

# Aquaculture

SOUTH  
AUSTRALIAN  
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INSTITUTE  
**PIRSA**

## Yellowtail Kingfish Health Training Workshop (Aquatic Animal Health Training Scheme) September 2018



**Steven Clarke**

Project No: CSIRO AAHTS 2018.01

**SARDI Publication No. F2018/000418-1**  
**SARDI Research Report Series No. 1014**

SARDI Aquatics Sciences  
PO Box 120 Henley Beach SA 5022

**April 2019**

Final Report to CSIRO DAWR and FRDC



**FRDC**  
FISHERIES RESEARCH &  
DEVELOPMENT CORPORATION



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*Cover Photograph: Dr Stephen Pyecroft demonstrating the dissection of Yellowtail Kingfish in the Anatomy Laboratory, Livestock and Veterinary Sciences School, Roseworthy Campus, University of Adelaide; photograph by Mr Steven Clarke, SARDI.*

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Science Leader - Aquaculture

Signed:



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### **HOST ORGANISATION**

South Australia Research and Development Institute (SARDI)

### **DATE REPORT SUBMITTED**

4 December 2018

### **EXECUTIVE SUMMARY**

#### **Activity Undertaken**

A two-day 'Yellowtail Kingfish Health Training Workshop', an initiative of the 'Kingfish for Profit' project, Rural R&D for Profit Programme, Department of Agriculture and Water Resources, Australian Government, was held at the South Australian Aquatic Sciences Centre, South Australian Research and Development Institute - SARDI (Aquatic Sciences), West Beach, Adelaide and Roseworthy Campus, University of Adelaide, South Australia on 10 and 11 September 2018.

Workshop instructors were Dr Fran Stephens, Consultant, WA; Dr Stephen Pyecroft and Mr Ken Lee, University of Adelaide; Dr Marty Deveney and Dr Matthew Bansemer, SARDI; Dr Kate Hutson, James Cook University; and Mr Evan Rees, Primary Industries and Regions South Australia.

In total the workshop was attended by 26 participants from the aquafeed manufacturing, Barramundi, Cobia and Yellowtail Kingfish aquaculture industry sectors from New South Wales, Queensland, South Australia, Tasmania and Western Australia. Participants included academic, government and industry research and technical personnel, as well as six PhD students from the 'Kingfish for Profit' project.

#### **Outcomes Achieved To Date**

Based on the responses received to a questionnaire completed and submitted by participants after the workshop, the workshop's key objective and aims were achieved. Participating industry and government research and technical personnel and researchers, as well as PhD students, were up-skilled gaining increased knowledge and practical experience in a broad range of topics relating to finfish, particularly Yellowtail Kingfish, health, diseases and parasites. Participants also gained useful contacts across the developing Australian finfish industry (Barramundi, Cobia and Yellowtail Kingfish), including industry, researchers, fish health officers and veterinarians.

## ACKNOWLEDGMENTS

I would like to acknowledge the 'Aquatic Animal Health Training Scheme' grant that enabled the 'Yellowtail Kingfish Health Training Workshop' to be held. The grant is jointly funded by the Department of Agriculture and Water Resources (DAWR), Fisheries Research and Development Corporation (FRDC) and the Commonwealth Scientific and Industrial Research Organisation (CSIRO). Also acknowledged is the 'Rural R&D for Profit Programme', Department of Agriculture and Water Resources, Australian Government, which funded the 'Kingfish for Profit' project that identified the need for this training workshop as part of its PhD student personal development project, and contributed a range of personnel and resources to make the workshop a success.

I would particularly like to thank the instructors involved in the 'Yellowtail Kingfish Health Training Workshop': Dr Fran Stephens, Consultant, WA; Dr Stephen Pyecroft and Mr Ken Lee, University of Adelaide; Dr Marty Deveney and Dr Matthew Bansemer, SARDI; Dr Kate Hutson, James Cook University; and Mr Evan Rees, Primary Industries and Regions South Australia. Without the involvement of these people the workshop would not have been possible, nor contained the breadth and depth of information that these people brought to the event.

I would also like to thank the South Australian Research and Development Institute (SARDI) for making their facilities available at West Beach, Adelaide and the University of Adelaide, its Roseworthy Campus. Also, to Clean Seas Seafood for providing the remaining 13 Yellowtail Kingfish that they contributed to the final South Australian 'Kingfish for Profit' tank experiment and which were used for the 'Yellowtail Kingfish Health Training Workshop'.

Finally, I would like to thank the workshop participants for their enthusiasm and active participation, and the organisations that employ them for supporting their attendance at the workshop.

## INTRODUCTION

The 'Kingfish for Profit' project, Rural R&D for Profit Programme, Department of Agriculture and Water Resources, Australian Government is focused on feeding strategies, nutrition and nutritional health (primarily the microbiome). Whilst undertaking these activities a need for broader aquatic animal health up-skilling of participants (i.e. Clean Seas Seafoods and SARDI-PIRSA, SA and Huon Aquaculture and PSFI-NSW DPI, NSW) was been identified, in particular, postgraduate students, on-farm technical personnel and researchers. Discussion at the 'Kingfish for Profit' Steering Committee identified strong support for a short workshop that combined presentations, discussion group sessions and practical hands-on training in a laboratory; also through its FRDC representatives it was clear that there is a broader need for enhanced aquatic animal health capability across the whole YTK industry and for other developing finfish industries (e.g. Barramundi and Cobia). As such, FRDC proposed that the workshop include more participants and from further afield, this requiring additional funds to be sourced. As such, this project sought a grant to:

- engage highly experienced Australian Yellowtail Kingfish veterinarians and fish health officers as the key workshop instructors; and
- support personnel from the Australian commercial Yellowtail Kingfish and other developing finfish farming sectors.

