

Tactical Research Fund: Establishment of the Aquatic Animal Health Technical Forum

Final Report

**Lynette M. Williams and
Mark St. J. Crane**

**September 2010
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Fisheries Research and
Development Corporation



Tactical Research Fund: Establishment of the Aquatic Animal Health Technical Forum. Draft Final Report

Lynette M. Williams and Mark St. J. Crane

September 2010

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NON-TECHNICAL SUMMARY

2008-357 Tactical Research Fund: Establishment of the Aquatic Animal Health Technical Forum.

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OBJECTIVES:

1. Establish an email discussion group initially consisting of contacts from known aquatic animal health laboratories.
2. Develop a current listing of aquatic animal health technical forum members and their capabilities.
3. Organise an inaugural meeting of potential forum participants attending the AAHS Cairns conference, July 2009.
4. Following the inaugural meeting prepare an operational plan for the further development of the forum.
5. Plan a workshop in March 2010, including technical presentations and a business meeting.
6. Review the effectiveness of the forum (e.g. level of participation and participant feedback on benefits for professional development).

OUTCOMES ACHIEVED TO DATE

The overall outcome of this project has been the successful establishment of an aquatic animal health technical forum - a core group of aquatic animal health specialists with varying levels of expertise – that is used as a means for information transfer and skills development.

An inaugural meeting of the forum was convened at the Fourth National FRDC Aquatic Animal Health Scientific Conference held in July 2009 and the concept received strong support from the then current forum members as well as other conference participants. Consequently, a second meeting incorporating an Aquatic Animal Health Technical Workshop was planned for the following year. This was convened at CSIRO Livestock Industries, Geelong in March 2010. Eighteen participants played an active role in ensuring the success of the workshop in that there was open and frank discussion of issues in an informal, non-competitive environment. Over the course of the workshop it was clear that a

good rapport developed among the participants and, in addition to facilitating transfer of technical information, the workshop also provided a means to build trust among the forum members. While the forum has only been operating for a short time, with further promotion, the likelihood is that it will grow and develop into an essential part of the national aquatic animal diagnostic laboratory network.

The forum also provides the participants with professional and personal development opportunities. The enhanced skills and expertise gained by 18 participants in the forum is likely to form an important part of laboratory staff training and competency development which are important aspects of National Association of Testing Authorities (NATA) accreditation for veterinary testing laboratories.

In summary, in its short life to date the forum has been able to enhance aquatic animal health outputs, strengthen the national network of aquatic animal health experts and research providers and provide a training opportunity for young scientists interested in aquatic animal health

KEYWORDS: Aquatic animal health; diagnostics; technology transfer

Acknowledgments

The authors acknowledge the forum members for their active participation and enthusiasm, their home institutes for supporting their attendance at the inaugural meeting and workshop, the FRDC Aquatic Animal Health Subprogram for their support and encouragement, and FRDC and CSIRO Livestock Industries for financial support.

Background

The concept of the Aquatic Animal Health Technical Forum (AAHTF) was informally discussed by some of the participants of the 2007 FRDC National Aquatic Animal Health Scientific Conference held in Cairns. The discussion was concerned with the apparent lack of availability of technical skills training in laboratories for young/inexperienced scientists and technical staff. It was acknowledged that there is a small number of experienced aquatic animal health specialists with well-developed skills and knowledge and there is a need to transfer these skills and knowledge to the new generation of aquatic animal health technologists as part of a succession plan. It was concluded that the establishment of such a forum would facilitate not only this technology transfer but also development of a support network for the next generation of aquatic animal health laboratory specialists.

Further discussion resulted in development of a proposal to establish an aquatic animal health technical forum, initially an email “discussion” group which, depending on interest, may develop further to include face-to-face meetings involving training workshops.

At the FRDC Aquatic Animal Health Subprogram (AAHS) business meeting held in July 2008 Mark Crane, FRDC AAHS Leader, presented the proposal to commence an Aquatic Animal Health Technical Forum to the AAHS Steering and Scientific Advisory Committees. The minutes of this meeting reflected that the proposal was well-supported by AAHS members and that it aligned well with the NAAH-TWG laboratory network concept and other FRDC projects that recommended network development and training in aquatic animal health (Landos et al., 2006; Landos et al., 2007). Thus a full application was submitted to the FRDC People Development Program to obtain funding to subsidise attendance of technical staff at the Fourth FRDC National Aquatic Animal Health Scientific Conference held in Cairns in 2009 for an inaugural meeting of the Aquatic Animal Health Technical forum (AAHTF) and participation in a follow-up workshop in 2010.

Need

There are technologists at various locations around Australia who have a diverse range of skills and experience in aquatic animal health. These skills constitute a valuable national resource that need to be “captured” as part of a succession plan for the aquatic animal health sector. The “aquatic animal health” discipline involves a small number of specialists that do not get the opportunity to convene at meetings/workshops/ conferences as often as those involved in the terrestrial animal health sphere. This is a deficiency that has inhibited the development of functional networks for the exchange of information which would enhance the skills-base of the health service providers to the aquatic animal sector.

Aquaculture is expanding not only overseas but also in Australia and this has attracted a cadre of young scientists with little experience in aquatic animal health. Although not all “aquatic” techniques are unique there are some aspects that are specific to aquatic technical skills and procedures. In addition, some of these inexperienced scientists/technologists feel that they are on their own and are even intimidated to request assistance or don't know where to go or whom to ask for input or assistance. The establishment of a technical forum where the application of various technologies to aquatic problems can be discussed and/or demonstrated would assist in the development of these scientists and their network.

The forum could even fulfill a mentoring role where young scientists get the opportunity to interact with experienced aquatic animal health specialists, establish networks and exchange ideas and information in an informal but structured forum. Providing such a forum for aquatic animal health technical staff would enhance the capabilities of the Australian network of aquatic animal health laboratories to provide high quality services to their stakeholders – governments and industry.

Thus the forum would be open to all aquatic animal health specialists with a variety of skills and levels of experience and who are resident at government laboratories, universities and colleges. It is anticipated that the group would develop in to a valuable national resource – a repository of technical knowledge, additional sources of information as well as mentoring to the new generation of laboratory technicians, students and staff at diagnostic laboratories and teaching institutions.

Objectives

1. Establish an email discussion group initially consisting of contacts from known aquatic animal health laboratories.
2. Develop a current listing of aquatic animal health technical forum members and their capabilities.
3. Organise an inaugural meeting of potential forum participants attending the AAHS Cairns conference, July 2009.
4. Following the inaugural meeting prepare an operational plan for the further development of the forum.
5. Plan a workshop in March 2010, including technical presentations and a business meeting.
6. Review the effectiveness of the forum (e.g. level of participation and participant feedback on benefits for professional development).

