, Yasmina Sultanbawa, Paul Exley, John Mayze, Andrew Forrest, Kent Fanning, Sharon Pun, Caterina Torrisi and Kerrie Abberton (DAFF, QLD)
25. Marketing Australian farmed barramundi; Meredith Lawley (University of the Sunshine Coast)
26. Super seafood - what's in Australian seafood?; Emily Mantilla (SfCRC)
27. Using food safety and environmental sustainability credentials to support market positioning in China – a case study; Jayne Gallagher (SfCRC)

- Genetic Futures – How Might the Business of Genetics and Breeding Unfold? (SfCRC-sponsored session)
    28. The business of breeding: challenges to commercialisation of genetic breeding programs in Australian aquaculture; Graham Mair (SfCRC)
    29. Australian Seafood Industries - A case study in commercialisation of selective breeding research; Matt Cunningham (Australian Seafood Industries)

- Oyster Farmers Day and Oysters
    30. Genetic variation in Pacific oysters for resistance to *Ostreid herpesvirus-1*; Peter Kube, Michael Dove, Matthew Cunningham, Peter Kirkland, Wayne O'Connor and Nicholas Elliott (CSIRO)
    31. Antiviral response of the pacific oyster and transgenerational immune priming; Timothy Green, Caroline Montagnani, Kirsten Benkendorff, Nick Robinson and Peter Speck (Flinders University)
    32. Loss of Allelic diversity within long term selection lines of Sydney rock oysters, *Saccostrea glomerata*; Vu Van In, Nguyen Hong Nguyen, Wayne Knibb and Wayne O'Connor (University of the Sunshine Coast)

- Social Licence to Operate: Create, Nurture and Grow
    33. Let's talk fish: the implications of social acceptability for the commercial fishing industry; Nicki Mazur, Andy Bodsworth and Allan Curtis (ENVision Environmental Consulting, and Charles Sturt University)
    34. Not all big bucks and flashy ads: how your community relationships affect and build your social license to operate; Kate Brooks (KAL Analysis Pty Ltd and ANU)
    35. Hearts and minds; Gary Hooper (Aquaculture New Zealand; Hub-funded speaker and workshop attendee)
    36. Supporting sustainable aquaculture development in New Zealand: earning trust and support from the communities in which you operate; Anna Crosbie, Hamish Wilson, Adam Hicks, Colin Johnston (NZ MPI and Aquaculture New Zealand)
    37. Engaging within the community - key lessons from a multi-stakeholder Australian/ New Zealand salmon industry workshop; Jennifer Cobcroft, Adam Main, Maree Fudge and Catriona MacLeod (IMAS)

- Effective Engagement in Policy Development
    38. Engaging with communities and stakeholders for policy development; Carla Leversedge and Michelle Blicavs (IAP2; facilitator of Spatial Planning workshop)
    39. Where does environmental assessment fit into aquaculture planning?; Catriona Macleod (IMAS)
    40. New Zealand aquaculture, a government perspective; Daniel Lees (MPI New Zealand; Hub-funded speaker and workshop attendee)
    41. Developing marine fish farms in New Zealand; Mark Gillard (New Zealand King Salmon; Hub-funded speaker and workshop attendee)

    The Seafood CRC booth at WAA14 also hosted product demonstrations and product launches based on SfCRC-funded research.

9. Workshop(s): Production methods for Yellowtail Kingfish.
   A Workshop on 8 November 2012: Early Weaning Techniques and Yellowtail Kingfish Research Update & Extension, provided 16 Australian hatchery technicians and managers with an update on Yellowtail Kingfish hatchery research (Appendix 5).

   The WAA14 conference included a dedicated Yellowtail session, and showcased SfCRC research.
   No other Kingfish-specific workshops were facilitated by the Hub.
   A Yellowtail Kingfish R&D Network is included in the project funded by the Rural Research and Development for Profit Grants Programme, "Growing a profitable, innovative, collaborative Australian Yellowtail Kingfish aquaculture industry: bringing 'white' fish to the market", to commence in the second half of 2015 and continue communication and extension of Yellowtail Kingfish research beyond the life of the SfCRC.

10. Finfish Deformity Classification.
    The classification guide was provided to the SfCRC for formatting and publication in May 2015.
    Cobcroft, J.M. (2015) Finfish deformity classification guide: a visual guide to categorising skeletal abnormalities in Australian marine finfish hatcheries. The Seafood CRC Company Ltd, the Fisheries Research and Development Corporation, the University of Tasmania, and the University of the Sunshine Coast, Bedford Park, Australia. ISBN: 9781862957947. 50 p.

11. Cryopreservation.
    No action was undertaken by the Hub in the preparation of proposed Fact Sheets for this research extension.

12. YTK Hatchery Manual.
    The proposal to revise a manual was tabled at the SBT Larval Rearing planning workshop on 21st November 2013 at SARDI. It was discussed by Craig Foster, Graham Mair and Jennifer Cobcroft, with agreement that there would not be a full revised hatchery manual. A manual for Yellowtail Kingfish was produced by Fisheries NSW in 2011 (Fielder and Heasman, 2011). The decision at the November 2013 meeting was to produce a brief report (6-8 pages) to summarise the key findings of the SfCRC-funded YTK hatchery research 2007-2014. The brief research summary has been provided to the SfCRC Program Manager as a working document.

13. Cobia production methods (Webinar: Fact Sheet).
    Instead of the proposed webinar and fact sheet, three presentations were delivered on the SfCRC cobia research at WAA14, two related to production and one to post harvest, all listed under Work Plan activity 8 above.

14. PhD Internships.
    The internship scheme was advertised in October 2013 by direct email to SfCRC RHD candidates past and present. Initial interest was received from three potential candidates. The final call for applications (up to 5 placements, supported to $1000 each) was made in February 2014, and one application was received and awarded to Priyantha Hathurusingha (University of Adelaide) to undertake a placement with RadAqua (Contact: Wil Conn). This is proposed to be undertaken in 2015, with funding managed by FRDC.

    Another, out-of-session student placement option was explored through Austral Fisheries (Chris Perrot and Martin Excel), for technical assistance and research experience in manta ray research in Coral Bay WA, but was outside the scope of the Aquaculture Hub.

15. Finfish and Shellfish Hatchery Networks - monthly blog/newsletter and annual workshop

    Registered membership of both Networks in June 2014 was 113 people (26 Finfish only, 41 Shellfish only, 25 Finfish and Shellfish, 21 Suppliers interested in both networks). This represents a 27% increase from 2012 numbers of 53 in the Finfish Network and 36 in the Shellfish Network. The Network activities will likely be continued under the umbrella of the FRDC's new and emerging aquaculture opportunities Subprogram (from July 2015).

    The *What's Hatching* series of aquaculture video news updates was launched on YouTube and provided research updates and extension activity information. It was distributed to over 640 Seafood CRC stakeholders (Episodes 1 and 2, May and October 2014). A link to *What's Hatching* has been provided from the SfCRC website. As at March 2015, there were 224 views of Episode 1 and 92 of Episode 2 on YouTube.

    Episode 1 - *What's Hatching*
    http://www.youtube.com/watch?v=-Cl0R0UQeeU&feature=youtu.be&utm_source=What%27s+Hatching_eNews_List&utm_campaign=b9b37a171b-What_s_Hatching_Episode_1&utm_medium=email&utm_term=0_28efe074f6-b9b37a171b-133584481

    Episode 2 - *What's Hatching*
    https://www.youtube.com/watch?v=LF7DcwLW9kc&feature=youtu.be

    A link to *What's Hatching* has been provided from the SfCRC website.

6. Discussion

The three key achievements from the Hub project were: the enhanced and structured trans-Tasman aquaculture sector communication and collaboration; the sharing of knowledge and technical skills improvement within the finfish, crustacean and shellfish hatchery sectors; and novel approaches to the dissemination of research results with *What's Hatching* video news and webinar platforms. These achievements benefited Seafood CRC Participants and the broader hatchery network participants in Australian and New Zealand, as indicated by survey responses documented in Appendix 11.

Within the trans-Tasman network, an informal 'community of practice' for community engagement in the salmon aquaculture sector was formed and then broadened around aquaculture spatial planning. The two workshops had participants from a range of sectors, which enabled improved communication and exchange between Australia and New Zealand, between social science and aquaculture production, between wild fisheries and fish farming, and among industry, regulators and researchers. The trans-Tasman workshops were very successful, resulting in changed practices in the workplace, in research methods, and in connecting people working in similar or inter-related fields. Participants strongly endorsed the continuation of this face-to-face workshop series, with potential for webinars or teleconferences to enhance networking between workshops. The survey results included suggested topics for future workshops: Tools for spatial planning; Science standards for ecological assessment and monitoring, potentially to develop an agreed trans-Tasman approach to assessing and managing ecological effects to inform decision making and social licence; Business risk analysis of social acceptance issues; Practical skills training and development of material/messages for improved community engagement.

An ongoing forum to consider, learn from, and act upon a diversity of research inputs, production logistics, and social acceptance will underpin sustainable aquaculture in the trans-Tasman region. One workshop attendee emphasised this need with the comment: "*Two key points for me … is that science is not all that matters… the manner in which the science is presented is important, but so are politics/economics/regulatory frameworks etc.*"

An important shift has occurred in the Hatchery Networks since the last workshop in 2010. The shellfish (notably oysters) and crustacean (prawn) hatcheries were very open in the 2014 workshop in discussing production challenges, commercial approaches to solving problems, and technical improvements. The cross-sector discussion about water treatment systems, feeds and hatchery health indicated an increased level of industry maturity and trust compared to workshops in previous years. This was supported with Hub-funded technical exchanges for shellfish hatchery technicians. At the workshop, commercial hatcheries gave examples of adoption of new technologies that they had been introduced to in previous workshops, and openly shared the implementation stories and step-wise changes. The fact that the workshop was over-subscribed, with more than 60 participants registered soon after the workshop was advertised, highlights the value of the hatchery workshop series. Workshop outcomes in 2014 were: more rapid adoption of new technologies; greater openness around common industry issues, resulting in faster

problem-solving; and applications of knowledge and technology resulting in improved seed quality to underpin aquaculture industry in Australia and New Zealand. The networks continue to foster informal communication among members between workshops. Registered membership of both Networks in June 2014 was 113 people, which is a 27% increase from 2012 membership numbers. It will be important to maintain the momentum of these whole-sector workshops, with targeted issue- or sector-specific training or technical exchange, for example in high-technology tropical fish hatchery production, domestication and selective breeding, business economics and increasing efficiency, and the early detection of sub-lethal health issues (seen as an ideal avenue for academic/RHD student engagement with industry). An ongoing challenge is "to forge a lasting legacy of coordination and communication within the aquaculture [hatchery] sector" (words from Geoff Allan et al in the previous Hub Final Report; Allan et al, 2013). The Network activities are proposed for continuation under the umbrella of the FRDC's new and emerging aquaculture opportunities Subprogram (from July 2015).

The *What's Hatching* video news episodes from the Hub received positive feedback from viewers (survey responses in Appendix 11; and direct emails to the Hub team after distribution). Over 75% of survey respondents (n = 63) would like to see *What's Hatching* continue. The platform appears to be enhancing within industry and industry-to-researcher communication for the Australian Oyster sector, through their equivalent video series, Australia's Talking Oysters. If this platform of research communication is continued beyond the Phase II Hub, a sector-focused content is recommended to engage a regular audience, and this would likely work well for hatchery-focused research and industry news, and several topics of interest were indicated by survey respondents. It will also be important to ensure a timely release of episodes through the year, with one every 3 months suggested.

As for the video news, webinars are a successful media for communication of research, teaching and discussing industry issues in other aquaculture-related extension projects. The FRDC's Aquatic Animal Health Subprogram (FRDC 2012/001) hosts a webinar approximately every two months. A regular series was not established in the Hub Phase II, and if continued beyond 2014 through another project, such as the new aquaculture opportunities subprogram, a focused theme would be important to ensure audience participation. One of the challenges in hosting webinars was technology, specifically issues with software choice, the quality of sound and internet access of presenters and viewers. To overcome this, recording webinars and making them available for later viewing, would be an advantage. In general, webinars represent a low cost method of communication (< $500 each, depending on the time required for administration and technical setup).

As indicated in the previous Hub final report, despite the fact that the activities reported by the Hub Phase II were well-received by all participants, these activities will not be self-maintaining without on-going coordination. The trans-Tasman network, the Hatchery Networks and other aquaculture producers brought together during this project have requested ongoing support for facilitation outside of industry, as commercial production pressures make the co-ordination of activities difficult, but they want to participate, share information and learn from others. A lasting legacy from the networks that have been

created through the Hub projects would ideally be funded from non-Seafood CRC and non-FRDC sources. However, we are not there yet. FRDC's new and emerging aquaculture opportunities Subprogram will take carriage of some activities from July 2015, and preliminary discussions with industry suggest partial sponsorship on an event-by-event basis would be considered, for example in continuing workshops around social acceptability of aquaculture that develop common messages (narratives) for community engagement.

The biennial series of Australasian Aquaculture conferences in Australia has served aquaculture stakeholders well as a forum for technical information dissemination and, as importantly, the chance to network closely with colleagues. In 2014, the World Aquaculture Adelaide conference provided an ideal forum for the Hub networks to come together and hold adjacent workshops. The biennial conference series in the traditional form (National Aquaculture Council partnership with World Aquaculture Society) finished with the 2014 event. It is likely that specialised sector-based workshops and other communication platforms will enhance the effectiveness of research-industry-regulator information exchange in the future.

With the conclusion of the SfCRC in June 2015, and since the FRDC currently leverages many aquaculture industry R&D levies, it seems FRDC remains the most appropriate source of funds to continue the Hatchery Networks, and potentially other aquaculture production focused communication and extension initiated by the Hub projects. This would enable further negotiation around a mechanism for user/stakeholder-payment for the coordination of the Hatchery Networks, the trans-Tasman workshop series, and other priority aquaculture production research extension.

7. Benefits and Adoption

The workshop and technical exchange reports in Appendices 3 to 7 include specific benefits and adoption of those activities. Highlights were:

- The establishment of structured trans-Tasman aquaculture sector communication and collaboration, with companies, government representatives and researchers reporting adoption of ideas and tools presented at the workshops in their workplaces;
- Increased openness and trust among the Hatchery Network members through workshop participation, leading to increased information exchange and practical on-farm improvements in hatchery production (case studies included higher yield in a prawn hatchery and higher survival in an oyster hatchery);
- Broadened networks for the regulatory, production and research sectors in Australian and New Zealand aquaculture (Hatchery Networks increased to 113 members, and trans-Tasman workshops reached 68 participants);
- Exposure of stakeholders to novel communication approaches, through *What's Hatching* video news and webinar platforms;
- A diverse range of SfCRC and FRDC-funded research showcased at World Aquaculture Adelaide 2014, and some explored further in panel discussions and

workshops;
- Strong industry support to continue the trans-Tasman workshop series and Hatchery Networks and workshops, although no agreed in-kind or cash funding, but there is an opportunity for partial industry sponsorship on an event-by-event basis.

The highlighted achievements benefited Seafood CRC Participants and the broader hatchery network participants in Australian and New Zealand.

8. Further Development

Following the end of the project with Dr Jennifer Cobcroft as the PI, the unspent funds will be returned to SfCRC for reallocation to relevant extension activities. This includes funds for some from the Phase II Hub activities which were not completed in the project timeframe due to a late project start and negotiations external to the Hub around appropriate activity delivery. Extension activities planned for the last 12 months of the Australian Seafood CRC, through the Production Innovation Program and the Communication, Education, Training and Extension Program will complete or replace the Hub Phase II unfinished activities.

A continuation of the trans-Tasman workshops, especially with a salmonid focus, is a priority for the Tasmanian Salmonid Growers Association (TSGA). A mechanism to continue the funding of these workshops remains to be explored by TSGA and FRDC.

Likewise, Hatchery Network members are highly supportive of future workshops and the funding for facilitating those remains to be discussed with FRDC and Network members.

9. Planned Outcomes

The original short-term planned outcomes of the Aquaculture Phase II Hub were largely achieved.

Short term: Increased engagement of industry and research providers by participation in Hub activities in 2012-2014 (minimum of 30 industry personnel and 20 researchers participating in at least one activity; achieved 58 industry and 58 researchers, plus 12 government and 16 suppliers, across four workshops), and adoption of information, skills or processes from those activities into commercial business or research approach (minimum of five examples; detailed in Appendices 3 to 7).

Short term: Increased skills of industry and researchers in aquaculture genetics has not been achieved by the Aquaculture Phase II Hub. However, a workshop was held in conjunction with CSIRO and ASI in November 2014 to achieve this benefit, and future genetics extension will be managed by Nick Robinson and the SfCRC.

The original long-term planned outcomes of the Aquaculture Phase II Hub were partially achieved.

Long term: Continuation of the successful Hub communication activities beyond the SfCRC (minimum of two activities continuing after June 2014) with an agreed strategy to support the activities operationally and financially (industry and research organisation cash and in-kind contributions).

While stakeholders are highly supportive of continuing both the trans-Tasman workshops and the Hatchery Networks and workshops, no agreements are currently in place regarding industry and research organisation cash and in-kind contributions. It should be noted that both of the last two Hatchery Workshops (2010, 2014) and the Early Weaning workshop for finfish hatcheries in 2012 obtained in-kind and cash ($4,000 for each Hatchery Workshop) contributions from service and supply companies. In addition, stakeholders have remained engaged by supporting staff time and travel to attend the workshops. There is no reason to suggest that this past support will not continue, or even grow, for future events. However, industry leaders and pro-active stakeholders are needed to achieve the continuation of Hub activities.

10. Conclusion

This project achieved most of the objectives and planned outcomes, although delayed contract finalisation, negotiation around some activity delivery, and the focus on workshops prevented completion of some planned activities in the project timeframe. The Phase II Hub improved communication and increased collaboration among aquaculture producers and researchers. In the trans-Tasman workshops, the networking reached farther than anticipated by connecting social science and aquaculture production, wild fisheries and aquaculture, and industry, regulator and researcher stakeholders in Australia and New Zealand. Workshop participants and their organisations are supportive of this workshop series continuing. The Hatchery Networks increased in member numbers and in the commitment to share knowledge, which has resulted in improved production from commercial hatcheries and ongoing support for the Hatchery workshops.

11. References

Allan, G.L., O'Connor, W., Fielder, D.S., Booth, M., and Heasman, H. 2013. Aquaculture Innovation Hub. Final Report Project 2008/902. NSW Department of Primary Industries, Port Stephens Fisheries Institute. 81 pp.

Fielder, D.S. and Heasman, M.P. 2011. Hatchery Manual for the production of Australian Bass, Mulloway and Yellowtail Kingfish. Industry and Investment NSW. ISBN 978 1 74256 058 8. 176 pp.

12. List of Appendices

Appendix 1: Intellectual Property

Appendix 2: Staff

Appendix 3: Trans-Tasman Workshop 1 - Communications & Community Engagement Workshop, 3-5 February 2014

Appendix 4: Trans-Tasman Workshop 2 - Spatial Planning Workshop, 12 June 2014

Appendix 5: Finfish Hatchery Network: Early Weaning Workshop - Hatchery Workshop, 8 November 2012

Appendix 6: Hatchery Networks: Hatchery Workshop - Hatchery Workshop, 12 June 2014

Appendix 7: Technical Exchange Reports

Appendix 8: Milestone Report 1, 30 August 2013

Appendix 9: Milestone Report 2, 30 November 2013

Appendix 10: Steering Committee Minutes, 30 September 2013

Appendix 11: Australian Seafood CRC Aquaculture Production Hub activity feedback surveys, March 2015

Appendix 1: Intellectual Property

PROJECT INTELLECTUAL PROPERTY

Project Name	Aquaculture Production Innovation Hub: Phase II – communication, extension and opportunities		
CRC Project Number	2010/756	**Principal Investigator**	Jennifer Cobcroft (UTAS)

Short title of Item of intellectual property

(<10 words; separate sheet for each discrete item of IP)

Australian Seafood CRC aquaculture project findings for incorporation into extension materials.

Description of the Project IP:-

- *Specific and unambiguous, but not disclose full enabling detail of Confidential Information;*
- *If subject to Restricted Access, this should define the nature and scope of the IP but not disclose the substance*

Australian Seafood CRC Aquaculture Production Program research project findings for incorporation into training and extension materials.
Full Workshop report from the 'Trans-Tasman salmon farming workshop – communications and community engagement', 3-5 Feb 2014, Commercial in Confidence and provided to workshop participants only.
All other items were considered on a case-by-case basis and in negotiation with Australian Seafood CRC and any other parties that may have IP ownership, documented in contracts with the Australian Seafood CRC. No other Hub outputs considered protected IP.

Where and by whom is full enabling detail of the Project IP recorded?

(location, identification of documents, person in charge)

Australian Seafood CRC, Dr Graham Mair (Program Manager – Production Innovation) and Ms Emily Mantilla (Program Manager - Communication, Education, Training and Extension). Phase II Hub Leader, Dr Jennifer Cobcroft.

Who developed the Project IP?

(Inventors, other project team members who are involved, any other contributions?)

Australian Seafood CRC Aquaculture project researchers.
Participants in the Trans-Tasman salmon farming workshop – communications and community engagement.

Method of IP protection used so far

(any doubts about security of confidential information must be disclosed here)

In some cases (e.g. Yellowtail Kingfish hatchery production methods), confidentiality has been used to protect IP. The aim of this project is to communicate results of research projects to the CRC Participants that have funded the research projects. In most cases this is material either publicly available or practical applications of research destined for publication in peer-reviewed articles.
Full Workshop report from the 'Trans-Tasman salmon farming workshop – communications and community engagement', 3-5 Feb 2014, Commercial in Confidence and provided to workshop participants only.

Proposed method of IP protection

(E.g. patents, confidentiality, registered design, etc)

All training and extension materials, including written and oral material, are authorised for release by the Seafood CRC. All confidential information remains protected by confidentiality. Responsible persons: Dr Jennifer Cobcroft (PI) in conjunction with Dr Graham Mair (Program Manager – Production Innovation) and Ms Emily Mantilla (Program Manager - Communication, Education, Training and Extension).