As the 'Kingfish for Profit' project ends early in 2019, this workshop was seen to provide a unique opportunity to drive the up-skilling of aquatic animal health in the newly developing Australian marine finfish industry sectors.

### Objectives

The key objective of this project was to hold a successful 'Yellowtail Kingfish Health Training Workshop', run by a number of experienced veterinarians and fish health officers who would up-skill the knowledge and practical experience of some 20 or so technical and research staff from industry and government, as well as postgraduate students working with the developing Australian finfish aquaculture industries.

The aims were:

- improve the fish health skills and knowledge of those working in or with the developing marine finfish aquaculture sectors;

- increase awareness of legislation and regulations relevant to biosecurity, fish health and the treatment of diseases and parasites;
- provide participants with more knowledge of the relevant procedures to follow and data to collect to provide to supporting diagnostic services and veterinarians and support them in their roles;  
increase awareness of the anatomy and histopathology of the major diseases and parasites of Yellowtail Kingfish; and
- encourage networking among participants and instructors involved in the developing Australian marine finfish industries.



## **METHODS**

### **Instructors**

The three key workshop instructors who originally agreed to participate in the workshop were:

- Dr Fran Stephens, Veterinarian Consultant, WA;
- Dr Matt Landos, Future Fisheries Veterinary Service Pty Ltd, NSW; and
- Dr Stephen Pyecroft, Senior Lecturer Veterinary Pathology, School of Animal and Veterinary Sciences, University of Adelaide.

Dr Matt Landos was unfortunately unavailable on the dates finalised for the workshop, with these necessarily being aligned to the annual 'Kingfish for Profit' Research Workshop and face-to-face Steering Committee meeting so as to reduce travel costs and time for those that attended. His role in the workshop was therefore addressed by the other participating veterinarians and fish health officers.

The workshop support instructors originally advised were:

- Dr Shane Roberts, Manager, Aquatic Animal Health, PIRSA; and
- Assoc. Prof. Marty Deveney, Marine Biosecurity Node Leader, Aquatic Sciences, SARDI.

Unfortunately, Dr Shane Roberts could not attend on the dates of the workshop and had his assistant, Mr Evan Rees, Aquatic Animal Health Officer, PIRSA present a collaboratively developed presentation and provide support during the practical sessions.

Additional instructors/trainers that participated in the workshop included:

- Dr Kate Hutson, James Cook University, who has many years' experience in aquatic animal health including the identification, epidemiology and management of Yellowtail Kingfish parasites.
- Mr Ken Lee, School of Animal and Veterinary Sciences, University of Adelaide who works in the histology and microbiology laboratory, including preparing Yellowtail Kingfish and other aquaculture species submitted to the University.
- Dr Matthew Bansemer, Senior Researcher, Nutrition and Feed Technology Subprogram, Aquatic Sciences, SARDI with eight years' experience in abalone and Yellowtail Kingfish research, both frequently requiring sample collection from anaesthetised or euthanised fish.

A short biography on each participating instructor was provided to workshop attendees (Appendix 1).

## **Program**

The workshop 'Welcome', 'Introduction' and 'Anaesthetising/Euthanising/Sampling' of Yellowtail Kingfish was undertaken at SARDI Aquatic Sciences, West Beach, Adelaide. The remainder of the workshop was held at the veterinary training laboratories at the Livestock and Veterinary Sciences School, Roseworthy Campus, University of Adelaide, as well as a general lecturing room.

The Workshop Program (Appendix 2) included presentations, practicals and discussion time and covered:

- biosecurity;
- early recognition and detection of YTK disease and parasite issues;
- optimal sampling, preservation and transport procedures;
- collection of other relevant information important for facilitating diagnosis;
- preliminary methods of diagnosis;
- interpretation of diagnostic results from analytical laboratories and veterinarians; and
- disease and parasite management on-farm and in research establishments including appropriate use of therapeutic chemicals.

## **Budget**

The funds provided through the 'Aquatic Animal Health Training Scheme' grant were used to contribute to the costs of:

- industry participants attending the workshop by subsidising a proportion of their travel and accommodation expenses; and
- a key participating instructor (i.e. Dr Fran Stephens, Consultant, WA) to attend and provide the time for preparing their teaching materials for the workshop.

Significant in-kind contributions were made by the key instructors, as well as the other instructors. The 'Kingfish for Profit', Rural R&D for Profit Programme, Department of Agriculture and Water Resources, Australian Government funded attendance by its PhD students and the time of Mr Steven Clarke, SARDI to organise the event. The University of Adelaide contributed the use of its specialised Anatomy Laboratory and Training Laboratory of the Livestock and Veterinary

Sciences School, and dissecting and disposable equipment for the participants that undertook practicals within these facilities. SARDI contributed access to its Pool Farm facilities at West Beach where the Yellowtail Kingfish used in the anatomy practical were euthanised.

## RESULTS/DISCUSSION

A two-day Yellowtail Kingfish Health Training Workshop, an initiative of the 'Kingfish for Profit Project', Rural R&D for Profit Programme, Department of Agriculture and Water Resources, Australian Government, was successfully held at the South Australian Aquatic Sciences Centre, South Australian Research and Development Institute – SARDI (Aquatic Sciences), West Beach, Adelaide and Roseworthy Campus, University of Adelaide, South Australia on 10 and 11 September 2018.

A highly capable and enthusiastic group of workshop instructors participated, including Dr Fran Stephens, Consultant, WA; Dr Stephen Pyecroft and Mr Ken Lee, University of Adelaide; Dr Marty Deveney and Dr Matthew Bansemer, SARDI; Dr Kate Hutson, James Cook University; and Mr Evan Rees, Primary Industries and Regions South Australia.

