

New & emerging aquaculture opportunities Subprogram: Establishment

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In submitting this report, the researcher has agreed to FRDC publishing this material in its edited form.

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Abbreviations

ABFA – Australian Barramundi Farmers’ Association

ACIAR – Australian Centre for International Agricultural Research

AFMF – Australian Fisheries Management Forum

Challenger IT - Challenger Institute of Technology

CSIRO – Commonwealth Scientific and Industrial Research Organisation

CST – Clean Seas Tuna Ltd

DAWR – Department of Agriculture and Water Resources

IMAS – Institute for Marine and Antarctic Studies, University of Tasmania

IPA – Industry Partnership Agreement

IRG – Indigenous Reference Group

K4P – Rural R&D for Profit project “Growing a profitable, innovative and collaborative Australian Yellowtail Kingfish aquaculture industry: bringing 'white' fish to the market”

NAC – National Aquaculture Council

NEAO – New and Emerging Aquaculture Opportunities Subprogram

NSW Fisheries – New South Wales Department of Primary Industries, Fisheries

NT DPIF – Northern Territory Department of Primary Industry and Fisheries

QDAF – Queensland Department of Agriculture and Fisheries

RD&E – Research, Development and Extension

RIRDC – Rural Industries Research and Development Corporation

RnD4P – DAWR, Rural Research and Development (R&D) for Profit programme

SARDI – South Australian Research and Development Institute

WA Fisheries – Department of Fisheries, Western Australia

Executive Summary

What the report is about?

This report documents the progress of the FRDC and the Subprogram Establishment Leader, Dr Jennifer Cobcroft, to establish a new Subprogram that will strategically coordinate research development and extension (RD&E) in new and emerging aquaculture growth opportunities for Australia. Extensive national consultation was undertaken with stakeholders between July 2015 and February 2016, with a planning workshop held 11-12 November 2015 and an Establishment Committee meeting 5 February 2016, both in Melbourne. Clear direction was provided for RD&E in the short term to strengthen cooperative linkages and prioritise RD&E that will underpin aquaculture industry establishment, production increases and profitability.

Background

To meet the market demand for quality seafood, now is a critical time to develop sustainable, productive and profitable new and emerging aquaculture industries in Australia that will complement growth in established sectors. The FRDC's RD&E Plan 2015-20 identified the development of new and emerging aquaculture growth opportunities as a national research priority. Aquaculture currently contributes 43% and \$1 billion to the value of Australian seafood production, and has increased 12% from 2002-03 to 2012-13. This project was the early establishment phase of forming a new FRDC Subprogram, New and Emerging Aquaculture Opportunities (NEAO) Subprogram, to strategically coordinate RD&E in new and emerging aquaculture opportunities. Subprogram activities will assist farmers to form new industries, overcome issues in emerging sectors, and become more profitable.

Aims/objectives

The aims of this project were to establish the Subprogram that will:

1. Collaborate with industry and government agencies to set strategic directions for new and emerging aquaculture opportunity research and development in Australia
2. Coordinate new and emerging aquaculture opportunities Subprogram research and ensure the quality and relevance of projects (project applications, project management, communication)
3. Identify and pursue opportunities for cross-sector and inter-agency research to enhance aquaculture development in Australia
4. Coordinate and undertake the communication of results from new and emerging aquaculture opportunity research and development

Methodology

The project focused on extensive consultation over eight months with industry, managers and policy makers, research, and funding agency stakeholders to establish the Subprogram. This was complemented by a planning workshop in November 2015, to prioritise RD&E in new and emerging aquaculture.

Results/key findings

Further research and consultation is required to inform the strategic RD&E Plan for new and emerging aquaculture opportunities. Stakeholders attending the November 2015 workshop identified current issues and gaps in knowledge, and recommended that an audit of past research and industry adoption in new and emerging aquaculture be undertaken by June 2016. The 2015 workshop resulted in consensus on the broad strategic research direction for the Subprogram (with species, functional and facilitation themes) and drafted components of the new and emerging aquaculture opportunities Strategic RD&E Plan 2016-2020. The NEAO Establishment Committee meeting (February 2016) refined the audit terms of reference into two phases to be completed in 2016. The audit and a strategic planning workshop in 2016 will inform future prioritisation of RD&E. The priorities will articulate with the FRDC's RD&E Plan, resulting in the completed Subprogram Strategic RD&E Plan for approval by the FRDC Board.

Implications for relevant stakeholders

An Establishment Committee was formed and held its first meeting on 5 February 2016 to consider the terms of reference of the audit, ensure linkages are established to leverage funds, prioritise initial projects, further develop the NEAO Subprogram Strategic RD&E Plan 2016-2020, and coordinate training and extension initiatives linked to existing Subprogram projects.

Industry, managers or policy makers, researchers and funding agencies interested in new and emerging aquaculture can join the NEAO Reference Group by contacting FRDC. The Reference Group will contribute to planning and to be kept informed of NEAO Subprogram activities.

Keywords

Emerging aquaculture; New species for aquaculture; RD&E planning; Finfish; Yellowtail Kingfish; Cobia; Rockcod; Molluscs; Edible oysters; Crustaceans; Octopus

Introduction

The FRDC's RD&E Plan 2015-20 identified the development of new and emerging aquaculture growth opportunities as a national research priority (FRDC 2015). Aquaculture currently contributes 43% and \$1 billion to the value of Australian seafood production, and has increased 12% from 2002-03 to 2012-13 (Stephan & Hobsbawn 2014). Increases were predominantly in finfish, specifically salmonids (worth \$497 million, 48% of aquaculture value in 2012-13), and edible oysters (currently 9% aquaculture value) (Stephan & Hobsbawn 2014). Other established key aquaculture species are wild-caught and farmed Southern Bluefin Tuna (15% value) and prawns (6% value).

In a global context, aquaculture production is projected to expand to provide almost two-thirds of fishery product consumption by 2030 (FAO 2011; World Bank 2013). An increase of around 36% in aquaculture production (29 million tonnes from 2010 to 2030) is needed to meet this demand. In Australia, apparent seafood consumption is increasing (3% p.a. 2000-01 to 2012-13), and imported seafood currently supplies two-thirds of product consumed (Stephan & Hobsbawn 2014). Consequently, there are increasing opportunities for Australian-grown aquaculture products to supply growing domestic and export markets. In response to the increased demand, there are initiatives in Australia to expand production of established aquaculture sectors: for example, Atlantic salmon in Tasmania, and prawn and Barramundi WA, NT and QLD. However, to meet the market for seafood, now is a critical time to develop sustainable, productive and profitable new and emerging aquaculture industries that will complement growth in established sectors.

The New and Emerging Aquaculture Opportunities (NEAO) Subprogram was established through this 8-month project to coordinate the strategic planning, funding and project administration related to the initiative. New and emerging opportunities/species for aquaculture were identified that would benefit from RD&E funding to achieve rapid results in terms of industry establishment, production increases and profitability.

Objectives

1. Collaborate with industry and government agencies to set strategic directions for new and emerging aquaculture opportunity research and development in Australia
2. Coordinate new and emerging aquaculture opportunities Subprogram research and ensure the quality and relevance of projects (project applications, project management, communication)
3. Identify and pursue opportunities for cross-sector and inter-agency research to enhance aquaculture development in Australia
4. Coordinate and undertake the communication of results from new and emerging aquaculture opportunity research and development

Method

Scope

The scope of the NEAO Subprogram is to provide a strategic RD&E plan for new aquaculture opportunities (species) and for the consolidation of emerging industries (e.g. Yellowtail Kingfish and Cobia) to increase production from Australian aquaculture. The NEAO Subprogram will focus on high quality science, and start-of-the-art approaches in support of positive growth in Australian aquaculture. Networking and collaboration among stakeholders will be supported by targeted communication and face-to-face workshops (topics to be prioritised by stakeholders). This 8-month project (July 2015-February 2016) undertook initial activities to establish the Subprogram.

The Subprogram is responsible for coordinating new aquaculture opportunity research projects submitted to the FRDC or funded by FRDC RD&E aligned to the strategic RD&E plan developed for new and emerging aquaculture opportunities. The NEAO Subprogram aims to work cooperatively with existing FRDC aquaculture sector industry partnership agreements (IPAs) and other Subprograms to leverage funding. The NEAO Subprogram will work with industry and R&D providers to identify opportunities and develop applications to seek additional funding through competitive funding initiatives (i.e. Department of Agriculture and Water Resources; Department of Industry, Innovation and Science). Other opportunities to value-add to research through collaboration would also be pursued (e.g. with ACIAR, FRDC's Indigenous Reference Group (IRG), ARC, FRDC's Social Sciences and Economics Research Coordination Program (SSERCP) and other IPAs). The NEAO Subprogram will also facilitate engagement of marine and freshwater aquaculture industry sectors in common interest workshops and/or on national and international technical study tours.

National Strategy Development

From September to November 2015, stakeholders were engaged to provide background information on new and emerging aquaculture research and opportunities.

An email survey was undertaken through people invited to the Subprogram planning workshop, comprising representatives of industry, research agencies, managers and policy makers (Table 1). Contributors were asked to indicate RD&E completed, in progress and priority for new research according to species/species groups and functional topics.

Other industry and research representatives were contacted for further input on new and emerging species, including ACIAR (Chris Barlow and Project Leaders - workshop June 2015), ABFA (Chris Calogeras and Bob Richards) and IRG (Chris Calogeras) for potential linkages and leverage of RD&E (Milestone report 2 - Appendix 10).

Table 1. List of individuals (and their organisations) surveyed for input to the new and emerging aquaculture RD&E that is completed, in progress and priority for new research according to species and functional topics.

Name		Company
Tim	Bull	Sustainability and Biosecurity Policy Division, Fisheries Branch, Department of Agriculture
Chris	Calogeras	Australian Barramundi Farmers Association; IRG
Steven	Clarke	SARDI Aquatic Sciences
Mark	Crane	CSIRO
Trent	D'Antignana	Cleanseas Tuna Ltd
Greg	Jenkins	Challenger Institute of Technology
Pheroze	Jungalwalla	National Aquaculture Council
Harry	King	CSIRO
Richard	Knuckey	FinFish Enterprise Pty Ltd
Sagiv	Kolkovski	WA Department of Fisheries
Peter	Lee	QLD Department of Agriculture and Fisheries
Graham	Mair	Flinders University
John	Maloney	Pacific Reef Fisheries
Wayne	O'Connor	NSW Department of Primary Industries Fisheries
Bob	Richards	Humpty Doo Barramundi; representing ABFA
Glenn	Schipp	Northern Territory Department of Primary Industry and Fisheries
Erica	Starling	Indian Ocean Fresh Australia
John	Susman	Fishheads Seafood Strategy; FRDC Board Member
David	Whyte	Huon Aquaculture
Pia	Winberg	Seaweeds Australia
Belinda	Yaxley	Petuna

In addition, a short survey was undertaken by email with the Australian Fisheries Management Forum (AFMF) Aquaculture Subcommittee representing all states, the Northern Territory and national agencies (Department of Agriculture and Water Resources (DAWR), National Aquaculture Council (NAC), CSIRO). The survey asked the following questions:

- Your perspective on what FRDC and the workshop attendees should consider in prioritising R&D in new and emerging aquaculture?
- What considerations are there within your jurisdiction policies for new aquaculture species/industry development?
- DRAFT criteria for selection of FRDC projects in new and emerging aquaculture - comments on that material.

In order to gain a perspective on the market for product from new and emerging

aquaculture, the following questions were asked of the industry workshop participants:

1. What is your perception of the market for your key species/product of interest? Is there any indication that the market would accept more of your product, and would this be at its current state (whole, fillets) or is there a need for further product development? and what impact might there be from increased production on price?
2. What is your perception of the market for new and emerging aquaculture species in general? From “new/emerging” industries already in the market, what has been your experience with new clients in the market place? Have people approached them or have they had to go looking? Is there a market pull in some sectors?
3. Are there any market or marketing barriers that may be addressed by research?

A planning workshop was held in November 2015 to scope the initial steps in Subprogram establishment (Appendix 3 – agenda and participants included).

The first Establishment Committee meeting was held in February 2016 to progress Subprogram establishment, especially in relation to planning future leveraged funding applications and to refine the terms of reference of a proposed audit of past aquaculture R&D and industry adoption (Appendix 12 – agenda and attendees included).

National co-ordination of new and emerging aquaculture RD&E

From July 2015 to February 2016, the project PI worked in the capacity of the Subprogram Leader, to ensure that:

- Strategic planning for new aquaculture opportunities is coordinated nationally, and FRDC RD&E investment is prioritised
- Administration project milestones are met on time
- Projects are coordinated and integrated in the Subprogram
- Communication and cooperation with other Subprograms and IPAs
- Meetings and workshops are organised effectively to engage participants, share knowledge, and support industry adoption of research results
- Subprogram reports are coordinated and delivered
- Advice is provided to the Reference Group and interim Establishment Committee

Results, Discussion and Conclusion

Establishment Project - Milestones

Following a delay in the first face-to-face workshop, from September to November 2015, a variation documented in milestone report 2 (Appendix 10) was approved. The project milestones have now been achieved for milestone 3 (Appendix 11), except for the Subprogram continuation application (no longer required) and finalisation of the Strategic RD&E Plan (underway):

- Committee formed and face-to-face meeting held (achieved) (Appendix 3)
- Strategic planning workshop completed (achieved) (Appendix 3)
- New & emerging aquaculture opportunities Strategic RD&E Plan 2016-2020 drafted (achieved) (Appendix 14; background in Appendices 5-9)
- Draft Final Report (achieved) (this document)
- Review of EOIs, revised EOIs, full applications and milestone reports by Subprogram and advice to FRDC (achieved)
- New & emerging aquaculture opportunities Strategic RD&E Plan 2016-2020 finalised (not achieved) (final priorities to be informed by the audit research and further planning by July 2016)
- Subprogram AOP advanced draft (achieved in part – Appendix 13 NEAO activities/calendar for 2016, and updated budget);
- Application submitted to FRDC for Subprogram continuation (not achieved) (no longer needed given direction from FRDC in February 2016 – Appendix 12)

National Strategy Development

The initial steps in Subprogram establishment were defined at a planning workshop in November 2015. A presentation was made of the collected research status and priorities, current opportunities and potential approaches to prioritise funding that will maximise the benefit of RD&E for the new and emerging aquaculture industry. Industry presented a perspective on the current market for new and emerging aquaculture seafood products and functional nutrients. (Detail in Appendices 3 and 4)

The planning workshop participants formed the initial Subprogram 'Reference Group' and included industry, research provider and government (DAWR) participants, with input sought from manager and policy maker stakeholders through the AFMF Aquaculture Subcommittee. A volunteer interim Establishment Committee (EC) was formed at the workshop, to be in place until the completion of the strategic plan (January - December 2016) and to foster linkages to leverage funds.