PROJECT INTELLECTUAL PROPERTY

Project Name	Aquaculture Production Innovation Hub: Phase II – communication, extension and opportunities		
CRC Project Number	2010/756	**Principal Investigator**	Jennifer Cobcroft (UTAS)
Agreements, licences, assignments or disclosures planned or carried out in relation to this IP *(Reference relevant documents)* None for the Phase II Hub project.			

DATA REGISTER

Project Name	Aquaculture Production Innovation Hub: Phase II – communication, extension and opportunities		
CRC Project Number	2010/756	**Principal Investigator**	Jennifer Cobcroft (UTAS)
The purpose of the Data Register is to identify Processed Data, i.e. assessed as reliable, statistically analysed, and processed into useable form. It is not for tracking all raw data.			
Location of data	**Topic(s)**	**Author/custodian**	**Access to data**
Administration documents, workshop reports and contact list databases	Files for administration and organisation of activities. Contact list, database for industry and researcher organisation contacts	Dr Jennifer Cobcroft (PI)	Confidential, protected on IMAS-FACC, UTAS password-protected file server.

Intellectual Property issues arising:

None

Appendix 2: Staff

Organisation, Staff	Position	Funding
IMAS, University of Tasmania		
Dr Jennifer Cobcroft	Australian Seafood CRC, Aquaculture Production Innovation Hub Leader (1 Nov 2012 – 30 Jun 2014)	Project funded 25%
Dr Catriona Macleod	Senior Research Fellow & Deputy Program Leader - Estuaries & Coasts Program (1 Nov 2012 – 30 Jun 2014)	In-kind 5%
Dr Gay McKinnon	Activities Co-ordinator, Aquaculture Production Innovation Hub (20 Jan 2014 – 30 Jun 2014)	Project funded 50%
Ms Karri Hartley	Administration and Research Assistant, Australian Seafood CRC Aquaculture Hub (22 Aug – 31 Oct 2013; 17 Mar – 6 Jul 2014)	Project funded 50%
Tasmanian Salmonid Growers Association (TSGA)		
Dr Adam Main	Chief Executive Officer	In-kind 5%
SARDI		
Prof Xiaoxu Li		In-kind 2%
Mr Wayne Hutchinson		In-kind 2%
Mr Steven Clarke		In-kind 2%
Oyster Consortium		
Mr Scott Parkinson	Breeding Manager	In-kind 2%
Mr Michel Bermudes	Hatchery Manager	In-kind 2%
RDS Partners		
Dr Tom Lewis	Director	In-kind 5%
University of the Sunshine Coast		
Prof Abigail Elizur		In-kind 2%
Flinders University		
Dr Nick Robinson		In-kind 2%

Appendix 3: Trans-Tasman Workshop 1

Communications & Community Engagement Workshop, 3-5 February 2014

Appendix 4: Trans-Tasman Workshop 2

Spatial Planning Workshop, 12 June 2014

Appendix 5: Finfish Hatchery Network: Early Weaning Workshop

Hatchery Workshop, 8 November 2012

Appendix 6: Hatchery Networks: Hatchery Workshop

Hatchery Workshop, 12 June 2014
http://www.seafoodcrc.com/hub-presentations/hatchery-technology-workshop.html

Appendix 7: Technical Exchange Reports

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Appendix 11: Australian Seafood CRC Aquaculture Production Hub activity feedback surveys, March 2015

Appendix 3

Trans-Tasman salmon farming workshop – communications and community engagement

Dr Jennifer Cobcroft, Dr Catriona Macleod
Dr Adam Main and Maree Fudge

Workshop report of Project No. 2012/756

AUSTRALIAN SEAFOOD COOPERATIVE RESEARCH CENTRE

Trans-Tasman salmon farming workshop – communications and community engagement

Dr Jennifer Cobcroft, Dr Catriona Macleod Dr Adam Main and Maree Fudge

3-5 February, 2014

This workshop was facilitated by the Australian Seafood CRC Aquaculture Production Innovation Hub, RDS Partners and Adam Main (CEO, Tasmanian Salmonid Growers Association Ltd)

All workshop participants are thanked for their contributions, including MPI-NZ, Marlborough District Council, Cawthron Institute, Aquaculture NZ, NZ King Salmon, NIWA, Tassal, Huon Aquaculture, Petuna, Van Dieman Aquaculture, NAC, and DPIPWE Tasmania. Material kindly provided by Nicki Mazur, Kate Brooks and Richard Gerathy has been incorporated in the report.

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

Table of Contents

Non-Technical Summary

Project 2012/756 – Trans-Tasman salmon farming workshop – Communications and Community Engagement

OBJECTIVES:

1. Consider the current body of knowledge regarding community perceptions and the risks that these may pose to the salmon aquaculture industry locally and globally

2. Identify priority issues for the industry (related to community perceptions, community engagement and communication)

3. Broadly characterise the information available that can be used to address the priority issues and identify any major gaps

4. Develop practical community engagement knowledge, and identify relevant planning and communication approaches for the salmon farming industry.

NON TECHNICAL SUMMARY:

The "Trans-Tasman salmon farming workshop – communications and community engagement" was held 3-5 February, 2014 at the Hobart Function and Convention Centre, Hobart, Tasmania. There were 43 participants, including seven delegates from New Zealand. Participants included representatives from the salmon farming industry, research, aquaculture supply and regulatory sectors, as well as wild fishery and market sectors, and communications professionals.

During Day 1, the group considered the existing body of knowledge in relation to community perceptions of salmon aquaculture, drawing on reports from Australian, New Zealand and international research. Presentations were made by trans-Tasman industry representatives and social science researchers. Participants identified a list of priority issues relevant to community engagement and social acceptability of salmon farming, then grouped these by issue type and allocated a ranking to the intensity of the issue. The potential impact of these issues was discussed; with focus on how might they affect 'access' (to resources to support farming) and 'market' (product sales). Key discussion points included the pending legal decision in New Zealand over NZ King Salmon's application for expansion, the rise of social media, and the need to find shared values with the community and clarify terms such as 'engagement' and 'consultation'. Approaches for dealing with the issues identified were then considered.

At the beginning of Day 2, a PR consultant presented different approaches to communication and working with community perceptions, drawing on examples from the mining industry, and providing some tools for managing issues and engagement with different stakeholders. Participants worked through engagement planning around a subset of priority issues, and shared personal examples of approaches used or experienced. The group appreciated the value of including social acceptability in business management, as the fourth pillar beside economics, environmental responsibility and technical capacity as sustainable foundations of business. The workshop established an informal learning network (community of practice) regarding best practice in fostering social acceptability. An overriding theme

was the need to build long-term relationships with stakeholders, work together on pre-competitive issues, and to consider a range of engagement tools.

The final day of the workshop focussed on scenario-based communications planning, moving from a long-term engagement issue, through to approaches to managing a critical incident.

At the end of the workshop, the group identified immediate actions (within 6 months) as follows:
New Zealand

- Develop a Community Engagement and Social Licence strategy (Aquaculture NZ and MPI) – report-back to group on the draft (by webinar) in April
- Incorporate changes in current research approach that will determine community attitudes to aquaculture - changes based on studies discussed at the workshop (MPI and Aquaculture NZ)
- Seek funding support for ongoing (post- June 2014) trans-Tasman activity (Aquaculture NZ, MPI)

Australia

- Survey of participants on workshop content. Including, ask "What will participants apply 'back at work'?" (Hub and RDS Partners)
- Send TSGA R&D Strategy to NZ participants (TSGA)
- Follow-up webinar in 3 months (end April 2014) – teaching from Nicki Mazur and update what's happened since the workshop?, Did strategies work?, Share stories. Hub to facilitate
- Next workshop in June 2014 – Spatial Planning. Hub to facilitate
- Seek funding support for ongoing (post- June 2014) trans-Tasman activity (Hub and TSGA)
- Q & A Tasmanian industry session for industry, research and government representatives (Skretting, Tassal, IMAS, et al.) – current information sharing

OUTCOMES ACHIEVED TO DATE

The priority issues for community engagement/ social acceptability of salmon aquaculture were defined, and workshop participants committed to actively work on positive communication approaches for the salmon farming industry, individually and where possible co-operatively, in their respective situations.

A trans-Tasman network of colleagues was established for follow-up of communications issues and to progress more workshops that will improve the sustainability of the aquaculture industry in Australia and New Zealand.

Three issue topics selected that the group will progress going forward:

1. Critical issue preparedness (TSGA Comms group)
2. Australia-New Zealand Broadscale Environmental Monitoring Strategy (ANZBSEMS) – (TSGA, AquaNZ, IMAS)
3. Animal Welfare communications strategy

KEYWORDS: salmon aquaculture, community engagement, communication, social acceptability, environment

Appendix: Workshop Program

Trans-Tasman salmon farming workshop - Communications and community engagement
Hobart Function and Convention Centre, Hobart, Tasmania
3-5 February 2014

Facilitated by the Australian Seafood CRC Aquaculture Production Innovation Hub

An industry perspective on salmon farming in Australia and New Zealand in the context of communications and community engagement

What do we know? What can we do?

WORKSHOP PROGRAM

Aims of the workshop

Through discussion, structured input and deliberation with workshop participants, the aims are to:

- Consider the current body of knowledge regarding community perceptions and the risks that these may pose to the salmon aquaculture industry locally and globally
- Identify priority issues for the industry (related to community perceptions, community engagement and communication)
- Broadly characterise the information available that can be used to address the priority issues and identify any major gaps
- Develop practical community engagement knowledge, and identify relevant planning and communication approaches for the salmon farming industry.

This facilitated three-day workshop creates the opportunity for industry members from across Australia and New Zealand to develop and progress their understanding of the ways that community perceptions of salmon aquaculture impact on profitability and production.

More importantly, this workshop creates a practical opportunity to develop new approaches and strategies for dealing with the impacts of community perceptions.

Day 1 works with the existing body of research and knowledge related to community perceptions and will draw on current experience within the industry and identify current priority issues.

Day 2 will delve more deeply into the important aspects of the issues (identifying and classifying different types of issues), teasing out a range of approaches for dealing with the industry's priorities.

Day 3 will take participants through scenario challenges, providing a practical experience of different approaches to dealing with the impacts of community perceptions.

Facilitators

Jennifer Cobcroft - SfCRC Aquaculture Hub Leader
Catriona Macleod - Deputy Director Fisheries, Aquaculture & Coasts Centre, Institute for Marine and Antarctic Studies
Adam Main - CEO, Tasmanian Salmonid Growers Association Ltd

Day 1 - Monday 3 February 2014

8:45 – 9:15 Arrival with tea and coffee available

9:15 – 11:15 Welcome, opening and establishing the groundwork

11:15 – 11:35 Short morning tea break

11:35 – 13:00 Considering current knowledge and research regarding community perception, communication and community engagement

13:00 – 14:00 Lunch

14:00 – 15:30 Considering current knowledge – industry experience

15:30 – 16:00 Afternoon Tea

16:00 – 16:30 Confirming current industry priorities

- What does this mean to the Australian and New Zealand salmon industry?

16:30 – 17:00 Summary and planning next day

- Confirm the focus for Day 2

Some key questions likely to inform Day 2

- What are the key perception issues?
- How can these perceptions influence our business?
- Who does industry need to engage with?
- What information do we already have that could be useful?
- What are we missing?
- What are the key questions?

17:30 – 22:00 Drinks and nibbles, followed by informal BBQ dinner at workshop venue

Day 2 - Tuesday 4 February 2014

The sessions listed below will be tailored according to Day 1 outcomes and participants' priorities – consequently, please consider these as working titles for the moment.

9:00 – 11:00 What tools do we have?

- Considering communication strategies
  - New and emerging
  - Existing, tried and true
  - Campaigning approaches

11:00 – 11:30 Morning Tea

11:30 – 13:00 How do we communicate effectively and with whom?

- How do different types of issue affect communication strategy

13:00 – 14:00 Lunch

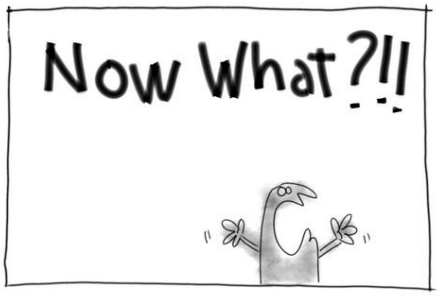
14:00 – 15:30 What happens next?

15:30 – 16:00 Afternoon Tea

16:00 – 17:00 Taking stock - what have we achieved?

17:00 – 17:30 Summary and preparing for Day 3 - Scenario-based response planning

- What do we need to consider on Day 3?



DRAFT working program

Day 3 - Wednesday 5 February 2014

Scenario-based response planning and communication based on Day 1 and Day 2 outcomes, conducted by communication specialists.

9:00 – 11:00 Morning session 1 - Critical scenario

- What do we do when we get a curve ball?

11:00 – 11:30 Morning Tea

11:30 – 13:00 Morning session 2 - Non-critical scenario

- Planning and developing strategic approaches to key issues

13:00 – 14:00 Lunch

14:00 – 15:30 Afternoon session

- Putting it all into practice. How could we change our strategy, actions and thinking for different scenarios?

15:30 – 16:00 Afternoon Tea

16:00 – 17:00 Summary and close

Appendix 4

Trans-Tasman Aquaculture Workshop 2
Spatial Planning

Organising Committee:
Rebecca Clarkson, Jill Coates, Jennifer Cobcroft, Daniel Lees, Catriona Macleod, Adam Main, Emily Mellor, Tony Thomas, Karri Hartley

Facilitators:
Daniel Casement, Carla Leversedge

Workshop Report of
Project No. 2012/756

AUSTRALIAN SEAFOOD COOPERATIVE RESEARCH CENTRE

Trans-Tasman Aquaculture Workshop 2
Spatial Planning

Organising Committee:
Rebecca Clarkson, Jill Coates, Jennifer Cobcroft, Daniel Lees, Catriona Macleod, Adam Main, Emily Mellor, Tony Thomas, Karri Hartley
Facilitators:
Daniel Casement, Carla Leversedge

26 June 2014

This workshop was facilitated by the Australian Seafood CRC Aquaculture Production Innovation Hub; Institute for Marine and Antarctic Studies, UTas; Tasmanian Salmonid Growers Association Ltd.; Tasmanian Department of Primary Industries, Parks, Water and Environment; Primary Industries and Regions SA; South Australian Oyster Research Council and South Australian Oyster Growers Association; Aquaculture New Zealand; Ministry for Primary Industries New Zealand; IAP2 Australasia; Rural Solutions SA; FRDC.

All workshop participants are thanked for their contributions.

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

Table of Contents

Non-Technical Summary

Project 2012/756 – Trans-Tasman Aquaculture Workshop #2 – Spatial Planning

OBJECTIVES:

(1) Define the elements in the process of the perfect spatial planning system for aquaculture

(2) Establish a trans-Tasman network of colleagues for follow-up of spatial planning issues

NON TECHNICAL SUMMARY:

The "Trans-Tasman Aquaculture Workshop – Spatial Planning" was held 12 June 2014 at SARDI, Waite Campus, Adelaide. There were 25 participants, with ten delegates from New Zealand.

The group considered three case studies of spatial planning, in Tasmania, South Australia and New Zealand, and then discussed the strengths and weaknesses of various spatial planning approaches. Participants workshopped key components of four vital areas in spatial planning for aquaculture: planning processes, information processes, governance processes, and stakeholder engagement. The result was a framework of process components for an ideal approach to aquaculture spatial planning.

At the end of the workshop, the group identified a topic for a third trans-Tasman aquaculture workshop: "defining what level of information or parameters are needed for spatial management (tools)". The organising committee members will work toward a mechanism to facilitate and fund future workshops.

OUTCOMES ACHIEVED TO DATE

The elements in the process of the perfect spatial planning system for aquaculture were defined, and workshop participants prioritised those to actively work on in their respective employment positions.

A trans-Tasman network of colleagues was established for follow-up of spatial planning issues and to progress more workshops that will improve the sustainability of the aquaculture industry in Australia and New Zealand.

KEYWORDS: aquaculture, spatial planning, community engagement, communication, environment, governance

Background and Need

This is the second in a series of trans-Tasman workshops funded by the Australian Seafood CRC and FRDC. The intention is to build linkages, networks, collaboration, and in some instances improve efficiencies, through closer Australia-New Zealand engagement around aquaculture. The initial focus of the workshops was on salmon aquaculture. Following the first workshop in Feb 2014, on Communication and Community Engagement, it is clear that the topics discussed relate to the broader aquaculture sector. With this in mind, the next workshop topic is Spatial Planning, with a finfish focus (salmon, tuna, kingfish) but considered in the whole-system context to include other sectors (oysters and mussels). There are examples from Australia and New Zealand of different approaches to Spatial Planning, and this workshop was an opportunity to discuss those in more detail, consider strengths and weaknesses, and potentially examine international case studies.

Objectives

(1) Define the elements in the process of the perfect spatial planning system for aquaculture
(2) Establish a trans-Tasman network of colleagues for follow-up of spatial planning issues

Workshop Discussion: Establishing a spatial management system for aquaculture

The establishment of an aquaculture spatial planning and management system for aquaculture requires 4 key processes:

- Information collection, collation and management
- Governance
- Stakeholder engagement
- Planning

Planning Processes

The principles of a strong planning process should include:

- A clear set of overarching objectives – local, state and national
- Clear, unambiguous structure
    - Minimum number of decision points
    - Limited feedback loops
- Process that ensures decisions are made in a timely fashion
- Encourage shared decision making and responsibility through information sharing, and open discussion
    - appeal limitations – one chance
    - clear public comment provisions
    - reduced litigious opportunities / involvement
- Build in flexibility to cope with change such as a changing climate, disease etc

- Review process - Independent review panel – where would they sit?
- Triple bottom line approach – economic impact
- funding – cost recovery if necessary
- Industry leadership – someone with MANA
    - someone with authority to speak for industry
    - science leadership – good science to support the planning

Information Processes

The formation of an 'information group' with a focus on getting the best information is vital throughout the development and operation of a spatial management system.

The group should be established under a clear Terms of Reference (TOR), which will encompass:

- The aims and objectives of the group, including the need to reach a consensus view
- The information requirements – ie what information is available, required and for what purpose. It is worth noting that there should be some flexibility in the information required, but this should not become unmanageable or no decisions will be made
- The group must be focused on information, and the principles of the system (not adversarial) on issues (conflicting views ok, but will be reviewed "in house").
- The group needs to be skills based rather than representative, thereby remaining non-biased, whilst being representative of issues and stakeholders
- The group must have involvement in the system/project throughout the lifecycle to ensure the established objectives are met
- This group can be a key reality check throughout the life of a project

If established and managed correctly, the system should be managed within a 'risk-management context.' This will ensure that issues, information and direction are framed appropriately based upon the likelihood, consequence and impact of the related risk. Further to this:

- Decision makers and stakeholders will know in advance of project what is required, and what can be gained as part of a process (see process TOR)
- An adaptive management process can be employed (risk related), and
- A review process is a key component of the system.

It will be important for this group and process to ensure that consideration is given to the triple-bottom line spectrum, and that not all required information is scientific.

Identifying the major issues up-front (see TOR) will ensure that information collection is not a 'catch-all', and resources can be spent the right way, drawing upon other studies, research, experiences, information sharing etc.

Information requirements are key to the planning and governance processes.

Governance Processes

Getting the level of governance right is imperative to the success of a spatial planning and management system.

There should be a clear political statement that outlines first and foremost the level of support at all levels of government to have an aquaculture industry.

Governments must have the policy and legislation system in place to support any political backing they give to aquaculture.

A skills based expert assessment panel/process should be a key part of the governance process. This will ensure that throughout the process there is the capacity to:

- make the appropriate decision on spatial planning
- reflect a variety of uses and values
- ensure expediency and efficiency of decision making process
- Limited ability to challenge decision that results from appropriate process

Stakeholder Engagement

DO	DON'T
Talk to stakeholders - community (broader) - regulators / government - other industries	Mix messages – not sticking to the objectives or messages of the engagement
Identify stakeholders - and weigh/evaluate their role and influence	Employ or promote a spokesperson who doesn't understand the issues / lacks credibility
Plan ahead (lots of time)	Get side tracked
Develop trust – internal and external process	Get emotional
Identify who will undertake the engagement and when	Evade the tough questions or issue
Consider what is fit for purpose i.e. project versus creating a zone	Just talk – do 'listen'
Find the common ground including the values, shared understanding	Forget "culture"
Ensure a clarity of focus	
Develop clearer process	
Rate the impact	
Develop and promote case studies from other spatial planning experiences – good practice	
Build and maintain credibility, including a champion	
Maintain an approach of ongoing relationship management – openness	
Ensure you consider dedicated	

resources	
Promote key messages – KISS (keep it simple)	
Maintain clear objectives	
Collect and share background data – understand what and how much is needed	

Benefits and Adoption

The benefits of using a well-developed spatial planning system will include greater connectivity between stakeholders, more efficient decision-making processes, and a greater support base for aquaculture as an industry.

Adoption of the key elements in the four areas as suggested throughout this workshop and highlighted in case studies across the jurisdictions will allow for more considered aquaculture development, and engagement throughout the required stakeholder network which will in turn create a greater impetus for success.

Further Development

A recommendation for a further workshop between Australian and New Zealand counterparts was made. This workshop should focus on:

- What level of information or parameters are needed for spatial management?
- What level of sensitivity?
- How can we determine these collaboratively across Australia and New Zealand?
- How do we ensure these are fit-for-purpose?

Planned Outcomes

The elements in the process of the perfect spatial planning system for aquaculture were defined, and workshop participants prioritised those to actively work on in their respective employment positions. This has public benefit outcomes in relation to an improved approach to stakeholder engagement in aquaculture planning, and the use of appropriate tools and information in planning. Private sector benefits include an increased understanding of strengths and weaknesses in aquaculture spatial planning, and enhanced efficiency for industry and regulators in terms of improving planning approaches.

A trans-Tasman network of colleagues was established for follow-up of spatial planning issues and to progress more workshops that will improve the sustainability of the aquaculture industry in Australia and New Zealand.

Conclusion

The workshop was a success in relation to connecting a group of people with a common interest and focus on improving spatial planning for aquaculture. The workshop strengthened trans-Tasman networks and developed an important framework of process components for an ideal approach to aquaculture spatial planning.

A follow-up survey of participants has been conducted (Appendix 1) to compile further feedback from the workshop and the workshop organising committee members will pursue a mechanism to facilitate and fund future workshops.