In total 26 participants attended the workshop from the aquafeed manufacturing, Barramundi, Cobia and Yellowtail Kingfish aquaculture industry sectors from New South Wales, Queensland, South Australia, Tasmania and Western Australia. Participants included academic, government and industry technicians and researchers, as well as PhD students.

Following the workshop all participants were e-mailed:

- a short biography of the instructors (Appendix 1);
- the workshop program (Appendix 2);
- the instructors PowerPoint presentations;
- a participants list with e-mail contact details (Appendix 3);
- select follow-up references; and
- a questionnaire for the participants to respond as to the success of the workshop (Appendix 4).

Fifteen responses to the questionnaire were received from industry, government and postgraduate student attendees regarding the nature and success of the workshop (Appendix 4). Overall they indicate that the workshop was a success demonstrated by high scoring in relation to:

- the usefulness of the workshop to participants (Question 1);
- appropriate coverage of the topic (Question 2); and

- a suitable mixture of practicals, presentations and discussion (Question 3).

While scores were typically high for all the components of the workshop (Questions 6a-6l), the inclusion of a histology practical was highlighted as a potential area of improvement (Question 9) and/or of further interest (Question 10) The workshop addressed histology through:

- a presentation on how samples were prepared within a semi-commercial laboratory for subsequent distribution to specialists for diagnosis; and
- through the provision of prepared histology slides indicating the effects of 16 common fish disease conditions, particularly those relating to Yellowtail Kingfish, which were examined by participants with one microscope for each pair.

A number of participants highlighted that they would have liked to have gained hands-on experience in preparing samples for histology and diagnosis, including the use of preservative, fixatives and stains. For this to occur, a longer workshop would be required.

While the 2.5 hours per day travel associated with running most of the course at Roseworthy Campus, University of Adelaide so as to use the specialised Livestock and Veterinary Sciences School training facilities was considered by some participants to be too great, others found this time beneficial for discussing the days training activities and networking (Question 5, 7 and 9).

All participants indicated that they would be interested in attending further short follow-up courses in fish health (Question 10).

Overall, the responses to the questionnaire highlighted that all the sub-objectives of the workshop were achieved.

## **BENEFITS AND ADOPTION**

Based on the responses received to a questionnaire completed and submitted by participants after the workshop, the workshop's key objective and aims were achieved. Participating industry and government research and technical personnel and researchers, as well as PhD students, were up-skilled gaining increased knowledge and practical experience in a broad range of topics relating to finfish, particularly Yellowtail Kingfish, health, diseases and parasites. Participants also gained useful contacts across the developing Australian finfish industry (Barramundi, Cobia and Yellowtail Kingfish), including industry, researchers, fish health officers and veterinarians.

## FURTHER DEVELOPMENT

Question 10 of the questionnaire responded to by workshop participants asked “would you be interested in a follow-up fish health events and what should this include”. The responses, in paraphrased form, received were:

- yes, more practical (anatomy, necropsy);
- yes, more practical;
- yes, more of the same;
- yes, more interpretation of pathology reports and relevant technology (PCR);
- yes, more on the effects of abiotic factors and nutrition on fish health;
- yes, more detail and practical on the specific diseases and parasites of Yellowtail Kingfish;
- yes, information on the activities and roles of on-farm health teams;
- yes, more on histology, in particular the preparation (fixing, staining) of tissues and the recognition of normal / abnormal conditions;
- yes, more on the biological processes associated with health, diseases and pests, as well as on the related histology;
- yes, more on the specifics of other species;
- yes, inclusion of a broader range of Australian finfish and shellfish species, a closer look at AQAVETPLAN, practical on-farm biosecurity protocols and an in-depth policy analysis;
- yes, more information on feeding patterns and behaviours for optimal health; and
- yes, a workshop on seafood product quality.

## Appendix 1: Instructors Short Biography

### *Dr Fran Stephens*

Dr Fran Stephens graduated as a veterinarian from the University of Sydney in 1975 and was awarded a PhD from Murdoch University in 2002. Her PhD project involved investigating the causes and management of the health problems affecting the Western Australian dhufish during a feasibility program to ascertain the suitability of the species for aquaculture. Fran worked as a Fish Pathologist for the Department of Fisheries in Western Australia from 2003 to 2017. Since retiring she has been offering histopathology services to the aquaculture industry. She has an interest in the diagnosis and management of disease of aquatic animals in aquaculture systems and has many years' experience with Yellowtail Kingfish. Fran has been providing much of the diagnostic services to the national "Kingfish for Profit", Rural R&D for Profit, Department of Agriculture and Water Resources, Australian Government project.



### *Dr Stephen Pyecroft*

Dr Stephen Pyecroft is a senior lecturer in veterinary pathology at the University of Adelaide, School of Animal & Veterinary Sciences, Roseworthy, South Australia. He returned to post graduate studies after 5 years working in rural mixed veterinary practice post-graduation. Stephen obtained a postgraduate honours and subsequent PhD at the University of Queensland in topics of fish parasitology before embarking on a fish health consultancy in aquatic disease diagnosis and management for the ornamental fish and aquaculture industries. Developing his pathology skills he then worked for the Department of Primary industries, Parks, Water and Environment (Tasmania) as a fish pathologist and senior comparative pathologist. Stephen left the position of Manager Animal Health

Laboratories and Principal Veterinary Pathologist after 13 years to take up his current position.



*Assoc. Prof. Marty Deveney*

A/Prof. Marty Deveney is Subprogram Leader, Marine Biosecurity at Aquatic Sciences, South Australian Research and Development Institute (SARDI). He has a Bachelor of Science degree in parasitology and marine science and a PhD in molecular and microbial science from the University of Queensland. Marty's PhD focused on identification and management of flatworm (fluke) parasites of fish. More recently he has worked in health management of aquatic organisms in aquaculture and fisheries, farm and open system biosecurity, pest and disease management, risk analysis, veterinary medicine and disinfectant registration and use, and application of science principles to public policy. Marty is a Leader of the Nutritional Health Theme of the national "Kingfish for Profit", Rural R&D for Profit, Australian Government project.