Methods

Objective 1

Establish an email discussion group initially consisting of contacts from known aquatic animal health laboratories.

Initial contact, via email, was made with all known technologists working in aquatic animal health to inform them about the AAHTF concept. Positive responses and expressions of enthusiastic interest were received and an initial email discussion group was established (see Table 1 in Results/Discussion section).

The concept of an aquatic animal health technical forum was discussed further at the FRDC National Aquatic Animal Health Scientific conference in Cairns, July 2009. The participants in this session provided excellent feed-back and many worthwhile suggestions for development of the AAHTF. After the subprogram conference in July 2009, there was email contact between some forum members to prepare a suitable agenda for the workshop. The agenda was distributed to aquatic animal health specialists on the FRDC AAHS contact list as well as to others who had expressed an interest in the forum. These people were encouraged to circulate information to their colleagues.

Objective 2

Develop a current listing of aquatic animal health technical forum members and their capabilities

A questionnaire (see Appendix 4.1) was sent to all known aquatic animal health technologists and their supervisors to obtain their contact details and information on their capabilities. Forum members have been asked to email lynette.williams@csiro.au with any updates to ensure records of capabilities are kept as current as possible. A reminder email will be sent out on an annual basis to all forum members and to other non-member, aquatic animal health technologists.

Objective 3

Organise an inaugural meeting of potential forum participants attending the AAHS Cairns conference, July 2009.

To attract technicians to attend the 2009 AAH Conference and to participate in the session on AAHTF, the following information was circulated to the FRDC AAHS contact list in May 2009:

Aquatic Animal Health Technical Forum

There are technicians in various locations within Australia who have a diverse range of skills and experience in the aquatic animal health area. These skills are

valuable to all involved and perhaps they should be demonstrated/discussed, and information exchanged in an informal but structured forum.

As the “aquatic” discipline does not involve as many people as the terrestrial laboratory field there is not as much exchange of information, techniques and outputs. Some staff feel that they are on their own and are even intimidated to ask or don’t know where to go or whom to ask for input or assistance. Although not all aquatic techniques are “unique” there are some aspects specific to aquatic technical skills and procedures. Providing the opportunity for aquatic animal health technical staff to interact, establish networks and exchange ideas and information would enhance Australian laboratories’ capabilities to provide high quality services to stakeholders.

This group would provide valuable technical knowledge, additional sources of information and mentoring to other laboratory technicians, students and staff at teaching institutes.

Structure

Initially, this forum would be set up as “group email” where people working in this field could “post” information, products, equipment issues, problems or solutions and receive input from other members.

Advantages of the “group email” include low ongoing costs, establishment of networks - particularly important for new or less experienced staff - and increased formal and informal collaborative opportunities. It could then progress to an annual/biannual meeting (in various locations) of aquatic technical staff in a relatively informal forum but having a structure under the following areas/disciplines:

- New aquatic skills or techniques
- Innovations in aquatic areas
- Molecular biology
- Virology
- Parasitology
- Histopathology
- Microbiology

The structure of the workshop would involve short presentations of some diagnostic or other interesting, unique work. Scientists with these disciplines/skills attending would be beneficial. Laboratory visits is also an area where technicians could be involved and this would enable people to gain experience from others working in the same field.

Issues for consideration:

- Coordinator of project - who?

- One person or more?
- Committee?
- Establishing the contacts and gaining workplace support
- Funding - by whom?
- Duration - 1 or 2 days?
- Location and timing of the meeting: central location? Which laboratory? The inaugural meeting of potential AAHTF members was held at the 2009 AAHS conference.

Objective 4

Following the inaugural meeting prepare an operational plan for the further development of the forum

Following the inaugural meeting and general discussion held at the 2009 Cairns Conference, a draft operational plan was developed for further discussion by forum members.

Objective 5

Plan a workshop in March 2010, including technical presentations and a business meeting.

Following the enthusiastic response to the establishment of the AAHTF and agreement that the 2010 AAHTF Workshop should be held at AAHL, the workshop was planned including all logistics, accommodation and content details.

Objective 6

Review the effectiveness of the forum (e.g. level of participation and participant feedback on benefits for professional development

A feedback form (see Appendix 4.2) was used to assess the effectiveness of the AAHTF workshop.

Results/Discussion

Objective 1

Establish an email discussion group initially consisting of contacts from known aquatic animal health laboratories.

Table 1 provides details of the founding members of AAHTF. Initially, there was not a lot of email “traffic” but subsequent to the workshop there has been an increased amount. This has principally involved the exchange of information on techniques (procedures and protocols) and reagents/tools.

There is a group email distribution list which has been distributed to forum members. As the email forum is not “administered by one person”, it is difficult to gauge the volume of dialogue or traffic. It is worthwhile noting that while the members of the email discussion group expressed an interest in the forum, not all were able to attend the workshop held in March 2010, due to timing issues.

Examples where the forum has enhanced collaboration between institutions in Australia include a recent interaction between JCU and AFDL in that fish cell lines held at AFDL have been provided to JCU.

Objective 2

Develop a current listing of aquatic animal health technical forum members and their capabilities

The list of aquatic animal health technologists and their capabilities for those who responded to initial emails and are part of the AAHTF has been generated (see Table 2). The complete excel spreadsheet has been emailed to the forum members.

Table 1. Initial email group established as founding members of AAHTF

Member	Organisation	Email address
Ellen Ariel	James Cook University	ellen.ariel@jcu.edu.au
Cadoret, Karine	University of Tasmania	kcadoret@amc.edu.au
Condon, Kelly	TAAHL Oonoonba	kelly.condon@dpi.qld.gov.au
Cornish, Martine	DPIPWE Tasmania	martine.cornish@dpiwe.tas.gov.au
Crameri, Sandy	AAHL Electron Microscopy Group	sandra.crameri@csiro.au
Douglas, Marianne	DPIPWE Tasmania	marianne.douglas@dpiwe.tas.gov.au
Dyrting, Kitman	Berrimah Veterinary Laboratories	kitman.dyrting@nt.gov.au
Elliott, Lisa	PROAQUA P/L	elisabethelliott@bigpond.com
Elliott, Nikki	Berrimah Veterinary Laboratories	nikki.elliott@nt.gov.au
Hawes, Mark	DPI Victoria	mark.hawes@dpi.vic.gov.au
Hayakijosol, Orachun	James Cook University	orachun.hayakijosol1@jcu.edu.au
Helsham, James	DPI Victoria	james.helsham@dpi.vic.gov.au