Agreed members of the EC are:

- Greg Jenkins (Challenger IT, Aquaculture Council WA & Marine Fish Farmers Association WA)
- Peter Lee (Queensland Department of Agriculture and Fisheries)
- David Whyte (Huon Aquaculture Company)
- Chris Calogeras (Indigenous Reference Group (IRG), Australian Barramundi Farmers Association (ABFA)), alternate Glenn Schipp (NT DPIF)

- Graham Mair (Flinders University)
- Pheroze Jungalwalla (National Aquaculture Council (NAC))
- Steven Clarke (South Australian Research and Development Institute (SARDI), EO for the Kingfish 4 Profit project (K4P))
- Wayne O'Connor (NSW Fisheries)
- Crispian Ashby (FRDC Programs Manager or delegate)
- Wayne Hutchinson (Oysters Australia RD&E Manager; FRDC Project Manager – Research)
- Ian Lyall (EO Australian Fisheries Managers Forum (AFMF) Aquaculture Subcommittee; Wayne O'Connor nominated alternate)
- Jennifer Cobcroft (Subprogram Establishment Leader); TBA (Subprogram Leader)

Agreed observers are:

- Chris Barlow (or delegate; Australian Centre for International Agricultural Research (ACIAR))
- Dave Alden (or delegate; Rural Industries Research and Development Corporation (RIRDC))

Once the NEAO Subprogram is established, a Steering Committee (SC) will be formed with expertise and composition reflecting the project composition. The appointment to the SC will be through a call for expressions of interest in membership (Oct-Nov 2016) including a list of expertise required and the availability commitment. An audit of past new and emerging aquaculture research and industry adoption was agreed as a priority activity for 2016. At a meeting on 5 February 2016 (Minutes – Appendix 12), the EC refined the terms of reference (TOR) for the audit, will endorse the TOR (by email in March 2016) for recommendation to FRDC, and will seek and endorse agencies and/or consultants to undertake the work.

Further details of Subprogram proposed scope, future actions, governance and position roles are included in Appendices 3 to 9, and the framework Strategic Plan (Appendix 14).

National co-ordination of new and emerging aquaculture RD&E

Advice was provided to FRDC on three EOIs and one full proposal related to new and emerging aquaculture submitted in the FRDC 2016 annual competitive funding round.

The Subprogram has maintained linkages with the K4P project through Patrick Hone (Chair), Jennifer Cobcroft and Joshua Fielding attending the K4P Steering Committee (SC) meetings (16 June, 8-9 July, 30 Sept, 23 Oct 2015, 28 Jan 2016). The K4P Executive Officer (EO), Steven Clarke is a member of the Subprogram Establishment Committee and it is proposed the K4P EO will remain on the Steering Committee. Key aspects of the linkages to-date are: i) ensuring national participation of Yellowtail Kingfish industry and researchers in the K4P SC and fostering connections between research and industry teams (SA, NSW and WA); ii) initiating a professional development program for students in the K4P project that will be co-managed by the Subprogram; and iii) planning co-ordinated science workshops of the K4P and related Subprogram projects to maximise information flow to the Yellowtail Kingfish and other “white flesh” finfish aquaculture industry.

Information to inform the new and emerging aquaculture RD&E Plan was gathered from the following contact with beneficiaries:

Week beginning – Monday 26 October 2015

- Discussions with stakeholders for further RD&E priorities in preparation for the Subprogram planning workshop on 11-12 November (NSW Fisheries - Wayne O'Connor, NAC - Pheroze Jungalwalla, AAHBS – Mark Crane).

Week beginning – Monday 2 November 2015

- Discussions with stakeholders for further RD&E priorities in preparation for the Subprogram planning workshop on 11-12 November (NT DPIF – Glenn Schipp, CSIRO – Harry King, QDAF – Peter Lee, Kimberley TAFE – Andrei Perez, IRG - Chris Calogeras, ABFA - Bob Richards).

Week beginning – Monday 9 November 2015

- Facilitated the planning workshop for the Subprogram in Melbourne (11-12 November 2015) to plan Subprogram focus, activities and governance. (Appendix 3 includes organisation affiliation of participants).

Week beginning – Monday 16 November 2015

- Meeting with Chris Carter of IMAS (19/11/2015) re Subprogram establishment update, to visit the new Experimental Aquaculture Facility in Taroona for large fish research, and FRDC's RnD4P application for new and emerging species extension. Outcome of the meeting was a commitment of \$5,000 cash plus ~\$40,000 in-kind commitment to the RnD4P application.
- Communication with RIRDC for support for FRDC's RnD4P application for new and emerging species extension. A letter of support was provided and in-kind committed for the application.
- Liaised with Peter Lee (QDAF) and Josh Fielding (FRDC) about a cobia sex determination research project proposed for Bribie Island Research Centre. Advised to wait for EOI submission until the Subprogram RD&E Plan is confirmed in 2016.

Week beginning – Monday 23 November 2015

- Communicated with workshop participants regarding FRDC's RnD4P application for new and emerging species extension. Outcome was commitment from 12 partner organisations: RIRDC, ABFA, ACIAR, CSIRO, IMAS – University of Tasmania, QDAF, Flinders University, SARDI, Cleanseas Tuna, WA Fisheries, Finfish Enterprise, NAC.
- Liaised with Richard Knuckey (Finfish Enterprise), Mark Crane (AAHBS) and Josh Fielding (FRDC) about potential research for the treatment of VNN in grouper. Communication ongoing.
- Discussed a potential collaborative opportunity with ACIAR (Chris Barlow) for winged oysters in WA. Paul Southgate is the researcher engaged.

Week beginning – Monday 30 November 2015

- Communication with Challenger IT (Greg Jenkins) and JCU (Dean Jerry) about the FRDC's RnD4P application for new and emerging species extension and opportunities for other organisations to be involved if it is successful.
- Update from NSW Fisheries (Wayne O'Connor, Ian Lyall, Mark Booth, Stewart Fielder) about current YTK R&D and Murray Cod industry. Suggesting a small scoping study to determine industry R&D needs.

Week beginning – Monday 7 December 2015

- Discussed preparations for broodstock and hatchery research for YTK at NSW Fisheries with Stewart Fielder. Undertook jaw malformation assessment in the current hatchery batch.
- Communication with CSIRO (Ben Maynard) in relation to hybrid salmon as a potential candidate for new and emerging aquaculture RD&E funding. Advised to wait for EOI submission until the Subprogram RD&E Plan is confirmed in 2016, and noted that the research would support a large established industry with an existing IPA.

Week beginning – Monday 14 December 2015

- Teleconference with Richard Knuckey (Finfish Enterprise) and Mark Crane (AAHBS) about potential research for the treatment of VNN in grouper. Resulted in full proposal submitted to FRDC early 2016.

Week beginning – Monday 21 December 2015

- Communication with NSW Fisheries (Wayne O'Connor) regarding FRDC support for a scoping study of RD&E needs for Murray cod farmers, and inclusion of consultation with Victorian researchers and industry, and a market expert.

Week beginning – Monday 11 January 2016

- Liaise with Richard Knuckey (Finfish Enterprise) and FRDC regarding pending full proposal submission.

Week beginning – Monday 18 January 2016

- Liaise with Dave Alden (RIRDC) and Chris Barlow (ACIAR) and EC members for February meeting planning and attendance.
- Updated communication with Tim Bull (DAWR) re progress in drafting the Aquaculture Strategy.

Week beginning – Monday 25 January 2016

- Briefed the K4P Steering Committee on Subprogram establishment progress, and discussed potential combined Science Workshop dates for 2016.

Week beginning – 1 February 2016

- Facilitated the first Subprogram Establishment Committee meeting in Melbourne (5 Feb 2016) to further plan Subprogram focus and activities, refining audit terms of reference. (Appendix 12 – minutes and agenda).

Discussion and Conclusion

A summary of Subprogram establishment is discussed in relation to the project objectives.

1. Collaborate with industry and government agencies to set strategic directions for new and emerging aquaculture opportunity research and development in Australia

Communication with industry and government stakeholders was undertaken to collect background information that was summarised and discussed at the Subprogram Establishment Workshop on 11-12 November 2015. The workshop resulted in consensus on the broad strategic research direction for the Subprogram (with species, functional and facilitation themes) and components of a draft new and emerging aquaculture opportunities Strategic RD&E Plan 2016-2020. Further data, through an audit of research and adoption, is required in 2016 to inform the priority RD&E topics for the Subprogram. The Establishment Committee meeting (February 2016) refined the audit terms of reference into two phases to be completed in 2016. The EC voted for the Subprogram name – New and Emerging Aquaculture Opportunities (NEAO) Subprogram. The audit and a strategic planning workshop in 2016 will inform future prioritisation of RD&E. The priorities will articulate with the FRDC's RD&E Plan, resulting in a full draft Strategic RD&E Plan.

2. Coordinate new and emerging aquaculture opportunities Subprogram research and ensure the quality and relevance of projects (project applications, project management, communication)

Integral to the Subprogram foundations is seeking input from stakeholders on the relevance of proposed research in new and emerging aquaculture opportunities. State aquaculture managers and policy makers clearly articulated a need for research to be focused where industry is already investing. Research project full applications for Yellowtail Kingfish (K4P, legacy Seafood CRC, and NSWFRAB supported), VNN in Rockcod (Grouper), and EOIs related to new and emerging aquaculture received in the 2016 FRDC competitive round were reviewed by the Subprogram establishment project lead, Jenny Cobcroft, in light of ensuring the quality and relevance of projects. Other potential projects have been discussed with industry, researchers and FRDC.

3. Identify and pursue opportunities for cross-sector and inter-agency research to enhance aquaculture development in Australia

An application for the second round of the RnD4P programme was submitted in December 2015, for new and emerging aquaculture extension. The application demonstrated the commitment to collaboration among the sector, with 12 partners committing to the project, including RIRDC, ACIAR and CSIRO.

Discussions have been held with ACIAR (Chris Barlow and Project Leaders) prior to the commencement of this project to identify potential opportunities. Based on other experienced researchers (especially Ann Fleming) it is apparent that supporting existing targeted RD&E in Indigenous communities may be the most promising opportunity for ACIAR inter-agency activity. Discussions are ongoing with ACIAR, specifically in relation to a winged oyster project proposal. Novel, cross-disciplinary co-operation (e.g. with engineering or IT) have also been suggested as options to enhance aquaculture development. The November 2015 workshop participants and February 2016 Establishment Committee members discussed opportunities, and more information is required in 2016 before priority research is identified. However, small projects and preliminary activities were initiated (Appendices 12 and 13).

4. Coordinate and undertake the communication of results from new and emerging aquaculture opportunity research and development

Close co-operation and science workshop planning is underway between the K4P project and the NEAO Subprogram through Steven Clarke and Jenny Cobcroft. Science planning meetings have been undertaken by K4P since July 2015, and science workshops presenting results will commence in 2016.

Implications

The project has collected preliminary information on new and emerging species and technology that could be supported by FRDC RD&E. An Establishment Committee was formed at the project planning Workshop and held its first meeting in February 2016. In 2016, the EC will:

- Oversee an audit of more detailed information on aquaculture research and industry adoption to inform the RD&E Strategic Plan (EC will endorse terms of reference and appointment of agencies or consultants to undertake the audit)
- Advise on the approach to a national planning workshop
- Contribute to the draft and endorse the final version of the NEAO Subprogram Strategic Plan 2016-2020, for final approval by the FRDC Board
- In alignment with the Strategic Plan, identify new aquaculture development opportunities, prioritise research needs, and develop funding strategies, informed by the national workshop and audit of past research
- Ensure linkages are established to leverage funds (including an RnD4P application submitted in mid 2016, and working with agencies including RIRDC and ACIAR)
- Release a targeted call for EOIs, from potential PIs, industry partners and collaborators to develop new research proposals in priority RD&E topics for the Subprogram
- Coordinate training and extension initiatives aligned to Subprogram projects

The ultimate outcome of the established NEAO Subprogram is through RD&E to develop at least two new aquaculture industry growth opportunities by 2020, to the point of significant commercialisation, with profitable business operations. Industry growth measured by an increase in production volume of 4,000 tonnes from 2012-13 level (1,420 tonnes, 'aquaculture other fish'; Stephan & Hobsbawn 2014) to greater than 5,420 tonnes in 2020.

In addition to commercial outcomes, the planning workshop participants recognised the need to:

- support projects that maintain national RD&E capacity; and
- to balance social and cultural benefits with economic return.

Leverage opportunities identified during the project were:

- NAC
- Industry
- AFMA Aquaculture Subcommittee
- AAHBS
- ACIAR, DFAT
- ARC (including Industrial Transformation Hubs)
- CRC for Developing Northern Australia (interim chair, John Wharton, consultation in February)
- State government RD&E investment

Recommendations

Recommendations resulting from the planning workshop included:

- Form a volunteer Establishment Committee for 12 months with membership agreed from workshop participants (and invitees) (first meeting held 5 Feb 2016)
- Subprogram structure to include the components: Species, Functional and Facilitation
- An audit of past new and emerging aquaculture research and industry adoption is a priority activity. Included in a DAWR RnD4P application in Round 2 (submitted on 1 Dec 2015)
- Items for Establishment Committee to consider – re small projects and existing commitments:
 - Scoping papers for initial projects
 - An energy efficiency workshop, including QDAF and CSIRO, how to deliver advanced technology to the new & emerging sector to improve on-farm energy efficiency? e.g. variable speed pumps.
 - Barramundi – fish health – pathogens & disease
 - Barramundi – processing – technology transfer/ travel bursary?
 - K4P – science workshop – confirm date(s), 1 day for other finfish (grouper, cobia, barramundi, mullet, Murray cod, etc) and plan for delivery of RHD professional development session
 - Business tools – Review and collate existing business planning tools; are they useful as possible ROI decision tools for R&D investment

Further development

Further actions to establish the Subprogram are included in the planning workshop notes and timeline (Appendices 3 and 5), and the EC meeting minutes (Appendix 12) and revised calendar (Appendix 13).

Key activities are to progress the audit of past new and emerging aquaculture research and industry adoption, and follow-up strategic RD&E planning.

A single workshop will be held in 2016 for RD&E development. Invitations will be extended to researchers, managers and policy makers, current industry members (potentially looking to diversify), representatives of related subprograms and IPAs, and investors. Input will also be sought from the broader Reference Group. The workshop will include:

- What has happened? - Past and current research (report back on audit of new & emerging aquaculture research)
- Species currently farmed
- What is the appetite for industry growth? - New and emerging species of interest (any recent stakeholder prioritisation of species)

- Resource access
- Industry/investor interest
- Government priorities
- What are the bottlenecks to development? In the framework of a Decision Support Risk Matrix arising from the audit. (e.g. Technical, Regulatory, Social, Economic)
- Identify RD&E needs in relation to the issues
- What are the priorities for research? Prioritise RD&E from national perspective
- Consideration of where to invest RD&E funding? Where possible, table and consider project/species opportunities, against the Decision Support Risk Matrix and eligibility criteria

Following the RD&E Planning workshop, the Establishment Committee will:

- Finalise the NEAO Subprogram strategic RD&E Plan for approval by the FRDC Board
- Prioritise where to best invest RD&E funds
- Release a targeted call for EOIs, from potential PIs, industry partners and collaborators to develop new proposals to address research priorities that are achievable using available funds

Extension and Adoption

The project has focused on extensive consultation with stakeholders to establish the Subprogram as indicated in this report and the Appendices. Planning workshop written notes and Establishment Committee minutes were distributed to participants and are not confidential so will be shared to a broader reference group. Industry, managers, policy makers and researchers are supportive of the NEAO Subprogram establishment to enhance extension and adoption of new and emerging aquaculture RD&E. This was evident in 12 partner organisations supporting the DAWR RnD4P new and emerging aquaculture extension application, with less than 2 weeks' notice.