*Mr Evan Rees*

Mr Evan Rees is a biologist with extensive domestic and international experience in finfish sea-cage aquaculture, specialising in fish health management. His career recently transitioned from Fish Health Manager for a major Australian finfish aquaculture company to Aquatic Animal Health Officer at Primary Industries and Regions South Australia (PIRSA). Evan has considerable experience in the practical aspects of Yellowtail Kingfish health management.



*Mr Ken Lee*

Mr Ken Lee has many years' experience in histopathology, microbiology molecular biology (PCR) and serology. Ken was the Laboratory Manager, Immuno-Serology Laboratory 1978-1996, Laboratory Manager, Microbiology (Veterinary) 1993-1996 and Manager, Shellfish Quality Assurance 1997-2009, all with Primary Industries and Regions South Australia (PIRSA). In the latter position he worked closely with a number of aquaculture and fisheries industries, in particular the South Australian Oyster industry. He is presently employed as the Diagnostic Microbiologist Technician, Veterinary Science at the University of Adelaide.



*Dr Kate Hutson*

Dr Kate Hutson leads the Marine Parasitology Laboratory and is the course coordinator for the Aquaculture and Technology Major at James Cook University. She conducted her PhD research on the parasites of wild and farmed yellowtail kingfish at the University of Adelaide. Her current research programme aims to enable informed decisions for parasitic disease management in aquaculture. Kate has developed and optimised culture techniques for generalist parasite species that impact aquaculture production globally. Using these models she has predicted emergent diseases through risk analysis and surveillance, diagnosed aetiological agents, developed decision-support tools for industry and identified novel management strategies.



*Dr Matthew Bansemer*

Dr Matthew Bansemer is a Senior Research Officer in the Nutrition and Feed Technology Subprogram, Aquaculture, Aquatic Sciences, South Australian Research and Development Institute (SARDI). Since his BSc (Hons) at the University of Adelaide and then PhD at Flinders University he has been involved in nutritional research of Greenlip Abalone and Yellowtail Kingfish. Over the last three years Matthew has undertaken a major role in the 'Kingfish for Profit' project having been involved in all the tank based experiments done at SARDI, including sampling the blood, flesh, organs and parasites of the fish after first anaesthetising or euthanasing them.



## Appendix 2. Workshop Program

### **Day 1: 8.00am – 5.30pm, Monday 10 September 2018 (starting at SARDI, West Beach and moving to Roseworthy Campus, University of Adelaide)**

8.00am-8.15am - Welcome, Introductions, Housekeeping and Workshop Objectives (Steven Clarke, SARDI) - SARDI West Beach Conference Room

8.15am-9.00am - Anesthetising YTK for Measurements and Sampling (Practical managed by Matthew Bansemer, SARDI and supported by Paul Skordas, SARDI and Evan Rees, PIRSA Fisheries and Aquaculture) - SARDI West Beach Pool Farm

9.00am-10.30am - Bus trip from SARDI Aquatic Sciences, West Beach to Roseworthy Campus, University of Adelaide - meet Hamra Avenue adjacent SARDI front car-park

10.30am-10.50am - MORNING TEA - Council Room, Roseworthy College Hall - D1 on map

10.50am-12.20am - YTK Anatomy (Dissecting Equipment and Laboratory Housekeeping by Anthony Wilkes, University of Adelaide and Presentation and Practical managed by Stephen Pyecroft, University of Adelaide and supported by Fran Stephens, Consultant; Marty Deveney, SARDI and Evan Rees, PIRSA Fisheries and Aquaculture) - Anatomy Lab, new Veterinary Science Building – E40 on map

- YTK externals
- YTK internal

12.20-1.00pm - LUNCH - Council Room, Roseworthy College Hall - D1 on map

1.00-1.40pm - Laboratory Histology and Microbiology Preparations (Presentation and demonstration by Mr Ken Lee, University of Adelaide)

1.40-2.40pm - Interpretation of Diagnosis Results On- & Off-Farm (Practical managed by Fran Stephens, Consultant and supported by Stephen Pyecroft, University of Adelaide and Marty Deveney, SARDI) Teaching Lab - West, new Veterinary Science Building – E40 on map

2.40-3.40pm - Optimal Sampling & Data Collection (Presentation and discussion managed by Marty Deveney, supported by Fran Stephens, Consultant, Stephen Pyecroft, University of Adelaide and Evan Rees, PIRSA Fisheries and Aquaculture) - Teaching Lab - West, new Veterinary Science Building – E40 on map

- Tissues
- Preservation
- Labelling

- Environmental data collection

3.40-4.00pm - AFTERNOON TEA - E-Learning Room, new Veterinary Science Building – E40 on map

4.00pm-5.30pm - Bus trip from Roseworthy Campus, University of Adelaide to Glenelg and SARDI Aquatic Sciences, West Beach– meet car-park, front of Roseworthy College Hall - D1 on map.