Higgins, Melissa	DPIPWE Tasmania	melissa.higgins@dpipwe.tas.gov.au
Hoad, John	CSIRO, AFDL	john.hoad@csiro.au
Hodgeman, Rachel	DPI Victoria	rachel.hodgeman@dpi.vic.gov.au
Hoj, Lone	AIMS, Cape Cleveland, QLD	l.hoj@aims.gov.au
Howard, Amber	Department of Fisheries WA	amber.howard@agric.wa.gov.au
Hutson, Kate	James Cook University	kate.hutson@jcu.edu.au
Jones, Belinda	DPIPWE Tasmania	belinda.Jones@dpipwe.tas.gov.au
Mohammad, Ilhan	DPI Victoria	ilhan.mohammad@dpi.vic.gov.au
Moody, Nick	CSIRO, AFDL	nick.moody@csiro.au
Morrison, Richard	DPIPWE Tasmania	richard.morrison@dpipwe.tas.gov.au
Motha, Julian	DPI Victoria	Julian.motha@dpi.vic.gov.au
Payne, Jean	AAHL Histology Section	jean.payne@csiro.au
Rusaini, Rusaini	James Cook University	rusaini.rusaini@jcu.edu.au
Slater, Joanne	CSIRO, AFDL	joanne.slater@csiro.au
Smith, Helen	QPI&F	helen.smith@dpi.qld.gov.au
Stephens, Fran	WA Fisheries Department	fstephens@agric.wa.gov.au
Tweedie, Alison	University of Sydney	a.tweedie@usyd.edu.au
Vincent, Benita	CSIRO Marine and Atmospheric Research	benita.vincent@csiro.au
Williams, Nette	CSIRO, AFDL	lynette.williams@csiro.au

See Appendix 5 for further details.

Table 2. Summary of current AAHTF members and their capabilities

Member	Organisation	Capabilities
Members with aquatic animal health capabilities		
Ellen Ariel	James Cook University	>15 yrs cell culture, ELISA, ICC, IHC
Cadoret, Karine	U. Tasmania	<5 yrs cell culture, histology, ELISA, IHC
Condon, Kelly	TAAHL Oonoonba	10-15 yrs PCR - prawn diseases
Cornish, Martine	DPIPWE Tasmania	10-15 yrs PCR and microbiology
Crameri, Sandy	AAHL EM Section	>15 yrs electron microscopy of viruses
Douglas, Marianne	DPIPWE Tasmania	10-15 yrs bacteriology, PCR
Dyrting, Kitman	Berrimah Vet Lab, NT	<5 yrs histopathology, parasitology
Elliott, Lisa	PROAQUA P/L	>15 yrs microbiology farm activities (prawns)
Elliott, Nikki	Berrimah Vet Lab, NT	10-15 yrs histology, PCR, gross pathology
Higgins, Melissa	DPIPWE Tasmania	10-15 yrs Fish Microbiologist, PCR
Hoad, John	CSIRO AFDL	10-15 yrs cell culture, virus isolation, ELISA, ICC
Hutson, Kate	James Cook University	5-10 yrs parasitology
Jones, Belinda	DPIPWE Tasmania	10-15 yrs gross pathology, histology, parasitology
Moody, Nick	CSIRO AFDL	10-15 yrs cell culture, virus isolation, PCR techniques, NATA auditor
Morrison, Richard	DPIPWE Tasmania	5-10 yrs PCR, microbiology, parasitology, ELISA, ICC
Slater, Joanne	CSIRO AFDL	10-15 yrs PCR, immunoassays, prawn viruses
Smith, Helen	QPI&F	5-10 yrs RT-PCR, microbiology, histology sample preparation
Stephens, Fran	Dept Fisheries WA	>15 yrs diagnostic pathology and histology
Tweedie, Alison	U. Sydney	>15 yrs cell culture, PCR, virus isolation, histopathology
Vincent, Benita	CSIRO Marine and Atmospheric Research	5-10 yrs microbiology, ELISA, ICC/IHC
Williams, Nette	CSIRO AFDL	>15 yrs cell culture, virus isolation, PCR, ELISA, ICC
Members with limited aquatic animal health experience but laboratory experience		
Hawes, Mark	DPI Victoria	<5 yrs veterinary pathologist
Hayakijkosol, Orachun	James Cook University	<5 yrs PhD student
Helsham, James	DPI Victoria	<5 yrs PhD student (abalone herpesvirus)
Hodgeman, Rachel	DPI Victoria	5-10 yrs general laboratory duties
Hoj, Lone	AIMS, QLD	<5 yrs PCR
Howard, Amber	Dept Fisheries WA	<5 yrs cell culture/virus isolation, PCR, microbiology
Mohammad, Ilhan	DPI Victoria	<5 yrs PCR, ISH, micro, ELISA
Motha, Julian	DPI Victoria	>15 yrs, cell culture, virology, immunology
Payne, Jean	AAHL Histology Section	10-15 yrs histology, immunohistochemistry
Rusaini, Rusaini	James Cook University	<5 yrs PhD student

See Appendix 5 for further details.

Objective 3

Organise an inaugural meeting of potential forum participants attending the AAHS Cairns conference, July 2009.

Table 3 is the full list of the 2009 AAHS conference participants, the majority of which attended the session and presentation on the AAHTF and participated in the general discussion.