Appendix 1

Spatial Planning Workshop: Survey Responses Summary

Overall, of the workshop participants which responded to the survey (27/60), most rated the **venue** and **catering** as **good**, and the **appropriateness of topics**, and **presentation** and **facilitation quality** were all considered **very good**.

Most valuable part of the workshop: all responses

1. The ability to engage and question representatives from different jurisdictions. It built nicely in the conference where you got a bit of everything but may not have had the chance to ask a lot of questions and get into the detail of the information presented. This provided that opportunity.

2. All of it including presentations, discussion, break-out groups, facilitation techniques, science.

3. The diversity of experience and knowledge of the participants. Really liked the presentations and frankly discussing experiences of each situation

4. Presentations from the different states and NZ which gave an overview and understanding of how others do their planning

5. Learning first hand from the hands on people at the pit face exactly as it was/is. Becoming more familiar with SA and TAS planning processes

6. The networking opportunity

7. Gaining insights into range of planning regimes

8. The workshop was really well facilitated and had a valuable mix of attendees. The issues were scoped up well and outcomes were pragmatic and very helpful.

9. Sharing common experience (across states and countries) to a develop meaningful response to the challenge of expressing good practice for spatial planning. I also really enjoyed the presentation on effective community engagement. The was extremely relevant given the conference and workshop both identified the need for effective community engagement in spatial planning.

10. The opportunity to discuss like issues and solution with other jurisdictions

11. Broad agreement reached on best approach to a spatial planning process for aquaculture

12. Networking - hearing about others' experiences: what has worked & what hasn't

13. Participation spectrum and matrix from [facilitator] - good not just for spatial planning.

Least valuable part of the workshop: all responses

1. Probably the additional presentation [on hydrodynamic modelling] and [facilitator]. While these are interesting works there were other similar models/tools being used by other jurisdictions and it would probably be more beneficial to have a workshop just around the "spatial planning tools" which are out there.

2. none

3. Travelling close to 45mins to get there. Least valuable was listening to our own country presentation from [one of the NZ presenters] as fully familiar.....this is not to denigrate [this] presentation.

4. The location - a taxi ride was required

5. none - it was all good

6. n/a

7. The presentations on the hydrodynamic modelling. Although relevant, modelling the effective of nutrient inputs is but one factor to take into account in any spatial planning exercise.

8. None it was all valuable

9. It was all useful. Would have benefited from another day

10. The breakout session in which we broke into self-selected small groups to discuss one of several topics

Improvements: all responses

1. It would have been nice to have had more industry representatives there.

2. Offering all a 1 minute chance to contribute a summary view and give contacts as a few can dominate discussions

3. Don't see any obvious deficiencies - it was comfortable environment to express and listen to views

4. Perhaps reverse engineer one or two of the Aus/NZ planning processes to see where weakest and where could be improved rather than a generic exercise.

5. Involvement of more planning exponents - enable those who carry out this activity to share and benefit from best practice.

6. The location seemed a little tricky for some as there were a few late arrivals.

7. There was not much that could have been improved as the day was very productive. As discussed below, perhaps some documentation of the success or otherwise of current spatial planning may have been useful as background. One aspect we did not cover was some consideration of the common issues involved in spatial planning exercises. What I found over the conference and workshop was a high degree of commonality between jurisdictions about the potential conflicts between natural and human use values, and the potential for aquaculture. The nature and extent of these conflicts is fundamental to resolving the tension over providing for new aquaculture areas. We could then focus our efforts on methods of establishing whether the tension is real or perceived and develop effective response mechanisms.

8. Perhaps more time

9. Probably needed more time to cover the topic

10. One day felt a little too rushed.

11. Politicians perspective

Priority areas to address within spatial planning context, given respondent's current position (employment)

1. I am interested in exploring the idea of the inclusion of broader impact statements further.

2. Finding ways to cajole/push the system to focus on delivering reasonable new aquaculture space

3. Keep industry in the loop. In many situations the local knowledge, experience and expertise of those individuals can greatly enhance workable outcomes

4. Spatial planning is backed by scientific information

5. As above

6. develop efficient and more certain management around spatial planning

7. We intend to use the workshop outcomes to work with the New Zealand Government on improving spatial planning overall.

8. From a regulatory perspective, communities often express concern over cumulative effects (on both hard and soft science elements) and carrying capacity. This is not an easy matter to address. Advances are being made in terms of nutrient modelling but cumulative effects extend beyond this specific matter.

9. A more detailed description of the social and economic benefits of the industry and their communication

10. Social licence to support effective community engagement

11. Defining limits of acceptable change for cumulative effects in the water column (how much extra nutrient, how much more/less chl etc, over what spatial extent and over what time-period). What should be monitored, how frequently, how to negotiate defensible levels of change.

12. Science and planning - research into carrying capacity

Implementations as a result of the workshop

7 out of 10 respondents to this question would implement something **in the next 3 months**
9 out of 10 respondents to this question would implement something **in the next year**
8 out of 10 respondents to this question would implement something **beyond the next year**

All responses: within the next three months

1. Reviewing how Tasmania incorporate EIS into their plans and whether it is something we should consider building into our consultation documents.

2. Focus on Marlborough Plan review and potential legislative change

3. Discuss options with Ministers

4. Feedback to various industry and Government forums

5. Ensuring that engagement strategies match the objective of the engagement.

6. Point 5 (A more detailed description of the social and economic benefits of the industry and their communication)

7. Advice to Government on improved spatial planning processes

All respondents: within the next year

1. Review the form and level at which we engage different communities/regions at, perhaps using Carla's tool.

2. Aquaculture development

3. As above: focus on Marlborough Plan review and potential legislative change

4. Build case for reform

5. A position piece on how to improve New Zealand spatial planning for aquaculture

6. Ensuring that engagement strategies match the objective of the engagement.

7. Point 5 (A more detailed description of the social and economic benefits of the industry and their communication)

8. Better on-line summaries of our aquaculture related science for lay readers

9. Participation and communication strategy

All respondents: beyond the next year

1. Trying to get a better handle on what some of the other tools which can be utilised in spatial planning are and try to figure out how we can better utilise electronic media in our processes

2. Getting NZ Officialdom to support reasonable Aquaculture development

3. As above: focus on Marlborough Plan review and potential legislative change

4. Work on implementation of reforms

5. Hopefully some progress towards an improved New Zealand spatial planning framework for aquaculture

6. Ensuring that engagement strategies match the objective of the engagement.

7. Point 5 (A more detailed description of the social and economic benefits of the industry and their communication)

8. I hope to build collaborative links with Australia around environmental monitoring and modelling

Suggestions for appropriate avenues for trans-Tasman networking

1. Adelaide harder and a bit pricier to get to from NZ than Melbourne or Sydney

2. Not really, but if a mailing list is established I'd like to be on it

3. Task specific workshops. Come up with trans-Tasman solutions to various issues.

4. Continued discussions and resource sharing

5. I am in favour of face to face forums. Although technology provides opportunities to reduce the costs associated with travel, I don't think you can share information as effectively as you can when in the same place at the same time. Given where the Australian states and NZ regions are at (i.e., all undertaking some for of spatial planning) it may be useful for the lessons learnt to be documented further. Each relevant state/region could document this to share in a forum. We kind of got this verbally at the workshop, but documenting this would create a resource for future reference. Reconvening the workshop in a few years to review the outcomes of the workshop may then be useful.

6. Face to face meetings are the best way to communicate but expensive to achieve. Perhaps phone hook-ups may be of benefit at times.

7. Science standards for ecological assessment and monitoring. It would be powerful to develop an agreed trans-Tasman approach to assessing and managing ecological effects to inform decision making and social licence

8. See my answer to question 5 (defining limits of acceptable change for cumulative effects in the water column (how much extra nutrient, how much more/less chl etc, over what spatial extent and over what time-period). What should be monitored, how frequently, how to negotiate defensible levels of change.)

Overall, most participants were **interested or very interested** in future trans-Tasman workshops, such as: Spatial Tools, Engagement Strategies, Decoding or Translating Science for Decision Makers, Internal Engagement.

Other comments:

1. Thank you, it was excellent!

2. This workshop was more interesting and useful than the first. Possibly a better choice of attendees at this one.

3. I would like to thank the coordinators and assistants for their efforts in putting the day together.

4. Collaboration very worthwhile and I would support this continuing

5. I have enjoyed both the Hobart workshop and this, more recent Adelaide one. I have made valuable contacts and have a much, much better understanding of the similarities (and differences) between the approaches to developing and regulating aquaculture in Australia and NZ - and of the roles that science is playing in the two countries. Thank you all very much. I hope this series of meetings continues. Two key points for me (and both bear upon one of the proposed topics in question 8) is that science is not all that matters. The manner in which the science is presented is important, but so are politics/economics/regulatory frameworks etc.

Appendix: Workshop Program

Australian Seafood CRC, Aquaculture Production Innovation Hub
Trans-Tasman Aquaculture Workshop #2: Spatial Planning
SARDI Waite Campus, 2b Hartley Grove, Urrbrae
12 June 2014

The elements in the process for developing the perfect spatial plan for aquaculture

What do we do? How do we get there?

WORKSHOP PROGRAM

Image: EU

Brief agenda

1. Presentation of three existing Spatial Planning (SP) processes:

South Australia, Tasmania, New Zealand

2. Consider the strengths and weaknesses of the particular SP processes

3. Identify the key issues, needs, engagement, overlaps

(stakeholders, policy, governments, sustainability)

4. Identify the key processes involved, determine prioritization (best practice)

5. Legislation discussion

Endpoint: what elements would be in the process of developing the perfect spatial plan for aquaculture, and how do we get there?

Workshop timetable

9:00-9:15am Workshop scope & introduction

9:15-10:15am Case Studies Presentations

Morning tea 10:15-10:35am

10:35-11:35am Strengths & Weaknesses

11:35am-12:15pm Issues

Lunch 12:15 – 1:15pm

1:15-3:30pm Process Conversation: best practice

Afternoon tea 3:30-3:40pm

3:40-4:30pm Legislation

4:30-5:00pm Wrap up

Note: Timelines are flexible – guidelines only

Facilitators

Carla Leversedge – International Association for Public Participation, Australasia (IAP2)
Daniel Casement - Rural Solutions SA, PIRSA

Organisers

Jennifer Cobcroft - Seafood CRC Aquaculture Hub Leader
Adam Main - CEO, Tasmanian Salmonid Growers Association Ltd
Tony Thomas - Department of Primary Industries, Parks, Water and Environment, Tasmanian State Government
Jill Coates - South Australian Oyster Growers Australia (SAOGA), South Australian Oyster Research Council (SAORC)
Emily Mellor - Primary Industries and Regions South Australia (PIRSA)
Rebecca Clarkson - Aquaculture New Zealand
Catriona Macleod - Deputy Director Fisheries, Aquaculture & Coasts Centre, Institute for Marine and Antarctic Studies (IMAS)

Appendix 5

Aquaculture Production Innovation Hub:
Phase II – communication, extension and opportunities
Activity Report
Prepared by Jennifer Cobcroft (IMAS)

1. Executive Summary

The Seafood CRC Aquaculture Production Innovation Hub organised a workshop on 8th November 2012 to coincide with Nick King (Skretting, USA) visiting Clean Seas Tuna (CST), funded by a CRC travel grant (SfCRC 2012/754). Nick presented on early weaning strategies for marine finfish at CST in Arno Bay, South Australia. His presentations were complemented by an update on Southern Bluefin Tuna larviculture (CST) and research results for Yellowtail Kingfish hatchery production (SARDI, CST, ACAAR, PSFI). There were 16 participants in total, including industry (n = 11) and research representatives (n = 5). The workshop was very well-received by participants in terms of exposure to alternative weaning techniques, and open dialogue of other new larval rearing methods including the replacement of microalgae (greenwater) with inert clay. Nick King was complimentary of the practical and systematic approach to larval research within the Seafood CRC hatchery projects. The workshop participants were appreciative of CST hosting the event and opening the kingfish and tuna hatcheries for a tour.

2. Objectives of Trip/Activity

- Communicate new approaches to early weaning of marine finfish larvae from live feeds to formulated microdiets, to Australian hatchery managers and technicians.
- Update hatchery technicians, managers and researchers on recent developments in larval culture of Southern Bluefin Tuna and research results for Yellowtail Kingfish.

3. Itinerary

The workshop program is included on the last page of this report, and focussed on presentations, a hatchery tour and open discussion on 8/11/2012 at the Clean Seas Tuna hatchery, Arno Bay, South Australia.

Workshop participants
*Nick King (Skretting, US)
Matthew Bransden (Skretting, Australia)
Jennifer Cobcroft (UTAS & SfCRC AquaHub)
*Marcell Boaventura (Clean Seas Tuna)
*Bennan Chen (Clean Seas Tuna)
*Wayne Hutchinson (SARDI)
*Gavin Partridge (ACAAR)
*Stewart Fielder (PSFI)
Luke Dutney (DAFF, QLD)
Andrei Perez (West Beach Aquaculture)
Rob Michael (for Marine Produce Australia & ACAAR)
Adam Miller (Clean Seas Tuna)
David Poppi (Clean Seas Tuna)
Melanie Benson (Clean Seas Tuna)
Atefeh Ghaltaii (Clean Seas Tuna)
Michael Harrison (Clean Seas Tuna)

* Workshop presenter

4. Activities

There were no hands-on activities, although many practical aspects of hatchery production were discussed by participants during the tour and workshop.

Following is a summary of the workshop presentations.

Nick King (Skretting) on early weaning in marine finfish

Skretting Marine Hatchery Feeds group is about 6 years old. Group members:

- Eamonn O'Brien
- Philipe Dhert (product development)
- Nick King (technical manager for products)

Laboratory in New Hampshire (hatchery built 1995)

Larvae ⟶ 15 g fish. – 3 to 4 Million p.a. production

Sea bass, Sea bream, Flounder, Atlantic cod, Cobia

Partnership "Local Oceans" – land-based marine fish production

Local Oceans - 1000 tonne production (mainly Sea bass + Sea bream)

(China, Korea, Mediterranean countries, Arno Bay)

If you have tried a product before - keep trying – technology has moved on.

International production statistics

2010 to 2011 (1,100, 000, 000 (> 1 billion)) 2 g fish

In Mediterranean countries 460 M Greece and 304 M Turkey

1.1 billion approximately

~ 330, 000 metric tonne in 2012 (250 g harvest size)

2008-2009 drop to < 800 M fry (could happen next year)

Bass and bream over production and collapse of cod

Change in industry

- fast scale up – no quality control
- 50% unregistered, losses in the cages
- Growth not matching model

"Cod farmers" – consolidated industry

⟶ Focus on quality – re-investigate protocols

Traditional model – "pushed" as far as possible

Susceptible to *Artemia* price

Norwegian influence – automation – break the mould – advance microdiets

Beginning of early weaning wave.

5 -10 years big changes

- Some hatcheries at least half production with no *Artemia*
- variable hatchery costs

  23% feed 2 g fish

  40% labour; 15% feed 60 days

  ~ 100 kg Arts / 1 million fish

  1, 200,000 per 10 m^3 tank

  25% survival

  Cost €16,780 per million 15% total
- *Artemia* almost half ($100 / kg) + enrichments
- to convert to wean (from *Artemia*) – bream

12% of the total coast € 12,980

What affects efficiency most ⟶ survival! (increasing the yield), how to improve it

- Reduce discards / deformities
- mortality in the first 60 days
- Manage feed + biomass as early survival improves (post 35 d.)

5% increase survival; 17% decrease in production costs.

- Massive impact of survival on production cost

In 2011, ~ 80 M bream without *Artemia*

15% to >60% survival in first 40 days

Challenge to complete the weaning before end of rotifers to achieve this, ⟶ need to know size of the start.

<u>Digestive system ontogeny</u>

- Important to understand digestive system ontogeny in the context of early weaning and the digestive capacity of larvae.
- Conserved development
- Early development adapted for early nutrient utilisation
- Early - Endogenous + exogenous (pancreas) enzymes, no stomach
- Late - gastric gland + dropping pH in stomach.
- Simple proteins – absorbed in hind gut early
- late stage – higher amount + broader range of proteins absorbed (gastric gland)
- In Pacific Bluefin Tuna (PBT) – this occurs day 11 (gastric gland functional)

{table of species + gastric gland development shown in presentation}

Usually, a high surge in growth (% / day) coincides with gastric gland development and function.

- Protein utilisation

Intestinal flow: relative absorption rates - Free Fatty acids (FAA) > peptides > soluble protein

Consequently, fast flow through the gut is conducive to smaller proteins being readily absorbed.

Complex proteins need slower flow.

Food motility (speed of passage through gut) decreases with ontogeny.

Applied feeding strategy

- What is the best prey density over the day?
- Different conditions for early weaning

High prey density ⟶ high flow rate through the gut (early larvae)

Lower prey density slows it down

- Facilitating first food – high prey density and nutrients need to be bio-available/ pre-digested in rotifers.
- "keep density feeding" – top up feeds to maintain prey density

Later stage- meal feeding is appropriate

- Fish get hungry⟶ use it to control feeding.

More intensive prey search and non selective when prey is scarce

Increase swimming + more active with low prey density

Do not starve them

Follow gut evacuation (food at hind gut)

- Need meals for early weaning. (eg 4 / day live feed)

Feeding 'Event' 11-2 pm; 5-8 pm; 11-2 am; 5-8 am

Frequency 30 min

Duration 3 min ⟶ lots of diet across tank in that 3 minutes

Prey density will oscillate during the day, between the target level (e.g. 20/ml) and the below the minimum effective prey density (e.g. 0.1-0.2/ml).

Aim to carry out the weaning 'event' – as co-feeding just before the next live feed meal is added. This way the wean diet is delivered when live prey density is lowest – and is repeated 4 times over a 24h period.

- After a couple of days drop a live feed + substitute with more wean events

To keep fish size together, needs to be progressive prey meal reduction

- Larval stages sensitive

Rotifer quality is critical

Microdiets impact water quality (need to respond with flow)

Slow rotation of flow

- Wean delivered by hand + with feeders
- Need daily cleaning – auto tank cleaners in Norway

Microdiets qualities, eg algae – hydrolysis to break down proteins pre-digested short chain amino acids.

[Great Bay Aquaculture]

Aqua 291:111-114 Gulbrandsen et al – see paper

Key wean diet properties

- Quality control of fish meals
- Protein sources
- Micro nutrients (eg minerals)
- Vitamins. Concentrated pre-mixture
- Phospholipids (patent from IFREMER)
- Health: ingredients - antioxidants; antimicrobials; antivirals; immunoregulators; glucans; nucleotides; polysaccharides
- Mini pellets – for transition stages.

New Gemma Micro – increased leaching (good characteristic for attraction & digestibility)

→ Surface spreading

50% floating + sinking – minutes to hydrate + sink

~ 7% expansion in hydration

Stable within 1 day

- Mass difference diet (150 µm) weighs ~ 3x more than an *Artemia* Instar I and 10x more for 300 µm compared to instar II
- Seabass issues – vertebral malformations- light tables needed for sorting - issues with application in seabass and better performance with Sea bream + Cod + flounder

- Calibrated schedule available with Sea bream

  Allows ability to test diets + formulations compared with "black box" of Arts + rots.

Marcell Boaventura on Southern Bluefin Tuna culture

- L type rotifers 2 dph
- *Artemia* from 8 dph - new last year
- Co-feed from 15 dph
- Wean from 25 dph

Last season

- Fish Green (fine fossil shell flour) + no vacuuming
- Day time – swim down
- During night – even spread
- Newly hatched *Artemia*
- Strong upwelling during day
- Fingerling concentrated for weaning (50 / m^3)
- Improved?
  - Survival
  - Growth
  - Weaning response
  - Hatchery output / yield

Behaviour in the wild is reverse Diel migration- day up and night down (12- 36 m layer in ocean)

This year

- Best methods from last year into this year
- Water quality / rotifers quality
- Decrease rotifers density / flushing during day
- More swim bladder inflation
- Pushed mortality later
- Fed *Artemia* from day 8 compared with day 13 previously

  Same growth to d 13 then growth increased to 10 mm compared with 6 mm at day 20 previously

  Newly hatched *Artemia* 8-9

  Enriched *Artemia* from d 9 to d 19

This method provided bigger SBT before YTK larvae + diet added from day 15

- "Grading" / separation of large + small
- Did not use grader (hang 'jug' transfers in water)
- Critical process to increase survival
- Training with a light focus point re transition from the nursery to cages

Transition in morts

33 – 39 cannibalism

39 – 46 starvation (due to chasing aggression, and decreased feeding)

45 – ? collision

Issues

- Early nutrition
- Cannibalism
- Collisions
- White larvae

1.7 M stocked
Kinki Uni survival
0.06% 1994
4.4% 2005
2-3% now

Application of good enrichment from last year (application of experimental results)

- Removed buffer nets; used currents; used stripes on wall.
- Fish apparently able to detect the wall, and make the 'turn' away, resulting in a decrease in mortality.

Kinki University (Japan) results

Fingerlings		from M eggs	
190 k	2009	808	⟶ first or second generation spawning
244 k	2010	856	
188 k	2011	966	

3,000 – 10,000 fish per tank

Need tank volume in Japan for the numbers to compare with CST

Hatchery production of SBT

< 500 in 2009, 2010

~ 4000 in 2011 – none to sea

200? fish to 100 days, in ponds up to 200 g

Recirculation - rotifer systems

Recirculation 2.5 billion/day with 2.5 people, 8 h day (diet?)

Batch / flow through 3 billion/day with 1 person 6 h day (Origreen)

27 ppt in flow through

25 ppt in recirculation

Bennan Chen on YTK research at Clean Seas Tuna

YTK production in 2009/2010 was 3500 tonnes, $27 M AUD

0.7 ⟶ 1.25 M fingerlings to sea cages

>5,500 tonnes in last 2 years, 10/11 + 11/12

Hatchery research

<u>Stocking density experiment</u>

5, 15, 30, 80 / L (n = 3 replicate tanks, but lost one of the 5 / L)

Rotifers d 2 ⟶ d 17

Artemia d 10 (newly hatched) ⟶

Orange 16 – 18 dph (microdiet, INVE)

Wean–S after 18 dph

Enrichments with Spresso + taurine

Survival significantly affected 22% (5 / L) ⟶ 12% (80 / L)

No effect on swimbladder inflation, applied skimming, and all done by d 5 + d 6.