**Day 2: 8.00am – 5.30pm, Tuesday 11 September 2018 (starting and finishing at SARDI, West Beach; Roseworthy Campus, University of Adelaide)**

8.00am-9.30am - Bus trip from SARDI Aquatic Sciences, West Beach to Roseworthy Campus, University of Adelaide – meet Hamra Avenue adjacent SARDI front car-park

9.30am-10.30am - Biosecurity Processes and Regulations Relevant to Disease Diagnosis on Farm (Presentation and discussion by Evan Rees, PIRSA Fisheries and Aquaculture and supported by Marty Deveney, SARDI and Fran Stephens) - Council Room, Roseworthy College Hall - D1 on map

- Interstate finfish transfers
- Transfer of finfish from hatchery to farm
- Lease to lease transfers

10.30am-10.50am - MORNING TEA - Council Room, Roseworthy College Hall - D1 on map

10.50am-11.20am - Monitoring and Surveillance (Presentation by Marty Deveney, SARDI and supported by Evan Rees, PIRSA Fisheries and Aquaculture) - Council Room, Roseworthy College Hall - D1 on map

- Monitoring
- Surveillance

11.20am-12.20pm - Early Diagnosis On-farm: (Presentation and discussion by Stephen Pyecroft, University of Adelaide, supported by Marty Deveney, SARDI and Evan Rees, PIRSA Fisheries & Aquaculture) - Council Room, Roseworthy College Hall - D1 on map

- Response time
- Tests and analyses

12.20pm-1.00pm - LUNCH

1.00am-2.00pm - Interpretation of Diagnosis Results Off-farm (Presentation by Fran Stephens, Consultant) - Council Room, Roseworthy College Hall - D1 on map

- Interpreting what laboratory reports state
- Deciding response actions based on a laboratory report
- Recognising signs of disease

2.00pm-2.45pm - Disease & Parasite Management On-farm (Discussion led by Marty Deveney, SARDI, Evan Rees, Fisheries and Aquaculture and Fran Stephens, Consultant) - Council Room, Roseworthy College Hall - D1 on map

- Vaccination
- In-feed
- Immersion
- Stock destruction

2.45pm-3.00pm - Management of Flukes in YTK Aquaculture (Presentation by Kate Hutson, James Cook University) - Council Room, Roseworthy College Hall - D1 on map

3.00pm-3.20pm AFTERNOON TEA - Council Room, front Historical Building

3.20pm-3.40pm – General Panel Questions and Answers Session (Stephen Pyecroft, University of Adelaide; Marty Deveney, SARDI; Evan Rees, Fisheries and Aquaculture and Fran Stephens, Consultant) - Council Room, Roseworthy College Hall - D1 on map

3.40pm-4.00pm - Wrap-Up and Close (Steven Clarke, SARDI)

4.00pm-5.30pm - Bus trip from Roseworthy Campus, University of Adelaide to SARDI Aquatic Sciences, West Beach – meet car-park, front of Roseworthy College Hall - D1 on map

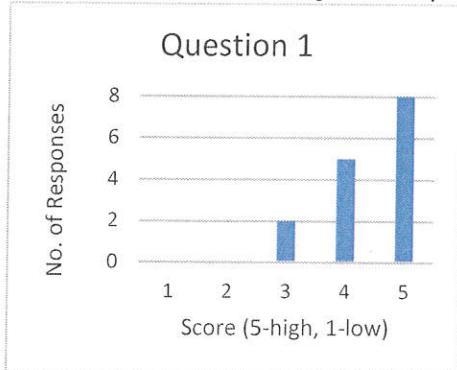
### Appendix 3: Participants List and Contact Details

Trainer (T)	Surname	First Name	Organisational Affiliation	Email
	Bansemmer	Matthew	SARDI	<a href="mailto:matthew.bansemmer@sa.gov.au">matthew.bansemmer@sa.gov.au</a>
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	Giltrow	Kurt	Indian Ocean Fresh Australia	<a href="mailto:fish@iofa.com.au">fish@iofa.com.au</a>
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	Lovell	Elisha	HUON Aquaculture	<a href="mailto:elovell@huonaqua.com.au">elovell@huonaqua.com.au</a>
	Ooi	Mei Chen	Marine Products Australia	<a href="mailto:mei.ooi@utas.edu.au">mei.ooi@utas.edu.au</a>
T	Pyecroft	Stephen	Uni of Adelaide	<a href="mailto:stephen.pyecroft@adelaide.edu.au">stephen.pyecroft@adelaide.edu.au</a>
T	Rees	Evan	PIRSA Fisheries & Aquaculture	<a href="mailto:shane.roberts@sa.gov.au">shane.roberts@sa.gov.au</a>
	Salini	Michael	Ridley Aquafeeds	<a href="mailto:michael.salini@ridley.com.au">michael.salini@ridley.com.au</a>
	Skordas	Paul	SARDI	<a href="mailto:paul.skordas@sa.gov.au">paul.skordas@sa.gov.au</a>
T	Stephens	Fran	Consultant	<a href="mailto:fstephens@iinet.net.au">fstephens@iinet.net.au</a>
	Warnock	Bryn	Indian Ocean Fresh Australia	<a href="mailto:bryn@iofa.com.au">bryn@iofa.com.au</a>
	Whelan	Georgie	HUON Aquaculture	<a href="mailto:gpember@huonaqua.com.au">gpember@huonaqua.com.au</a>

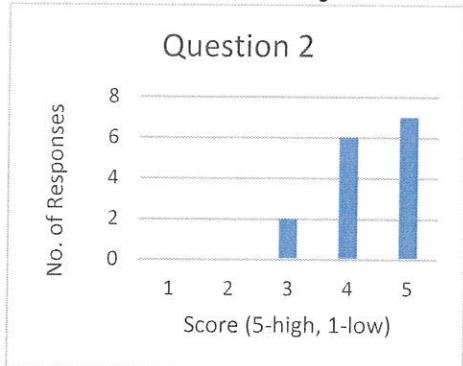
### Appendix 4. Workshop Feedback Questionnaire and Responses