Project coverage

None from the project

Project materials developed

The Subprogram Planning Workshop (Nov 2015) participants and the Establishment Committee (Feb 2016) produced draft materials included in the appendices for use in establishment of the Subprogram, comprising:

- Appendix 3 – Planning Workshop meeting notes, agenda and participants
- Appendix 4 – Planning Workshop – background information, new and emerging aquaculture priorities and national considerations
- Appendix 5 – Timeline of Subprogram activities for next 6 months
- Appendix 6 – Planning Workshop – Facilitation theme
- Appendix 7 – Planning Workshop – Species theme
- Appendix 8 – Planning Workshop – Functional theme
- Appendix 9 – Planning Workshop – Draft Subprogram Governance
- Appendix 10 – Milestone Report 2
- Appendix 11 – Milestone Report 3
- Appendix 12 – Establishment Committee meeting notes and agenda, 5 Feb 2016
- Appendix 13 – Revised NEAO Workplan/Calendar for 2016 (working document)
- Appendix 14 - Framework NEAO Strategic RD&E Plan

Appendices

Appendices include:

- Appendix 1 - List of project staff
- Intellectual Property - None
- Appendix 2 - References
- Appendix 3 – Planning Workshop meeting notes, agenda and participants
- Appendix 4 – Planning Workshop – background information, new and emerging aquaculture priorities and national considerations
- Appendix 5 – Timeline of Subprogram activities for next 6 months
- Appendix 6 – Planning Workshop – Facilitation theme
- Appendix 7 – Planning Workshop – Species theme
- Appendix 8 – Planning Workshop – Functional theme
- Appendix 9 – Planning Workshop – Draft Subprogram Governance
- Appendix 10 – Milestone Report 2
- Appendix 11 – Milestone Report 3
- Appendix 12 – Establishment Committee meeting notes and agenda, 5 Feb 2016
- Appendix 13 – Revised NEAO Workplan/Calendar for 2016
- Appendix 14 - Framework NEAO Strategic RD&E Plan

Appendix 1

Project Staff

Dr Jennifer Cobcroft (Consultant) 0.26 FTE

Other contributors to Subprogram establishment, but not project staff, are included in the Final Report and Appendices.

Appendix 2

References

FAO, 2011. World Aquaculture 2010, FAO Fisheries and Aquaculture Technical Paper 500/1. Food and Agriculture Organization of the United Nations, Rome. 105pp.

FRDC, 2015. Knowledge for Fishing and Aquaculture into the Future: FRDC's Research, Development and Extension Plan 2015–20. Fisheries Research and Development Corporation, Deakin West. 44pp.

Stephan, M & Hobsbawn, P 2014. Australian fisheries and aquaculture statistics 2013. Fisheries Research and Development Corporation project 2010/208. ABARES, Canberra, November. CC BY 3.0.

World Bank, 2013. Fish to 2030: Prospects for Fisheries and Aquaculture 2013. World Bank Report Number 83177-GLB. International Bank for Reconstruction and Development / International Development Association or The World Bank, Washington. 80pp.

Appendix 3



New and Emerging Aquaculture RD&E Planning Workshop

Workshop Dates: 11-12 November 2015

Venue: Holiday Inn Melbourne Airport, 10-14 Centre Rd, Melbourne

Notes

Attendees

21 people in attendance

Josh Fielding (FRDC), Jenny Cobcroft (FRDC), Tim Bull (DAWR), Steven Clarke (SARDI), John Malony (Pacific Reef, APFA), Bob Richards (ABFA, Humpty Doo), Wayne Hutchinson (SARDI), Trent D'Antignana (CST), Wayne O'Connor (NSW DPI), Mark Crane (AAHBS, CSIRO), Sagiv Kolkovski (WADO), Pheroze Jungalwalla (NAC), Pia Winberg (Seaweeds), Belinda Yaxley (Petuna), Harry King (CSIRO), David Whyte (Huon Aquaculture), Richard Knuckey (Finfish Enterprise), Glenn Schipp (NT Fisheries), Greg Jenkins (Challenger Institute), Peter Lee (Qld DAF), Patrick Hone (FRDC).

Apologies: Graham Mair, Chris Calogeras

Day 1 – 11 November 2015

Meeting commenced – 08:40

Background

FRDC context of the new Subprogram was presented, with the key requirements being:

1. National
2. Market-led with clear economic benefit
3. Australian competitive/comparative advantage
4. Demonstrate how it meets government objectives, broader than economic goals

Budget – will depend on leverage and partnerships.

Presentation on new and emerging aquaculture and current R&D priorities collected from participants in a species x functional area table.

Discussion of market perspective with input from workshop industry participants.

- Lack of market data about price elasticity and market segments; consumer decision points, eg. Fish over chicken.
- For 2020, supermarkets/retail not the answer for new and emerging – so need to focus on food service – wholesale market

- PW raised the issue of developing standards – selling products through established (scientifically verified) standards – traceability in systems – bring in new technologies – Australia has the capacity to set international standards.

Focus

Group discussion of where and how to focus the Subprogram to a meaningful piece of work with a 5-year delivery time. Discussed industry, current R&D projects and lease sites in different jurisdictions.

Update on the National Aquaculture Strategy document – DAWR plan to circulate early in 2016, for release mid 2016. Impediments and opportunities are a component of the Strategy, linking to R&D.

Criteria for species/project selection

Group white-boarding of selection criteria for Subprogram projects.

- Market driven, industry led
- Competitive business model
- National – broad support
- Economic leverage – aligned to other funding sources; targeted to attract investor support based on results
- Technology status of the industry (are different criteria relevant depending on the stage of industry development?)
- R&D need/question
- Return on investment (financial, production volume (t), jobs, social and cultural)
- Risk balance (in Subprogram research portfolio)
- Predominantly pre-competitive
- To avoid market failure
- Species must be suitable for aquaculture
- Planning approvals are in place
- Where applicable, species suitable for remote locations – eg do not need to be fed
- Species is endemic to Australia?

Where should the FRDC Subprogram be focused?

Participants divided into three groups (rotated) to consider themes of the Subprogram:

1. Species (will include kingfish, others to be determined; Option for big industries e.g. 1 to 2 species and many boutique species)
2. Functional (Research Themes - health, nutrition, business and ROI tools, production systems)
3. Facilitation

The group agreed to the Subprogram structure (Species, Functional and Facilitation) with the detail of projects to be informed by an audit of past new and emerging aquaculture

research and industry adoption. The group agreed that an audit of past new and emerging aquaculture research and industry adoption is a priority activity.

Species discussed for consideration for Subprogram RD&E included (but was not limited to):

Finfish

Tropical – groupers, barramundi, cobia

Temperate – YTK, snapper?, freshwater Murray cod

Cool temperate – Blue eye trevalla

Shellfish

Tropical

Temperature – oysters, pipis, cockles, etc

Other

Octopus

Crustaceans

Polychaetes

Algae

Budget planning

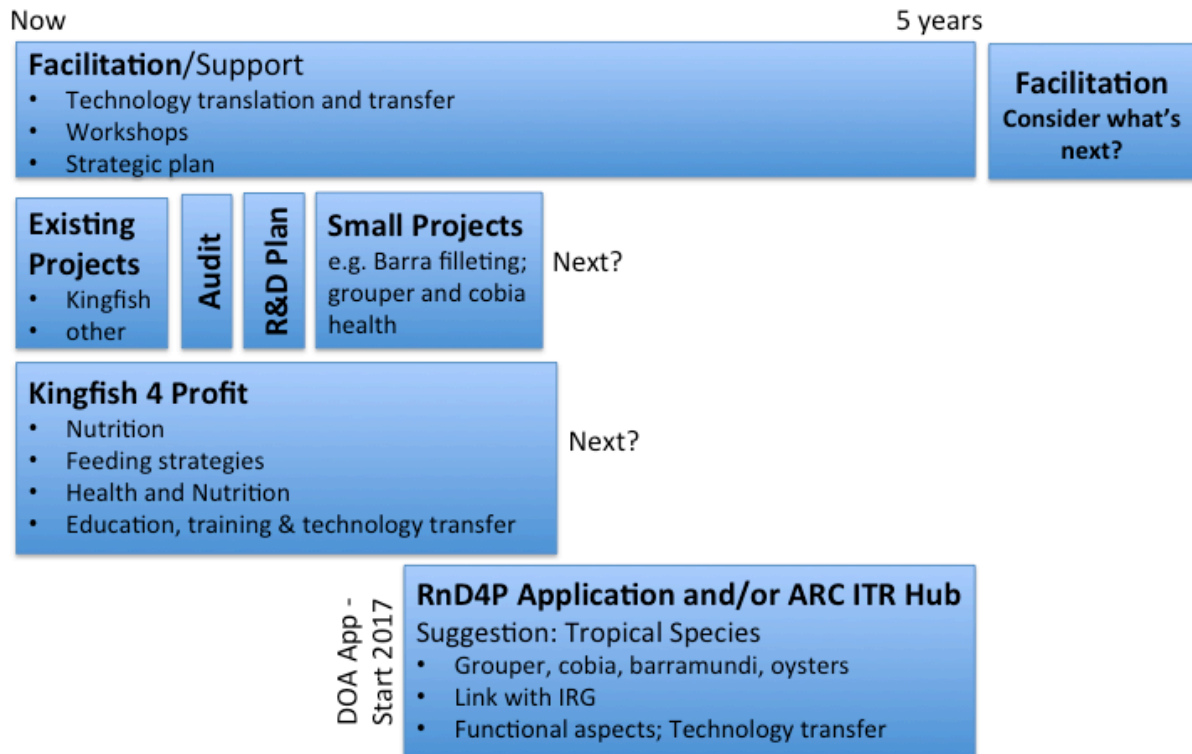
PH proposed that the budget could be notionally allocated, with sheltered funding for facilitation, and then other funds available to leverage with industry or other agencies. A discretionary spend in 'reserve' was also recommended. FRDC indicated project applications/EOIs could go up every 4 months, and projects <\$75k do not need to go to the Board.

The following schematic was suggested as an approach to forward budget and activities planning, to be considered in more detail by the Establishment Committee.

PH indicated that the FRDC Board would approve a Plan, put forward by the Establishment Committee in consultation with the wider reference group, and then projects are funded according to the Plan priorities. Projects are commissioned by agreement. This may be by 2 or 3 companies tendering for a project, and demonstrating leverage.

MC described the process for AAHBS, where the research 'needs' are promoted and EOIs called. The AAHBS committee funds projects, usually to the maximum Subprogram budget available. Research Provider Network is a useful link for the efficiency of use of facilities and resources and would be useful for new and emerging aquaculture.

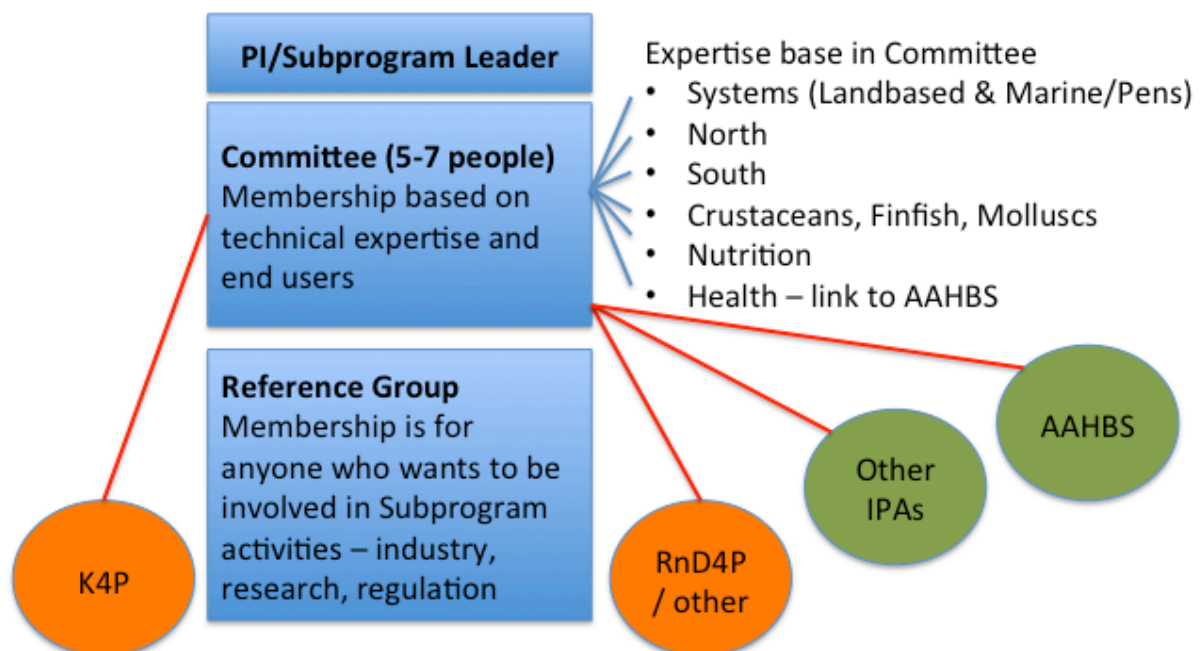
At this stage, it was agreed we can detail a plan of activities for the next 6 months, particularly to include setting up for leverage opportunities (Appendix 2).



Governance

The proposed structure is similar to other Subprograms – see following schematic.

Group agreed to form an Establishment Committee for 12 months, to oversee the strategic planning process and to ensure linkages are established to leverage funds. Once established, a Steering Committee will be formed with expertise and composition reflecting the project composition.



Volunteers were called for the Establishment Committee and the membership is:

- Greg Jenkins (Challenger, Aquaculture Council WA & Marine Fish Farmers Assoc WA)
- Peter Lee (QDAF)
- David Whyte (Huon Aquaculture)
- Chris Calogeras (IRG, ABFA), alternate Glenn Schipp (NT DPIF)
- Graham Mair (Flinders University)
- Pheroze Jungalwalla (NAC)
- Steven Clarke (SARDI, K4P)
- Wayne O'Connor (NSW DPI)
- FRDC representative
- Jenny Cobcroft (Subprogram Establishment Leader)

Subprogram name – to be determined. Think about terminology 'aquaculture' versus 'fish farming' or 'seafood farming'.

Day 1 meeting closed – 16:50

Day 2 – 12 November 2015

Meeting commenced – 08:40

A smaller group of participants worked on practical components of the actions:

- Timeline – plan for the first 6-12 months of activities (Appendix 2)
- Facilitation – activities, initial projects, ID leverage opportunities (Appendix 3)
- Species R&D - Operational criteria for project/species selection (from whiteboard) (Appendix 4)
- Functional R&D – activities, initial projects, ID leverage opportunities (Appendix 5)
- Governance - Drafting governance position descriptions (Appendix 6)

Documents prepared with an inclusive definition of new and emerging aquaculture.

The Governance working group raised concern about the potential for too many large steering committees (SCs). One suggestion was to form the 12-month Establishment Committee (large group for 2016). From 2017, depending on the outcome of future funding leverage applications (esp with RnD4P), a small SC/SRAC for the Subprogram could be formed (one representative from each of the SC of the RnD4P projects – K4P and Northern Species; FRDC; PI), and maintain the larger RnD4P SCs.

The working group documents are included as separate appendices to the Workshop notes.