3,000 lux light intensity at water surface

{Comment from Nick – they turn aeration down during inflation / still surface}

Growth, there was a similar pattern in length + weight

CV- coefficient variation was lower at 5 / L ~ 12% compared with 20%

Commercial cull 26% at 5 / L (n = 2, one tank morts 100% at day 10), compared with 45% at 80 / L

- Will repeat the experiment

[Marcell commented that there is a need to look at surface water velocity in relation to inflation in YTK + SBT]

Wayne Hutchinson on YTK research by SARDI

Malformation rate appears to be related to interactions between fish (density effect).

In Chile – lower densities are used for stocking to give less malformation

⟶ High density early ⟶ split + lower density with older fish

Light Intensity

CST – May 2011

1,000; 7,000; 12,000 lux (light distribution not optimal)

⟶ - No significant difference in growth (bit lower to 9 dph at 1000 lux)

Better inflation with higher light

Survival better at 7k + 12k

Jaw malformation levels lower at 1 klux

Repeated experiment and continued to 24 dph

750; 1,500; 3,000; 6,000 lux

14 92 µmol (equivalent)

Swim bladder inflation - no significant difference

Only difference growth 1500 > 750 (others intermediate and very close)

Day 20 – 6,000 lux- one tank died and another the next day, so in the end only 1 tank for that treatment. (Reason - cleaned dam at same time – may be linked to mortality?)

1,500 lux 10% survival

750 & 3,000 lux ~ 14%

And at 6,000 lux, 17%

Higher deformity at 750 lux 66% than at 6000 lux 50%

Take home - do not need natural / high light for SBI

- Need to skim for 3 days

Gavin Partridge on YTK research at ACAAR (WA)

YTK Research in WA.

- Genetics – Flinders
- Health – WA Fisheries
- Hatchery – Challenger

5 trials planned

1. Rotifer feed regimes
2. Rotifer enrichments
3. *Artemia* enrichments
4. Bacterial management
5. Combine the best + compare with industry standard

1. Feed Strategy

Plus: high density: hybrid

12 x 300 L tanks.

60 larvae / L

14:10 L:D photoperiod, 5000 lux, Spresso rotifers

➢ Mastax counts

2 h post f. feed

No effect on rotifer intake

Survival highest 29% with hybrid, then 17% pulse

- Benefits high survival and less rotifers

2. Enrichments

Selenium

Taurine (Salze, 2011 & 2012), 60% better growth in cobia

- Noted role in bone formation in humans
- DHA utilisation ⟶ better neural function

(NBT – Selfdott, also looked at taurine)

Treatments:

UMEH + extras - 2.5 g / 100g (Miami's diet) ~ 45% Algamac ~ 45% yeast

UMEH

N – Rich PL Plus (Reed Mariculture)

Spresso

(Copepods)

Rotifers 0.1% ww - ~ 0.65g / 100g

Astaxanthin: not much incorporated

Vit C: top of Copepod range

Vit A: (mg / 100 g)

YTK - photoreceptor cell development (immunohistochemistry at UWA)

- GPx activity
- Whole body selenium + taurine
- Lipid class + profile
- Ingestion of rotifers, no difference

Growth no difference

Survival no difference

- D 15-16 enzyme activity increase (with taurine)

So may show a difference in *Artemia* experiment

Deformity? Not done yet [day 13]

[from Japan wild fish Seriola 5 x higher taurine then cultured Seriola]

3. Bacterial Management – Cobia larval rearing in clay
   - Rob Michael and Miami Masters
   - Secchi disk depth vs NTU
   - 60 cm depth ~ 10 NTU with inert clay
   - Compared with 60 cm and 2 NTU with algae paste
   - Standardise by secchi disk
   - Survival and growth no significant difference
   - Low TCBS in column much lower with clay

Substantial difference in cost, 98% saving

Used Kentucky Ball Clay

Stewart Fielder on YTK research at PSFI (NSW)

1- Temperature

2- Enrichment

3- Light intensity

4- Dissolved oxygen

5- Salinity 30 and 38 ppt

Adopted following as best practice SOP (Standard Operating Procedure)

35,000 lux

Spresso

24.5^{o}C

(Oxygen saturation to 12 dph no significant difference)

Question the dissolved oxygen level re older fish and / or higher larval density

10 larvae / L

F1 eggs- v. Good

Hatchery manual - legacy discussion in Kingfish hatchery research

- SOPs (Standard Operating Procedures) - CST- annual update
  - Arno and Port Augusta
  - Challenger
  - PSFI
- Flexible format
  - CDS
  - Online systems
- Drop box
  - Access anywhere
  - Fact sheets for experiments
- Static document or flexible

YTK / CST – legacy project application

- National YTK R + D consortium – targeted to immediate issues (Wayne Hutchinson spoke to this)

4 objectives

- Around current constraints
- Consolidate info + research findings on key problems

1) Fish health in feed treatments
2) Nutrition
3) Culture systems + management (land-based)
4) Fingerling quality

Other SfCRC Aquaculture Hub potential/planned activities discussed

- Genetics
- Pathology for dummies – R. Wittington
- May need some road show components to cover WA

End of formal presentations

Nick's feed back

"Nice bonus to see the {SBT and YTK research} work"

"Very practical"

From all participants; "Thanks to CST for opening the facility"

The presentations were complemented by a hatchery tour.

5. Benefits

The workshop was very beneficial to all participants. The exposure to alternative early weaning approaches was useful to all Australian participants. Discussion of the Yellowtail Kingfish research was also helpful to improve understanding, share research outcomes, and inform refinements to SOPs and experiment designs.

Photos from 'Early Weaning Techniques and Yellowtail Kingfish Research Update & Extension Workshop' CST hatchery tour and dinner, 8th November 2012, Arno Bay, South Australia.

Australian Government
Fisheries Research and
Development Corporation

Finfish Hatchery Workshop – Thursday 8th November
Cleanseas Tuna, Arno Bay, South Australia

Early Weaning Techniques and
Yellowtail Kingfish Research Update & Extension

Wednesday 7th November – participants arrive in afternoon/evening and travel to Arno Bay. Dinner at own expense. Accommodation is booked in the Arno Bay Caravan Park in shared cabins.

WORKSHOP DAY
Thursday 8th November –
(Breakfast – at own expense)

Morning
08:30 Leave caravan park to travel to the hatchery
09:00 Presentation from Nick King on early weaning in marine finfish (1.5 h)
10:30 Presentation by Marcell Boaventura on Southern Bluefin Tuna culture (0.5 h)
11:00 Hatchery tour (1.5 h)

12:30 Lunch (provided)

14:00 YTK Research session – intro
14:15 presentation by Bennan Chen on YTK research (0.5 h)
14:45 presentation by Wayne Hutchinson on YTK research (0.5 h)
15:15 presentation by Gavin Partridge on YTK research (0.5 h)
15:45 presentation by Stewart Fielder on YTK research (0.5 h)
16:15 – 17:30 Discussion of SfCRC legacy in kingfish hatchery research

18:30 Networking dinner at Arno Bay Hotel (provided by CRC Aquaculture Hub)
Accommodation is booked in the Arno Bay Caravan Park in shared cabins.

Friday 9th November –
(Breakfast – at own expense)
Workshop finished
Return travel to Port Lincoln (we will organise time(s) when we know flight times)

Appendix 6

Hatchery Technology Workshop

12 June 2014 Adelaide

Final Report

Australian Seafood CRC
Aquaculture Production Innovation Hub

Non-technical summary

Bringing together members of the Australian and New Zealand Shellfish and Finfish Hatchery Networks, this workshop highlighted current practice and recent innovations in aquaculture hatchery technology, with presentations on:

- Water quality management through filtration, disinfection, etc
- Solving production problems
- Tank cleaning systems
- Algae production systems
- Algae supplements and diets
- Marine hatchery microflora and animal health

A guided group discussion was held, leading to information exchange on

- Water quality issues
- Recent changes in hatchery practice that have made a significant difference to production in different types of hatcheries
- Desired directions/changes/innovations in hatchery practice for the future.

The workshop was attended by approximately 60 delegates including operators of prawn, rock lobster, oyster, abalone, mussel, scallop, salmon, tiger grouper, barramundi and striped trumpeter hatcheries. Four sponsors (Fresh by Design, Pentair, Proaqua, and Ridley/Primo) supported the workshop and demonstrated relevant aquaculture products.

Once again the workshop was a successful opportunity for people working in hatcheries, including research, industry and service providers, to expand their networks and share contact details. Of particular value in this workshop was the sharing of experiences and issues across industry sectors.

Outputs

1. Expansion of existing hatchery networks with new contacts.
2. Sharing of recent information and new technologies as summarised in this report.
3. Forging of new links between hatchery network members, leading to proposed future activities e.g. forum on LED lights and microalgae production.
4. Follow-up survey to determine future directions for hatchery network activities and topics of interest to members.

Outcomes

1. Following the 2010 workshop (Hobart), a prawn hatchery was connected to a new algae paste supplier with substantial improvements in productivity and efficiency as a result of applying the paste.

2. Projected long-term outcomes of this workshop include:
    - more rapid adoption of new technologies;
    - greater openness around common industry issues, resulting in faster problem-solving;
    - improved seed quality to underpin aquaculture industry in Australia and New Zealand.

Key messages from speakers

Tony Charles (Australian Prawn Farms)

- Summary of water treatment in a prawn farm, in an environment with highly fluctuating water quality. System components included AFM filters, activated charcoal filters, 1 micron bag.
- Water delivery to desalination unit or to hatchery (mixed to 35 ppt)
- Broodstock and larval rearing, live algae production of 20,000 L/day
- Algae grown from agar plate colonies to reduce bacterial contamination
- Daily *Vibrio* checks

Sagiv Kolkovski (Dept Fisheries WA)

- Interesting technologies and systems from around the world:
- Banana screen for harvesting *Artemia* from 32,000 L tank
- Automated creepy crawly cleaning robot at Kagoshima hatchery
- Sagiv has developed a tank with self-cleaning arm (can't be retro-fitted due to need for flat base and gutter in tank). Slow moving (1 turn/hour). Requires siphoning. Noted with yellow tail that arm should be turned off at night.
- Box screens: trapezoidal shape and use of double screen. Aeration on the screen prevents blockage. Suggested no need for surface skimmers.

Michel Bermudes (Shellfish Culture)

- Overview of Shellfish Culture company – produce about 100 million seed per annum
- Bicheno hatchery refurbished two years ago
- Highlighted the importance of happy and enthusiastic degree qualified staff
- Went through issues in production history – fluctuation over time and two bad years 2009-10 and 2010-11 – unsustainable and needed addressing.
- Highlighted commercial imperative to resume normal production before understanding source of problem and addressing it. Sought help and expert advice from external hatcheries in NSW, Tasmania and overseas.
- Addressed practices in larvae culture; looked at algae production; shifted hatchery production to all year round instead of mainly summer
- Increased monitoring and analysis of seasonal water quality including currents, water temperature, salinity, pH, bacteriology, phytoplankton blooms (cabbage smell) and looked for correlation with production
- Found a bloom of *Alexandrium tamarense*; coincided with low yield of Ds
- Filtering water with activated carbon and maturing water before use made a big difference to production.

Amy Stone (Pentair)

- Discussed various equipment filtration types – pros and cons

- Advised operators to stay in touch with new membrane filter technology
- http://www.pentair.com/

Quinn Fitzgibbon (IMAS)

- Ozone technology for hatchery water quality
- Importance of using two ORP probes at every measuring point, and several measuring points
- Ozone has to be managed carefully for OH&S considerations, but has allowed major breakthroughs for rock lobster and striped trumpeter

Joe McDonald (Varicon Aqua – with Fresh by Design)

- Biofences for algae production: numerous examples and applications
- Now using glass tubing and in some cases internal LED illumination
- Indoor/outdoor systems on various scales
- Joe offered to show interested people examples of hatchery applications
- http://www.variconaqua.com/contactus.php

Matt Landos (Fresh by Design)

- Overview of wide variety of aquaculture products and services provided by Fresh by Design
- https://freshbydesign.com.au/

Tania de Wolf (INVE Aquaculture – with Justin Holgate of Ridley Agriproducts & Primo Aquaculture)

- Unable to attend, but her presentation on fish larval health management and probiotics may be made available to participants later
- http://www.primo.net.au/
- http://www.agriproducts.com.au/Contactus/ContactAquafeed.aspx

Fernando Garcia (Epicore) and Tim Reed (Reed Mariculture) - Proaqua

- Discussed shift in algae species used with prawns (*Penaeus vannamei*) – changed which algae to use
- Key to use agar plate source for algae culture
- Epifeed liquid hatchery feeds and EpiLite
- Focus on lipids rather than protein in feeds
- New products from Reed Mariculture – rotifer production diets, buffered ChlorAmX
- Taurine protocol for enrichment
- RGComplete – fridge stable, simple rotifer feed system, direct to bucket (small system)
- New algae species *Thalassiosira pseudonana*
- http://proaqua.net.au/

Tony Charles (Australian Prawn Farms)

- Impressive improvement in prawn farm production by supplementing live algae with algae paste (as a result of connection made during 2010 hatchery workshop)

Ian Anderson (DAFF/consulting animal health specialist)

- Overview of hatchery health with a focus on tropical hatcheries chiefly prawns, fish
- Advocated green water culture and stable microbial conditions. Complete sterilisation (eg ozone) may not work in every situation; it creates space for harmful opportunistic bacterial species to bloom eg *Vibrios* and may remove helpful probiotic bacteria
- Very important to have shutdown, cleanup and dry out every year
- AQUAVETPLAN manual available online and recommended to inform disinfection, biosecurity, cleaning practices

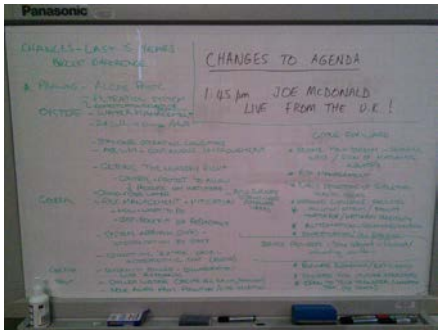
Workshop discussions

Water quality discussion:

- What does water quality mean and what are we aiming for?
- Depends on animal and applications – ideal student projects to look at amount of N, P tolerable for each organism/stage
- East Australia current changing, warming ocean on east coast; increasing dinoflagellate blooms in Tasmania; increasing pollutants in water including drugs, hormones
- A major need for better ORP probes
- Salmon industry use ozone for denitrification and removing phosphorus

Group strategy discussion:

What is the one change in the last 5 years that has made the biggest difference to your hatchery?



Prawns

- Algae paste
- Filtration system
- Domestication / selective breeding

Oysters

- Water management
- Cultural change / staff
- Standard operating conditions/procedures (SOPs)
- Ask why? – leads to continuous improvement; training and explaining why
- Greater openness and information exchange among companies
- Getting the nursery right - Control and protect to reduce the pressure on hatchery production
- Ground-filtered water

- Build duplicate systems – used alternate weeks (to make sure the 'back-up' works)

Kingfish

- Deformity solved with marble-coloured tanks – through collaboration with researchers

Trout & *freshwater hatchery*

- Chilled water (secure egg survival / hatchery)
- Move away from pollution / site selection

General

- Risk management and mitigation
    - How and what to do
    - Cost-benefit analysis of redundancy (building duplicate/back-up systems)
- System approach (SOPs) + interpretation by staff
- Collecting 'extra' data + interpreting that (e.g. jellyfish)

Service providers

- Stay relevant and focused / interacting on-farm

What is the one change you wish you could make to improve the hatchery?

- Become 'mainstream' rather than 'closed shop'/protecting IP.
  Change to share information – which is a sign of a maturing industry
- Risk management implementation
- Better assays and record keeping to understand production problems
- Early detection of sub-lethal health issues
- Improved challenge facilities
    - Pollution effects / toxicity; watch for changes in performance of larvae; hatchery production and larvae have a high sensitivity to pollutants
    - Partner with researchers/student projects
- Automation – e.g. solenoid control
- Domestication / selective breeding
- Business economics / increased efficiency
- Be open to tech transfer / innovative technology (e.g. ozone)
- Holidays for owner-operators

Appendices

Appendix 1: Agenda

Australian Seafood CRC Aquaculture Production Innovation Hub

Hatchery Technology Workshop
Adelaide, 12th June 2014

Aims

Provide practical information and training in the latest hatchery technologies including water treatment, feeds and diagnostics. Promote information exchange on current hatchery issues.

Dates and locations

Dinner: Wednesday 11 June 2014, 7:00 pm at Melt CBD, 38 Waymouth St, Adelaide (ph. 08 8211 6723)

Workshop: Thursday 12 June 2014 (after WAA14 conference): 9 am - 5 pm. South Australian Aquatic Sciences Centre (SAASC), 2 Hamra Ave, West Beach, Adelaide, South Australia – lecture theatre.

Cost

There is no cost to attend the workshop. Dinner on Wednesday, and morning and afternoon tea and lunch on Thursday, are provided free to participants. The dinner and Workshop are sponsored by the Australian Seafood CRC Aquaculture Innovation Hub, Fresh by Design, Pentair Aquatic Eco-Systems, ProAqua Pty Ltd, and Ridley Agriproducts P/L T/A Primo Aquaculture.

Workshop Agenda

Time	Speaker	Affiliation	Topic
9:00-9:10	Jennifer Cobcroft	Seafood CRC	Welcome and introduction
Seminar-style presentations			
9:10-9:30	Tony Charles	Australian Prawn Farms	Prawn hatchery walkthrough and new water filtration system – AFM + activated carbon, automated freshwater injection
9:30-9:50	Ben Pope/Joe McDonald	Fresh by Design/Varicon Aqua	Water treatment systems/algae production systems
9:50-10:10	Sagiv Kolkovski	Dept Fisheries WA	Water treatment, self-cleaning tanks, box filters
10:10-10:30	Michel Bermudes	Shellfish Culture	Oyster hatchery walkthrough and water management
10:30-10:50	Amy Stone	Pentair	Water treatment systems
10:50-11:20			Morning tea
11:20-12:40	Group strategy discussion		Topics: 1. Water management 2. What is the one change in the last 5 years that has made the biggest difference to your hatchery? 3. What is the one change you wish you could make to improve the hatchery?
12:40-13:00	Tania de Wolf	INVE Aquaculture	Fish larval health management (including probiotics)
13:00-14:00			Lunch/activities
Seminar-style presentations			
14:00-14:20	Tim Reed, Fernando Garcia	ProAqua	Algae pastes, Epicor diets
14:20-14:30	Tony Charles	Australian Prawn Farms	Data on algae pastes used in prawn hatchery
14:30-15:30	Ian Anderson	Aquatic animal health hatchery specialist	Marine hatchery microflora; diagnostics; health issues in prawn and finfish larval rearing; screening prawn broodstock as SPF; disinfectants
15:30-15:45			Q & A
15:45-16:45			Afternoon tea/ activities

Groups of approximately 8-10 people will spend 60 min between the following activities (sponsor displays/demos may also be available during lunch break)

	Presenters	Affiliation	Activity topic
1	Wayne Hutchinson	SARDI	Tour of SARDI facility (30 min)
2	To be advised	ProAqua	To be advised
3	To be advised	Fresh by Design	To be advised
4	Amy Stone	Pentair	To be advised
5	Justin Holgate	INVE/Ridley	To be advised
6	Jennifer Cobcroft with Ian Anderson	Seafood CRC, DAFF	Discuss disinfectants - AQUAVETPLAN Decontamination Manual, ozone disinfection
16:45-17:00	Jennifer Cobcroft	Seafood CRC	Wrap-up and close

Jennifer Cobcroft and Gay McKinnon (Australian Seafood CRC Aquaculture Hub)
Gay Marsden (WAA14 Industry Tours, Tourism & Events Committee)
Wayne Hutchinson (South Australian Aquatic Sciences Centre)

A BIG THANK YOU to our sponsors Fresh by Design, Pentair Aquatic Eco-Systems, ProAqua Pty Ltd, and Ridley Agriproducts P/L T/A Primo Aquaculture.

Useful links:
DAFF AQUAVETPLAN
http://www.daff.gov.au/animal-plant-health/aquatic/aquavetplan

DAFF AQUAVETPLAN decontamination manual
http://www.daff.gov.au/animal-plant-health/aquatic/aquavetplan/operational_procedures_manual_-_decontamination

Appendix 2: Participants

Company	Full name	Email
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Great Southern Waters (Jade Tiger Abalone)	Luke McPherson	Luke@gsw.com.au
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	Jonathon Bicton	0416 662 818
	Ben Quigley	

Appendix 3

Hatchery Technology Workshop: Survey Responses Summary

Overall, almost half of the participants responded to the survey (27/60, 45%). Most workshop participants who responded to the survey rated the **venue** and **catering**, the **appropriateness of topics**, and **presentation** and **facilitation quality** as **very good**.

Most valuable part of the workshop: all responses

1. Open information sharing by industry operators
2. The openness and exchange of ideas amongst operators rather than the closed shop approach of times past. The small group was diverse enough to have some really interesting points raised by operators from various sectors.
3. Informal discussion with other hatchery operators. The presentations by commercial hatchery operators
4. Open exchange of experiences from commercial operations
5. Presentations by other hatchery operators
6. Interactions with people
7. For me, the opportunity to gather, but also hearing from the commercial hatchery operators and open disclosure of challenges faced.
8. water quality and tank cleaning presentations.
9. good mix of industry, research and suppliers. Dinner night before was very good for networking.
10. Getting together with everyone an seeing who is doing what and where.
11. Discussions with other hatchery people
12. Being able to attend! Hearing from speakers with world wide experience and networking with similar
13. Presentation about Vibrios and networking opportunities
14. Networking
15. The concept of an open forum to discuss new hatchery technologies, in my opinion has been long overdue. Well done to all involved.

16. The health presentation and prawn hatchery presentation

17. Talking to other hatchery people.

18. demonstrations of new technology

19. The opportunity to meet cross sector, and 'competitors' in a social format at the dinner and then on the day of the workshop.

20. Open nature of discussion by commercial operators

21. Unfortunately had to leave early to catch a flight home. So cannot comment.

22. Meeting other people involved in Hatchery production. Getting together to discuss hatchery production specifically. Sharing experiences.