FOR EACH QUESTION, PLEASE CIRCLE OR HIGHLIGHT (IN **YELLOW**) THE MOST APPROPRIATE RESPONSE ('1' IS LOW AND '5' IS HIGH; 'Y' IS YES AND 'N' IS NO) UNLESS A WRITTEN RESPONSE IS REQUESTED

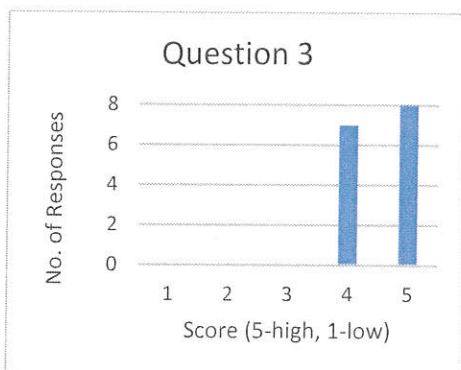
- 1) Was the YTK Health Training Workshop useful to you? 1 2 3 4 5



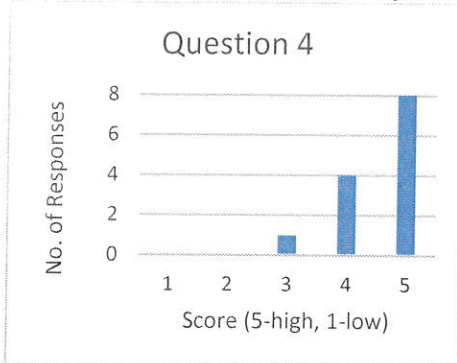
- 2) How well did the sessions together cover the topic for you? 1 2 3 4 5



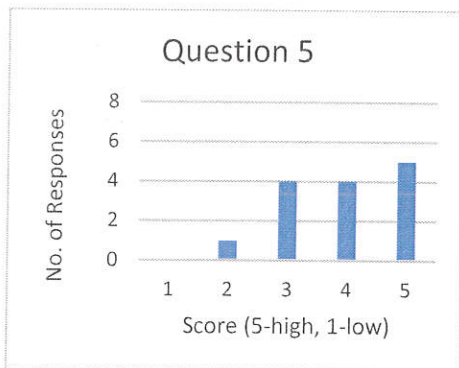
- 3) Was the mix of practical to presentations to questions/answers to discussion satisfactory? 1 2 3 4 5



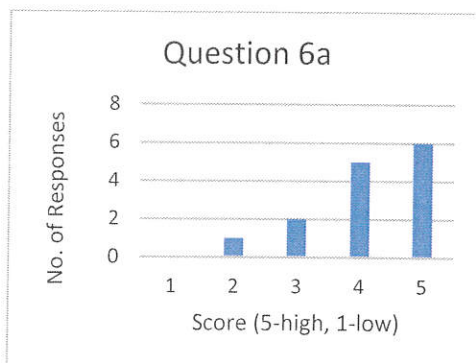
- 4) Was it beneficial having a relatively large number of trainers with diverse expertise and from different Australian geographical regions? 1 2 3 4 5



- 5) Was it worthwhile holding the workshop at Roseworthy Campus, University of Adelaide so as to utilise the specialised facilities of their School of Animal and Veterinary Sciences? 1 2 3 4 5



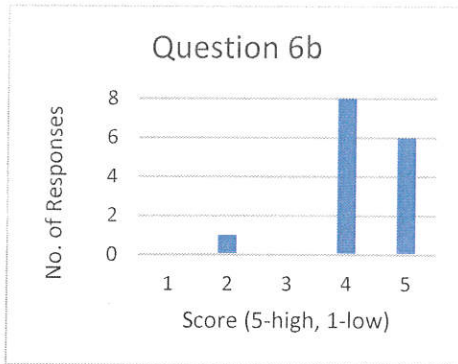
- 6) Which sessions did you think least/most worthwhile  
a) Euthanising R&D YTK (practical) 1 2 3 4 5





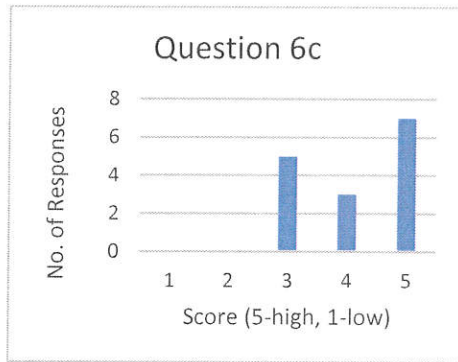
b) YTK Anatomy (practical)

1 2 3 4 5



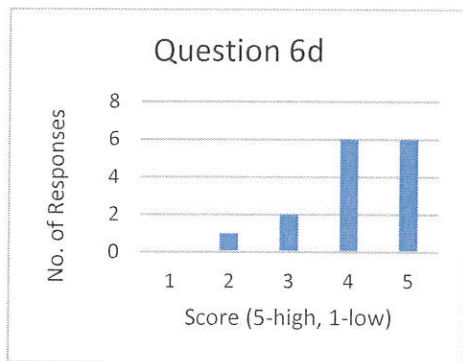
c) Lab Histology & Microbiology Processes

1 2 3 4 5



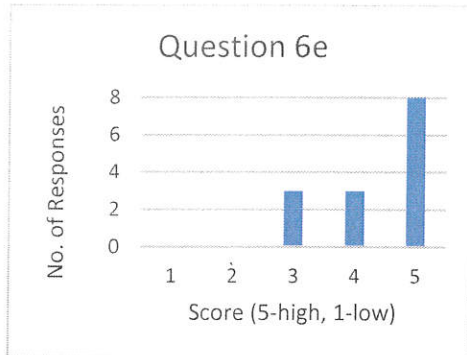
d) Microscopic Diagnosis of Prepared Samples (practical)