Day 2 meeting closed – 12:00

Summary of Agreed items

- Form a volunteer Establishment Committee for 12 months with membership agreed from workshop participants (and invitees) (first meeting in Jan-Feb 2016, date TBA)
- Subprogram structure to include the components: Species, Functional and Facilitation
- An audit of past new and emerging aquaculture research and industry adoption is a priority activity. Include in a DAWR RnD4P application in Round 2 (due 1 Dec 2015)
- Items for Establishment Committee to consider – re small projects and existing commitments:
 - Scoping papers for initial projects
 - An energy efficiency workshop, including QDAF and CSIRO, how to deliver advanced technology to the new & emerging sector to improve on-farm energy efficiency? e.g. variable speed pumps.
 - Barramundi – fish health – pathogens & disease
 - Barramundi – processing – technology transfer/ travel bursary?
 - K4P – science workshop – confirm date(s), 1 day for other finfish (grouper, cobia, barra, mulloway, Murray cod, etc) and plan for delivery of RHD professional development session

- Business tools - Review and collate existing business planning tools; are they useful as possible ROI decision tools for R&D investment

Actions

1. Distribute Action notes to Workshop attendees (Dec 2015)
2. Detail a plan of activities for the next 6 months (draft - Appendix 2)
3. Plan the first Establishment Committee meeting (Jan-Feb 2016)
4. Pursue other links
 - NAC
 - AFMA Aquaculture Subcommittee
 - AAHBS
 - ACIAR, DFAT
 - ARC
 - CRC for Developing Northern Australia (interim chair, John Wharton, consultation in February)
5. Assist DAWR with relevant elements of the Aquaculture Strategy (Dec 2015 - April 2016)
6. Complete a DAWR RnD4P application in Round 2 for the audit, technology extension and a national workshop (due 1 Dec 2015)
7. Budget estimates to prepare – for the Establishment Committee (Jan-Feb 2016)
8. Develop project brief/terms of reference for the audit of past research including what has and what hasn't worked in species and production platforms (Jan-Mar 2016)

New and Emerging Aquaculture RD&E Planning Workshop

Workshop Dates: 11-12 November 2015

Venue: Holiday Inn Melbourne Airport, 10-14 Centre Rd, Melbourne

Agenda

Day 1: Wednesday 11th November

Time	Topic	Presenter/ Facilitator
08:30	Registration – tea/coffee	
08:45	Welcome Introductions Context	Patrick Hone
09:30	New and emerging aquaculture background - Table by species & theme - Priorities gathered - National Aquaculture Strategy - AFMF Aquaculture Subcommittee input	Jenny Cobcroft
10:15	Market perspective	To be confirmed
11:00	Morning tea	
11:15	Group discussion. The aim is for the subprogram is to have a programmatic focus for R&D, should this be at the species level or some other functional unit (i.e. hatchery based, feed based etc)? Where is the gap & opportunity for R&D? What are the existing prospects?	Group discussion.
13:00	Lunch	
13:45	Summary of pre-lunch discussion. What is the best way to pull together consortia for this program to encourage a programmatic approach (regional, species based)? Group discussion – continued	Group discussion.
15:00	Eligibility criteria for projects	Jenny Cobcroft
15:30	Afternoon tea	
15:45	Proposed subprogram governance - Steering Committee - Research Advisory Committee - Subprogram leader	Group Discussion

	Proposed subprogram role/operations - Prioritise RD&E, Call for projects, EOI and project application review, Milestone approval, Pursue inter-agency research opportunities - Facilitate cross-sector communications & training from subprogram projects - Administration & communications	
16:15	Summary of subprogram direction Next steps - Subprogram name - Membership of the volunteer Establishment Committee (max 7 members)	
17:00	Workshop close	
18:30	Dinner	

DRAFT

Day 2: Thursday 12th November

Time	Topic	Presenter
08:30	Registration – tea/coffee	
08:45	Implementation of the subprogram	Group discussion.
10:30	Morning tea	
10:45	Implementation of the subprogram (continued)	Group discussion.
12:30	Meeting close and lunch	

Background documents to provide:

- List of attendees
- Background table
- Background notes
- New and emerging aquaculture projects selection criteria – draft

FRDC - new and emerging aquaculture Subprogram. Planning Workshop November 2015. Participants

First Name	Last Name	Email	Position	Company	Attending
Crispian	Ashby	crispian.ashby@frdc.com.au	Programs Manager	FRDC	Yes
Tim	Bull	Tim.Bull@agriculture.gov.au	Assistant Director	Sustainability and Biosecurity Policy Division, Fisheries Branch, De	Yes
Chris	Calogeras	calogeras@iinet.net.au	Executive Officer	Australian Barramundi Farmers Association; IRG	No
Steven	Clarke	Steven.Clarke@sa.gov.au	Science Initiatives & Support Manager; Executive O	SARDI Aquatic Sciences	Yes
Jennifer	Cobcroft	jennifer.cobcroft01@gmail.com	Subprogram Establishment Leader	FRDC	Yes
Mark	Crane	mark.crane@csiro.au	Aquatic Animal Health Subprogram Leader;	CSIRO	Yes
Trent	D'Antignana	Trent@cleanseas.com.au	Research and Development Manager	Cleanseas Tuna Ltd	Yes
Joshua	Fielding	Joshua.Fielding@frdc.com.au	Projects Manager - Research	FRDC	Yes
Patrick	Hone	patrick.hone@frdc.com.au	Executive Director	FRDC	Yes
Wayne	Hutchinson	Wayne.Hutchinson@sa.gov.au	Senior Research Scientist – Aquaculture	SARDI Aquatic Sciences	Yes
Greg	Jenkins	Greg.Jenkins@challenger.wa.edu.au	Director ACAAR	Challenger Institute of Technology	Yes
Pheroze	Jungalwalla	pherozej@gmail.com	Chair	National Aquaculture Council	Yes
Harry	King	harry.king@csiro.au	Aquaculture Team Leader, Hobart	CSIRO	Yes
Richard	Knuckey	rknuckey@finfishenterprise.com	General Manager, Technical & Research Developm	FinFish Enterprise Pty Ltd	Yes
Sagiv	Kolkovski	skolkovski@fish.wa.gov.au	Principal Research Scientist - Aquaculture	WA Department of Fisheries	Yes
Peter	Lee	Peter.Lee@daf.qld.gov.au	Principal Scientist - Aquaculture	QLD Department of Agriculture and Fisheries	Yes
Graham	Mair	graham.mair@flinders.edu.au	Director of Marine Sciences and Aquaculture Profe	Flinders University	No
John	Maloney	John@pacificreef.com.au	General Manager	Pacific Reef Fisheries	Yes
Wayne	O'Connor	wayne.o'connor@dpi.nsw.gov.au	Principal Research Scientist, Research Leader Aquar	NSW Department of Primary Industries Fisheries	Yes
Bob	Richards	bob@hdbarra.com.au	Managing Director	Humpty Doo Barramundi; representing ABFA	Yes
Glenn	Schipp	glenn.schipp@nt.gov.au	Fisheries Development Director	Northern Territory Department of Primary Industry and Fisheries	Yes
Erica	Starling	erica@wn.com.au	Managing Director	Indian Ocean Fresh Australia	No
John	Susman	john@fishtales.tel	Managing Director	Fishheads Seafood Strategy; FRDC Board Member	
David	Whyte	dwhyte@huonaqua.com.au	Group Technical Manager	Huon Aquaculture	Yes
Pia	Winberg	pia@uow.edu.au	Executive Officer	Seaweeds Australia	Yes
Belinda	Yaxley	Belinda.Yaxley@petuna.com	Sustainability & Accreditation Officer	Petuna	Yes

FRDC RD&E new and emerging aquaculture

Planning Workshop
11-12 November 2015

Outline

What do we learn from Australian success stories?
What do we learn from Australian expansion challenges?
How does this influence strategically planning for new and emerging aquaculture R&D?

What options are on the table?

What haven't we thought about?

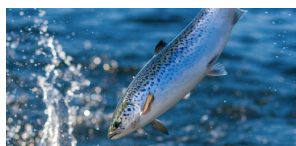
Where should the FRDC Subprogram be focussed?

How do we deliver on that focus?

Success stories

Why sectors such as Atlantic salmon have been successful?

- Atlantic Salmon aquaculture in Tasmania
- Pacific and Sydney Rock Oysters – NSW, Vic, Tas, SA
- Tuna – SA
- Pearls – WA
- Prawns – Qld, NSW
- Barramundi – NT, Qld, NSW, SA, WA



53 tonnes in 1986/87
47,000 tonnes p.a. current

11 companies in mid 1980's
4 companies now

Expansion

Examples

- Prawns – Qld, NSW – currently > 900 ha; development in north > 1000 ha to 10,000 ha expansion
- Barramundi – all mainland states and NT; currently ~ 6,000 t; target (forecast) 10,000 t by 2020

What holds back expansion?

Are there research outputs that would assist expansion?



What's on the table?

Background for New & Emerging Aquaculture Opportunities Subprogram

Group	Macroalgae		Bivalves		Other molluscs		Echinoderms	Finfish
Species	Seaweeds	Tropical oyster	Flat oyster (Angasi)		Octopus	Abalone	Sea Cucumber	Barramundi
Existing R&D Area								
						Halosid cyclobates, H lavesigata, P		
Hatchery	Y, P	Y, P	Y, P	P	P		C, P	C
Nursery	Y, P	Y, P	Y, P	P	P	As above, C	C, P	C
Grownout	Y, P	Y, P	Y, P	C		As above, C	P	
Feed			Y, P	P	P			Y
Genetics					P	N/A	As above, N/A	Y, P
Health						P (hatchery stage)		P
Hydroponics/Urban Farms	Y							P, P

Y = yes, ongoing
C = completed previous research/optimal procedures known
P = priority for future research

Columns/Rows inserted by contributors

What's on the table?

Background for New & Emerg

Group					Crustacea	Polychaete
Species	Yellowtail Kingfish	Cobia	Sturgeon	Tropical finfish	Marron	
Existing R&D Area						
Hatchery	Y, C	Y, P	(P)		YP	YP
Nursery	Y, P	Y	(P)			
Growout	C, Y, P	P			YP	YP
Feed	Y, P	P		low P		YP
Genetics	Y, P	P				YP
Health	Y, P	Y, P		P		YP
Hydroponics/Urban Farms						
IMTA	o					YP

Y = yes, ongoing
C = completed previous research
P = priority for future research

Columns/Rows inserted by cc

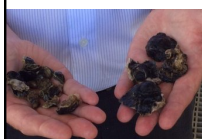
Something old...

- **10,000 year old eel production** in Victoria

IRG (Chris Calogeras) - Indigenous projects and partnerships

- Many business and project ideas – main things to consider in any new project are:

- Is there an Indigenous opportunity?
- And if so, how could we engage, involve and ensure Indigenous participation?



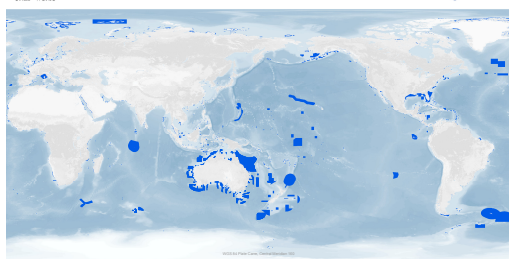
Something old...

Potential IRG projects

- Tropical oysters, native oysters, giant clams
 - Sea cucumbers (Trepang)
 - Barramundi
 - Eels
 - Abalone
 - Mud crabs
 - Corals (aquarium trade)
 - Tropical lobster grow out
 - Murray Cod and other freshwater species
 - Prawn farming – low input (power, labour, feed) and broadscale
 - Pearls or mabe pearls
 - Sponges
- Often concepts are linked to country – local and familiar species connection, but not always with a good business model
- **IRG offering option to partner with new & emerging aquaculture Subprogram** projects – and include assessment of the business model with stop-go points
- Need to recognise and balance social and cultural benefits vs economic return



MARINE PROTECTED AREAS



Source: IUCN and UNEP-WCMC (2013). The World Database on Protected Areas (WOPA) Official Map Series: Marine Protected Areas. Series M01. WOPA October 2013 Release. May available at: www.protectingplanet.net. WOPA available at www.protectingplanet.net.

Something new...

- Octopus – hatchery and nursery survival bottleneck
- Why have other new species not progressed?
 - Striped Trumpeter
 - Greenback Flounder
 - Sponges



Something borrowed...

- Atlantic Salmon – now established
- Grouper/Rockcod
- Sturgeon
- Milkfish
- Tilapia
- Threadfin
- Cobia
- Pink snapper



Something blue...

- Blue sky innovation
- Onshore RAS – “x-factor” site selection
- Offshore technology
- Urban Farms
- IMTA
- ‘New’ species



India

Nano Technology May Improve Aquaculture Production, says Scientist

15 October 2015

The Fish Site:
<http://www.thefishsite.com/fishnews/26553/nano-technology-may-improve-aquaculture-production-says-scientist/>
 accessed 16/10/15

Existing infrastructure

Desalination plants
– in standby mode



- Victorian taxpayers will be paying \$1.8 million a day for something they may not use for several years, if at all. (ABC News: Tuesday, December 18, 2012; accessed 14 Oct 2015; <http://www.abc.net.au/worldtoday/content/2012/s3656791.htm>)
- <http://www.adelaidenow.com.au/news/south-australia/cost-of-keeping-adelaide-desalination-plant-on-standby-blows-out-11m-a-year/story-fni6uo1m-1227516824923?sv=e513f10711ebd2e77daf59bb735dddb6>

What haven't we thought about?

- Industry investment and development plans
- Department of Agriculture Aquaculture Strategy
- FRDC Strategy, budget and targets
 - \$400k for the Subprogram first year (~\$450 p.a. average)
 - Production volume increase from 500 t in 2016 to 2,500 t in 2020
- Where should the FRDC Subprogram be focussed?
 - Big industry – 1-2 species?
 - Many boutique species?
 - Research themes?

How do we deliver on the Subprogram focus?

National priority:

Developing new and emerging aquaculture growth opportunities

Deliverables:

- A nationally-coordinated strategy for the growth of new industry subsectors.
- RD&E to address barriers to aquaculture development including improved:
 - hatchery production technologies
 - breeds
 - feeds and feeding systems
 - husbandry
 - health systems
 - market access and/or value add.

Where's the market?

Questions for our industry participants.

1. What is your perception of the market for your key species/product of interest? Is there any indication that the market would accept more of your product, and would this be at its current state (whole, fillets) or is there a need for further product development? and what impact might there be from increased production on price?
2. What is your perception of the market for new and emerging aquaculture species in general? From "new/emerging" industries already in the market, what has been your experience with new clients in the market place? Have people approached them or have they had to go looking? Is there a market pull in some sectors?
3. Are there any market or marketing barriers that may be addressed by research?

Appendix 5

Appendix 2.

Draft - **Plan of activities for the new & emerging aquaculture Subprogram** for the next 6 months

Initial phases of New and Emerging Aquaculture subprogram planning							
	Dec 2015	Jan 2016	Feb	Mar	Apr	May	June
Extension project application							
Audit of past & currently occurring work (Round 2 outcome est May/June 2016)							
Outcomes from the planning workshop							
FRDC Board approval							
Form the Establishment Committee and have first meeting							
R&D plan							
Desktop gap analysis for finfish feeds and nutrition							
Desktop gap analysis for shellfish							
Finalise terms for the audit							
Conduct process assessing 'where are the funding opportunities?'							
Plan for future R&D for profit rounds (Round 3 likely latter half 2016)							

Appendix 6

Appendix 3

FRDC Subprogram - New & emerging aquaculture

FACILITATION

0-6 Months (also see the timeline, Appendix 2)

Audit - Review current and previous progress on species across Australia

- Stalled
 - Previous FRDC and other R&D projects - evaluate status little future prospects, potential to progress in changed environment (market, technology advancements, locations/site access)
- Progressing/emerging species
 - Define opportunities and impediments to growth
 - Technical
 - Regulatory

Use information to prepare projects for co-investment to leverage available FRDC funds. Identify other leverage opportunities.