Table 3. List of participants at the 2009 FRDC National Aquatic Animal Health Scientific Conference, Cairns, July 2009

Name	Organisation
ADLARD Robert	Qld Museum
AIKEN Hamish	PIRSA-SARDI
ANDERSON Ian	DPI QLD
ANDERSON Melissa	Atlantic Veterinary College, Canada
ARIEL Ellen	James Cook University
BALSHAW Sita	PIRSA-SARDI
BECKER Joy	University of Sydney
BOWATER Rachael	DPI QLD
BRADLEY Tracey	DPI Attwood
BROCK Emma	University of Adelaide
CADORET Karine	University of Tasmania
COOK Mat	CSIRO, MAR
COSTA Amanda	University of Tasmania
COWLEY Jeff	CSIRO, LI, St. Lucia
CRANE Mark	CSIRO, AAHL
CROCKFORD Melanie	Agriculture, WA
DANG Vinh	Flinders University
DEVENEY Marty	PIRSA-SARDI
DYRTING Kitman	Berrimah Vet Lab NT
ELLARD Kevin	DPIPWE Tas
ELLIMAN Jenny	James Cook University
ELLIOT Elisabeth	PROAQUA P/L
ERNST Ingo	DAFF
FEGAN Mark	DPI Vic
FEIST Stephen	CEFAS
FROMM Justin	National Aquaculture Council
GO Jeffrey	NSW PDI
GOULDEN Evan	AIMS
GROSSEL Geoff	DAFF
GUDKOV Nick	CSIRO, AAHL
GUY Brad	DEEDI-QLD
HARRIS James	Flinders University
HAYAKIKOSOL Orachun	James Cook University
HAYWARD Craig	SARDI Aquatic Services
HIGGINS Melissa	DPIPWE Tas

HOJ Lone	AIMS
HUTSON Kate	University of Adelaide
JONES Brian	Fisheries, WA
JUNGAWALLA Pheroze	Tasmanian Salmonid Growers Association
JUNTUNEN Karen	James Cook University
KNOWLES Celeste	CSIRO MAR/Flinders University
LEEF Melanie	University of Tasmania
LIMA Paula	CSIRO MAR/Flinders University
MAYNARD Ben	CSIRO, MAR
MOHAMMAD Ilhan	DPI Vic
MOODY Nick	CSIRO, AAHL
MORRISON Richard	DPIPWE Tasmania
NAIR Sham	Macquarie University
NOWAK Barbara	University of Tasmania
RAFTOS David	Macquarie University
REYNOLDS Adam	QLD Primary Industries & Fisheries
RIMMER Anneke	University of Sydney
RUSAINI	James Cook University
SLATER Joanne	CSIRO, AAHL
STEPHENS Fran	Agriculture, WA
TAVERNER Paul	QLD Primary Industries & Fisheries
TWEEDIE Alison	University of Sydney
VALDENEGRO Victoria	University of Tasmania
VINCENT Benita	CSIRO, MAR
WALKER Melissa	DPI, NSW
WILLIAMS Nette	CSIRO, AAHL
WRIGHT Emily	James Cook University
ZAINATHAN Sandra	University of Tasmania

The concept of an AAHTF was well received and the discussion very positive. There was a broad and frank discussion involving a range of constructive comments during and after the presentation.

The following is a summary of the comments from the presentation on the Technical Forum:

- Email group to include field based people who are sending samples into labs so that a network is built up and they know correct procedure for collecting field surveillance samples. Therefore they gain an understanding of what goes on in labs.
- Incorporate emergency response – what do you do at a lab when ‘the flag goes up’? Structure of an emergency response – appropriate procedures and techniques involved in the process.
- AAHTF meeting could “piggy back” onto the Annual Meeting of the Australian Association of Veterinary Laboratory Diagnosticians (AAVLD) to reduce costs as many people already attend the AAVLD meeting.

- NATA audits - perhaps can include some specific aquatic protocols in audits.
- How much can you do in a workshop? How many techniques can be done? Maybe best to start with a smaller area first such as aligning with proficiency testing.
- Fitting people into the bigger picture - their role does have an outcome.
- Web-based forum attached to FishNET?
- Send email with AAHTF questionnaire out to conference participants – they can then forward on to others who may be interested.
- Justification to supervisor to attend workshop – will be bringing back knowledge to their laboratory.
- Animal husbandry information (e.g. modeling infections at universities) could be passed on. Experience/knowledge that is not usually communicated through diagnostic methods or conferences.
- Might need to include laboratory, industry and university people.
- Are there plans to have a website on fish parasites that links people to areas of expertise, contact details?
- People who are interested in the forum and workshop are to email Lynette Williams after the conference so she can start to put together a plan for the workshop
- Include in plan what is it that participants want to achieve from such a forum
- Request for volunteers to form a committee
- Prepare and distribute a feedback to potential participants to see if it is going to be supported with approval from supervisors/institutes. Funding most likely will not cover all costs of workshop (travel will be subsidised). Funding support will depend on the number of participants.
- People asked to go back to workplace and spread the word and promote the concept.

Objective 4

Following the inaugural meeting, prepare an operational plan for the further development of the forum

The following is a draft operational plan which, depending on the success of the establishment of an AAHTF, will be further developed.

Aquatic Animal Health Technical Forum (AAHTF)

1. Target participants

- Recent/new graduates/employees in the aquatic animal field
- Technicians
- Science graduates
- Veterinary graduates
- Aquaculture farm employees
- Honours and PhD students

Need to have supervisors' support as there will be some investment of time/travel (i.e. funds) needed for participants.

2. Linkages

- Sub-committee on Aquatic Animal Health (SCAAH)
- AAVLD (Australian Association of Veterinary Laboratory Diagnosticians)
- FRDC Aquatic Animal Health Subprogram

3. Potential ongoing/additional funding sources

- FRDC – only for the workshop to be held in early 2010
- DAFF

4. Email communication

- Group email to be used for communication
- Participants to “register” by completing the questionnaire
- Participants to be willing to provide information to others via “group email”
- Set up as an electronic Discussion Group for exchange and to gather relevant information
- At this stage restrict email group to Australian participants (i.e.au)

5. Content/outcomes

- This is not intended to be a diagnostic service via email, or an alternative to diagnosis
- May provide solutions to participants' technical problems that others have previously experienced
- Intended to provide an exchange of methods/techniques/reagents which may lead to skill and test development and improvement, collaborations
- May help to provide streamlining of methods
- Exchange of information
- Potential for exchange visits between laboratories

6. Confidentiality

- Consider confidentiality of information shared

7. Future Direction

7.1 Is an organising committee needed? If so, volunteers needed to assist with organisation of the forum

7.2 Potential to expand

- Could provide suitably qualified staff for future employment
- Be included in the FRDC AAHS conference every two years?
- Alternatively, workshop would be held every two years (opposite year to the FRDC AAHS conference) and venue rotated.

- 7.3 Newsletter? There are already a couple of aquatic animal health newsletters (FRDC AAHS *Health Highlights* - 2 editions per year) and SCAAH Newsletter (one edition per year) either of which could include a Section on AAHTF. See if it is required or if the "group email" is working and adequate. Monthly edition? - include interesting "health" articles, events etc.
- 7.4 Group email to expand and could be put on Google or another search engine?

8. March 2010 Workshop

- Intended that the FRDC funding would subsidise travel and accommodation for participants – dependent on number of participants – 10-20 participants?
- Location - held at AAHL?