1 2 3 4 5



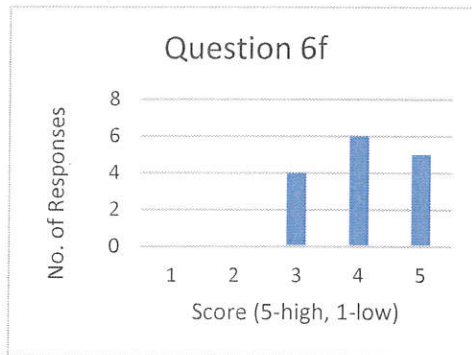
e) Optimal Sampling & Data Collection

1 2 3 4 5



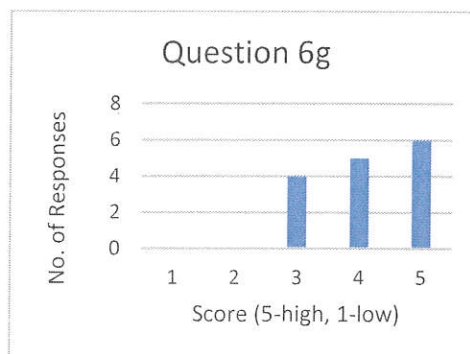
f) Biosecurity Processes and Regulations

1 2 3 4 5



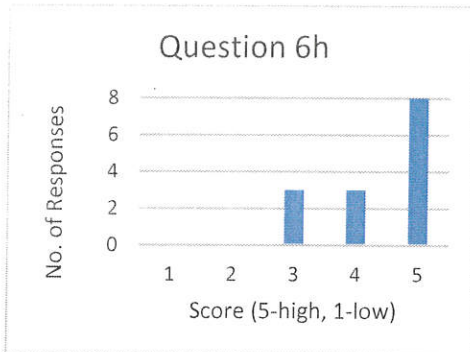
g) Monitoring and Surveillance

1 2 3 4 5



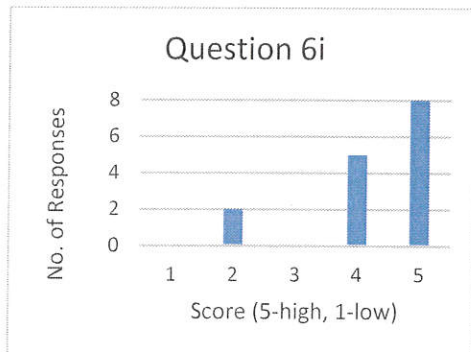
h) Early On-farm Diagnosis

1 2 3 4 5



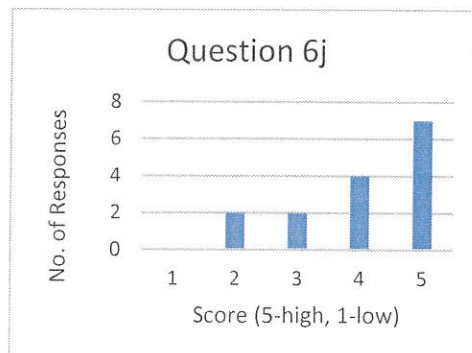
i) Interpretation of Off-farm Diagnosis

1 2 3 4 5



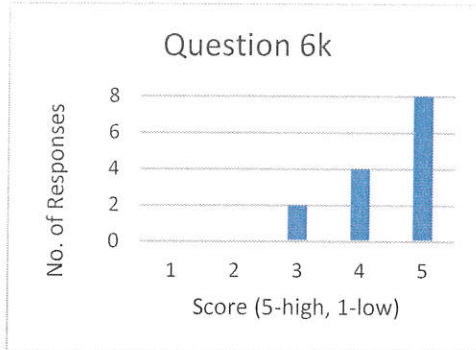
j) Disease and Parasite Management Off-farm

1 2 3 4 5



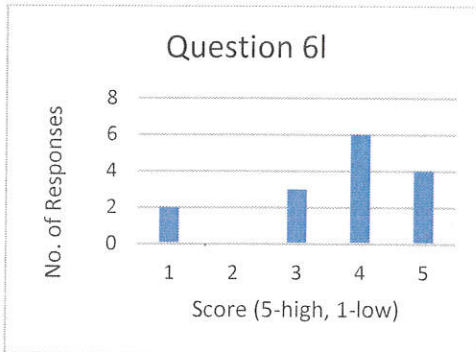
k) Management of Flukes in YTK Aquaculture

1 2 3 4 5



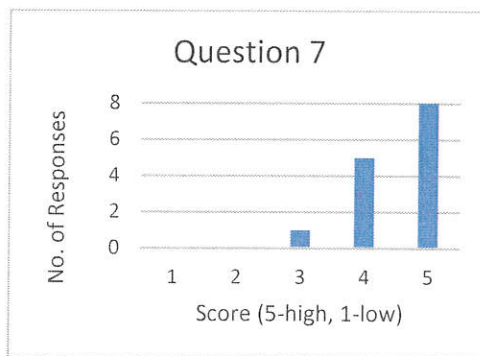
l) Closing Panel Discussion Session

1 2 3 4 5

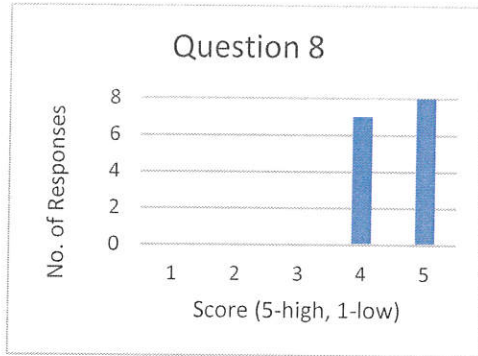


7) Did the event include enough time for interaction with the trainers and with other attendees?