23. The whole thing was great, thankyou, Overview talks are excellent - eg Shellfish culture, filtration, bacteriology. Distilling the essence out of long experience eg the most important development in the last 5 years.

24. Open Discussions after each presentation

25. Exposure to like minded people and seeing how real people deal with and solve problems in hatchery and on the farm. Also the marine hatchery microflora talk was excellent. Innovation with mechanical is good like the intensive algae production systems.

Least valuable and possible **improvements**

1. All valuable. Needed more time, both for presentations and networking

2. Some presentations were not particularly relevant to my situation but having the diversity of species present makes this unavoidable. Not really a downside in my opinion.

3. Non-shellfish related presentations

4. Some talks were very press on time and some others were given free time.

5. Presentations by sponsors

6. Tour of facility was a bit disappointing due to limited projects on-site.

7. The tour was of limited value, though I would not be against having a tour, but most of the participants are already familiar with most seawater systems etc, and so I think this is just a nice aside, and not critical.

8. more finfish presentations

9. think it was all pretty good.

10. Everything was good.

11. Spreading over 2 Days and having the dinner in on the middle night. Have smaller groups was valuable in Hobart - allowed for discussion (ie people talk more and get to know each other in smaller groups) Discussion over training / staff / information sharing. Getting some big hatchery operators over to do more "hatchery walkthroughs" - US etc

12. More hands on activities/demonstrations

13. More technical developments. Less supplier based

14. As this was the first workshop i have attended i found all topics relevant and interesting, however more time would have been good so we could fit the afternoon activities in.

15. The oyster hatchery presentation Replace the presenter

16. Too much prawn discussion. Some abalone discussion would have been good.

17. the algae production systems, this section was more about what could be done in growing algae but not relevant to hatchery quality algae.

18. Liked the format, never enough time, but spot on with it following up on other conferences - could work as a stand alone if following up on other 'value' topics such as selective breeding?

19. No comment

20. Practical demo's. Hard to demo anything practical meaningfully in just a short time period. Practical demo's often need several days.

21. Next time it could be longer for me. I could have happily sat through a second day with hatchery people describing their systems, the reasons for their choices, the problems they have had and solved, the problems they have not yet solved and would like feedback on.

22. Demonstrations. Perhaps a bit more time for presentations.

23. More of the same sales pitch of equipment and self cleaning tanks. Yes yes we all know a drum filter out performs a sand filter.

Implementations as a result of the workshop

24 out of 24 (100 %) respondents to this question would implement something **in the next 3 months**

16 out of 24 (67 %) respondents to this question would implement something **in the next year**

15 out of 24 (63 %) respondents to this question would implement something **beyond the next year**

All responses: within the next three months

1. Testing of algal paste for brood stock
2. LED lighting for algal cultures
3. keeping in touch with others
4. water ageing
5. not much
6. upgrade cleaning products and procedure
7. assessment of algae paste as replacement for live algae
8. Aging seawater
9. Making contact with others
10. Building a hatchery so lots
11. Network with contacts, seek advice
12. UV system
13. Head to KSA
14. substitution of live algae trials
15. ozonation (already planned before the workshop)
16. Sandfilter maintenance
17. continuous algae system
18. Review the use of algal concentrates.

19. feed trials using some of the products highlighted

20. no comment

21. Increase awareness of Health Treatments/Probiotics and larvae safe bacteriosides

22. Build in space for additional water treatment in new facility under development

23. more regular carbon checks on filtration system

24. More stringent cleaning protocol

All respondents: within the next year

1. Development of a network of hatchery operators

2. ageing water

3. nothing

4. trial some pastes

5. develop our own RAS system

6. replacement of algae paste in commercial production

7. Use of algae concentrates

8. establish the hatchery

9. Biosecurity strategies

10. Sandfilter maintenance

11. new filtration and systems

12. Implement further 'environmental' microbiological monitoring and recording/reporting

13. no comment

14. New feed technology to reduce Artemia usage

15. Some additional hygiene measures

16. Increase bacterial monitoring and LED lighting in the algae lab.

All respondents: beyond the next year

1. Small scale larval rearing
2. nothing
3. as above
4. automatic tank cleaners for larvae
5. improved filtration
6. wait and see
7. Water treatment systems
8. Sandfilter maintenance
9. species diversification
10. maintain contact and discussions with other participants
11. no comment
12. New culture and enrichment products for Roitfers
13. Additional water treatment if justified
14. new algae culture system
15. Unsure at this stage.

Meeting Frequency

13 out of 27 (48%) respondents to this question wanted to meet **once a year**
12 out of 27 (42%) respondents to this question wanted to meet **once every 2 years**
All respondents wanted future meetings

Other responses:

1. in association with conference or similar national event every 2-3 years
2. Once every 1-2 years would be good at our early stage of development

Most respondents (19/27 or 70%) expressed interest in attending a future combined finfish and hatchery workshop, and **most respondents** (16/27 or 59%) also expressed interest in attending a shellfish (molluscs and crustaceans) workshop.

Further topics and **requirements** for **change** to **improve** their own hatcheries: all responses

1. Oyster brood stock management Factors affecting set rates Need new info and technical exchange

2. Maybe some case studies of hatchery problems that have been successfully solved over the years would be an interesting dissemination of the progress of the state of our knowledge.

3. Probiotics. development of bacteriophage technology. Water treatment.

4. Main problems fish and shellfish operations face

5. I have been to a few of these now. I think the day should be for people who work in hatcheries talking about their experiences. Small things are good such as how we do .....Ideally everyone should make a short presentation so that everyone is contributing. Most subjects should have no IP content so people are happy to talk. eg how we reduced our electricity bill would have everyone sitting up. Most hatcheries have things they want to keep in house but equally have things they are happy to talk about. Just like any other business really.

6. Nutrition New lighting options with LED RAS design

7. How people are using probiotics, and what evidence of efficiency

8. tour and workshop of working finfish hatchery, i.e. livefood production to larval rearing, see green water, flow dynamics, larvae behaviour, feeding etc

9. (a) new technology for micro-algae production (for hatcheries, not for biofuel or other applications). (b) Options for power efficiency

10. Species development (ie latest hatchery technology by species)

11. No special area - any/all input is excellent

12. Technical exchange

13. oyster broodstock conditioning tanks LED's for culturing microalgae

14. Larval rearing infrastructure and techniques

15. technical exchange and training on disease, algae systems, business aspects of hatcheries and filtration systems and technology

16. Algal production processes/ Water treatment/ staff development and 'underpinning' technical knowledge, i.e. selective breeding for 'Dummies', Water treatment systems for "Dummies' (one of the talks summed up many year of lessons that would be very costly for 'newbies') Energy efficiencies with pumping, heating, lighting and temperature control systems.

17. technical exchange

18. No comment

19. Technical Exchange and Training

20. Ongoing critical analysis of water treatment options to try and identify best-practise (many different solutions out there at present) Hygiene, microbiology and opportunistic pathogens of marine larvae Nutrition Information on causes of larval failures

21. technical exchange, technological applications in hatcheries (phone apps/ computer programs/ automation)

22. Health management, Specific brood technique, disease treatment, updates on national strategy for regulation

Interest in proposed outreach strategies

All respondents were **interested** in **workshops** as a form of outreach and communication.

Most respondents (24/27 or 89%) were **interested** in **email newsletters** as a form of outreach and communication.

More than half of respondents (18/27 or 66%) were interested in **video news** (short 5 minute videos) as a form of outreach and communication.

Some respondents (12/27 or 44%) were interested in **social media** as a form of outreach and communication.

Other responses

1. Site visits

2. Links to shellfish hatchery events, technological advances, new products and other news

3. interactive online workshop like Reed website has

4. Global Shellfish/Hatchery network

Future of hatchery networks management: all responses

Suggested: Led and administered by research organisation(s), led and administered by industry representatives, joint effort, funding from where, other ideas

1. Joint effort res inst and industry Funding???

2. Preferably led by research organisation(s) so that there was no perception of any bias in favour of one or more commercial outfits, or bias towards one particular species.

3. Taking it in turns organising meetings. Have separate shellfish, finfish and prawn groups meeting annually, with all groups getting together every 2nd or 3rd year

4. More interaction

5. Hatcheries tend to make their own links, usually with hatcheries overseas who they don't compete with, so are unlikely to organise a domestic version but may attend and contribute to an organised workshop. Probably still needs external organisation but with industry input.

6. It is probably best managed through a research organisation that has access to facilities.

7. Industry representatives, or some combination with research organisation. Not sure about funding origin?

8. joint effort...good to see suppliers on board i.e. FBD

9. Joint effort by industry and research. Funding by FRDC, could also gauge if people would be prepared to pay a small workshop attendance fee ($100) to supplement funding

10. Joint FRDC

11. I thought the way this one was done worked well.

12. Joint effort. Ideally funded externally but could be "user pays" if this was the case then would take some of the cost out by maybe just having a happy hr rather than full dinner?

13. Joint effort

14. Joint effort from research organisations and industry

15. Research organisation

16. A joint effort with an attendance fee

17. Dont think it will work. Tried in the past without success.

18. joint effort

19. Joint effort between 'research' and industry - industry on its own could be sidetracked, the upside to this type workshop is that it gets beyond the general managers/owners and to the technicians and folk on the ground. Having the research providers 'leading' this help 'sell' vs if it was seen to be 'pushed' by folk in industry.

20. Joint effort

21. Research and industry

22. Jointly by industry reps and research, needs to be a close connection between research and industry.

23. User pays is fine by me. Researchers are often better at getting around to organising these things unless there is a professional industry body to organise.

24. led and administered by research organisations. Industry doesn't have time to organise. Funded by CRC's/FRDC etc

25. Led and administered by research organisations.

Appendix 7a

Hatchery Hub Activity Report

Rodney Grove-Jones

EP Shellfish

1. Executive Summary

Rodney Grove-Jones, the owner operator of EP Shellfish, a commercial mollusc hatchery located at Coffin Bay, Eyre Peninsula, South Australia, and Kyle Johnston, hatchery operator from the Port Stephens research hatchery visited two Tasmanian shellfish hatcheries on 9/10/13 and 13/10/13 as part of a technical exchange sponsored by the shellfish CRC Aquaculture Innovation Hub.

While the technical systems of both hatcheries were similar to my own (RG-J), small differences in the way in which they were operated were apparent which I can now apply and assess at my own site. I thank the sponsors of this trip and the managers of the hatcheries visited for the frank discussions we had concerning larval rearing.

2. Objectives

Over the past decade there has been a convergence in mollusc hatchery methods in Australia and there are now often more similarities than differences in the systems used in different hatcheries. Despite this, output success can be variable between hatcheries and achieving consistent results in larval growth and survival remains a potential bottleneck in mollusc hatcheries.

The reasons for my trip were to try and understand why results are variable despite the convergence of techniques and apply this to my own business.

3. Itinerary

9.10.13	Pipeclay Lagoon	Shellfish Culture Hatchery and Nursery Facility	Scott Parkinson
11.10.13	Spring Bay Seafood	Mussel and Oyster Hatchery and Nursery Facility	Bryce Daley

4. Activities

Shellfish Culture uses an algal culture and spat rearing system similar to our own. Water is drawn from a shallow bay with variable water quality, also similar to our situation in South Australia. Severe problems with consistent hatchery production were experienced two seasons ago but since then they have achieved highly consistent results. While several changes were made to turn this around It seems that a major contributing factor has been the ageing of seawater for at least three days prior to use.

Spring Bay has a water supply of consistently good quality and in contrast to the pipeclay lagoon site, filtered the water and used it without delay. An interesting variation at Spring Bay was the use of both low density static and high density flow through systems for the rearing of larvae at different life stages. Thus, low density static culture was used during the first 6 days but high density flow through systems were used during the second week of culture.

5. Benefits

It is always uplifting to see successful hatcheries and both the hatcheries visited were of a high standard and achieving consistent results. Both emphasised water quality as important although this is a somewhat elusive parameter depending as it does on the incoming water condition, subsequent treatments and growing method.

The Pipeclay Lagoon site was probably most relevant to my own since it has a shallow water intake and variable water quality whereas Spring Bay evidently enjoyed more stable conditions. Other variables such as diet, egg quality and handling methods are of course important but more easily defined and controlled. The visit has refocused my attention on water quality as one of the key elements in achieving consistency of production and given me some ways of attaining it.

Rodney Grove-Jones

2.11.13

Appendix 7b

Hatchery Hub Activity Report

Kyle Johnston (NSW Fisheries)

1. Executive Summary

To travel to Tasmania and meet with Rod Grove-Jones, a South Australian bivalve hatchery operator. Also to visit two bivalve hatcheries in Tasmania, Shellfish Culture and Spring Bay Mussels, to talk to their staff and see their operations. Finally to attend Shellfish Futures 2013 on Bruny Island.

2. Objectives of Trip/Activity

- To meet with mollusc hatcheries in Tasmania to explore other systems and assist the exchanging of technical information.
- To gain an oversight of Tasmania's oyster industry by attending Shellfish Futures 2013.

3. Itinerary

Date	Location	Facilities visited	Staff involved
11/10/13	Pipeclay Lagoon	Shellfish Culture	Kerri Wells, Scott Parkinson, Andy Day
11/10/13 12/10/13	Bruny Island	Shellfish Futures	Oysters Tasmania
13/10/13	Spring Bay	Spring Bay Mussels	Bryce Daley, Phil Lamb

4. Activities

Shellfish Culture- Full tour of entire nursery operations for Pacific oysters and algae with many questions and exchanging of information and ideas in both directions.

Shellfish Futures- Two day conference (program attached)

Spring Bay- Full tour of entire nursery operations for Pacific oysters, Mussels and algae also with exchanging of knowledge.

5. Benefits

My knowledge on the commercial production of Pacific Oysters has been significantly increased. The hatchery visits have provided me with more knowledge on the technical aspects of larval and algal culture. The conference provided me with an oversight of the Tasmanian oyster industry and its practices, while talking to farmers revealed more information on the later stages of Pacific Oyster Culture.

More importantly to my organisation will be the application of such information to our bivalve larvae operations including:-

- Advantages of continuous lay-flat algal bag culture as opposed to batch culture.
- Similar advantages of continuous upright algal bag culture
- Pasteurisation of seawater for refilling algae cultures
- Confirming benefits of large volume settlement tanks to remove exposing larvae to massive bacterial spikes.
- Fluidised bottle culture of spat so much more efficient than screens. Less labour, faster growth, higher stocking densities. Will other species show similar benefits?
- First observations of mechanical spat grading.
- Confirming other hatcheries have just as vigorous cleaning routines and regular maintenance and exchanging of equipment and hoses in dry out rotational rosters.
- Learning about the systems for maintaining and continual conditioning of Pacific Oyster Brood-stock and temperature regimes

Appendix 8

AUSTRALIAN SEAFOOD COOPERATIVE RESEARCH CENTRE

Project Milestone Report

To be completed by the Principal Investigator for each reportable milestone

Send the completed report to report@seafoodcrc.com.

Project Name:	Aquaculture Production Innovation Hub: Phase II – communication, extension and opportunities		
Project Type: *(double click on the appropriate check box and change the default value to "checked")*	☒ Research. Project ☐ Post Doc ☐ PhD ☐ Masters ☐ Honours ☐ Res. Travel Grant ☐ Industry Bursary ☐ Visiting Expert ☐ Other	**Seafood CRC Project Number:**	2012/756
		Principal Investigator:	Jennifer Cobcroft, University of Tasmania
		Program number? *(double click on the appropriate check box and change the default value to "checked")*	Program 1 ☒ Program 2 ☐ Program 3 ☐ Program 4 ☐
Milestone number: *(Milestone number 1 is the initial project payment.)*	2	**Milestone due date:**	30/08/2013

PROJECT PROGRESS ON THIS MILESTONE:

Has this milestone been achieved? **Yes** ☒ **No** ☐ **Partially** ☐

Will the Project be completed according to the current milestone schedule? **Yes** ☒ **No** ☐

1. Original full milestone date and title:

30 Aug 2013. Report on activities listed in the Hub Work Plan for Dec 2012 to June 2013. Update the Work Plan for the following 6 months.

2. IF REVISED, revised full milestone date and title:

N/A

AUSTRALIAN SEAFOOD COOPERATIVE RESEARCH CENTRE

OVERALL PROJECT PROGRESS UPDATE:

3. Summary project progress description:

This report section describes the overall progress of the project against each of the objectives.

1 Improve communication and increase collaboration among aquaculture producers and researchers

The Aquaculture Production Innovation Hub Phase II contracts were finalised on 1st August 2013. Initial activities to improve communication between Aquaculture producers commenced prior to that date, starting with an 'Early Weaning' workshop for marine finfish hatcheries held in South Australia in November 2012. Several meetings have been held with Atlantic Salmon producers since January 2012 to progress the trans-Tasman workshops, beginning with one on 'Communications', planned for February 2014. At the Australian Prawn and Barramundi Farmers Conference in July 2013, industry representatives stepped forward to take an active role in the Shellfish and Finfish hatchery networks, including a request for a tropical finfish hatchery workshop. As this is early days for the Hub activities after contract signing, most activities are in planning and the initial implementation phase. The six month Work Plan has been updated and is provided as an appendix to this milestone report.

2 Delivery of key extension activities for the 'Finfish' and 'Breeding for Profit' Themes of Production Innovation Program

In relation to the Finfish theme, meetings with the SfCRC Managers of the Production Innovation Program, and Communication, Education, Training and Extension Program have identified several areas of focus for extension. These are 1) a revised technical hatchery manual for Yellowtail Kingfish, 2) presentation and fact sheet communication of Cobia production in Australia, and 3) a fact sheet or booklet regarding skeletal malformation classification for several finfish species cultured in Australia.

The proposal for the extension of 'Breeding for Profit' theme research is for the SfCRC Program Manager to work with selected Hub co-investigators to identify and outline content of a series of training modules and webinars, with individuals or organisations put forward to deliver those. There are two levels of training needed, the first is at the technical, hatchery management level, and the second is for people already involved in breeding programs. Training module allocation is planned to occur by December 2013.

Other activities have been added to the Work Plan, which span several production sectors, including communication of a review of cryopreservation technology and services (re 2008/773).

3 Develop a plan for continuation of successful communication activities beyond the life of the Seafood CRC

Verbal support from industry representatives suggests that there are some champions to drive ongoing communication initiatives. However, it is too early to determine which activities will be successful and would be proposed for continuation.

4. Tangible outputs against original proposal produced during this reporting period:

Workshop: 8 November 2012 – "Early Weaning Techniques and Yellowtail Kingfish Research Update & Extension". Training provided to 16 Australian hatchery technicians and managers on early weaning methods for marine finfish, and an update on Yellowtail Kingfish hatchery research: participants from industry (n = 11) and research (n = 5).

5. Progress against milestone:

See attachments:

Appendix 1. Finfish Hatchery Workshop – Early Weaning Techniques and Yellowtail Kingfish Research Update & Extension. Activity Report.

Appendix 2. Minutes of the first SfCRC Aquaculture Production Innovation Hub Steering Committee, 30 September 2013.

Appendix 3. Revised Hub Work Plan for July 2013-June 2014, endorsed by Steering Committee on 30 September 2013.

6. Project information management:

Location and format of data	Topic(s)	Author/ custodian	Access to data
(Lab notebook, database, manual, report. Identification: titles, dates, reference number etc)	*(Description specific enough for potential collaborator or stakeholder to know whether it is likely to be of value to them. E.g. "oyster genetics" would be insufficient; "genetic selection parameters for oyster breeding values" would be sufficient)*	*(Person to approach if access is sought)*	*(Published, freely available, for project participants only, confidential, subject to Seafood CRC approval)*
Electronic files	Data for inclusion in reports and fact sheets. Meeting notes and minutes, Work Plan activity administration documents. Contact details for Hatchery network participants	Dr Jennifer Cobcroft (IMAS)	For use in project management and operations. The files are stored on a UTAS secure file server. As reports, fact sheets, webinars are available, they will be made available to SfCRC

			Participants and/or hatchery network members.

7. Intellectual property issues arising:

N/A

8. Extension and commercialisation:

This project predominantly focuses on extension, and activities are reported above and in the appendices.

There have been no Hub products commercialised to date.

9. Publications:

Publication type:	Full reference:	Status:
Indicate publication type from the following list: *- Peer reviewed journal (please - provide ERA ranking);* *- Book Chapter;* *- Conference proceeding;* *- Published conference abstract;* *- Published report;* *- Unpublished report;* *- Electronic media;* *- Teaching resource;* *- Technical manual;* *- Other.*		*Indicate current status from: submitted, in press or published.*
Conference proceeding	Cobcroft, J.M. 2013. "What's in it for Prawns and Barramundi? - The Australian Seafood CRC Aquaculture Hub, and World Aquaculture Adelaide 2014." 2013 Ridley Aqua-Feed Prawn & Barramundi Conference, Palm Cove, Queensland, 31 July – 1 August. (Abstract and oral)	Published

11. Communication :

Communication type:	Title:
Workshop	Finfish Hatchery Workshop – Early Weaning Techniques and Yellowtail Kingfish Research Update & Extension. Location: Clean Seas Tuna, Arno Bay, South Australia Date: Thursday 8th November Number participants: 16

12. Variations to project:

N/A

Original MS date	Original description	Original cost ($)	Revised MS date	Revised description	New cost ($)
Net change to project budget ($)					

PI to Complete

I have viewed this report and am satisfied it is complete.

Principal Investigator name: Jennifer Cobcroft

Please email your completed Milestone Report to report@seafoodcrc.com

AUSTRALIAN SEAFOOD COOPERATIVE RESEARCH CENTRE

Appendix 9

Project Milestone Report

To be completed by the Principal Investigator for each reportable milestone

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Project Type: *(double click on the appropriate check box and change the default value to "checked")*	☒ Research. Project ☐ Post Doc ☐ PhD ☐ Masters ☐ Honours ☐ Res. Travel Grant ☐ Industry Bursary ☐ Visiting Expert ☐ Other	**Seafood CRC Project Number:**	2012/756
		Principal Investigator:	Jennifer Cobcroft, University of Tasmania
		Program number? *(double click on the appropriate check box and change the default value to "checked")*	Program 1 ☒ Program 2 ☐ Program 3 ☐ Program 4 ☐
Milestone number: *(Milestone number 1 is the initial project payment.)*	3	**Milestone due date:**	30/11/2013

PROJECT PROGRESS ON THIS MILESTONE:

Has this milestone been achieved? **Yes** ☒ **No** ☐ **Partially** ☐

Will the Project be completed according to the current milestone schedule? **Yes** ☒ **No** ☐

1. Original full milestone date and title:

30 Nov 2013. Report on activities listed in the Hub Work Plan for July 2013 to December 2013. Update the Work Plan for the following 6 months.