- Department of Agriculture and Water Resources – R&D for Profit (Native oysters, northern white finfish, seaweed)
- ARC
- Innovation fund DFAT
- Northern Australia expansion
- AusIndustry – support provided for writing grants within the scheme
- Other FRDC subprograms

Budget and project funding approach

Proposed 20% of Subprogram funding 'sheltered' for facilitation.

Would it be open to applications for activities, e.g. workshops? Leverage other activities, such as species-function R&D extended with a workshop, co-funded by industry, part-funded by the facilitation budget.

Ongoing

National

Communicate with State and Commonwealth government agencies (regulatory, policy and research) to inform subprogram stakeholders of aquaculture developments occurring across Australia. Include: site access, social license, public value, EIS.

Facilitate interstate information transfer and better connection of regulatory personnel.

Translation and extension of R&D outcomes: Research providers (government, academic and private) to industry; Industry to industry; Industry to research providers (esp. translating needs to universities).

Conference (biennial), targeted workshops (common need/interest/issue)

Subprogram summary/newsletter, website (or professional online forum, e.g. LinkedIn), mailing list – extension of R&D outcomes, promote industry – industry information exchange. Connect through industry associations.

LinkedIn site trade directory for Australian Aquaculture – Blue Pages

Directory of research or industry support experience – who has done what? For industry, regulators or researchers to use to source expertise.

Aquaculture business planning (explore existing programs & tools), with the aim of managing/reducing business risk in new & emerging. Standard approach for investment risk analysis by new entrants and bankers (independent/2nd opinion). Extension workshops for industry. (Note AusIndustry services)

Develop linkages to NAC, AAHBS, Indigenous Reference Group (IRG)

Assist DAWR on the new and emerging aquaculture relevant sections of the Strategic Plan. (ref Canadian Strategy as an example)

International

Overseas collaboration & information updates – complementary OS R&D being conducted on same species (*Seriola* sp.) or species of interest (i.e. Meagre/mulloway, wreckfish/hapuka).

Consider facilitating symposium with OS programs (possibly with NAC conference funds?), for example be the first country to host a conference/workshop of the WAS *Seriola* working group (contact Graham Mair).

Travel bursaries for international exchange/technical training (in conjunction with the People Development Program).

Linkage/leverage - Australian Academy of Science (co-funding with international governments, e.g. China, India)

Appendix 7

Appendix 4

FRDC Subprogram - New & emerging aquaculture

Species RD&E

- Review of past studied species that haven't moved forward to see what the blockages were and whether these may now be addressable through a changed environment and/or more recently developed technology; to be done in first 6 months.
- Critical review of new/novel species and technologies to develop a priority list of developmental opportunities. Should focus on collating relevant information and presenting a transparent analysis. To be done in the first year.
- Need to establish set of criteria to help the Steering Committee to justify its project selection but recognise that it will be challenging to apply rigorously; suggest reviewing published methodologies and establishing our own as a short first year project.
- Then talked about likely individual species of importance and recognised that there were specific R&D needs for most, but it would be useful to build these into groupings to maximise \$ industry contribution, leverage and broaden the application of outcomes.
- The finfish species group was Grouper, Barra, Cobia and YTK with two potential functional programs;
 - Health - Pathogen management/biosecurity (include consideration of national translocation and international import of whole fish)
 - Nutrition/FCR/Feeds/gut microbiomes-probiotics
- The shellfish species group was flat oysters, native oysters, native bivalves; In the end we decided the focus should be the diversification of existing oyster farms to reduce business risk and as such the oyster industry should strongly influence the species selection. The flat oyster meeting to be held early in 2016 was seen as a starting point.
- Both species groupings could initially be tackled through the development of EOI's in the next 6 months to summarise the history, identify needs and gaps, who would participate and the best way to leverage the funds available (DoA - RRDFP, ARC Hubs, Blue Economy, etc).
- With respect to systems technology, the issue was identified as in large part due to limited information, lack of desire to import and utilise overseas technology and expertise, and lack of awareness of Australian successes. As such, the recommendation was for the Subprogram to support awareness and technology transfer in this area – onshore systems, offshore systems, IMTA, etc. – with recognition of technologies applicable at the relevant socio-economic level.

First 'species' projects:

1. Criteria basis, review of papers on new species selection criteria, and development of the criteria to be used by the Subprogram.
2. Desktop study (EOI(s)) to identify needs and gaps in health (pathogens) and nutrition related to finfish (Grouper, Barra, Cobia) (YTK covered by K4P?).
3. Audit – commercial assessment of what went wrong for other new & emerging R&D adoption.

Appendix 8

Appendix 5

FRDC Subprogram - New & emerging aquaculture

Functional RD&E

A. Health Program

- Surveillance and Farm health response
 - Baseline surveillance for Crustacean, Mollusc and Finfish: sample submission, incentivise sample costs, get state support
 - Extension of results to farmers and how to manage identification and diagnostics, record keeping, control manual protocol
- Develop a vaccine for Grouper as a trial with National Vaccine Centre – or RNAi
- Environmental health detection in ponds and tanks – use Cobia as example, using eDNA technology
- Biosecurity ?? what is the RD&E issue e.g. translocation
- Audit – if any health identified issues that led to failure can be addressed by RD&E

Linkages: AAHBS – provide technical expertise and advice on progress reports, possible co-investment

B. Nutrition and Feed development

- Nutritional gap analysis – whole body analysis, proximate analysis for finfish, crustacean and octopus
- Scope for small batch production – include information on capability
- Evaluate immunostimulants – increase awareness of immunostimulant trials
- Feeding delivery – type of feeds, frequency, density etc

Linkages: ABFA, YTK super group

C. Business Models and ROI tools

- Review and collate existing business planning tools
- Use as possible ROI decision tool for R&D investment

Linkages: IRG

D. Production systems

- Extension role and trade shows
- Bursaries to attend overseas trade shows

E. Timeline

- Health surveillance
- Business tool review/audit and ROI investment
- Evaluate results from Audit of what has and has not worked

F. Possible Funding Options:

- R&D For Profit – second round: extension

- R&D For profit – northern white fish
- ARC Industry Transformation Hub
- DFAT \$3M

G. Other opportunities:

National Aquaculture Strategy- submission on how to handle new and emerging fish farming

Terminology: aquaculture versus fish farming

List of financial support for new and emerging seafood farming – grant programs, energy systems, business advisory services

Appendix 9

Appendix 6

FRDC Subprogram - New & emerging aquaculture

Governance

Background

The FRDC's 2015-20 RD&E strategy identified the development of new and emerging aquaculture opportunities as a national research priority. Aquaculture currently contributes 43% and \$1 billion to the value of Australian seafood production, and has increased 12% from 2002-03 to 2012-03 (ABARES 2014). Increases were predominantly in finfish, specifically salmonids (worth \$497 million, 48% of aquaculture value in 2012-13), and edible oysters (currently 9% aquaculture value) (ABARES 2014). Other established key aquaculture species are wild-caught and farmed Southern Bluefin Tuna (15% value) and prawns (6% value).

In a global context, aquaculture production is projected to expand by 2030 to provide almost two-thirds of fishery product consumption (World Bank and FAO). An increase of around 36% in aquaculture production (29 million tonnes from 2010 to 2030) is needed to meet this demand. In Australia, apparent seafood consumption is increasing (3% p.a. 2000-01 to 2012-13), and imported seafood currently supplies two-thirds of product consumed (ABARES, 2014). Consequently, there are increasing opportunities for Australian-grown high value aquaculture products in domestic and export markets. In response to the increased demand, there are initiatives in Australia to expand production of established industries: for example, Atlantic Salmon in Tasmania, and prawn and Barramundi in the north (WA, NT and QLD). However, to meet the market for seafood, now is a critical time to develop sustainable, productive and profitable new aquaculture industries that will complement growth in established sectors.

The Subprogram will be established to lead the FRDC's priority activity in new and emerging aquaculture development, and to coordinate the strategic planning, funding and project administration related to the initiative. New and emerging opportunities/species for aquaculture will be identified that would benefit from RD&E funding to achieve rapid results in terms of industry establishment, production increases and profitability.

Mission

To develop new and emerging aquaculture opportunities in Australia

Objectives

1. Collaborate with industry and government agencies to set strategic directions for new & emerging aquaculture opportunity research and development in Australia
2. Coordinate **new & emerging aquaculture** Subprogram research and ensure the quality and relevance of projects (project applications, project management, communication)
3. Identify and pursue opportunities for cross-sector and inter-agency research to enhance aquaculture development in Australia
4. Coordinate and undertake the communication of results from new & emerging

aquaculture opportunity research and development

Role

The Subprogram focus is strategic planning, research coordination, communication, and extension related to new aquaculture opportunities. The Interim Establishment Committee, and the Steering and Research Advisory Committee will have an expert advisory role along with industry partners in relation to RD&E and commercialisation of new aquaculture ventures.

Outcomes

By 2020, develop at least two new aquaculture industry growth opportunities to the point of significant commercialisation, with profitable business operations. Industry growth measured by an increase in production volume of 4,000 tonnes from 2012-13 level (1,420 tonnes, 'aquaculture other fish'; ABARES, 2014) to greater than 5,420 tonnes in 2020.

Scope within FRDC

The scope of the **new & emerging aquaculture** Subprogram is to provide a strategic RD&E plan for new and emerging aquaculture opportunities (species) and for the cooperation of existing industries (e.g. Yellowtail Kingfish and Cobia) to increase production from Australian aquaculture. The Subprogram will focus on high quality science, and start-of-the-art approaches in support of positive growth in Australian aquaculture. Networking and collaboration among stakeholders will be supported by targeted communication (topics prioritised by stakeholders) and face-to-face workshops.

The Subprogram is responsible for coordinating new aquaculture opportunity research projects submitted to the FRDC or funded by FRDC RD&E, and aims to work cooperatively with existing IPAs and other subprograms to leverage funding. Where projects are jointly funded with IPAs or other subprograms, prime carriage of projects would be determined according to project scope. These subprograms/IPAs (e.g. Barramundi; Edible oysters) would have projects specific to their species, and the **new & emerging aquaculture** Subprogram would ensure cross-linkage and advice where appropriate. The **new & emerging aquaculture** Subprogram will have prime carriage of projects where the other subprogram/IPA species is a smaller component of a project with broader industry application. Opportunities to value-add to research through collaboration would be pursued (e.g. with ACIAR, IRG, ARC, and FRDCs Social Sciences and Economics Research Coordination Program (SSERCP)). The **new & emerging aquaculture** Subprogram will facilitate engagement of marine and freshwater aquaculture industry sectors in common interest workshops and/or an international technical study tours.

National Strategy Development

A planning workshop was held in November 2015 to scope the initial steps in Subprogram establishment. The group forms the initial 'Reference Group' and included industry, research provider and government (DAWR) participants, with input sought from regulator stakeholders through the AFMF Aquaculture Subcommittee. The Reference Group agreed to form a volunteer Establishment Committee for 12 months, to oversee the strategic planning process and to ensure linkages are established to leverage funds. Once established, a Steering Committee will be formed with expertise and composition reflecting the project composition. An audit of past

new and emerging aquaculture research and industry adoption was agreed as a priority activity for 2016. At a meeting early in Jan-Feb 2016, the Establishment Committee will endorse the terms of reference for the audit of past research and adoption, for recommendation to FRDC, and will likely call for tenders/EOIs to undertake the work.

A single workshop will be held in 2016 for R&D Plan development. Invitations will be extended to researchers, regulators, current industry members (potentially looking to diversify), representatives of related subprograms and IPAs, and investors. Input will also be sought from the broader Reference Group. The workshop will include:

- What has happened? - Past and current research (report back on audit of new & emerging aqua research)
- Species currently farmed
- What is the appetite for industry growth? - New and emerging species of interest (any recent stakeholder prioritisation of species)
- Resource access
- Industry/investor interest
- Government priorities
- What are the bottlenecks to development? Technical, Regulatory, Social, Economic
- Identify RD&E needs in relation to the issues
- What are the priorities for research? Prioritise RD&E from national perspective
- Consideration of where to invest RD&E funding? Where possible, table and consider project/species opportunities, against eligibility criteria

Following the R&D Planning workshop, the Establishment Committee will:

- Determine where to invest RD&E funding
- Draft the Subprogram strategic R&D Plan for endorsement by the FRDC Board.
- Release a targeted call for EOIs, from potential PIs, industry partners and collaborators to develop new research proposals

The Subprogram will apply a decision tree approach developed by the Subprogram Establishment Committee, informed by the Reference Group. Briefly, FRDC will invest in new aquaculture initiatives that are exploratory funding, industry ready, or strategic partnerships to:

- contribute to the objectives outlined in the FRDC RD&E Plan
- contribute to successful resource access for new aquaculture initiatives
- foster new ideas in a timely and tactical manner
- reduce elements of risk associated with establishing new aquaculture initiatives
- assist in attracting the level of capital investment and scale required to ensure success of new aquaculture businesses

{Insert the decision tree/selection criteria – to be confirmed}

Draft list of criteria

- Market driven, industry led
- Competitive business model

- National – broad support
- Economic leverage – aligned to other funding sources; targeted to attract investor support based on results
- Technology status of the industry (are different criteria relevant depending on the stage of industry development?)
- R&D need/question
- Return on investment (financial, production volume (t), jobs, social and cultural)
- Risk balance (in Subprogram research portfolio)
- Predominantly pre-competitive
- To avoid market failure
- Species must be suitable for aquaculture
- Planning approvals are in place
- Where applicable, species suitable for remote locations – eg do not need to be fed
- Species is endemic to Australia?

Management

Subprogram Leader

The role of the Subprogram Leader is to manage the new & emerging aquaculture Subprogram to ensure that:

- Strategic planning for new aquaculture opportunities is co-ordinated nationally, and FRDC RD&E investment is prioritised
- Administration project milestones are met on time
- Projects are coordinated and integrated in the Subprogram
- Communication and cooperation with other Subprograms and IPAs
- Meetings and workshops are organised effectively to engage participants, share knowledge, and support industry adoption of research results
- Subprogram reports and newsletters are coordinated and delivered
- Advice is provided to both the Interim Establishment Committee and the Research and Strategy Advisory

Committee

Interim Establishment Committee

A volunteer Interim Establishment Committee (IEC) will be established until the completion of the strategic plan (January - December 2016), with a maximum of 10 members, selected on the basis of their expertise in developing new aquaculture opportunities and strategic planning for aquaculture, with a member of the FRDC staff and the Subprogram Leader. Specific expertise will cover North (tropical) and South (temperate), finfish, crustaceans and/or molluscs, new and emerging species, and production systems (onshore and/or offshore). Where additional expertise is required external advice will be sought, for example from AAHBS for health.

Agreed members are:

- Greg Jenkins (Challenger IT, Secretary of Marine Fish Farmers Association WA)
- Peter Lee (QDAF)
- David Whyte (Huon Aquaculture)
- Chris Calogeras (IRG, ABFA), alternate Glenn Schipp (NT DPIF)
- Graham Mair (Flinders University)
- Pheroze Jungalwalla (NAC)
- Steven Clarke (SARDI, K4P)
- Wayne O'Connor (NSW Fisheries)
- FRDC (FRDC Programs Manager or delegate)
- Jenny Cobcroft (Subprogram Leader)

Terms of Reference

The IEC and the Subprogram Leader would:

- advise on the approach to a national planning workshop
- identify new aquaculture development opportunities, prioritise research needs, and develop funding strategies, informed by the national workshop and audit of past research
- contribute to the draft and endorse the final version of the new & emerging aquaculture Subprogram Strategic Plan 2016-2020
- call for EOIs in priority RD&E topics for the Subprogram

Steering and Research Advisory Committee

Once the new & emerging aquaculture Subprogram Strategic Plan is complete, and the scope of research projects is known, a volunteer Steering and Research Advisory Committee (SRAC) will be established (January 2017-June 2020), with a maximum of 10 members. Members will be selected on the basis of their expertise in commercial production of key species, regulatory environments, research field, and will include a member of the FRDC staff. The membership term will be for the life of the Subprogram funding (3.5 years, January 2017 to June 2020).