1 2 3 4 5



- 8) If this event was to be run again with a similar format how strongly would you recommend it to others to attend? 1 2 3 4 5



- 9) If such an event was run again for others, how do you believe it could be improved?
- More industry specific, some of what was presented was not relevant to industry
  - Demonstration and practicals on preparing histological samples
  - No major faults
  - Less time in transit between locations although this time was good for networking
  - Reduce the amount of travelling time by having one day of theory at SARDI, West Beach and one day of practical at the Livestock and Veterinary School, Roseworthy Campus
  - Have longer breaks between sessions and another day to enable information to better sink-in
  - Include hands-on practicals to learn preserving and fixing techniques
  - More elaboration on biological processes pertaining to fish health
  - More focus on histology, including a group introductory session so as to better understand different cell and tissue types when normal and abnormal prior to working with the prepared slides provided highlighting various major fish health conditions
  - Closer collaboration between presenters to avoid occasional duplication of information provided
  - More time on histology and disease/parasite diagnosis
  - More time for practicals
  - Design into a full three day workshop with a comprehensive on-line component prior to the workshop and some form of evaluation so it is within an educational framework to obtain a more formal recognition for attendance [a certificate of attendance was provided to the students who sought them]
  - Would have been great for the students that attended to have had access to this type of training workshop early in the 'Kingfish for Profit', Rural R&D for Profit Programme rather than near the end
  - Adapt the training workshop to cover other species so as to make it relevant to a broader audience

10) Would you be interested in a follow-up fish health event and if so what should this include?

- Yes, more practical (anatomy, necropsy) (x 3)
- Yes, more of the same
- Yes, more interpretation of pathology reports and relevant technology (PCR)
- Yes, more on the effects of abiotic factors and nutrition on fish health
- Yes, more detail and practical on the specific diseases and parasites of Yellowtail Kingfish
- Yes, information on the activities and roles of on-farm health teams
- Yes, more on histology, in particular the preparation (fixing, staining) of tissues and the recognition of normal / abnormal conditions
- Yes, more on fish histopathology
- Yes, more on the biological processes associated with health, diseases and parasites, as well as on the related histology
- Yes, more on the specifics of other species
- Yes, inclusion of a broader range of Australian finfish and shellfish species, a closer look at AQAVETPLAN, practical on-farm biosecurity protocols and an in-depth policy analysis
- Yes, more information on feeding patterns and behaviours for optimal health
- Yes, a workshop on seafood product quality

11) Was the catering adequate, if not what is needed to improve it?

- Adequate (x 13)
- More diversity desirable for vegans (x 1)
- Slightly more quantity (x 1)

12) Please identify whether you were: (please circle the most appropriate response)

- A commercial industry participant? Y / N (Y x 9)
- A government/university participant (excluding PhD students)? Y / N (Y x 3)
- A student? Y / N (Y x 3)

**PLEASE E-MAIL YOUR COMPLETED RESPONSE TO STEVEN CLARKE, SARDI:  
[steven.clarke@sa.gov.au](mailto:steven.clarke@sa.gov.au) AS SOON AS POSSIBLE AND AT THE LATEST BY THE 30  
 NOVEMBER 2018**

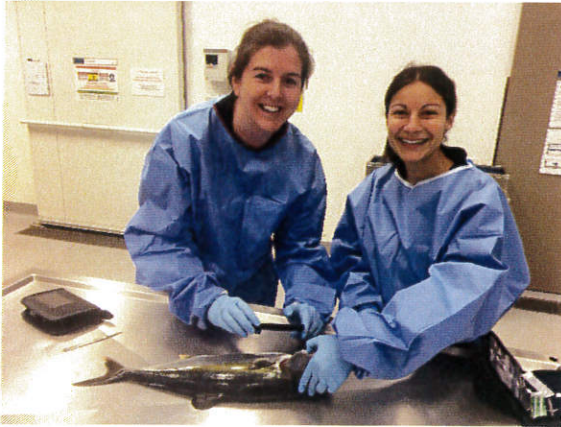
## Appendix 5. Selection of Workshop Photographs (approval for use provided)



Dr Stephen Pyecroft (left) and some workshop participants in the Anatomy Laboratory, Livestock and Veterinary Sciences School, Roseworthy Campus, University of Adelaide.



Dr Fran Stephens and PhD students Mr Benjamin Crowe, Flinders University and Ms Samantha Chown, University of Adelaide (left to right).



Dr Kate Hutson, James Cook University and Dr Sarah Catalano, SARDI (left to right).



Dr Michael Salini, Ridleys and PhD student Mr Thibault Legrand, University of Adelaide (left to right).



PhD students Ms Angela Liu, University of New South Wales and Caroline Candebat, James Cook University (left to right).





PhD student Ms Dam Thi My Chinh, University of the Sunshine Coast and Ms Mei Chen Ooi, Marine Products Australia (left to right).



Mr Wayne Di Bartolo, Pacific Reef and Mr Toby Fox, Clean Seas Seafood (left to right).



Ms Elisha Lovell, Ms Georgie Whelan and Mr Dan Creevey, Huon Aquaculture (left to right).



Dr Stephen Pyecroft, and Mr Bryn Warnock and Mr Kurt Giltrow, Indian Ocean Fresh Aquaculture (left to right) in the Training Room – West, Livestock and Veterinary Sciences School, Roseworthy Campus, University of Adelaide.



Assoc Prof Marty Deveney, SARDI and some workshop participants in the Training Laboratory – West, Livestock and Veterinary Sciences School, Roseworthy Campus, University of Adelaide.



Dr Kate Hutson and some workshop participants in the Council Room, Administration Building, Roseworthy Campus, University of Adelaide



Dr Fran Stephens and some workshop participants in the Council Room, Administration Room, Roseworthy Campus, University of Adelaide.