2. IF REVISED, revised full milestone date and title:

N/A

AUSTRALIAN SEAFOOD COOPERATIVE RESEARCH CENTRE

OVERALL PROJECT PROGRESS UPDATE:

3. Summary project progress description:

This report section describes the overall progress of the project against each of the objectives.

1 Improve communication and increase collaboration among aquaculture producers and researchers

The Aquaculture Production Innovation Hub Phase II contracts were finalised on 1st August 2013. Initial activities to improve communication between Aquaculture producers commenced prior to that date, starting with an 'Early Weaning' workshop for marine finfish hatcheries held in South Australia in November 2012. Several meetings have been held with Atlantic Salmon producers since January 2012 to progress the trans-Tasman workshops, beginning with one on 'Communications', to be held 3-5 February 2014. At the Australian Prawn and Barramundi Farmers Conference in July 2013, industry representatives stepped forward to take an active role in the Shellfish and Finfish hatchery networks, including a request for a tropical finfish hatchery workshop. Two oyster hatchery technicians were supported on a technical exchange to attend Shellfish Futures in October 2013, and to visit Tasmanian hatcheries. Most activities are in planning and the initial implementation phase. There is no change from the previous milestone report to the six month Work Plan that is provided as an appendix (1) to this report.

2 Delivery of key extension activities for the 'Finfish' and 'Breeding for Profit' Themes of Production Innovation Program

In relation to the Finfish theme, meetings with the SfCRC Managers of the Production Innovation Program, and Communication, Education, Training and Extension Program have identified several areas of focus for extension. These were 1) a revised technical hatchery manual for Yellowtail Kingfish, 2) presentation and fact sheet communication of Cobia production in Australia, and 3) a fact sheet or booklet regarding skeletal malformation classification for several finfish species cultured in Australia. After discussion with the key industry stakeholder (Cleanseas Tuna in Nov 2013), the revised technical hatchery manual for Yellowtail Kingfish will be replaced with a brief report to summarise the key findings of the SfCRC-funded YTK hatchery research.

The proposal for the extension of 'Breeding for Profit' theme research is for the SfCRC Program Manager to work with selected Hub co-investigators to identify and outline content of a series of training modules and webinars, with individuals or organisations put forward to deliver those. There are two levels of training needed, the first is at the technical, hatchery management level, and the second is for people already involved in breeding programs. Training module allocation is pending.

Other activities have been added to the Work Plan, which span several production sectors, including communication of a review of cryopreservation technology and services (re 2008/773).

Dr Gay McKinnon commenced as Activities Co-ordinator for the Aquaculture Hub in January 2014. She has launched into finalising the plans for the trans-Tasman workshop, and will be keenly progressing Work Plan targets over the next six months.

3 Develop a plan for continuation of successful communication activities beyond the life of the Seafood CRC

Verbal support from industry representatives suggests that there are some champions to drive ongoing communication initiatives. However, it is too early to determine which activities will be successful and would be proposed for continuation.

4. Tangible outputs against original proposal produced during this reporting period:

Technical Exchange: Shellfish Futures 11-13 October 2013 and shellfish hatchery visits. Two oyster hatchery technicians (from NSW and SA) were supported to attend Shellfish Futures 11-13 October 2013, Bruny Island, Tasmania, and to visit two Tasmanian shellfish hatcheries. Reports are provided in Appendices 2 and 3, and discuss practical methods that were observed for implementation in the mainland facilities.

5. Progress against milestone:

Progress by Activities listed in the Work Plan (Appendix 1) is reported below and numbered according to the Plan.

1. Trans-Tasman salmon workshop 1 - communications. RDS Partners has been engaged to work with the workshop organising committee (Jennifer Cobcroft, Catriona Macleod and Adam Main) and facilitate Day 1 and Day 2 with a PR and communications consultant leading Day 3 (Program in Appendix 4). 40 people have registered to attend the workshop from 3-5 February 2014, including seven from New Zealand.
2. Trans-Tasman salmon workshop 2 – spatial planning. Initial planning is underway, with a venue booked for 12th June 2014 in Adelaide, immediately after WAA14. Following the first workshop, an organizing committee with representation from Tasmania, SA and New Zealand will be formed to plan the workshop focus and content, and advise on participants.
3. Aquaculture Genetics Production Package.
   There has been no progress since the previous report.
4. Workshops: Hatchery Health. Discussions are being held with:
   - the shellfish industry in relation to a shellfish biotoxin workshop – to demonstrate and discuss available commercial test kits that may be used as practical tools by farmers to inform harvest management from various sites. This activity may go ahead as a complement to a proposed project to validate the test kits. Planning ongoing (contacts: Phil Lamb and Ali Turnbull).

- a tropical finfish hatchery workshop is proposed with input from high technology facility managers in south-east Asia. (contacts: Justin Forrester)
- Biosecurity in land-based facilities will be a subject of the Hatchery workshop, for multi-sectors (shellfish, crustaceans and finfish) to be held 12th June 2014 at SARDI West Beach in Adelaide. (contacts: Gay Marsden, Brian Murphy, SARDI representative TBA)

5. Workshop: Response planning. This activity has been replaced by the shellfish biotoxin workshop discussed above.
6. Bi-monthly webinars. No progress since the previous report.
7. Co-ordinate technical exchange. The first two technical exchanges are complete (see Appendices 2 and 3), with 3 more proposed in an open call round (March 2014).
8. Workshop: Highlights of CRC Production Innovation. In addition to the Hatchery Workshop and 2nd trans-Tasman salmon workshop, there will be several sessions within the World Aquaculture Adelaide conference 2014, that will Showcase SfCRC Aquaculture research, including:
   - Tuna Propagation
   - Aquaculture Biotechnology
   - Finfish Nutrition
   - Yellowtail Aquaculture – hatchery and ongrowing
   - Cobia
   - Post-harvest product quality
   - Marketing
   - Seafood and Health

   The Seafood CRC booth at WAA14 will also have product demonstrations and product launches, which will include Hub materials such as Fact sheets.

9. Workshop(s): Production methods for Yellowtail Kingfish. No progress since the previous report. The value and content of a workshop will be discussed again with the SfCRC Program Manager and Kingfish industry partners. Note that a *Seriola* working group, affiliated with WAS, is likely to hold its first meeting at WAA14.
10. Finfish Deformity Classification. The classification guide has been drafted and is anticipated to be complete by April 2014, for launch at the SfCRC booth at WAA14. Some
11. Cryopreservation. No progress since the previous report. Fact Sheet for WAA14.
12. YTK Hatchery Manual. The manual was tabled at the SBT Larval Rearing planning workshop on 21st November 2013 at SARDI. It was discussed by Craig Foster, Graham Mair and Jennifer Cobcroft, with agreement that there would not be a full revised hatchery manual. A short 6-8 page summary of the SfCRC larval research findings 2007-2014 was agreed and to be written by the researchers on the relevant projects.
13. Cobia production methods (Webinar:Fact Sheet). No progress since the previous report. Peter Lee is session co-chair for 'Cobia' at WAA14.
14. PhD Internships. The internship scheme was advertised in October 2013 by direct email to SfCRC RHD candidates past and present. Initial interest was received from three potential candidates. The final call for applications (up to 5 placements, supported to $1000 each) was postponed

until Hub administration support was available. The call for applications will be made in February 2014.

15. Finfish and Shellfish Hatchery Networks - monthly blog/newsletter and annual workshop

See attachments:

Appendix 1. Revised Hub Work Plan for July 2013-June 2014, endorsed by Steering Committee on 30 September 2013.

Appendix 2. Hatchery Hub activity Report. Rodney Grove-Jones, EP Shellfish.

Appendix 3. Hatchery Hub activity Report. Kyle Johnston, NSW Fisheries.

Appendix 4. Program for the first trans-Tasman salmon workshop, 3-5 Feb 2014.

6. Project information management:

Location and format of data	Topic(s)	Author/ custodian	Access to data
(Lab notebook, database, manual, report. Identification: titles, dates, reference number etc)	*(Description specific enough for potential collaborator or stakeholder to know whether it is likely to be of value to them. E.g. "oyster genetics" would be insufficient; "genetic selection parameters for oyster breeding values" would be sufficient)*	*(Person to approach if access is sought)*	*(Published, freely available, for project participants only, confidential, subject to Seafood CRC approval)*
Electronic files	Data for inclusion in reports and fact sheets. Meeting notes and minutes, Work Plan activity administration documents. Contact details for Hatchery network participants	Dr Jennifer Cobcroft (IMAS)	For use in project management and operations. The files are stored on a UTAS secure file server. As reports, fact sheets, webinars are available, they will be made available to SfCRC Participants and/or hatchery network members.

7. Intellectual property issues arising:

N/A

8. Extension and commercialisation:

This project predominantly focuses on extension, and activities are reported above and in the appendices.

There have been no Hub products commercialised to date.

9. Publications:

Publication type:	Full reference:	Status:
Indicate publication type from the following list: *- Peer reviewed journal (please - provide ERA ranking);* *- Book Chapter;* *- Conference proceeding;* *- Published conference abstract;* *- Published report;* *- Unpublished report;* *- Electronic media;* *- Teaching resource;* *- Technical manual;* *- Other.*		*Indicate current status from: submitted, in press or published.*
NIL		

11. Communication :

Communication type:	Title:
Meetings	Meeting to discuss the YTK Hatchery Manual Location: SARDI, Adelaide, South Australia Date: Thursday 21st November 2013 Number participants: 3 (Craig Foster, Graham Mair and Jennifer Cobcroft) Meeting re 'Oceanography and Aquaculture' and including "Spatial Planning" workshop associated with WAA14. Location: SARDI, Adelaide, South Australia Date: Thursday 21st November 2013 Number participants: 3 (John Middleton, Graham Mair and Jennifer Cobcroft) Informal meetings and discussions with Gustaaf Hallegraeff, Alison Turnbull and Phil Lamb, (October 2013 - January 2014), regarding a workshop to discuss and demonstrate tool kits to assess biotoxins in shellfish.

	Several planning meetings by Jennifer Cobcroft with Adam Main, Catriona Macleod, salmon industry representatives, and RDS Partners to organise the first trans-Tasman salmon workshop.

12. Variations to project:

N/A

Original MS date	Original description	Original cost ($)	Revised MS date	Revised description	New cost ($)
Net change to project budget ($)					

PI to Complete

I have viewed this report and am satisfied it is complete.

Principal Investigator name: Jennifer Cobcroft

Please email your completed Milestone Report to report@seafoodcrc.com

Appendix 10

Steering Committee Meeting Minutes

Seafood CRC Aquaculture Production Innovation Hub: Phase II

Steering Committee
Meeting: 1
Date: 30 September 2013
Time: 11:00am AEST (10:30 in SA)
Where: Webinar Phone Number: +61 3 8644 7030
Access Code: 599-095-562
Pin Number: shown after joining the webinar

1. **Welcome**
   JC welcomed the members to the first ASCRC Aquaculture Production Innovation Hub Steering Committee meeting.
2. **Attending**
   Jenny Cobcroft (Chair), Emily Mantilla, Steven Clarke, Karri Hartley (minutes)
3. **Apologies**
   Graham Mair
   TBC: Rachel King
4. **Conflicts of Interest**
   It was noted that some Hub-funded activities would involve funding for activities to CRC Participants and links to World Aquaculture Adelaide 2014 (WAA14). In that context, SC declared he is an employee of SARDI and Chair of WAA14 CAP. JC declared she is an employee of UTAS and Co-chair of WAA14 Program Committee and member of CAP.
5. **Hub Background**
   - Hub has started late, contracts signed off in August 2013
   - There has been one Finfish Hatchery Workshop at Clean Seas, Nov 2012
   - 12 months of activities need to be compressed into 9 months in the Work Plan
   - EM noted that with the 12 month extension of SfCRC, there was scope to push out some Hub activities. JC noted this, but would like to finish as much as possible by 30 June 2013.

   - SC enquired whether a training and extension needs analysis had been conducted. JC indicated that two had been done – Hatchery training needs analysis (Report

available from CRC), and a Genetics training needs analysis. For other areas this has not been done in a structures way.

- Conversations between JC, Patrick Hone (FRDC) and industry at the recent Prawn and Barramundi farmers' conference indicated other areas of need. Tropical fish hatcheries are keen for international collaboration, workshop and potential exchange, particularly in relation to high technology new hatcheries.

6. Work Plan

1. Trans-Tasman salmon industry workshops - Communications
    i. FRDC TRF proposal planned for salmon industry perception survey prior to 1st Workshop (February 2013 TBC)
    ii. Option for JC to attend Aquaculture NZ Conference (24-25 Oct 2013) for planning purposes.

- Funding for 2 Australia/NZ workshops, including 6 people from NZ – salmon industry WS1
- WS1 – Communications and community involvement
- Proposal – tactical research grant FRDC – community telephone survey (general public)
- SC proposed participation beyond the salmon industry – possible scope for engaging with people working in sector planning and policy. Noted the recent social & economic workshop held by PIRSA, Kate Brooks facilitated. Group agreed that best way forward was to distribute the list of proposed invitees to EM (cc to SC and GM) to ensure appropriate cross-sectoral Participant attendance.
- Date of tactical research project finishing will determine the date of WS1: Feb 2014, but may be pushed back into March 2014.

2. Trans-Tasman salmon industry workshops – Spatial Planning (topic TBC)

- salmon industry WS2 – for June 2014, in conjunction with WAA14
- Site selection, environmental modelling
- Could involve discussion of IMTA (Integrated Multi-trophic Aquaculture) – growing different levels of the food chain together e.g. fish, molluscs, macroalgae to use excess nutrients – decrease potential environmental impact, increase sustainability, increase profit, diversify product
- SC proposed WS2 to become broader in invitation list to include oceanographers and people that recently completed carrying capacity assessment for Spenser Gulf

3. Aquaculture Genetics Product Packages – module outline and ID people/groups to deliver

- The Committee noted comments from GM provided electronically:

"This training is overdue for delivery. Need to review the TNA we did. We have identified training needs for three groups:

I. Hatchery staff - Basic genetics and the principles of genetic management

II. Breeding program implementers - Breeding program design and implementation

III. Breeding program managers and owners – commercialisation of breeding programs

The framework for III is being very much shaped by the discussion with CSIRO on potential for a genetic services unit (now unlikely to go ahead in the proposed form) and the attempt to build better business models for ASI and SOCO.

We have several groups capable of delivering this training (CSIRO, USC, Flinders and outside the CRC – JCU). Ideally we want to build a cooperative model rather than the usual competition. The CRC RAC has suggested a meeting of providers and key industry to discuss the commercialisation project and potentially also a cooperative genetics/genomics program as part of a CRC rebid. If this does go ahead we could potentially also integrate a discussion on training into the meeting agenda. If this meeting occurs it should be before the 'extension beyond July 2015 meeting scheduled for late November.

Always considered that we can deliver much material, esp to hatcheries, via webinars. We need to take the opportunity to include input from Norwegian experts through Nick Robinson's Nofima exchange project. This has funding equivalent to one expert coming over but we could convert this to include significant input into on line training but identifying the unique added value the Norwegians can provide.

Question: This should not be stand alone, one off training, but developing packages and material that can be delivered in the future. Undergrad programs already have the technical stuff covered with content that could be adapted. We don't have anything for VET sector (I believe). What is the best way to institutionalise programs. Units of competency? Cert III? Involve Mark Oliver?"

- JC to communicate with GM regarding the face-to-face meeting, possibly held before end Nov '13
- SC suggested policy representatives would be interested, at least in part of the meeting/genetics training process. The intention would be to start a conversation between policy/industry/research about what is currently underway and what is planned in aquaculture selective breeding, how breeding programs are managed, what that means for stock types in the water (esp. in seacages or 'open' systems). It may identify another area of training needs to support future industry direction and planning.
- EM agreed that certified qualifications was very important, and Mark Oliver should be involved in this. JC to follow up with MO.
- The ultimate aim is to support universities and genetics services providers to develop training material for the trainers in short-term and ongoing, so that the legacy of the training package will be there for future years.

4. Hatchery workshops
    - Finfish early weaning (Nov 2012)

- Tropical finfish (Feb 2014)
- Shellfish – prawns and pearl involvement (dates TBA; Nov 2013, June 2014)
- Finfish YTK/Tuna (TBA June 2014)

- GM asked (by email) how this would be integrated with the WAA14 conference and how the workshops will link to the technical sessions?
- JC indicated it would be a close association – there are sessions proposed for major species groups, including hatchery research from SBT and YTK. The science would be presented in WAA14, and follow-up workshops address technology (hands-on), and opportunities for international engagement in YTK and tuna.
- SC suggested that this should be expanded to mulloway as well, since there are groups in South Africa, Ecuador, France, Portugal, and related species red drum in Texas. JC will take this on board to consider how to incorporate.
- The group agreed that biosecurity should be added to all hatchery workshop agendas
- Tropical finfish – high-tech systems in Asia – looking at options for changing or improving systems/ upscaling. SC indicated Bennan had made a research training tour to Taiwan – report available on SfCRC website. Could be worth investigating with Bennan possible contacts for the tropical workshop. JC to check with Colin Buxton if any formal Australia-Taiwan links are ongoing.

5. Hatchery Health response planning (e.g. POMS) –

- JC to get an update from Tom Lewis/Wayne O'Connor; possible alternative is prawns (viral response)
- SC suggested that JC contact Shane Roberts (PIRSA), currently writing up an FRDC POMS Final Report.

6. Bimonthly webinars
    - Shellfish – oysters (Oct 2013)
    - Completed PhD candidates (proposed)
    - Other (Genetics training, Cobia, finfish deformity, cryopreservation)

From GM: "We need to trial one of these so we can develop the approach. Same question re genetics, how do we create long term value from these rather than one off. We can store recordings as resource materials. Would love to see this develop into information sessions that are valued by industry and try to find an organisation to continue them beyond the life of the CRC which will require some kind of cost recovery to the provider."

- EM was very supportive of the RHD students contributing and JC requested EM send a list of potential candidates.
- SC suggested that FRDC could be considered, along with subprograms for continued webinar support if successful.

7. Technical exchange
    - NSW and SA oyster hatchery technicians to Shellfish Futures and Tasmanian hatcheries (Oct 2012)
    - Offer extended to pearls. Recent interest expressed by Dave Mills (Paspaley), but unable to attend.

- Group discussed options for promoting this activity and decided that the best approach was to advertise through CRC weekly newsletter and website, for one public call with a Dec 2013 deadline, maximum four awards up to $1000ea. After that, if funds available, be open to unsolicited requests.
- Add information to Aquaculture program leaders in each state, to be aware that this is available for CRC Participants or hatcheries.
- Be aware of the need to balance opportunity for industry and research.

8. Workshop: Highlights of CRC Production Innovation at WAA14
    - 2nd trans-Tasman - salmon
    - Hatchery workshop – hatchery technology
    - Possible support for Tuna/YTK workshop – international participants

From GM: The SfCRC has a proposed sponsorship package, which includes Aquaculture Hub activities. There will be at least 4 CRC badged sessions organised (by SfCRC, with input from Hub as needed) with the following suggested themes:

- Tuna Propagation
- Yellowtail Kingfish
- Oysters (POMS, husbandry)
- Food safety and trade
- Genetics commercialisation

- JC noted that as mentioned earlier in the meeting, these sessions would be complemented by Hub workshop(s) at WAA14, especially in 'Hatchery' topics and potentially species groups.
- These workshops would be promoted in conjunction with displays and activity at the CRC Trade Show booth (to display fact sheets, manuals, training materials, etc.)

9. Workshop(s): Production methods for Yellowtail Kingfish
    - Finfish early weaning and YTK update (Nov 2012)
    - Other re manual planning (TBA?, see activity #12)

- This would be promoted at CRC Trade Show booth.

10. YTK and other finfish deformity 'Fact Sheets'/booklet with ISBN - JC

From GM: "Need to get these done. Role of Rachel? There should be a general discussion here including Emily on what support Rachel can provide on the communications side?"

- Drafting material is underway (JC and KH).
- EM agreed that RR could support with this. JC and KH to contact RR about the best approach.
- EM also agreed that RR could support other activities, including website promotion.

11. Cryopreservation – Fact sheet & webinar

- JC to contact XL, and work with KH and RR to arrange this.

12. YTK Hatchery Manual – propose eformat – need to subcontract

From GM: "Intended to be a living document so it can be updated with new research. Who has ownership after life of CRC?"

- JC noted that there is potential to add YTK Manual to the agenda of an SBT meeting in November 2013.
- Possible format an ebook with hyperlinks and short demo videos.
- There was discussion around who the target audience was. Is it CRC Participants only, intended to be international (widely distributed or paid for?). Past manuals have had very few purchases and effort was questioned.
- The group agreed that a good approach was for JC to distribute the beginning of a simple SWOT analysis to parties involved (CST, SARDI, NSW Fisheries, IMAS, ACAAR, SfCRC), to get email conversation going, prior to final discussion and agreement as an agenda item of the SBT meeting in Nov.
- Ownership beyond life of SfCRC would depend on format selected, group contracted to produce it, intended audience, research group agreement.

13. Cobia production methods - Webinar and/or presentation at WAA14 plus FS

- JC to contact Peter Lee. What did we learn from this research and what would we do in future? Information for future investors.

- SC suggested more transparency with respect to CRC project progress and outcomes – what has been completed/activities being undertaken – and possibility of sharing this information (with due respect to Intellectual Property)
- There was general discussion of this point, what is currently available publically (Project title, objectives, intro summary) and on Members-only sections of the CRC website (Final Reports).
- EM indicated a review of all SfCRC project IP had recently been conducted, making this a good time to identify if there are non-IP protected outcomes that could be communicated. JC to discuss with GM.

14. PhD Internships

- Group discussed options for promoting this activity. Agreed, as for technical exchange, advertise through CRC weekly newsletter and website, for one public call with a Dec 2013 deadline, maximum five awards up to $1000ea. After that, if funds available, be open to unsolicited requests.