Benefits of being at AAHL:

- AAHTF Coordinator located at AAHL
- Reduced or no venue cost
- Already 10 people involved in aquatic animal health activities in AFDL
- Participants could tour the high bio-secure area of AAHL which would be an interesting and possibly "one-off" opportunity.
- Opportunity for participants to see all disciplines (e.g. cell culture, virology, histopathology, molecular testing) at one location.
- Opportunity for participants to hear presentations from staff actively working in those disciplines and to develop their networks.
- Geelong is reasonably accessible via Melbourne then bus, train or private car to Geelong (1 hour).

Objective 5

Plan a workshop in March 2010, including technical presentations and a business meeting.

The following is a summary of the workshop plan.

Workshop (2 day duration): Draft planning if held at AAHL

Day 1

Arrival on the morning of Day 1

Lunch, welcome and AAHL Induction and secure area tour

Dinner

Day 2

8.30-9.00am Commence with an invited guest Presentation – perhaps a veterinarian/specialist who works in aquatic animal health and the interaction between the farm and the laboratory

15 minute semi-informal, but structured, presentations by participants in relevant areas of interest

Conclude by 3 or 4 pm – to allow return travel.

Once details of the workshop including dates, travel arrangements, subsidies available for travel and accommodation were established, the background to the forum and the workshop agenda was distributed to the FRDC AAHS and forum members. These contacts were encouraged to distribute the information to other potential interested parties within their own networks.

The AAHTF workshop was held at CSIRO Livestock Industries, AAHL, Geelong on 17-19 March 2010. Detailed content of the workshop is shown in Table 4.

Table 4. 2010 AAHTF Workshop, Geelong 17-19 March 2010: Agenda

Wednesday 17 March 2010		
Time	Agenda item	Presenter/Comments
12 Noon	Workshop participants arrive	Nette Williams (AFDL) to greet
12.30 pm	Lunch	Non-secure canteen
1.30 pm	“AAHL Fish Diseases Laboratory (AFDL)”	Mark Crane, AFDL
2.00 pm	Introduction to the workshop	Nette Williams, AFDL
2.15 pm	“Histopathology – the role of the modern pathologist!!”	Ken McColl, AFDL
3.00 pm	Coffee/tea break	Non-secure canteen
3.30 pm	“Molecular Diagnostics - it's not CSI”	Nick Moody, AFDL
4.00 pm	“Nodavirus diagnosis, suspect toxic algae”	Kitman Dyrting, NT
4.15 pm	“Mudworm infestation in shellfish”	Belinda Jones, DPIPWE, TAS
4.30 pm	Discussion	
5.00 pm	Transport to hotel	AFDL staff to assist
Thursday 18 March 2010		
8.30 am	“A field veterinarian’s perspective on the value of good lab support”	Paul Hardy-Smith, Panaquatic Health Solutions Pty Ltd
9.30 am	Coffee/tea break	Non-secure canteen
9.50 am	AAHL Induction for secure area tour	Boardroom
10.30 am	Secure area tour and discussion	
12.30 pm	Lunch	Secure canteen
1.30 pm	Exit secure area	
1.45 pm	“Virology and virus isolation (techniques and virus isolates)” - including a tour of the non-secure fish laboratory	Nette Williams, AFDL

2.30 pm	"Microbiology Techniques and Innovations"	Melissa Higgins, DPIPWE, TAS
3.00 pm	Coffee/tea break	Boardroom
3.30 pm	"How NOT to fix samples for electron microscopy"	Sandy Cramer, AAHL EM Group
4.00 pm	"Bacteriophage therapy for the control of <i>V. harveyi</i> in hatcheries"	Lisa Elliott, PROAQUA P/L
4.30 pm	Discussion	
5.00 pm	Transport to hotel	AFDL staff to assist
6.30 pm	Workshop dinner	
Friday 19 March 2010		
9.00 am	Group photo at AAHL	
9.15 am	"Immunodiagnostic techniques: IHC and ICC"	Jean Payne, AAHL Histology Joanne Slater, AFDL Nette Williams, AFDL
10.00 am	Coffee/tea break	Non-secure canteen
10.30 am	"The EU ringtest – a pre-Christmas treat!!!"	Nick Moody, Nette Williams, AFDL
11.00 am	Discussion on workshop: <ul style="list-style-type: none"> • How did it go? • Is it worth continuing on? • Where to from here? • Include in other conferences (FRDC sub program or AAVLD?) • Potential funding bodies for the workshop • Location/venue of future workshops • Complete feedback forms 	Led by Nette Williams, AFDL
12.30 pm	Lunch	Non-secure canteen
1.00 pm	Workshop close	

Objective 6

Review the effectiveness of the forum (e.g. level of participation and participant feedback on benefits for professional development).

The final session of the 2010 AAHTF workshop involved discussion on the workshop specifically as well as on the future directions of the forum in general. Table 5 summarises the points discussed and the comments made during this session of the workshop.

Table 5. Summary of Workshop Discussion

Discussion point	Comments received
How did the workshop go?	Very well; well organized; exceeded expectations; best workshop attended; relaxed atmosphere and there were no “silly” questions; most beneficial; exchange of information and knowledge shared; met people in similar work areas; established contacts and therefore know where to go for advice; more people would attend because it has been very worthwhile
Presentations	10 minutes for presentations is a good length; every participant should present some aspect of their work
Format	Should be 1 day longer (i.e. 3 1/2 days) Have a combination of theory and practical sessions
Is it worth continuing on?	Yes: Based on this workshop the participation rate should increase. Managers and supervisors need to be informed that the workshop was very beneficial.
Stand alone or back-to-back with another AAH event	The overall response was that it was beneficial to have the AAHTF workshop as a stand-alone annual workshop, at various venues and not be included in conferences like AAVLD. Reasons being that some of the participants would not present at AAVLD but they would in this workshop format. The AAHTF would get “railroaded” if included in AAVLD. Only certain people get the opportunity to attend conferences including AAVLD. There was some support for the inclusion of a session at the FRDC subprogram conference, which is held biannually, but not to replace the workshop format. If the AAHTF was included in the FRDC subprogram conference it was suggested that a session (perhaps even half a day before the conference commenced) be dedicated to technical discussions and exchange of skills/techniques.
Future funding?	The cost of the workshop was approximately \$1000 per head, including travel and accommodation. If supervisors and managers were informed by participants that it was worth attending, it was felt that they would support the AAHTF. The future dates could be planned ahead and therefore included in the institutes’ budgets. Activities of the AAHTF could also contribute to institutes’ NATA requirements and therefore would add support to an annual NATA assessment.
Location/venue of future workshops	AAHL was an excellent venue as it allowed participants to see how the laboratory operated. For some participants that submitted samples to AAHL, it also allowed them to see what was involved following sample submissions from the regional laboratories. Participants were able to see some of the capabilities of AAHL. Suggestion to have other laboratories “host” the workshop was supported. Launceston was suggested as the next venue.
Timing	Annually and March was good. There should be an