The appointment process will be through a call for expressions of interest in membership (Oct-Nov 2016) including a list of expertise required and the availability commitment. (Draft call for EOI in membership at the end of this document.) Members will be appointed by FRDC. If positions become vacant during the Subprogram funding, a call for EOIs will be made to the replace vacant industry and/or researcher position(s).

The Steering and Research Advisory Committee (SRAC) will comprise both government and industry representatives.

Positions on the Steering and Research Advisory Committee (SRAC) are defined:

- Subprogram Leader
- Aquaculture (NAC Chair or delegate)
- AAHBS (AAHBS Leader or delegate)
- Federal Government representative (DAWR)

- FRDC (FRDC Programs Manager or delegate)
- New and emerging aquaculture industry sector (2 positions)
- State Government representative with expertise in new and emerging aquaculture (AFMF – Aquaculture Subcommittee nominee)
- New and emerging aquaculture scientific advisors (2 positions)

Member expertise to include the following:

- North (tropical)
- South (temperate)
- Systems (Landbased; Marine Pens)
- Crustaceans
- Finfish
- Molluscs
- Nutrition
- Health

While full representation is not possible within the Steering and Research Advisory Committee (SRAC) structure, many of the major stakeholders will be represented. In addition, a Reference Group will be established for all stakeholders, starting from participants and invitees of the planning Workshop in November 2016. The Reference Group will be open to any interested stakeholder.

Terms of Reference

The SRAC and the Subprogram Leader would:

- develop an Annual Operating Plan (AOP) for key stakeholders including the FRDC Board
- review the Subprogram Strategic R&D Plan on a regular (at least annual) basis
- ensure that research objectives are commercially focused and outcome driven
- call for EOIs in priority RD&E topics for the Subprogram
- review EOIs, revised EOIs and full applications for the Subprogram
- meet face-to-face twice per year to review EOIs, applications and current project progress (other meetings/input are proposed quarterly by teleconference)
- ensure no duplication of efforts in research or communications
- review project progress against KPIs in the Strategic Plan and AOP
- review of research priorities supplied by the FRDC prior to the annual industry, jurisdictional and subprogram meeting
- advise on additional project leverage from external sources (industry investment, alternative funding agencies)
- coordinate industry and research provider involvement to maximise usage of available resources, in cooperation with the Research Provider Network (RPN)
- facilitate industry extension and technology transfer
- promote the Subprogram projects and activities

Special tasks of the scientific advisors members:

- To scientifically assess new research proposals, *inter alia* to ensure that the research

- proposed is scientifically feasible, and to advise the SRAC on new funding applications.
- To advise on scientific problems with project progress as well as identify remedial action, to ensure scientific objectives and milestones are met.
 - To foster and develop collaboration amongst researchers.
 - To co-opt, as required, additional aquaculture experts to assist in the provision of advice.

Reference Group

This group will provide advice to the IEC and SRAC on new and emerging aquaculture RD&E. Membership is open to all stakeholders interested in Subprogram activities from industry, regulators and research.

Proposed call for EOIs in membership of the Subprogram Steering Committee (once the Establishment Committee has completed its tasks in 2016). Based on call from AAHBS.

FRDC new & emerging aquaculture Subprogram

Call for Expressions of Interest: Committee membership

FRDC is requesting a new governance committee for the new & emerging aquaculture Subprogram (name TBA). The Subprogram is made up of a Steering and Research Advisory Committee (SRAC).

Some positions on the Steering and Research Advisory Committee (SRAC) are defined:

- Subprogram Leader
- Aquaculture (NAC Chair or delegate)
- AAHBS (AAHBS Leader or delegate)
- Federal Government representative (DAWR)
- FRDC (FRDC Programs Manager or delegate)
- New and emerging aquaculture industry sector (2 positions)
- State Government representative with expertise in new and emerging aquaculture (AFMF – Aquaculture Subcommittee nominee)
- New and emerging aquaculture scientific advisors (2 positions)

We invite expressions of interest from both the commercial aquaculture sector for the new and emerging aquaculture industry sector positions, and from aquaculture scientists for the scientific advisor positions, that are currently vacant on the SRAC.

Position Description:

SRAC members will have:

- Expert knowledge of the specific sector/stakeholder group being represented
- An understanding of the issues confronting the new and emerging aquaculture industries in Australia, particularly with respect to RD&E needs
- A capability and enthusiasm to commit the time required to progress the new & emerging aquaculture Subprogram business in a timely and professional manner, specifically to:
 - Critically and objectively review expressions of interest, full proposals, tactical research proposals, milestone reports, and draft final reports relating to research projects within the Subprogram portfolio
 - Participate in Subprogram face-to-face meetings (normally two per year in March and October) and teleconferences (on an as-needs basis)
 - Bring to the attention of Subprogram STC/SAC Committees, developing issues that could have a significant impact on Australia's new and emerging aquaculture industries
 - Participate in an annual review of the Subprogram R&D Plan

Scientific Advisors

Two positions are scientific advisors, who are aquaculture experts with tertiary qualifications and more than 10 years research experience in aquaculture of finfish, crustaceans and/or molluscs and discipline expertise in one or more fields including health, nutrition, production systems (onshore and/or offshore), tropical aquaculture, temperature aquaculture, and/or other relevant fields.

Applicants should provide a current resume and a letter of application addressing their suitability as per the position description and forward to the Subprogram Leader (**insert contact details**). ***Applications will close (insert date).***

NOTE: All travel expenses (travel, accommodation, meals) associated with face-to-face meetings are paid or reimbursed by the Subprogram. Time on Subprogram business is considered “in-kind” and is not billable i.e. sitting fees are not paid.

PT-04 - MILESTONE PROGRESS REPORT**FRDC PROJECT NUMBER: 2014/246.20****New & emerging aquaculture opportunities Subprogram: Establishment****MILESTONE NUMBER: 2****DATE DUE:** 30 October 2015**PRINCIPAL INVESTIGATOR:** Jennifer Cobcroft**OVERALL PROJECT PROGRESS:****Milestone Status**

Has this milestone been achieved (Yes/No)	No
Will the project be completed according to the current milestone schedule (Yes/No)	Yes

The milestone has not been achieved due to a delay in the first face-to-face workshop, from September to November 2015. All aspects of milestone #2 will be complete by milestone #3 report, due 14 December (see requested variation).

PROJECT PROGRESS AGAINST PROJECT OBJECTIVES

1. Collaborate with industry and government agencies to set strategic directions for new & emerging aquaculture opportunity research and development in Australia

Communication with industry and government stakeholders is underway to collect background information that will be summarised and discussed at the Subprogram Establishment Workshop on 11-12 November 2015. The workshop should result in consensus on the strategic research direction for the Subprogram (with a specific species or theme approach), which will articulate with the FRDC's RD&E Plan, resulting in a draft New & emerging aquaculture opportunities Strategic Plan 2016-2020.

2. Coordinate New & Emerging Aquaculture Opportunities Subprogram research and ensure the quality and relevance of projects (project applications, project management, communication)

Integral to the Subprogram foundations is seeking input from stakeholders on the relevance of proposed research in new and emerging aquaculture opportunities. State aquaculture regulators have clearly articulated a need for research to be focused where industry is already investing. Research project full applications for Yellowtail Kingfish (K4P, legacy Seafood CRC, and NSWFRAB supported) and EOIs related to new and emerging aquaculture received in the 2015 FRDC round were reviewed by the Subprogram establishment project lead, Jenny Cobcroft, in light of ensuring the quality and relevance of projects.

3. Identify and pursue opportunities for cross-sector and inter-agency research to enhance aquaculture development in Australia

Discussions have been held with ACIAR (Chris Barlow and Project Leaders) prior to the commencement of this project to identify potential opportunities. Based on other experienced researchers (especially Ann Fleming) it is apparent that supporting existing targeted RD&E in

Indigenous communities may be the most promising opportunity for ACIAR inter-agency activity. Novel, cross-disciplinary co-operation (e.g. with engineering or IT) have also been suggested as options to enhance aquaculture development. Opportunities remain to be discussed and prioritised with the workshop participants in November.

4. Coordinate and undertake the communication of results from new & emerging aquaculture opportunity research and development

Close co-operation and science workshop planning is underway between the K4P project and the Subprogram through Steven Clarke and Jenny Cobcroft. Science planning meeting have been undertaken by K4P since July 2015, and science workshops presenting results will commence in 2016.

Repeat the following three sections for each milestone in the period being reported on:

1. ORIGINAL MILESTONE DATE AND TITLE:

30 October 2015

Interim Establishment Committee formed and face-to-face meeting held; Strategic planning workshop completed; industry and researcher liaison; New & Emerging Aquaculture Opportunities Strategic RD&E Plan 2016-2020 drafted.

2. REVISED MILESTONE DATE AND TITLE:

None

3. PROGRESS AGAINST MILESTONE (Achieved/Not Achieved):

Interim Establishment Committee formed and face-to-face meeting held (Not achieved)

Strategic planning workshop completed (Not achieved)

Industry and researcher liaison (Achieved)

New & Emerging Aquaculture Opportunities Strategic RD&E Plan 2016-2020 drafted (Not achieved)

The first workshop was proposed for September 2015 but was delayed to 11-12 November 2015 due to availability of invitees to maximise the industry input from a broad group of national stakeholders. Based on discussions with FRDC staff, it was proposed to have an initial planning and establishment meeting, which would determine the scope and strategic direction of Subprogram activities, prior to forming the Interim Establishment Committee (EC). An output of the November workshop is to determine the membership of the EC, a volunteer committee (suggested maximum of 7 members). The draft agenda for the meeting and list of invited participants are attached as appendices. Stakeholder liaison is underway to collect background information for the workshop. The workshop should result in consensus on the strategic research direction for the Subprogram (with a specific species or theme approach), which will articulate with the FRDC's RD&E Plan, resulting in a draft New & emerging aquaculture opportunities Strategic Plan 2016-2020.

PUBLICATIONS/PRODUCTS

None

SPECIAL CONDITIONS

No public announcements to date.

INTELLECTUAL PROPERTY ISSUES ARISING:

None

CONTACT WITH BENEFICIARIES:

Week beginning – Monday 6 July 2015

- Discussions with Patrick Hone, Crispian Ashby and Joshua Fielding to finalise the Subprogram establishment project application and contract (6-10/7/2015).
- Attended the K4P Steering Committee meeting in Adelaide (8-9/7/2015) to plan project activities, subcontracting and governance.
- Liaised with Stewart Fielder about legacy YTK project underway at NSW Fisheries, specifically a call for tenders to supply genetics services.
- Meeting with Sam Matthews and Paul Pak Poy, DA (10/07/2015), with Josh Fielding re the Aquaculture Strategy consultation & linkages to Subprogram planning.

Week beginning – Monday 13 July 2015

- Discussions with seafood retailers, wholesalers and marketers in relation to perceived market gaps in inform Subprogram research at the Seafood Executive Program, Sydney (13-16/7/2015); John Susman (Fishtales), Adam Mourad and Donald Keith (Woolworths), Nicholas Roussis (Mermaid Seafood, Melbourne), Paul Papacosta (Penrith Seafoods).
- Discussion with Phil Lamb (14/7/2015) about shellfish and seaweeds in the Subprogram planning, and seeking contact with DA in relation to the Aquaculture Strategy consultations. Message forwarded to Sam Matthews at DA (15/7/15).

Week beginning – Monday 3 August 2015

- Reviewed and commented on K4P subproject applications from SA and NSW, communicated to Josh Fielding (7/8/2015).

Week beginning – Monday 31 August 2015

- Prepared the draft invitation letter, background species/topics priorities table, and liaised with Josh Fielding and Pheroze Jungalwalla on the invitation list for the Subprogram planning and establishment Workshop to be held in November. Invitation, Doodle poll and background table sent to invitees by Josh Fielding (4/9/2015).

Week beginning - Monday 7th September

- Liaised with Josh Fielding and Steven Clarke to edit and finalise the first K4P milestone report submitted to the DA (10/9/15).

Week beginning - Monday 14th September

- Meeting with Peter Lee at QDAF, Bribie Is (14/9/2015) to discuss cobia project, complete the subprogram establishment background table for cobia, discuss other opportunities from QDAF perspective.
- Meeting with Abigail Elizur at USC (16/9/2015) to discuss research interests, especially in relation to subprogram planning.

- Attended presentations by Paul Southgate and Cathy Hair at USC (16/09/2015) on sea cucumber and pearl oysters. Discussed subprogram establishment and followed up with email (17/09/2015)
- Meeting with Nick Elliott (CSIRO) (17/9/2015). Discussed emerging aquaculture opportunities – especially need to engage novel technologies and ideas. Things like bringing engineers and IT experts to the table, and looking at options with existing infrastructure – e.g. onshore RAS beside desalination plants.
- Discussion with Steven Clarke (18/9/2015) re K4P and planning, policy, development questions at state level re new species subprogram ‘homework’.

Week beginning – Monday 21st September

- Meeting with Nigel Preston (25/9/2015) to discuss emerging aquaculture opportunities, namely catfish (*Arius midgleyi*) and freshwater prawn (*Macrobrachium*); also development in Kimberley and Arakoon.
- Discussion with John Bailey (25/9/2015) – re Pink Snapper project, Tamar, Tasmania
- Discussion with Luke Mowat (25/9/2015) – seeking support for business plan development for finfish aquaculture in WA.

Week beginning – Monday 28th September

- Canberra – re K4P project – attended Steering Committee teleconference meeting (30/9/2015); review previous minutes and actions; review Communication, Extension and Commercialisation Plan; review WA research proposal and discussed with Erica Starling and Gavin Partridge.
- Meeting with Sam Matthews, DA (1/10/2015), with Josh Fielding re the Aquaculture Strategy consultation & linkages to Subprogram planning.
- Meeting with Patrick Hone, Crispian Ashby and Josh Fielding (2/10/2015) re the emerging aquaculture Subprogram workshop and background.
- Drafted the K4P Student Expectations and K4P Student Promotion documents – sent out and liaised with Steering Committee members to revise.

Week beginning – Monday 5th October

- Reviewed three EOIs related to emerging aquaculture for FRDC - submitted (6/10/2015)
- Discussion with Richard Knuckey (6/10/15) about emerging aquaculture opportunities, namely tropical finfish, especially groupers and current status of FinFish Enterprise research priorities.
- Discussion with Lindsey Woolley (7/10/15) re Honours supervision in the WA YTK project. Followed up by email with Chris Carter (IMAS) (cc'd to John Purser & Lindsey).
- Updated the K4P Student Expectations & Promotions documents with K4P SC input.
- Discussion with Chris Calogeras (8/10/15) regarding emerging aquaculture opportunities, specifically in terms of alignment with Barramundi industry, ABFA strategy, and IRG. Bob Richards will attend the workshop in Melbourne for ABFA.

Week beginning – Monday 12th October

- Discussion with Chris Carter and John Purser (IMAS) focussed on the research potential in the pink snapper development and project in the Tamar River. Discussed potential linkages for that and other species/projects with the Subprogram. (13/10/15)
- Further editing of the K4P student docs, with headers & footers from SARDI, and liaising with SC.