- SC suggested making preliminary contact with industry participants and RHD candidates, to see who may be interested and willing to share contact information, and then focus email advertising/promotion, as well as open call.
- Send list and details of interested PhD students to industry (person, thesis, skillset, future plans, link to CV if needed)
- JC and KH to progress.

15. Finfish and Shellfish Hatchery Networks -

- Options for monthly blog/newsletter and annual workshop – as above item 4. Need social media support re eNews/ discussion group.
- EM indicated that the Oyster Grower Group Blog was well received by growers, but they preferred to read the information, rather that interact. She also mentioned a project by Jane G, with SMS communications – was expensive and not ideal due to limited characters.
- JC to investigate effective and successful ways for social media integration (e.g. moderated, self-sustaining topics). JC to talk to Tom Lewis and RR about approaches.

7. Promotional Activities

- JC attended the Prawn & Barramundi Farmers conference (31 July/1 August 2013) & presented an invitation to 'engage', supported by Patrick Hone.
- Option for JC to attend Aquaculture NZ Conference (24-25 Oct 2013) for planning purposes. (est budget $1,950; $750 approved from WAA14; balance $1,200)
  - The Committee supported the proposal for JC to attend Aquaculture NZ using $1,200 Hub funds.
  - Activities for planning – trans-Tasman workshops; webinars; YTK hatchery manual interest; engage oceanographers re 'spatial planning'

8. Other business

From GM: "Role for Rachel Robbins in Hub comms?"

- Group agreed that RR be involved in Fact Sheet preparation, website presence and promotion of activities.

EM also noted that there was a lot of work in the Work Plan.

9. Next Meeting Date

February 2014

Date to be determined by Doodle Poll – distributed in mid December 2013.

10. Close

Meeting closed at 12:00 midday AEST.

Attachment

Agreed Work Plan

Actions

#	Task	Responsible	Status
1	EM to send SfCRC hatchery training needs analysis to JC	EM	{JC downloaded 2008/755 Training Needs Analysis of Seafood CRC Industry Participants}
2	JC send EM list of who is likely to be invited to Aust/NZ WSs, and ensure wide CRC participant involvement (cc to SC & GM)	JC/EM	
3	JC to follow up with GM time of genetics meeting & training planning	JC/GM	
4	JC to follow up with GM adding policy ppl to genetics discussion/training	JC/GM	
5	JC to contact Mark Oliver about genetics product packages – training certification and future delivery	JC	
6	JC work with GM, RR, Wayne H & others on tuna, YTK, mulloway workshop options	JC/GM/RR	
7	Tropical finfish hatchery workshops JC to follow up with Colin & Bennan status of links to Taiwan. Download Bennan's report CRC website	JC	{JC downloaded report}
8	JC to contact Shane Roberts about hatchery health response planning	JC	
9	Advertise technical exchange	JC/KH/RR	
10	JC and KH to contact RR about the best approach to format deformity booklet	JC/KH/RR	
11	JC contact XL; work with KH and RR to arrange cryopreservation material.	JC/KH/RR	
12	JC send draft SWOT re YTK manual and target audience	JC	
13	JC contact WH to add YTK manual to SBT meeting agenda	JC/WH	
14	JC contact PL; work with KH and RR to arrange cobia material	JC/KH/RR	
15	JC contact GM re wider access to non-IP protect outcomes JC/EM/GM identify what is able to be shared with respect to IP	JC/GM/EM	
16	EM to give CRC completed PhD/RHD list to JC	EM	

17	KH to contact CRC PhD/postgraduate students about internships with industry, send details of interested parties to industry (person, thesis, skill set, future plans, link to CV)	KH	
18	KH/JC to contact industry participants about RHD internships, send contact info to RHDs.		
19	JC/KH/RR advertise student industry placement bursaries	JC/KH/RR	
20	Finfish and shellfish hatchery networks: JC to talk to Tom Lewis & Rachel R about successful social media integration	JC	
21	Doodle poll mid Dec 2013 for next meeting date	JC	

JC – Jenny Cobcroft
GM – Graham Mair
EM – Emily Mantilla
SC – Steve Clarke
KH – Karri Hartley (admin)

Appendix 11

Australian Seafood CRC Aquaculture Production Hub activity feedback surveys

Prepared by RDS Partners
for the
Institute for Marine and Antarctic Studies

24 March 2015

Table of Contents

Non-Technical Summary

Australian Seafood CRC Aquaculture Production Innovation Hub activity feedback surveys

PRINCIPAL INVESTIGATOR: Tom Lewis
tom.lewis@rdspartners.com.au
(03) 6231 9033

ADDRESS: Level 4 / 29 Elizabeth Street, Hobart TAS 7000

PROJECT OBJECTIVES:
These feedback surveys of the Australian Seafood CRC Aquaculture Production Innovation Hub activities were conducted to provide the Australian Seafood CRC and the Fisheries Research and Development Corporation (FRDC) - and potential investors/sponsors in future workshops and/or eNews - with stakeholder and participant thoughts on the utility, effectiveness and future options for these types of R&D communication activities.

ABSTRACT
In 2014, the Australian Seafood CRC Aquaculture Production Innovation Hub trialled two new extension activities with key stakeholders in aquaculture RD&E. These were:

i. two Trans-Tasman Workshops for Australian and New Zealand stakeholders; and
ii. the distribution of two short video news episodes of *What's Hatching?*' via email alert to the full CRC stakeholder contact list.

Feedback from participants at the Trans-Tasman Workshops was generally very positive. Both workshops were seen as beneficial and valuable to professional networks by workshop participants.

There appears to be strong support for the Trans-Tasman Workshop series continuing. Relevance of topic and tangible benefits will be key considerations for participation in future workshops, although self-funding of attendance by participants may be problematic.

Feedback from recipients of the *What's Hatching?* video news email was very positive.

The vast majority of survey respondents who indicated they had received either at least one or both episodes of *What's Hatching?*, either always or sometimes viewed the video and also viewed either all the video or most of it. For increased uptake, distribution via email may be improved by a second email (reminder) message (e.g. one week after the initial mail out).

The video format of *What's Hatching?* was received very favourably, with respondents particularly liking the concise nature, the variety and content of the news items. Improving the production quality of videos was the main change suggested.

There was strong support for continuing with *What's Hatching?* as a way of communicating about aquaculture research and industry happenings. All respondents indicated that they

would prefer to access and view future editions by receiving an email with an alert to recently available video news (i.e. a continuation of the current format of distribution).

Communicating through emails and text messages and electronic newsletters were noted as effective ways to communicate about aquaculture R&D.

OUTCOMES ACHIEVED

- The survey feedback on these Aquaculture Hub activities has been consolidated, analysed and compiled into a single report for the Australian Seafood CRC and the Fisheries Research and Development Corporation (FRDC) - and potential investors/sponsors in future workshops and/or eNews
- The profile of the Aquaculture Production Innovation Hub activities has been raised with key stakeholders

OUTPUTS

- Output 1: Trans-Tasman workshop series survey (Survey 1)
- Output 2: *What's Hatching?* video news survey (Survey 2)
- Output 3: Report with basic analysis and commentary (This Report)

1. Introduction

Background

Trans-Tasman Workshop series

The "Trans-Tasman salmon farming workshop – communications and community engagement" was held 3-5 February 2014 at the Hobart Function and Convention Centre, Hobart, Tasmania. Participants included representatives from the salmon farming industry, research, aquaculture supply and regulatory sectors, as well as wild fishery and market sectors, and communications professionals.

The "Trans-Tasman Aquaculture Workshop – Spatial Planning" was held 12 June 2014 at SARDI, Waite Campus, Adelaide.

'What's Hatching?' video news

What's Hatching? video news – is a series of short videos showcasing progress on a selection of CRC projects that are posted on YouTube. An email alert with a link to Episode 1 (May 2014) was sent on 15 May 2014 to 643 subscribers to the Seafood CRC mailing list while email notification of Episode 2 (October 2014) was sent on 13 October 2014 to 690 subscribers to the Seafood CRC mailing list.

As at 30 January 2015, the following statistics were reported for each email and video news episode. The percentage of email recipients who opened the email and also clicked to view the video decreased slightly from Episode 1 to Episode 2. The high number of video views for Episode 1 suggests that this episode may have been viewed multiple times by email recipients or email recipients were more likely to forward Episode 1 to others than Episode 2.

Episode	Date	Subscribers	Opened email	Opened email & clicked to read more	Video views
1	May 2014	643	257 (40%)	90 (35%)	224
2	October 2014	690	221 (32%)	66 (30%)	92

Australian Seafood CRC Aquaculture Production Innovation Hub activity feedback surveys

For this survey, IMAS (as Administering organisation of the Seafood CRC Hub) were interested in stakeholder and participant thoughts on:

1. The Trans-Tasman workshop series:
    - Were these beneficial?
    - How have the skills and discussions been utilised in the workplace since the workshop?
    - Rate value of the network creation.
    - Would you like the workshops to continue?
    - Would you or your organisation self-fund participant travel?
    - What topics?

- Location?
- Would you find it useful to have a webinar (40 minutes) once every two months for continuity of information/research exchange?

2. The *What's Hatching?* video news:
    - Were the episodes informative?
    - Would you like these to continue?

The results of these surveys were to be compiled into a single report with basic analysis and commentary for Seafood CRC and Fisheries Research and Development Corporation (FRDC) and potential investors/sponsors in future workshops and/or eNews.

Objectives

These feedback surveys of the Australian Seafood CRC Aquaculture Production Innovation Hub activities were conducted to provide the Australian Seafood CRC and the Fisheries Research and Development Corporation (FRDC) - and potential investors/sponsors in future workshops and/or eNews - with stakeholder and participant thoughts on the utility, effectiveness and future options for these types of R&D communication activities.

Outputs

- Output 1: Trans-Tasman workshop series survey (Survey 1)
- Output 2: *What's Hatching?* video news survey (Survey 2)
- Output 3: Report with basic analysis and commentary (This Report)

2. Methods

RDS Partners reviewed the survey requirements and prepared two surveys for IMAS' approval. Once approved by IMAS investigators, the Seafood CRC and FRDC, the surveys (Outputs 1 and 2 – see Appendices) were loaded to Survey Monkey and distributed to relevant recipient lists as advised by IMAS.

Survey 1 was distributed on 27 February 2015 - in separate email communications - to a total of 59 Trans-Tasman Workshop participants who attended either the:

- Communications Workshop in February 2014 - sent along with Confidential final workshop report (33 participants);
- Spatial Planning Workshop in June 2014 – sent along with final workshop report (19 participants); or
- Communications Workshop and the Spatial Planning Workshop – sent with both the final workshop reports (7 participants).

To encourage participant response, a reminder email was sent on 6 March 2015 and a final reminder email sent on 10 March 2015. The survey was closed for data collection on 11 March 2015.

Survey 2 was distributed by email (via MailChimp) on 4 March 2015 to 690 "What's Hatching?" email recipients.

To encourage participant response, a reminder email was sent on 11 March 2015 and a final reminder email sent on 16 March 2015. The survey was closed for data collection on 17 March 2015.

At the conclusion of the data collection period for each survey, this report - providing basic analysis and commentary - was prepared and submitted to IMAS for approval (Output 3).

3. Results

Trans-Tasman Workshop series (Survey 1)

Response

Twenty (20) responses were received to the Trans-Tasman Workshop feedback survey – a response rate of 34% of the total 59 Trans-Tasman Workshop participants.

Demographics

Workshop participants were assigned by the project team as working in the areas of either: Industry; Management; Research; or Other, and these were then compared with the area of work reported by survey participants. Those working in Management and Other appear fairly well represented in the survey responses. However, survey responses from those working in the area of Industry appear to be under-represented. Those working in Research are over-represented.

Area of work	Industry	Management	Research	Other
Assigned (n=59)	37%	19%	25%	19%
Survey (n=20)	25%	20%	40%	15%

Those attending the Communication Workshop appear fairly well represented in the survey responses. However, survey responses from those attending the Spatial Planning Workshop appear to be under-represented in survey responses. Those who attended both workshops are over-represented in the survey responses.

Workshop	Communications Workshop	Spatial Planning Workshop	Both workshops
Total attendees (n=59)	56%	32%	12%
Survey (n=19)	53%	21%	26%

Benefit and professional value of workshops

	Communications Workshop			Spatial Planning Workshop		
	Total (n=15)	**Only attended this workshop (n=10)**	**Attended both workshops (n=5)**	**Total (n=9)**	**Only attended this workshop (n=4)**	**Attended both workshops (n=5)**
Benefit of the workshop	7.06	6.70	7.80	6.89	7.25	6.60
Value of professional networks	6.80	6.30	7.80	7.00	6.25	7.60

Overall, when asked to rate the benefit of the workshop/s they attended to themselves (on a scale from 1 to 10, where 1 is no benefit at all and 10 is maximum benefit), the Communications and Community Engagement Workshop (rating 7.06) and the Spatial Planning Workshop (rating 6.89) were rated very similarly.

Interestingly, those who attended both workshops:

- rated the Communications Workshop of greater benefit than Spatial Planning workshop (rating of 7.80 compared to 6.60);
- rated the Communications workshop of greater benefit than those who only attended that workshop (rating of 7.80 compared to 6.70); and
- rated the Spatial Planning Workshop of lower benefit than those who only attended that workshop (rating of 6.60 compared to 7.25).

Overall, the value of the professional networks created at both workshops were rated very similarly. Those who attended both workshops rated the professional networks that were created at each of the workshops higher than those who had only attended one workshop.

Utilising the skills acquired from the Communications and Community Engagement Workshop in the workplace

Feedback from those who only attended this workshop:

- *assisted in the on-going implementation of a social licence work programme*
- *helped progress broader work with the aquaculture industry on social licence*
- *the social licence material was useful, and good to catch up with how it's been implemented*
- *increased awareness and appreciation of social science research and language in relation to community acceptance of aquaculture*
- *increased awareness of the need to communicate within and among stakeholder groups to understand current production methods and operations in salmon farming.*
- *I believe that they have initiated and continued some good discussions which are generating some modifications in the way the industry perceives it needs to communicate with its industry partners and the public (both those directly affected and indirectly)*
- *knowledge gained will be incorporated in future project planning and management*
- *my outputs from the workshop were not directly relevant to my workplace but I learned some interesting perspectives on communication which have generic relevance*
- *no activity yet*

Feedback about this workshop from those who attended both workshops:

- *revised communications and engagement strategies for current processes & key messages industry can portray to broader community that are consistent, good news stories*
- *better overall feel for what is possible and options*
- *input to my research and network development*
- *a much better understanding of how the industry and government relate and respond to issues, and the communication mechanisms they employ to identify and address engagement and communication, and therefore as a research provider I can integrate with those processes better and as a result am better able to provide the support needed. This workshop helped me identify gaps in the community engagement and communication strategies of both government and industry and I have since been actively involved in seeking research opportunities (and funding) to address those gaps. So the information gathered at this workshop has translated directly to my research team and our ongoing activities*

- *fortunately, we have not had a 'disaster event' to respond to (i.e. akin to one of the workshop exercises), but I have tried to bear the lessons of the entire workshop in mind when talking with people and planning resource applications. On the other hand, the workshop did help to emphasize that we have not invested sufficiently in 'outreach' in our work programme. In response, we increased the budget for meetings/liasons/outreach. In more general terms, the most valuable material that I gained was the chance to meet such a diverse range of people involved in various aspects of the aquaculture industry. Some I already knew. Others I did not. Many were working in parts of the industry that I previously knew almost nothing about.*

Utilising the skills acquired from the Spatial Planning Workshop in the workplace

Feedback from those who only attended this workshop:

- *learning about planning for aquaculture in the Australian context has been very useful for our discussions in New Zealand*
- *really appreciate the benefits of consultative relationships we've established with the regulatory bodies. Prior to the workshop I had not recognised that our ability to have an open dialogue and a degree of faith in the system and policies was not shared by all sectors*
- *one of the benefits of the workshops was to explore and understand the management of aquaculture, especially spatial allocation, in other jurisdictions. This proved invaluable and demonstrated that all jurisdictions are managing similar if not the same issues. Understanding the different approaches to these common issues has also been a valuable insight*

Feedback about this workshop from those who attended both workshops:

- *I am now working with some of the people that I first got to know better at this workshop. The informal relationships which we built at the workshop have helped to make the present, formal, relationships easier*
- *Input to my research and network development*
- *Backgrounder on Australian situations helpful in directing traffic*
- *Looking at what other spatial planning tools can inform the projects we are currently or looking at undertaking in the future, reviewing the EIS that Tasmania undertake in their spatial planning and considering how we could incorporate something similar*
- *This workshop gave me a much better perspective on the variety of planning processes, and the specific problems/ concerns in Australia - and even highlighted several really positive strategies in the planning area. I have since been involved in a number of projects, and in the development of projects, looking directly at how research can better integrate with and support spatial planning processes for aquaculture. We will have a project report coming out in the next 2-3 months, looking specifically at information needs for planning support in the aquaculture sector. I have a number of proposed PhD projects which are seeking funding through the new Centre for Marine Socioecology to look specifically at GIS systems to support aquaculture planning. These have been directly influenced by the discussions and presentations at this workshop. I have also been asked to contribute to a proposal ……. focused on carrying capacity for aquaculture, which has as a key element spatial planning issues and which shows the strong correlation between issues in Australia and the rest of the world, and our contribution will very much be informed by the discussions and issues highlighted in this workshop. I am using the understanding developed in this workshop on a daily basis in my workplace*

Future Workshops? – topics, venues, funding and format

Overall two-thirds of survey respondents would like to see the "Trans-Tasman Workshop" series continue. No-one answered they did not want them to continue. The other third of respondents did not have an opinion either way. Interestingly, 100% of respondents who attended either the Spatial Planning Workshop only or both Workshops would like to see them continue. However, only 40% of respondents who attended the Communication Workshop only responded that would like to see them continue.

Suggested topics for future workshops were:

- Monitoring of environmental effects
    - Particularly approaches for water quality monitoring (methods, standards, monitoring conditions)
- Cumulative effects
    - Putting aquaculture into the broader environmental context (e.g land-derived organic matter inputs)
- Ecosystem services valuation
- Spatial planning (follow up)
    - Spatial planning combined with risk assessment
    - Documenting good practice in the process of making spatial allocations
    - Documenting spatial planning case studies
- Biosecurity Modelling
    - With a focus on the application - what is a "fit for purpose" model
- Community Engagement (follow up)
    - Identifying top 3 mechanisms for effective community engagement
    - Engagement methods and strategies that have been found to be successful (as against communication just being information out)
    - NGO's perspective on aquaculture and how we address these concerns
    - Development of common issue statements (NZ & Aust) around key topics
- Crisis management
    - How to deal with big issues in aquaculture/ fisheries
- Agriculture/ aquaculture joint workshop
    - Addressing the public's poor understanding of primary industry
- Education and training in aquaculture/ fisheries
    - What do we need at the tertiary and vocational levels and how do we get that?
- Cooperative R&D
- On-shore/off-shore aquaculture
- Incorporating science into policy
- How to develop meaningful impact statements
- Certification - Standards and options
- Negotiation around what levels of environmental change should be deemed acceptable
    - What objective standards/thresholds exist? How generic/transferable are they?

Suggested locations for holding future workshops were:

- New Zealand

- Nelson, NZ – where much of industry is based; is very engaged with the concepts discussed at the workshops; seeking to progress activities to improve their social license to operate
- Marlborough, NZ
- Within the ~3-hr flight range from NZ
- Alternate between Australia and NZ
- Melbourne or Sydney (somewhere easy to get to)
- Close to where majority of participants live
- Issue/sector dependant

One respondent suggested that workshops not be aligned with other major seafood event as it runs the risk of it being just an add on and not taken so seriously, or that participants can be a bit "talk weary" at the end of major conferences (although they did recognise benefits from a cost-saving perspective).

Most respondents (83%) indicated that it would depend on particular circumstances of the workshop as to whether they or their organisation would self-fund travel to future workshops. Two thirds of respondents would be willing to pay either a small (up to $100) to medium (up to $500) registration fee to attend a future workshop – but none would pay a fee up to $1000. Several respondents suggested a figure of around $300 would be easier to get approval for.

Comments regarding funding arrangements and/or whether payment of a fee would be considered but would be dependent on factors such as:

- *Tangible benefits*
- *The nature of the workshop and how closely aligned it is with our organisations priorities*
- *Visible links with existing work programmes and there is budget available*
- *Relevance of the issue/topic and the other participants*
    - *Participants were able to make a real contribution and bring things back*
- *Total travel costs*
- *How busy we are*
- *Location and topic*
- *Potential return on investment from attending*
    - *Would have to perceive a direct pathway to future paid work to justify the expenditure*
- *Would need sufficient notice in order to prepare a funding request*
    - *Much easier if the meeting is inside NZ. Australia counts as overseas travel and we have only one application round per year for that.*

Feedback on the utility of having a regular webinar (e.g. a 40 minute webinar once every two months) for continuity of information/research exchange was mixed – about half responding that it would depend (e.g. on content and quality; on a well-defined agenda and good facilitation; on speakers; on frequency; on outcomes) and the remainder equally divided between yes and no regarding the usefulness of a regular webinar.