	AAHTF session at the FRDC AAHS where the details of the March workshop could be discussed.
Where to from here?	As has been discussed previously the workshop was well received and would be further supported by the participants and, it is envisaged, by more attendees. The inaugural AAHTF meeting and workshop were organised essentially by one person at her work place. The AAHTF has the potential to become significantly larger and therefore would necessitate the formation of an organising committee. Two additional people indicated an interest in be involved in organising further workshops. The participants indicated that they were required to prepare written reports to their employer in which they would support further involvement in the AAHTF. In order to advertise the AAHTF more effectively it could be put on the FRDC website. Contact lists for the FRDC Aquatic Animal Health Subprogram and universities could be utilised to further promote the forum.

A feedback form was also used to gather participant comments and assessment. A summary of participants' feedback obtained from their completed forms is shown in Table 6.

Table 6. Summary of 2010 AAHTF workshop participants' feedback

ITEM	Excellent	Good	OK	Poor
Location and venue: (Geelong/AAHL)	12/14	2/14		
Other suggestions	Hobart, Launceston, Darwin, QLD			
Accommodation:	9/12	2/14	3 did not stay	
Other suggestions/comments	Close to everything – very good			
Date and duration:	10/14	3/14	1/14	
Other suggestions/comments	<ul style="list-style-type: none"> • Good time of the year • Could be 1 day longer and have some lab work 			
Format: Presentations Participant interaction	12/14	2/14		
Other suggestions/comments	<ul style="list-style-type: none"> • Short (5 min) presentation from each participant • Excellent format - easy to share information • Non-threatening environment • Maybe some practical component 			
Program topics	11/14	2/14	1/14	
Other suggestions/comments	<ul style="list-style-type: none"> • More molecular biology • Specific themes in more detail • One day/theme so labs could allow specific staff to attend 			

	<ul style="list-style-type: none"> • Great • Good all round coverage of diagnostic topics 			
Length (2 and a half days):	8/14	5/14	1/14	
Other suggestions	<ul style="list-style-type: none"> • 3 full days • 1 week 			
Food:	9/14	5/14		
Secure area tour	11/14	3/14		
Comments	<ul style="list-style-type: none"> • Too brief • Great opportunity to see secure area • “Eye opener” and enjoyed it 			
Workshop dinner: Quality	11/14	3/14		
Would a “stand alone” workshop be better than one included in the FRDC conference or AAVDL	Agree 12/14	Disagree 1/14	Don't mind Maybe a session at FRDC subprogram conference to advertise the workshop	
Other comments	<ul style="list-style-type: none"> • Some “hands-on” activities or demonstrations of specific tests for new technicians • Really exciting format • Great way to develop a fish orientated technical network • More practical work than presentations • Longer workshop=more practical sessions • Great experience. More hands-on training of skills • As an introduction it was an excellent workshop. Further specialised courses on separate disciplines and diagnostics would be ideal for the development of staff in state laboratories • As a technician, a ‘stand-alone” workshop is more informal and easier to participate/interact in than a conference format • The small group worked well for discussions • Very well organised and did a fabulous job. • Learnt about a lot of techniques, had questions answered and made useful contacts with other laboratories • Participants could discuss “tricks and pitfalls” in fish diagnosis to help others. 			

In summary, the workshop participants provided very positive feedback, were very enthusiastic for a continuation of the forum/further workshops and suggested some modifications to the format.

Benefits

The establishment of an Aquatic Animal Health Technical Forum (AAHTF) will help to ensure and facilitate transfer of skills and knowledge to the next generation of aquatic animal health laboratory specialists. The forum will help technical staff at diagnostic laboratories to develop improved competencies in a broad range of diagnostic procedures. Unlike terrestrial production systems where the significant diseases of production animals are well-known and documented with well-described tests, aquatic technicians and new scientists often struggle just to understand just what they are testing for and why the results are so often equivocal. In recent times, many of the emerging aquatic animal diseases are novel, and caused by previously unknown infectious agents e.g. abalone viral ganglioneuritis, oyster oedema disease, pilchard herpesvirus.

Membership to the forum is likely to contribute to staff development and training aspects of NATA accreditation. Moreover, the exchange of technical skills and methodology will enable them to respond more effectively to disease outbreaks. Consequently, the negative impact of disease outbreaks on industry productivity and profitability will in all likelihood be reduced.

In addition the younger generation of less experienced technologists will benefit from interaction with their more experienced colleagues.

This project will contribute to the establishment and development of an aquatic animal health technical network. The network will facilitate interaction between State and Commonwealth diagnostic laboratories and University departments involved in aquatic animal health and will build on the Network of Aquatic Animal Diagnostic Laboratories that had been recommended previously (see FRDC Project No. 2005/621).

Thus the skills and knowledge (e.g. diagnostic capabilities) of the forum participants will be enhanced not only to the benefit of themselves but also of their host institutes, and the local industries they service.

Further Development

The email discussion group requires further development and input from the participants. This could be achieved by perhaps appointing an administrator who prompts participants to contribute and thereby keeping communication active. This may also encourage others to be involved - when they see the content of the discussion group.

The AAHTF and its effectiveness would benefit from further promotion and advertising. Currently, there are approximately 20 forum members and the group could potentially increase to greater than 50 participants. The group would consist of aquatic animal health specialists with varying degrees of experience and areas of expertise.

The workshop should become an essential and regular activity of the forum, if funding is available, and be conducted on an annual basis. The outputs of the workshop could be enhanced by:

- Rotating the venue – to allow others (all local technologists) access to the workshop
- Increasing the workshop duration to 3 full days
- Incorporating practical and theoretical sessions
- Keeping the cost down to participants (e.g. host institutes to provide in-kind support such as meeting room and laboratory space)
- Continuation of funding or subsidising travel and accommodation costs
- Having an invited speaker

Planned outcomes

The objectives of the project were met in that an Aquatic Animal Health Technical Forum has been established with participants using email as a means for information exchange. The workshop further developed the forum by building rapport and trust among the forum participants such that there is a collegiate atmosphere within the current technical network. Forum participants are enthusiastic and there have been discussions on how the AAHTF can be further developed. Thus the planned outcomes have been achieved and it is anticipated that the forum will grow as its existence becomes more widely known. The development of this network should provide tangible benefits to the participants, their organisations and the aquatic animal sectors they service.