- Discussion with Helen Jenkins about APFA research and activities and potential links to Subprogram (14/10/15)
- Draft Subprogram workshop agenda prepared and provided to Josh Fielding (15/10/15), which was distributed to all
- Discussion with Ann Fleming re Subprogram planning, especially in relation to projects in NT and working with Indigenous communities (16/10/15)
- Letter sent to Ian Lyall for the AFMF Aquaculture Subcommittee seeking input from committee members on Subprogram planning (16/10/15)

Week beginning – Monday 19th October

- Discussion with Abigail Elizur and Tomer Ventura at USC re Subprogram (19/10/15).
- Review background material and attend K4P Steering Committee teleconference (23/10/15). Provided email comments on letter to feed companies, student expectations and previous meeting minutes docs.

PROGRESS AGAINST COMMUNICATION & EXTENSION PLAN:

Stakeholder liaison has progressed as indicated above, and the first face-to-face workshop is planned for 11-12 November 2015.

Oversight of the K4P project has been maintained by the FRDC with a view to ensure linkages with the Subprogram by Patrick Hone (Chair), Jennifer Cobcroft and Joshua Fielding attending the K4P Steering Committee (SC) meetings. The K4P Executive Officer, Steven Clarke will be invited to be a member of the Subprogram Implementation and Steering Committees. Key aspects of the linkages to-date are: i) ensuring national participation of Yellowtail Kingfish industry and researchers in the K4P SC and fostering connections between research and industry teams; ii) initiating a professional development program for students in the K4P project that will be co-managed by the Subprogram; and iii) planning co-ordinated science workshops of the K4P and related Subprogram projects to maximise information flow to the Yellowtail Kingfish and other “white flesh” finfish aquaculture industry.

VARIATIONS TO PROJECT:

This milestone (#2) has not been achieved due to a delay in the first face-to-face workshop, from September to November 2015. A variation is requested for reporting of all aspects of milestone #2 to the milestone #3 report. A variation of the milestone #3 report date, to one week later than the original on 14 December, is also requested.

A financial variation is also requested, to reduce the payment amount for this milestone (#2) by the deposit for the planning workshop (\$1,060.91), to be held on 11 and 12 November 2015. Jenny is administering the workshop through this project, however the deposit was paid directly from FRDC out of the project budget for convenience.

A further budgetary variation is likely in the next milestone, although the quantum is not yet known, due to the FRDC, for administrative convenience, directly reimbursing the travel costs of workshop participants. Josh and Jenny will maintain communication about this.

Original MS date	Original Description	Original Cost	Status	Revised MS date	Revised Description	New Cost
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30 October 2015 (current milestone)	Interim Establishment Committee formed and face-to-face meeting held; Strategic planning workshop completed; industry and researcher liaison; New & Emerging Aquaculture Opportunities Strategic RD&E Plan 2016-2020 drafted.	26,400	In progress, but not yet achieved. Based on direct FRDC expenditure of workshop deposit this milestone payment is reduced by \$1,060.91.	30 October (no change)	No change	25,339.09
7 December 2015	Draft Final Report; Review of EOIs, revised EOIs, full applications and milestone reports by Subprogram and advice to FRDC; Application submitted to FRDC for Subprogram continuation.	13,200.00		14 December 2015 (delay 7 days)	(Merged milestone items from milestone #2.) Committee formed and face-to-face meeting held; Strategic planning workshop completed; New & Emerging Aquaculture Opportunities Strategic RD&E Plan 2016-2020 drafted; Draft Final Report; Review of EOIs, revised EOIs, full applications and milestone reports by Subprogram and advice to FRDC; Application submitted to FRDC for Subprogram	13,200.00

					continuation.	
8 January 2016	Final Report	6,599.00		8 January 2016 (no change)	No change	6,599.00

Appendix 1 Draft Agenda – Subprogram planning workshop



New and Emerging Aquaculture RD&E Planning Workshop

Workshop Dates: 11-12 November 2015

Venue: Holiday Inn Melbourne Airport, 10-14 Centre Rd, Melbourne

Agenda

Day 1: Wednesday 11th November

Time	Topic	Presenter/ Facilitator
08:30	Registration – tea/coffee	
08:45	Welcome Introductions Context	Patrick Hone
09:30	New and emerging aquaculture background - Table by species & theme - Priorities gathered - National Aquaculture Strategy - AFMF Aquaculture Subcommittee input	Jenny Cobcroft
10:15	Market perspective	To be confirmed
11:00	Morning tea	
11:15	Group discussion. The aim is for the subprogram is to have a programmatic focus for R&D, should this be at the species level or some other functional unit (i.e. hatchery based, feed based etc)? Where is the gap & opportunity for R&D? What are the existing prospects?	Group discussion.
13:00	Lunch	
13:45	Summary of pre-lunch discussion. What is the best way to pull together consortia for this program to encourage a programmatic approach (regional, species based)? Group discussion – continued	Group discussion.
15:00	Eligibility criteria for projects	Jenny Cobcroft
15:30	Afternoon tea	
15:45	Proposed subprogram governance - Steering Committee - Research Advisory Committee - Subprogram leader	Group Discussion

	Proposed subprogram role/operations - Prioritise RD&E, Call for projects, EOI and project application review, Milestone approval, Pursue inter-agency research opportunities - Facilitate cross-sector communications & training from subprogram projects - Administration & communications	
16:15	Summary of subprogram direction Next steps - Subprogram name - Membership of the volunteer Establishment Committee (max 7 members)	
17:00	Workshop close	
18:30	Dinner	

Day 2: Thursday 12th November

Time	Topic	Presenter
08:30	Registration – tea/coffee	
08:45	Implementation of the subprogram	Group discussion.
10:30	Morning tea	
10:45	Implementation of the subprogram (continued)	Group discussion.
12:30	Meeting close and lunch	

Background documents to provide:

- List of attendees
- Background table
- Background notes
- New and emerging aquaculture projects selection criteria – draft

Appendix 2 List of Invitees - Subprogram planning workshop

First Name	Last Name	Position	Company
Crispian	Ashby	Programs Manager	FRDC
Tim	Bull	Assistant Director	Sustainability and Biosecurity Policy Division, Fisheries Branch, Def
Chris	Calogeras	Executive Officer	Australian Barramundi Farmers Association; IRG
Steven	Clarke	Science Initiatives & Support Manager; Executive O	SARDI Aquatic Sciences
Jennifer	Cobcroft	Proposed Subprogram Leader/ Subprogram Establi	FRDC
Mark	Crane	Aquatic Animal Health Subprogram Leader;	CSIRO
Trent	D'Antignana	Research and Development Manager	Cleanseas Tuna Ltd
Joshua	Fielding	Projects Manager - Research	FRDC
Patrick	Hone	Executive Director	FRDC
Wayne	Hutchinson	Senior Research Scientist – Aquaculture	SARDI Aquatic Sciences
Greg	Jenkins	Director ACAAR	Challenger Institute of Technology
Pheroze	Jungalwalla	Chair	National Aquaculture Council
Harry	King	Aquaculture Team Leader, Hobart	CSIRO
Richard	Knuckey	General Manager, Technical & Research Developm	FinFish Enterprise Pty Ltd
Sagiv	Kolkovski	Principal Research Scientist - Aquaculture	WA Department of Fisheries
Peter	Lee	Principal Scientist - Aquaculture	QLD Department of Agriculture and Fisheries
Graham	Mair	Director of Marine Sciences and Aquaculture Profe	Flinders University
John	Maloney	General Manager	Pacific Reef Fisheries
Wayne	O'Connor	Principal Research Scientist, Research Leader Aqua	NSW Department of Primary Industries Fisheries
Bob	Richards	Managing Director	Humpty Doo Barramundi; representing ABFA
Glenn	Schipp	Fisheries Development Director	Northern Territory Department of Primary Industry and Fisheries
Erica	Starling	Managing Director	Indian Ocean Fresh Australia
John	Susman	Managing Director	Fishheads Seafood Strategy; FRDC Board Member
Pia	Winberg	Executive Officer	Seaweeds Australia
Belinda	Yaxley	Sustainability & Accreditation Officer	Petuna

PT-04 - MILESTONE PROGRESS REPORT**FRDC PROJECT NUMBER: 2014/246.20****New & emerging aquaculture opportunities Subprogram: Establishment****MILESTONE NUMBER: 3****DATE DUE: 14 December 2015****PRINCIPAL INVESTIGATOR: Jennifer Cobcroft****OVERALL PROJECT PROGRESS:****Milestone Status**

Has this milestone been achieved (Yes/No)	No
Will the project be completed according to the current milestone schedule (Yes/No)	No

The milestones for Milestone 3 are predominantly completed. However, at the direction of the participants of the planning workshop in November 2015, more information is needed before the strategic plan can be completed. In addition, FRDC have indicated the new and emerging aquaculture opportunities RD&E will be best facilitated internally by the FRDC to reduce costs of a traditional Subprogram structure. For the project to be achieved in a timely manner and to reflect the different direction requested by FRDC, a project variation is requested to remove the Annual Operating Plan and finalised Strategic R&D Plan from this project. As these are dependent on the outcomes of an audit of past research and industry adoption, and the strategic planning process for new and emerging aquaculture in 2016.

PROJECT PROGRESS AGAINST PROJECT OBJECTIVES

A summary of Subprogram establishment is discussed in relation to the project objectives.

1. Collaborate with industry and government agencies to set strategic directions for new and emerging aquaculture opportunity research and development in Australia

Communication with industry and government stakeholders was undertaken to collect background information that was summarised and discussed at the Subprogram planning Workshop on 11-12 November 2015. The workshop resulted in consensus on the broad strategic research direction for the Subprogram (with species, functional and facilitation themes) and components of a draft new and emerging aquaculture opportunities Strategic RD&E Plan 2016-2020. Further data, through an audit of research and adoption, is required in 2016 to inform the priority RD&E topics for the Subprogram. The priorities will articulate with the FRDC's RD&E Plan, resulting in a full draft Strategic RD&E Plan in 2016.

2. Coordinate new and emerging aquaculture opportunities Subprogram research and ensure the quality and relevance of projects (project applications, project management, communication)

Integral to the Subprogram foundations is seeking input from stakeholders on the relevance of proposed research in new and emerging aquaculture opportunities. State aquaculture managers and policy makers clearly articulated a need for research to be focused where industry is already investing. Research project full applications for Yellowtail Kingfish (K4P, legacy Seafood CRC, and NSWFRAB supported) and EOIs related to new and emerging aquaculture received in the 2016 FRDC competitive round were reviewed by the Subprogram establishment project lead, Jenny Cobcroft, in light of ensuring the quality and relevance of projects. Other potential projects have been discussed with industry, researchers and FRDC.

3. Identify and pursue opportunities for cross-sector and inter-agency research to enhance aquaculture development in Australia

An application for the second round of the RnD4P programme was submitted in December 2015, for new and emerging aquaculture extension. The application demonstrated the commitment to collaboration among the sector, with 12 partners committing to the project, including RIRDC, ACIAR and CSIRO.

Discussions have been held with ACIAR (Chris Barlow and Project Leaders) prior to the commencement of this project to identify potential opportunities. Based on other experienced researchers (especially Ann Fleming) it is apparent that supporting existing targeted RD&E in Indigenous communities may be the most promising opportunity for ACIAR inter-agency activity. Discussions are ongoing with ACIAR. Novel, cross-disciplinary co-operation (e.g. with engineering or IT) have also been suggested as options to enhance aquaculture development. The November 2015 workshop participants discussed opportunities, and more information is required in 2016 before priority research is identified.

4. Coordinate and undertake the communication of results from new and emerging aquaculture opportunity research and development

Close co-operation and science workshop planning is underway between the K4P project and the Subprogram through Steven Clarke and Jenny Cobcroft. Science planning meetings have been undertaken by K4P since July 2015, and science workshops presenting results will commence in 2016.

1. ORIGINAL MILESTONE DATE AND TITLE:

Due: 7 December 2015

Draft Final Report; Review of EOIs, revised EOIs, full applications and milestone reports by Subprogram and advice to FRDC; Application submitted to FRDC for Subprogram continuation.

2. REVISED MILESTONE DATE AND TITLE:

Due: 14 December 2015

Committee formed and face-to-face meeting held; Strategic planning workshop completed; New & Emerging Aquaculture Opportunities Strategic RD&E Plan 2016-2020 drafted;

Draft Final Report; Review of EOIs, revised EOIs, full applications and milestone reports by Subprogram and advice to FRDC; Application submitted to FRDC for Subprogram continuation.

Note these two were removed in the milestone 2 variation "New & emerging aquaculture opportunities strategic RD&E plan 2016-2020 finalised; and Subprogram AOP advanced draft"

3. PROGRESS AGAINST MILESTONE (Achieved – in Part):

Following a delay in the first face-to-face workshop, from September to November 2015, a variation documented in milestone report 2 was approved. The project milestones have now been achieved for milestone 3, except for the Subprogram continuation application and finalisation of the Strategic RD&E Plan due to change in approach requested by FRDC. These are documented in detail in the Draft Final report submitted 14 December 2015.

- Committee formed and face-to-face meeting held (achieved)
- Strategic planning workshop completed (achieved)
- New & emerging aquaculture opportunities Strategic RD&E Plan 2016-2020 drafted (achieved – governance components)
- Draft Final Report (achieved) (achieved - submitted to FRDC 14 December 2015)
- Review of EOIs, revised EOIs, full applications and milestone reports by Subprogram and advice to FRDC (achieved)
- New & emerging aquaculture opportunities Strategic RD&E Plan 2016-2020 finalised (not achieved) (pending audit research and further planning by July 2016)
- Subprogram AOP advanced draft (not achieved – timeline for actions completed at planning workshop);
- Application submitted to FRDC for Subprogram continuation (not achieved) (change in direction from FRDC in December 2015, this is no longer required)

PUBLICATIONS/PRODUCTS

None

SPECIAL CONDITIONS

No public announcements to date.

INTELLECTUAL PROPERTY ISSUES ARISING:

None

CONTACT WITH BENEFICIARIES:

See Draft Final report submitted 14 December 2015

PROGRESS AGAINST COMMUNICATION & EXTENSION PLAN:

See Draft Final report submitted 14 December 2015

VARIATIONS TO PROJECT:

A variation is requested in Milestone 3 to remove (i) New & emerging aquaculture opportunities strategic RD&E plan 2016-2020 finalised, (ii) Subprogram AOP advanced draft, and (iii) Application submitted to FRDC for Subprogram. A reduction in the milestone cost is also requested, for the estimated cost of EC members travelling to the 5 February 2016 meeting. For ease in financial management, FRDC will administer the reimbursement of travel funds, as per the Subprogram planning workshop on 11-12 November 2015.

An extension in time for the project is requested to allow facilitation, attendance and distribution of meeting notes for the first EC meeting on 5 February 2015, and delivery of the project Final Report on 22nd February 2016.

There is no change in project costs associated with this variation, and unspent funds (as of 18 December 2015) will be allocated to salary for Jennifer Cobcroft, travel costs for Establishment Committee members to the first meeting on 5 February 2016 in Melbourne (estimated \$5,000), and meeting costs (venue and catering).