Some comments around the webinar suggestion were:

- *Find the technology a bit frustrating and webinars a detached experience*
- *Once every two months to (sic) much – maybe every quarter*

- *Would need to have a focus to ensure something was accomplished*
- *Useful if you can set up a stakeholder network and the webinars are well pitched to those stakeholders*
- *I think these would be particularly useful if they could be recorded, archived and then viewed at any time that would be suitable for the participants*
- *Benefits of face to face discussions are considerable*
- *Focusing as at a workshop is best*
- *Topics relevant and requested/driven by trans-Tasman network participants*
- *Would be ideal to have speakers from a variety of organisations.*

Suggested improvements

Suggestions on how to improve workshops like the Trans-Tasman Workshop series were:

- *actual problem/issue solution outputs would help participants*
- *encouraging more industry involvement would be great and having participants from all relevant stakeholder groups (if relevant to the topic) - Industry, government, research, indigenous, NGOs, commercial fishing etc. so that an all-round picture of the issue was sought*
- *try to seek industry sponsorship for meetings Would there be merit in seeking assistance for the group through World Aquaculture Society?*
- *workshops would be most successful if they have a single individual organising, co-ordinating and promoting them - this would need to be someone with their finger well and truly on the pulse to make sure they really are relevant to the issues and concerns of the day. That someone would also need to actually identify participants and try to actively generate the group dynamic. So basically it would need to "managed "to be truly effective*
- *while the spatial planning workshop was interesting it has not improved the working relationship within the network I previously had (i.e. has not improved the connection between research scientists and resource managers). The physical distance is making it difficult to follow up with resource managers in Australia. A suggestion for future workshops is to allow time after the formal workshop for 'like-minded' people to spend a day to discuss some specific issues or topics that are not of interest for the wider group. For example, this could be specifics around environmental monitoring, including scientifically sound resource consent conditions/monitoring programmes or more detailed discussions on modelling approaches.*
- *thought it was all very well organised and executed*
- *I can't think of any suggestions to improve! Thanks very much*

What's Hatching? video news survey (Survey 2)

Response numbers
Sixty-three (63) responses were received to the *What's Hatching?* video news feedback survey – a response rate of 9% of the total 690 *What's Hatching?* video news email recipients.

Respondent demographics
These survey responses were received from people working in the following areas of work.

Area of work	Industry	Management	Research	Other
Survey (n=63)	38%	14%	33%	6%

Views regarding receiving and watching 'What's Hatching?'
Around 60% of respondents had received both episodes of *What's Hatching?* and a further 21% had only received one episode. Twelve percent (12%) for respondents stated that they didn't receive any episodes and 7% didn't know if they had.

Of those respondents who answered that they had received either at least one or both episodes of *What's Hatching?*, about 85% either always or sometimes viewed the video (60% always viewed and 25% sometimes viewed) while 4% never watched the video and 9% couldn't remember.

Of those respondents who answered that they had received either at least one or both episodes of *What's Hatching?*, about 85% viewed either all the video or most of it (64% viewed all the video and 21% viewed most of it) while 10% only watched the speakers that interested them.

Some comments about watching *What's Hatching?* were:

- *I didn't realise you could skip to particular speakers, perhaps I missed this option*
- *I fast-forwarded some parts that were less interesting*

Views regarding what people liked about 'What's Hatching?' and how informative was it?
To the question, *What was the one thing you liked most about the 'What's Hatching?' video news?,* the people who indicated that they had received the video news liked the following key things:

- concise; short; brief; to-the-point
- timely; relevant; current, the latest; staying connected
- mixed topics; the variety; good overview
- simple language; real presenters
- nice format; visual; easy to view; didn't have to read it
- the science; real research; innovations; the breakthroughs
- informative; interesting
- Australian research
- that the effort is being made to communicate and bring people together

When asked to rate how informative they thought *What's Hatching?* was in communicating information about Seafood CRC Aquaculture Hub activities to them (on a scale from 1 to 10, where 1 is not informative at all and 10 is maximum informative level), rated the video news at 6.95 on average. Researchers thought the video news was more informative than those who worked in industry and those in management found it the least informative.

Area of work	Industry (n=18)	Management (n=7)	Research (n=16)	Average
Survey response	6.78	6.14	7.38	6.95

Views regarding Effective ways to communicate about aquaculture R&D

When questioned as to the top three most effective ways to communicate to them about aquaculture R&D, survey respondents indicated the following (in order of most nominated in top three):

- emails & text messages
- electronic newsletters
- conferences & seminars
- industry magazines
- video news
- websites
- journal articles

Views regarding Continuing with 'What's Hatching?', topics of interest and access & viewing

Over 75% of respondents would like to see *What's Hatching?* continue as a way of communicating about aquaculture research and industry happenings? Only one person said they did not want it to continue and around 20% didn't have an opinion either way.

The main reason given for continuing with *What's Hatching?* was clearly that it kept people informed of former Seafood CRC & future FRDC research project progress. Of much lesser importance was that it provided a 'point of contact' to ask for more detail and that it provided direct information for adoption.

Survey respondents indicated the following topics of interest - in order of most nominated to least nominated (times nominated):

- hatchery (33)
- growout/production (30)
- industry updates (28)
- research updates (26)
- shellfish (26)
- finfish (25)
- genetics (19)
- environment (17)

Some additional topics of interest suggested were: basic "state of knowledge" sessions (Topic 1.01's); and nutrition.

All respondents indicated that they would prefer to access and view future editions by receiving an email with an alert to recently posted video news (i.e. the format of distribution for Episodes 1 and 2). A small number of respondents would also prefer to either receive an MMS to their phone and/or have the ability to log in themselves to an R&D website to find video news.

Suggested changes to improve 'What's Hatching?

Some of the following changes were suggested to improve *What's Hatching?*

- *better quality control; clearer audio; improve video consistency; better production; better consider location of recordings; subtitles could be good*
- *better instructions to presenters on "how to best film these" including what not to do & level to pitch talks*
- *consider the reporter approach that was used for previous CRC updates*
- *some speakers appeared uncomfortable - consider item to be presented by others, following a considered 'script' of the news (although it's good to be able to put a face to the person actually undertaking the work)*
- *provide images/slide summarizing research instead of people talking*
- *change the background music*
- *more frequent episodes; monthly editions; a series covering a research project from start to end*
- *keep productions tight – we are time limited*
- *longer presentations – or links to access a longer presentation*
- *clear link to more detailed written information (e.g. publications or project reports)*
- *provide a diverse range of topic updates*
- *more video of real work; actual production; lab or hatchery footage*
- *more articles relevant to my field of interest*
- *broadcast news as soon as available (e.g. twitter)*
- *could be replaced/complemented with twitter (use meerkat app)*
- *build-up momentum/ interest in this through other mechanisms. Perhaps email informing people of the highlights of each bulletin and developing an online archive (something like the TED talks) so that people can revisit when it suits them*

Other suggestions to research teams and FRDC to improve communication

- *need to ensure focus on aspects occurring in all parts of Australia - not east coast centric*
- *a contacts page that has a brief bio on what's happening, and by who? This might help link folks together, also allowing a discussion thread as previous questions and answers might be valuable for others*
- *I'd prefer a technical document with results (data) and conclusions, which I can save and refer back to later to get whatever level of detail I need*
- *problem of industry is finding time to view and read what's happening beyond the immediate day to day priorities*

And finally:

- *I think you are all doing a pretty good job in a difficult environment. Don't give up!*
- *keep up the great work*
- *this is an excellent cross sector initiative that I would like to see continue beyond the seafood CRC*

- *thanks for the efforts to communicate effectively (and asking our opinion)*
- *I think you're doing a good job as is*
- *doing great job*

4. Discussion

Trans-Tasman Workshop series

Feedback from workshop participants was generally very positive. However, it is worth noting that survey responses from those working in the area of Industry appear to be under-represented while those working in Research are over-represented, so feedback may be skewed accordingly.

Both workshops were seen as beneficial and valuable to professional networks by workshop participants. However, some differences in benefit and value were reported between those who attended both workshops and those who had only attended one workshop.

Feedback was received suggesting skills and material from the Communications and Community Engagement Workshop were being utilised to improve social licence strategies and to improve communication both within industry and with the public. Some tangible examples were provided of changes that workshop participants had made to how they operate, such as increasing their communication budget.

Participants indicated that the Spatial Planning Workshop was particularly valuable in exposing participants to the variety of planning processes that are occurring across jurisdictions – even though the issues may be similar. Valuable lessons were learnt though comparison of Australian and New Zealand experiences. The working relationships that were formed and dialogue opportunities between industry and regulators from the Spatial Planning Workshop were identified as a key outcome.

There appears to be strong support for the Trans-Tasman Workshop series continuing. A large number of topics for future workshops was suggested. However, the ability to fund participation may be limiting for many participants and should be a key consideration when planning venues for future workshops and funding models. Relevance of topic and tangible benefits were key considerations for participation in future workshops.

Webinars may be a useful tool for continuity of information/research exchange with some participants from the Trans-Tasman network. However, content, proposed outcomes and frequency of webinars would require careful consideration before committing to this communication format.

***What's Hatching?* video news survey**

Feedback from recipients of the *What's Hatching?* video news email was very positive.

The vast majority of survey respondents that indicated they had received either at least one or both episodes of *What's Hatching?*, either always or sometimes viewed the video and also viewed either all the video or most of it.

Some recipients on the *What's Hatching?* video news mailing list indicated that they had not received the video news, suggests that the distribution via email may be improved by subsequent, 'reminder', email message/s (e.g. one week after the initial mail out).

The video format of *What's Hatching?* was received very favourably with people particularly liking the concise nature, the variety and content of the news items.

Improving the production quality of videos was the main change suggested.

Researchers thought the video news was more informative than those who worked in industry and those in management thought it the least informative.

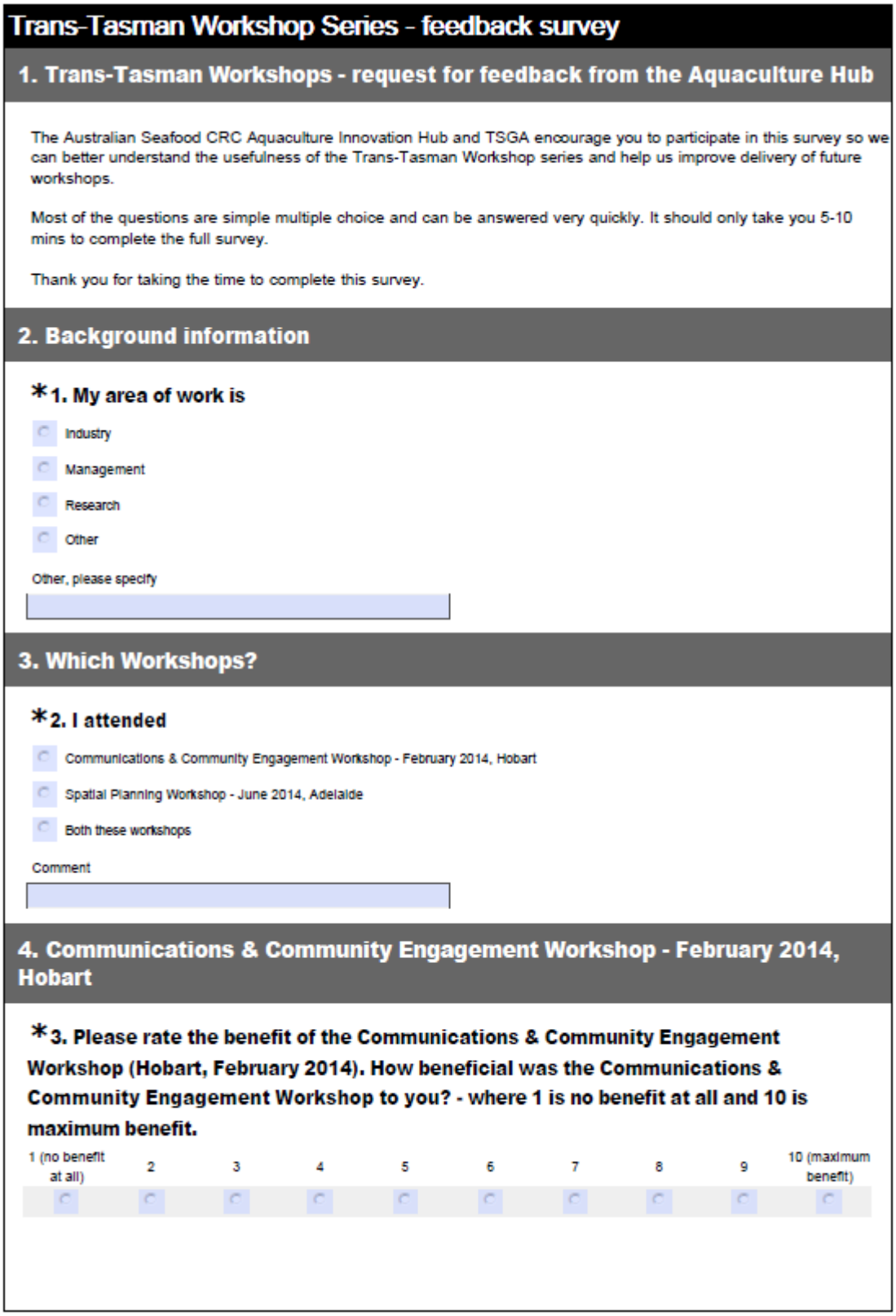
There was strong support indicated for continuing with *What's Hatching?'* as a way of communicating about aquaculture research and industry happenings and all respondents indicated that they would prefer to access and view future editions by receiving an email with an alert to recently available video news (i.e. continue the current format of distribution).

Communicating through emails & text messages and electronic newsletters were noted as effective ways to communicate about aquaculture R&D.

5. Conclusion

The survey responses documented in this report provide endorsement for these Seafood CRC Aquaculture Hub R&D communication activities – the Trans-Tasman Workshops and the *What's Hatching?* video news. The stakeholder and participant thoughts collected can be used to improve future activities. The challenge faced by the Seafood CRC Hub investigators and contributors, will be securing appropriate funding and an administration/management framework to ensure the continuation of these, or similar, activities beyond the conclusion of the Australian Seafood CRC. The feedback obtained will be used to engage with the Fisheries Research and Development Corporation (FRDC) and other potential investors/sponsors in future communication projects.

6. Appendices



Trans-Tasman Workshop Series - feedback survey

1. Trans-Tasman Workshops - request for feedback from the Aquaculture Hub

The Australian Seafood CRC Aquaculture Innovation Hub and TSGA encourage you to participate in this survey so we can better understand the usefulness of the Trans-Tasman Workshop series and help us improve delivery of future workshops.

Most of the questions are simple multiple choice and can be answered very quickly. It should only take you 5-10 mins to complete the full survey.

Thank you for taking the time to complete this survey.

2. Background information

***1. My area of work is**

- Industry
- Management
- Research
- Other

Other, please specify

3. Which Workshops?

***2. I attended**

- Communications & Community Engagement Workshop - February 2014, Hobart
- Spatial Planning Workshop - June 2014, Adelaide
- Both these workshops

Comment

4. Communications & Community Engagement Workshop - February 2014, Hobart

***3. Please rate the benefit of the Communications & Community Engagement Workshop (Hobart, February 2014). How beneficial was the Communications & Community Engagement Workshop to you? - where 1 is no benefit at all and 10 is maximum benefit.**

1 (no benefit at all)	2	3	4	5	6	7	8	9	10 (maximum benefit)

Trans-Tasman Workshop Series - feedback survey

***4. Please rate the value of the professional networks created from this workshop. How valuable are the professional networks that were created at this workshop to you? - where 1 is no value at all and 10 is maximum value.**

1 (no value at all)	2	3	4	5	6	7	8	9	10 (maximum value)
○	○	○	○	○	○	○	○	○	○

5. How have the discussions at the Communications & Community Engagement Workshop and the skills acquired from this workshop been utilised in your workplace?

5. Spatial Planning Workshop - June 2014, Adelaide

***6. Please rate the benefit of the Spatial Planning Workshop (Adelaide, June 2014). How beneficial was the Spatial Planning Workshop to you? - where 1 is no benefit at all and 10 is maximum benefit.**

1 (no benefit at all)	2	3	4	5	6	7	8	9	10 (maximum benefit)
○	○	○	○	○	○	○	○	○	○

***7. Please rate the value of the professional networks created from this workshop. How valuable are the professional networks that were created at this workshop to you? - where 1 is no value at all and 10 is maximum value.**

1 (no value at all)	2	3	4	5	6	7	8	9	10 (maximum value)
○	○	○	○	○	○	○	○	○	○

8. How have the discussions at the Spatial Planning Workshop and the skills acquired from this workshop been utilised in your workplace?

6. Communications Workshop & Spatial Planning Workshop

Trans-Tasman Workshop Series - feedback survey

***9. Please rate the benefit of the Communications & Community Engagement Workshop (Hobart, February 2014) and the Spatial Planning Workshop (Adelaide, June 2014). How beneficial were each of these workshops to you? - where 1 is no benefit at all and 10 is maximum benefit.**

	1 (no benefit at all)	2	3	4	5	6	7	8	9	10 (maximum benefit)
Communications & Community Engagement Workshop (Hobart)	○	○	○	○	○	○	○	○	○	○
Spatial Planning Workshop (Adelaide)	○	○	○	○	○	○	○	○	○	○

***10. Please rate the value of the professional networks created from each of these workshop. How valuable are the professional networks that were created at each of these workshop to you? - where 1 is no value at all and 10 is maximum value.**

	1 (no value at all)	2	3	4	5	6	7	8	9	10 (maximum value)
Communications & Community Engagement Workshop (Hobart)	○	○	○	○	○	○	○	○	○	○
Spatial Planning Workshop (Adelaide)	○	○	○	○	○	○	○	○	○	○

11. How have the discussions at the Communications & Community Engagement Workshop and the skills acquired from this workshop been utilised in your workplace?

12. How have the discussions at the Spatial Planning Workshop and the skills acquired from this workshop been utilised in your workplace?

7. Trans-Tasman Workshops - future options

Trans-Tasman Workshop Series - feedback survey

***13. Would you like the "Trans-Tasman Workshops" series to continue?**

- Yes - continue with "Trans-Tasman Workshops"
- No - don't continue
- I don't have an opinion either way

Comment

14. What topics would you suggest for future workshops?

15. What locations would you suggest for holding future workshops?

16. Would you or your organisation self-fund participant travel to future workshops?

- Yes
- No
- It depends (comment please)

Comment

17. Would you or your organisation self-fund workshop registration to attend - keeping in mind the registration would cover running costs and would not be for profit?

- Yes, we'd pay a workshop registration fee of up to $100
- Yes, we'd pay a workshop registration fee of up to $500
- Yes, we'd pay a workshop registration fee of up to $1000
- No, we wouldn't pay a registration fee
- Other (please comment)

Comment

Trans-Tasman Workshop Series - feedback survey

18. Would you find it useful to have a regular webinar (e.g. a 40 minute webinar once every two months) between future workshops for continuity of information/research exchange?

- ○ Yes
- ○ No
- ○ It depends (comment please)

Comment

8. Any other comments?

19. Please provide any other suggestions that you have on how we can improve workshops like the Trans-Tasman Workshop series.

9. Optional info

20. Optional feedback

Name	
email address	
Phone number (prefer mobile)	

"What's Hatching?" video news feedback survey

1. "What's Hatching?" - request for feedback from the Aquaculture Hub

The Australian Seafood CRC Aquaculture Innovation Hub would greatly appreciate you taking a few minutes to provide us with your feedback on our "What's Hatching?" video news - so we can continue to improve how we communicate with you.

You are receiving this survey because you are on the Seafood CRC mailing list and were sent a message in May 2014 (Episode 1) and October 2014 (Episode 2) alerting you to our "What's Hatching?" video news - a series of short videos showcasing progress on a selection of CRC projects.

Your feedback will be invaluable in informing and guiding our future communications.

Most of the questions are simple multiple choice and can be answered very quickly. It should only take you 3-5 mins to complete the full survey.

Thank you for taking the time to complete this short survey.

2. Background information

***1. My area of work is**

- Industry
- Management
- Research
- Other

Other, please specify

3. "What's Hatching?" video news

***2. Did you receive both episodes of "What's Hatching?" video news (Episode 1 - May 2014 and Episode 2 - Oct 2014))**

- Yes - both episodes
- Only one episode
- No - I didn't receive any episodes
- I don't know

Comment

"What's Hatching?" video news feedback survey

***3. Did you view the "What's Hatching?" video news?**

- Always
- Sometimes
- Never
- I can't remember

Comment

***4. How much of each "What's Hatching?" video news did you view?**

- All of it
- Most of it
- Only the speakers that interested me
- None of it

Comment

4. "What's Hatching?" video news

5. What was the one thing you liked most about the "What's Hatching?" video news?

6. Please rate how informative you thought the "What's Hatching?" video news was. How informative was "What's Hatching?" in communicating information about Seafood CRC Aquaculture Hub activities to you? - where 1 is not informative at all and 10 is maximum informative level.

1 (not Informative at all)	2	3	4	5	6	7	8	9	10 (maximum Informative)

5. "What's Hatching?" future options

"What's Hatching?" video news feedback survey

7. What are the top three most effective ways to communicate to you about aquaculture R&D?

	1 (most effective for me)	2 (my second preference)	3 (third most effective)
Other (please specify)	○	○	○
Emails & text messages	○	○	○
Website	○	○	○
Journal articles	○	○	○
Hard copy reports	○	○	○
Industry magazines	○	○	○
Word of mouth	○	○	○
Electronic newsletter	○	○	○
eDocuments	○	○	○
Conferences & seminars	○	○	○
Video news	○	○	○

Other (please specify)

8. Would you like to see the "What's Hatching?" video news continue as a way of communicating with you about aquaculture research and industry happenings?

- ○ Yes - continue with "What's Hatching?" video news
- ○ No - don't continue (please comment)
- ○ I don't have an opinion either way

Comment

6. "What's Hatching?" future options

9. Why would you like to see the 'What's Hatching?" video news continue or not continue?

- ☐ Provides direct information for adoption
- ☐ Keeps me informed of former Seafood CRC & future FRDC research project progress
- ☐ Provides a 'point of contact' to ask for more detail
- ☐ Other (please comment)

Comment

"What's Hatching?" video news feedback survey

10. What topics would interest you most in future "What's Hatching?" video news?

- [ ] Hatchery
- [ ] Growout/Production
- [ ] Environment
- [ ] Genetics
- [ ] Industry updates
- [ ] Research updates
- [ ] Finfish
- [ ] Shellfish
- [ ] Other

Other (please specify)

11. How would you prefer to access and view future editions of "What's Hatching?"

- [ ] email (alert to recently available video news)
- [ ] Multimedia Messaging Service (MMS) to my phone (alert to recently available video news)
- [ ] Log in myself to R&D website to find available video news (no email or MMS alert)

Comment

12. What changes would most improve "What's Hatching?"?

7. Any other comments?

"What's Hatching?" video news feedback survey

13. Please provide any other suggestions that you have on how research teams and FRDC can improve our communication about aquaculture research and industry happenings with you.

For more information, please contact Jenny Cobcroft 0408 394 437; jenny.cobcroft@utas.edu.au

8. Optional info

14. Optional feedback

Name	
email address	
Phone number (prefer mobile)	