Conclusion

The main objective of this project was to establish an Aquatic Animal Health Technical Forum (AAHTF) that would encourage interaction and information transfer of a technical nature between forum participants. Of particular interest was to ensure that the younger generation of aquatic animal health scientists benefitted from the 20+ years experience and expertise of some of the more mature aquatic animal health scientists who are on the brink of retirement.

Initially, an email discussion group consisting of contacts from known aquatic animal health laboratories was established to further develop the concept of a forum. One of the first tasks was to develop a current listing of aquatic animal health technical forum members and their capabilities which has been achieved for the current membership. This was followed up with a face-to-face discussion at the 2009 FRDC National Aquatic Animal Health Scientific Conference held at Cairns in July 2009. Interest in the forum was evident from the level of participation and the enthusiastic discussion at this session of the conference.

There was strong support for the planned workshop to be held at AAHL in March 2010. The format of the workshop was drafted and included both technical presentations and a “business meeting”. There were 24 participants (2 attended for one day only) at the 2010 AAHTF workshop, 17 from non-CSIRO sites and 7 CSIRO staff who made presentations on their specialty. All participants found the workshop informative and enjoyable. The non-CSIRO participants provided candid feed-back and appreciated the relaxed and non-competitive nature of the workshop. They informed the organiser that they would recommend participation to other aquatic animal technologists. The less experienced technologists found the forum friendly and would be keen to make a presentation in such a forum rather than at a “more formal” scientific conference.

Thus, apart from providing a forum for information exchange, participation in the AAHTF workshop was effective at developing the technologists’ networks, building rapport and trust between laboratories and individuals, and providing experience in making presentations. Thus in reviewing the effectiveness of the forum (e.g. level of participation and participant feedback on benefits for professional development) it can be concluded that the participants had a positive experience and found the workshop beneficial to their professional and personal development. It is anticipated that, providing adequate support is obtained, that membership to the forum will expand thus increasing its effectiveness. Following on from the 2010 AAHL workshop, participants were enthusiastic about forth-coming workshops that could be convened at other venues around Australia.

References

Landos M, Dhand N. and Whittington R. 2006. Aquatic Animal Health Subprogram: Establishment of a national aquatic animal health diagnostic network. Final Report FRDC Project No. 2005/621.

Landos M, Dhand N, Jones B. and Whittington R. 2007. Aquatic Animal Health Subprogram: Current and future needs for aquatic animal health training and for systems for merit-based accreditation and competency assessments. Final Report FRDC Project No. 2005/641.

Appendix 1: Intellectual Property

While no intellectual property arising from this project has been identified, the professional development of AAHTF participants has been beneficial to the participating individuals, their organisations and to industry stakeholders.

Appendix 2: Project Staff

Name	Organisation
Lynette Williams	AAHL Fish Diseases Laboratory, CSIRO Livestock Industries
Nick Moody	AAHL Fish Diseases Laboratory, CSIRO Livestock Industries
Mark Crane	AAHL Fish Diseases Laboratory, CSIRO Livestock Industries
Melissa Higgins	DPIPWE, Tasmania
Joanne Slater	AAHL Fish Diseases Laboratory, CSIRO Livestock Industries
Ken McColl	AAHL Fish Diseases Laboratory, CSIRO Livestock Industries
Sandy Crameri	AAHL Electron Microscopy Group, CSIRO Livestock Industries
Jean Payne	AAHL Histology Section, CSIRO Livestock Industries

Appendix 3: 2010 AAHTF workshop participants

Non-CSIRO Livestock Industry AAHTF participating members		
Name	Organisation	Position
Belinda Jones	DPIPWE, Tasmania	Fish Health Unit Technical Officer
Martine Cornish	DPIPWE, Tasmania	Technical Officer (Fish Health Unit)
Karine Cadoret	University of Tasmania	Fish health lab manager & technician
Melissa Higgins	DPIPWE, Tasmania	Fish Microbiologist
Nikki Elliot	Berrimah Veterinary Laboratories, NT	Technician
Kitman Dyrting	Berrimah Veterinary Laboratories, NT	Veterinary Officer/Pathologist
Lisa Elliot	PROAQUA P/L	Project Officer
Orachun Hayakijkosol	James Cook University	PhD candidate
Rusaini Rusaini	James Cook University	PhD candidate
Ilhan Mohammad	DPI Victoria	Technician
James Helsham	DPI Victoria	PhD candidate
Mark Hawes	DPI Victoria	Veterinary Pathologist
Julian Motha	DPI Victoria	Virologist
James Helsham	DPI Victoria	PhD Candidate
Rachel Hodgeman	DPI Victoria	Technologist
Expert Presenters		
Name	Organisation	Position
Dr Mark Crane	AAHL Fish Diseases Laboratory	Research Team Leader
Dr Ken McColl	AAHL Fish Diseases Laboratory	Veterinary pathologist
Dr Nick Moody	AAHL Fish Diseases Laboratory	Diagnostic Virologist
Dr Paul Hardy-Smith	Panaquatic Health Solutions Pty Ltd	Veterinary consultant
Ms Nette Williams	AAHL Fish Diseases Laboratory	Senior Technical Officer
Dr Mel Higgins	DPIPWE, Tasmania	Microbiologist
Ms Joanne Slater	AAHL Fish Diseases Laboratory	Senior Technical Officer
Ms Sandy Crameri	AAHL Electron Microscopy Group	Senior Technical Officer
Ms Jean Payne	AAHL Histology Section	Senior Technical Officer

AAHTF Workshop participants, CSIRO AAHL, 17-19 March 2010



Appendix 4.1: Questionnaire sent to AAHTF members

Aquatic Animal Health Technicians Forum (AAHTF)

Name:

Institute:

Email:

Contact telephone:

Qualifications:

Years aquatic animal health experience (please circle) <5 5-10 10-15 >15

Areas of interest (tick those that apply)

- Cell culture Molecular biology Virology Microbiology
- Parasitology Histopathology Immunodiagnostics

Areas of expertise (tick those that apply)

Cell culture and virus isolation/identification

- Cell culture
- Virus isolation
- Virus identification
- Virus characterization
- New technology

Molecular detection

- PCR
- RT-PCR
- Nested PCR
- Taqman
- SYBR Green
- Sequence analysis
- Phylogenetic analysis

Microbiology

- Bacterial isolation
- Bacterial identification
- MIC/antibiotic sensitivity
- Mycology

Parasitology

- Sample preparation
- Parasite identification

Types of parasites:

Histopathology

- Sample preparation
 - finfish (fresh and salt water)
 - crustaceans
 - molluscs
 - other species
- Interpreting histopathology changes

Immunodiagnosics

- Antigen detection ELISA
- Antibody detection ELISA

Immunochemistry

- Cell culture (ICC)
- Fixed tissues (IHC)

Current project or areas of work

Are you agreeable to offer advice or information transfer if requested?

Please email your completed form to lynette.williams@csiro.au

Appendix 4.2: Workshop feedback form

Workshop Participant Review Form

ITEM	Excellent	Good	OK	Poor
Location and venue: (Geelong)				
Other suggestions				
Accommodation:				
Other suggestions				
Date and duration:				
Other suggestions				
Format: <ul style="list-style-type: none"> • Presentations • interaction 				
Other suggestions				
Program topics				
Other suggestions				
Length (2 and a half days):				
Other suggestions				
Food: <ul style="list-style-type: none"> • Morning breaks • Lunches • Afternoon breaks 				
Secure area tour				
Comments				
Workshop dinner: Quality				
Would a “stand alone” workshop be better than one included in; -FRDC conference -AAVDL Other comments	Agree	Disagree		

Appendix 5.1: Listing of current AAHTF members and summary of their capabilities

Name	Email address	Yrs	Cell culture Virus isol	Molecular tests	Micro	Parasitol	Histo	Immunodiag
Ellen Ariel	ellen.ariel@jcu.edu.au	>5	All					ELISA;ICC;IHC
Karine Cadoret	kcadoret@amc.edu.au	<5	All				Yes	ELISA;IHC
Kelly Condon	kelly.condon@dpi.qld.gov.au	10-15		PCR; RT-PCR; Nested				
Marianne Douglas	marianne.douglas@dpiwe.tas.gov.au	10-15		PCR; RT-PCR; Nested				
Amber Howard	amber.howard@agric.wa.gov.au	<5	Virus Isol	PCR;Nested; sequencing	Isol & ID		Yes	
Lone Hoj	l.hoj@aims.gov.au	<5		PCR				
Kate Hutson	kate.hutson@jcu.edu.au	5-10				Yes		
Belinda Jones	belinda.jones@dpipwe.tas.gov.au	10-15				Prep & ID	Prep various species	
Karen Juntunen	karen.juntunen@jcu.edu.au	5-10	Yes					ELISA
Ilhan Mohammad	ilhan.mohammad@dpi.vic.goc.au	<5		All			molluscs	ELISA;ICC;IHC
Nick Moody	nick.moody@csiro.au	10-15	All	All				ELISA;ICC;IHC
Richard Morrison	richard.morrison@dpipwe.tas.gov.au	5-10		All excl. sequence	Isol & ID	Prep		ELISA;ICC;IHC
Joanne Slater	joanne.slater@csiro.au	10-15		All excl. sequence			Crustacea	ELISA;ICC;IHC
Fran Stephens	fstephens@agric.wa.gov.au	>15					Yes	
Helen Smith		5-10		RT-PCR Nested	Isol & ID		Sample Prep	
Alison Tweedie	a.tweedie@usyd.edu.au	>15	Yes	PCR;Nested			Finfish	
Benita Vincent	benita.vincent@csrio.au	5-10		PCR	Isol & ID		Finfish	ELISA;ICC;IHC

Name	Email address	Yrs	Cell culture Virus isol	Molecular tests	Micro	Parasitol	Histo	Immunodiag
Nette Williams	lynette.williams@csiro.au	>15	All	PCR	Isol		Sample prep	ELISA, ICC
John Hoad	john.hoad@csiro.au	5-10	All		Isol			All
Julian Motha	julian.motha@dpi.vic.gov.au	5-10						
Rachel Hodgeman	rachel.hodgeman@dpi.vic.gov.au	5-10			Yes			

Appendix 5.2: AAHTF members' organisations and their current projects

Name	Organisation	Current Projects
Ellen Ariel	JCU Townsville	Techniques to identify and characterise herpesvirus in turtles
Karine Cadoret	U. Tas	Histology of finfish, IHC
Kelly Condon	TAAHL	QLD survey of IHHNV in prawns, routine testing of aquatic samples for GAV, IHHNV, MoV
Marianne Douglas	DPIPWE Tas	Bacterial fish pathogens, AI, EI, NNV, <i>Kudoa</i> , RLO detection
Amber Howard	Fisheries WA	Investigating chlamydia-like organisms in pearl oysters
Lone Hoj	AIMS Townsville	Mol. Biol., ecology, spiny lobster project, probiotics, <i>Vibrio harveyi</i> -related pathogens, marine fungi
Kate Hutson	U. Adelaide	Parasites of wild farmed fishes, blood fluke of wild fishes, parasite identification and taxonomy
Belinda Jones	DPIPWE Tas	Gross pathology & sample collection various species, parasitology of shellfish
Karen Juntunen	JCU Townsville	Fibropapillomas in <i>Chelonia mydas</i>
Ilhan Mohammad	DPI Victoria	Development of RT-PCR, <i>in-situ</i> hybridisation for AbHV
Nick Moody	CSIRO AAHL	Cell line identification, molecular test development, new technologies, high-throughput testing, ISO 9000/NATA procedures
Richard Morrison	DPIPWE Tas	Tasmanian Rickettsia-like organism characterisation/vaccine development, development of multivalent vaccines, fish immunology, host pathogen interactions
Joanne Slater	CSIRO AAHL	Validation of diagnostic PCR for prawn viruses
Fran Stephens	Fisheries WA	Diagnostic pathology and histology, interpretation of results
Helen Smith	QPI&F	Routine diagnostic, arbovirus project
Alison Tweedie	U. Sydney	Routine diagnostic, arbovirus project
Benita Vincent	CSIRO MAR	Routine diagnostic, arbovirus project
Nette Williams	CSIRO AAHL	AbHV infectivity & biophysical properties, virus isolation (endemic & exotic), cell culture KHV infectivity trials establishing/characterising cell lines, ISO 9000/NATA procedures
John Hoad	CSIRO AAHL	Virology and export certification
Julian Motha	DPI Victoria	Virology and cell culture
Rachel Hodgeman	DPI Victoria	