Original MS date	Original Description	Original Cost	Status	Revised MS date	Revised Description	New Cost
14 December 2015	Committee formed and face-to-face meeting held; Strategic planning workshop completed; New & Emerging Aquaculture Opportunities Strategic RD&E Plan 2016-2020 drafted; Draft Final Report; Review of EOIs, revised EOIs, full applications and milestone reports by Subprogram and advice to FRDC; Application submitted to FRDC for Subprogram	13,200.00	Achieved, except for the Subprogram continuation application and finalisation of the Strategic RD&E Plan	14 December 2015	Committee formed and face-to-face meeting held; Strategic planning workshop completed; New & emerging aquaculture opportunities Strategic RD&E Plan 2016-2020 drafted (governance components); Review of EOIs, revised EOIs, full applications and milestone reports by Subprogram and advice to FRDC.	\$8,200

	continuation.					
				19 February 2016	Draft Final Report	0
8 January 2016	Final Report	6,599.00		11 March 2016	Final Report; Establishment Committee meetings notes distributed	6,599.00



New and Emerging Aquaculture Subprogram

Establishment Committee Meeting

Meeting Date: 5 February 2016

Venue: ParkRoyal Hotel Melbourne Airport

Action Notes

Attendees

14 people in attendance

- Patrick Hone (Chair; FRDC)
- Greg Jenkins (Challenger, Aquaculture Council WA & Marine Fish Farmers Assoc WA)
- Peter Lee (Queensland Department of Agriculture and Fisheries)
- David Whyte (Huon Aquaculture Company)
- Chris Calogeras (Indigenous Reference Group, Australian Barramundi Farmers Association)
- Graham Mair (Flinders University)
- Pheroze Jungalwalla (National Aquaculture Council)
- Steven Clarke (South Australian Research and Development Institute, EO for the Kingfish 4 Profit project)
- Wayne O'Connor (NSW Fisheries)
- Crispian Ashby (FRDC Programs Manager)
- Jenny Cobcroft (Subprogram Establishment Leader)
- Dave Alden (Rural Industries Research and Development Corporation)
- Wayne Hutchinson (Oysters Australia)
- Chris Barlow (Australian Centre for International Agricultural Research)

Apologies:

- Glenn Schipp (NT DPIF) - alternate for Chris Calogeras
- Ian Lyall (AFMF - Aquaculture Committee) – represented by Wayne O'Connor

Meeting commenced – 08:25

1. Welcome; Introductions (esp RIRDC and ACIAR); Context of Subprogram

PH welcomed attendees and provided an update of FRDC positions and location, including:

- formation of Research Advisory Committees (RACs) to replace FRABs, internal FRDC management of RACs with two new positions managing 4 committees each and whole-of-life projects, and one person with support communications
- Wayne Hutchinson is the first new appointment as 'Project Manager – Research' and he will manage the new and emerging aquaculture subprogram (including K4P) along with other aquaculture IPAs (APFA, Abalone, ABFA, Safefish, Oysters)
- Josh Fielding will manage TSGA salmon IPA
- new positions located in Adelaide with Wine Australia
- co- location of FRDC in Canberra with other organisations in an Australian Rural Hub
- internalising delivery of Australian Fish Statistics
- formerly 11.7 FTE and increasing to 20 FTE
- fact sheets and stakeholder information ready to distribute [note – email sent 11/02/2016].

D Alden provided an overview of the RIRDC animal programs research portfolio that includes new & emerging animal industries (<<\$2M p.a.). Aquaculture related projects funded have included crocodiles, polychaetes, red claw, marron, mullocky, seaweeds, microalgae and health benefits. RIRDC keen to co-invest or invest without overlapping with FRDC NEAO SP. RIRDC runs Aquavet chemicals component of research, biofuels, new extension platforms to transfer knowledge and information, primary industry health and safety program, and leads RDC groups in R&D for Profit applications (Vicki Woodburn). RIRDC involved in the Grow North CRC bid, which is on hold & in review to re-establish needs & benefits.

CB provided an overview of ACIAR activities in fisheries & aquaculture with approx. 50:50 split of \$10M p.a., which is further leveraged with R&D providers. Aquaculture projects include seaweeds, pearls, tropical finfish (incl grouper), tilapia, lobsters. Over the project portfolio the research must deliver benefit internationally and to Australia. See opportunity in assisting with northern development, especially with indigenous community development. Later discussed a specific project for potential collaboration with FRDC new & emerging.

[RIRDC report including Mega-trends, for EC 'for a good read'. Available from <http://www.rirdc.gov.au/publications>

Hajkowicz, S. and Eady, S. 2015. Rural Industry Futures: megatrends impacting Australian agriculture over the coming twenty years. Rural Industries Research and Development Corporation; Publication No. 15/065 Project No. PRJ-00971.
ISBN 978-1-74254-811-1
ISSN 1440-6845]

2. Note meeting outcomes from the planning workshop, 11-12 November 2015. Noted.

Action – JC to amend the Plan of activities table to include calendar of events (K4P, IRG, SP meeting next to K4P) – becomes draft Annual Operating Plan in conjunction with revised Budget table.

3. Review actions from 11-12 Nov workshop. Noted

4. Role and responsibilities of Establishment Committee and membership

Action – EC to address 'Conflict of Interest' in the Governance documentation, once the Subprogram structure is finalised.

Action – JC add to committee membership observers ACIAR (Chris Barlow or delegate) and RIRDC (Dave Alden or delegate). Add formal member AFMF Aquaculture Subcommittee member (Ian Lyall, Executive Officer). Add Oysters Australia representative (Wayne Hutchinson, RD&E Manager; also FRDC Project Manager – Research managing the new and emerging aquaculture subprogram).

EC agreed the observers would be included in all EC correspondence, distribution of minutes, and could choose to attend any meeting.

5. Linkages - Where are the cooperative funding opportunities?

Group discussed potential linkages with:

- IPAs – noting ABFA (barramundi) is an agreed collaborator (co-investor) for the new & emerging aquaculture Subprogram
- Oysters Australia
- Kingfish
- AAHBS (Aquatic Animal Health & Biosecurity Subprogram)
- ACIAR, RIRDC – input received under agenda item 1
- R&D Providers
- Investors and companies
- ARC Industrial Transformation Hub funding
- New CRCs – more suited to smaller industry sectors. Applications due early March. Information webinars on 22-23 February.
- Potential leveraging of rec-fishing research funding related to stock enhancement where there is a related aquaculture R&D program.
- CSIRO
- Feed companies
- Grow North
- Universities – noting a trend for government to increase funding to universities, with an emphasis on 'quality and impact of science to industry'.
- Department of Innovation
- NRM (Natural Resource Management Regions, Australia;
<http://nrmregionsaustralia.com.au/our-projects/>)

- Encourage use of the “Grant finder” Commonwealth tool.
(<http://www.business.gov.au/grants-and-assistance/grant-finder/Pages/default.aspx>)

Comment - the audit needs to capture the broader benefits of aquaculture research, including supporting restocking and stock enhancement activities (e.g. prawns) and vice versa (e.g. Murray cod).

Comment – the R&D for Profit leverage guidelines changed in the latest round.

Action – FRDC (PH, CA & WH) work with GM on preparing a briefing for stakeholders on the new CRC program. Noted Tony Peacock coming to speak to FRDC re the new CRC program.

Action – FRDC (PH, CA, WH) to organise a meeting with ARC to discuss processes for co-funding. Noted that the co-funding model is working well for RIRDC in chicken meat.

Comment that the new and emerging aquaculture Subprogram would have a triaging role for potential projects, for example where some are directed to ARC, some are co-funded and others are all FRDC (preferably with industry partner leverage). The following components/matrix could be considered, with a score or scale in each category, to determine where to send the applications.

Basic	Domestic	Novel
Applied	International	Established industry

PH indicated that the ARC has increased flexibility to approve projects now, and applications can be sent to the board five times per year. Information will still be distributed to stakeholders in rounds.

6. Existing projects

- a. Update from Kingfish for Profit (K4P) DAWR R&D for Profit project. Science workshop(s).

SC provided an update on the K4P project partners and structure. There is internal project management through a combined Steering Committee and Research Advisory Committee, with open meetings including senior scientists. Currently advertising for technical positions (SARDI and NSW Fisheries), and PhD and Honours students. The project includes three Research Fellows.

It was noted that there was positive feedback from DOA/DAWR to the inclusion of “white fish” in the project title.

The new & emerging aquaculture Subprogram has an existing commitment to work with and support the K4P project in professional development of research higher degree candidates (PhDs and Honours). This will include sessions at K4P science

workshops and encouraging work experience with other white flesh fish aquaculture industries.

b. Other projects (PH)

- i. FRDC – WA Kingfish project with Challenger and Indian Ocean Fresh Australia (IOFA). Project sits alongside the K4P project.
- ii. FRDC – NSW Fisheries Kingfish hatchery project. Also communicates with the K4P project.

PH noted that the group may submit further projects, for example on more detailed diagnostics in liaison with AAHBS. They will also likely re-apply to the R&D for Profit scheme in early 2017. Kingfish is likely to become an IPA in future.

GM indicated that there is international interest in a Kingfish Community of Practice (CoP), with agreed industry coordinators from Mexico and Australia (Trent at Cleanseas). For more information contact Graham Mair.

WOC mentioned a recent Kingfish genetics workshop held in the US. Australian researchers from USC participated in that.

The group discussed what the Subprogram EC can do for YTK, including:

- Provision of feedback and expertise on RD&E
- Support professional development of PhD and Honours candidates
- Seek additional resources
- Already providing Subprogram funds to Kingfish research.

It was noted that the K4P project has links to Seafood CRC funding for the first trial, and that this was successful, with Cleanseas already applying the results and achieving reduced cost of production.

- iii. Cobia – carry over funding from Seafood CRC (\$150k in 2014-15)
- iv. Management and administration costs of the new & emerging aquaculture Subprogram (\$66k to-date)
- v. Feasibility of sturgeon (\$20k)

Other projects that could possibly come in, include:

- Native oysters
- Tropical oysters (DAC)
- Cobia with Pacific Reef and DAFF – current project ends June 2016
- Grouper diagnostics – new project proposed

Projects/topics outside the Subprogram scope are:

- Clams and tropical aquarium species - outside the scope of FRDC
- Post-harvest

It was noted that the Subprogram is focused on production issues and that there are other avenues to fund 'new product development', trade and post-harvest issues for new species.

7. New project options (based on planning workshop, especially short-term activities)

Note – items were considered in a different order to those in the agenda.

Species

I. The EC discussed the Selection Criteria document provided and suggested changes to the text. It was noted that the final criteria will be evident from the results of the audit.

Action – JC to amend the text for the Selection Criteria document as advised by the EC.

A project concept was presented to the EC by PL and CB (ACIAR) on winged oysters (*Pteria penguin*). The project is based on translation of work done by Paul Southgate in Tonga, Fiji and PNG with low technology production methods to an indigenous community or communities in Australia.

Action – PL and JC to forward the brief project proposal to CC.

Action – CC to invite Paul Southgate to an IRG meeting in March.

Other potential project ideas included:

- Fresh Food production with RAS – using alternative energy sources and aquaponics
- sea cucumbers

Facilitation

a. Audit TOR

The EC discussed the audit TOR and agreed on changes, specifically to focus on two phases of the work; a preparation phase and the audit case study phase, once the outcome of the DAWR application is known. The EC agreed that the priority for this activity should be on case studies, especially cases of success and failure, which may lead to the output of a document "The 7 habits of successful seafood farmers", with "bad habits" also identified.

Phase I – Initial data summary from past projects (what was done & why?) and development of a risk matrix (risk decision points), where factors considered would include: Biological/production (including disease); Market (including competition and prevention of expansion); Regulatory system; Technology; Business (including planning investment (cost of entry), access to farming area (social

acceptance/perception), industry champions, interference); Political support (including announcements of support for aquaculture).

Phase II – After consideration of phase I results, the EC will determine the case studies for detailed audit.

Audit output - Results of the two phases would provide a risk decision matrix to be used by the EC, enabling projects to be rejected with a high degree of confidence based on experience and assessment.

In further discussion, the EC agreed that the intended audience in the TOR should include researchers.

There was discussion of how salmon projects are prioritised through an R&D Technical Committee. Projects brought forward by researchers or industry. Projects must have collective interest and be pre-competitive, and environmental projects usually fit. Projects are considered for (1) Relevance – do we need to know it and what's the relevance?, and (2) Deliverability – timeline, cost and partners. Fundamental collective vision to grow the industry. The cost-benefit comes out in the scoping of the project.

RIRDC indicated that it has conducted independent feasibility studies for some project and species in the past, and that these should be considered in the audit.

Action – JC to amend the text of the audit Terms of Reference as advised by the EC.

EC discussed potential people to ask to conduct the audit, including:

- | | |
|------------------|-------------------|
| • Tom Lewis | • Clive Jones |
| • Craig Foster | • Craig Laurence |
| • Ewan Colquhoun | • Guy Westbrook |
| • Nick Moore | • Stewart Rolands |
| • Mike Rimmer | • Jenny Cobcroft |

The first approach for the team was agreed as:

- Jenny Cobcroft
- Ewan Colquhoun
- Guy Westbrook
- Mike Rimmer

Action – JC to approach the proposed audit team to gauge availability and interest.

The EC agreed on an indicative budget of \$100k for both phases of the audit. Phase I with a budget up to \$60k. Phase II has \$35k FRDC funds allocated in the DAWR R&D for Profit application (\$80k requested from DAWR; cash from IMAS \$5k) – outcome pending May.

c. Project species/selection criteria

GM noted that there were no points related to genetics and hatchery technology in notes from the previous meeting, and that it is important that the scope of projects includes genetics and hatchery RD&E.

Audit results are needed before final criteria are determined.

(See earlier notes and changes to the draft selection criteria provided after the meeting.)

d. K4P Science Workshop

SC suggested a combined Steering Committee Meeting, a project R&D meeting and a technical exchange workshop for industry and scientists in mid April.

Also notes a project launch in April, milestone due in July, and project meeting in October.

Action – SC and JC to communicate re YTK Science Workshop and combined Subprogram workshop dates. Once dates confirmed, notify EC.

Action – WH to progress the Science workshop for the Subprogram, in conjunction with the K4P Science Workshop (liaise with SC, K4P and Subprogram EC)

Action – WH to arrange facilitation of professional development session for K4P PhD and Hons students (with SC, K4P researchers/supervisors)

Other calendar notes: ABFA have a workshop 12-13 April in Townsville.

NSW industry Field Days with Tom Losordo 28-29 May (RAS systems).

Action – JC to add related meeting dates to the Subprogram calendar/plan.

b. Next R&D for Profit Round (applications likely due early July/late September)

Proposed consortium of Grouper, Cobia and Barramundi (tropical white fish), with production related research. EC agreed that Peter Lee take the lead on this. Some background scoping already complete. Topics would include feed issues for grouper and cobia; feed management and feeding; health surveillance; early pathogen detection; preventative health and biosecurity; water quality in ponds; discharge water quality.

There was discussion of the option to include tropical oysters (blacklip), and the value of emphasis on strengthening aquaculture in northern Australia with a national project. The indigenous component could also be built. Potential collaborating partners RIRDC (contact c/o Dave Alden), ABFA (Chris Calogeras), and IRG (Chris Calogeras).

Action – PL to prepare a project brief and budget request for FRDC Subprogram funds for consideration by the EC.

Other projects discussed were a re-bid for further Kingfish research in 2017, and oysters for Pacific, Sydney Rock and Angasi. The oyster project was considered as a potential for a CRC bid under the new CRC model.

e. Travel bursaries - e.g. Barramundi – processing – technology transfer

Item noted – for consideration by EC once Strategic Plan is developed and budget clarified.

Functional

Health Program

f. Surveillance and Farm health response

Included in proposed DAWR R&D for Profit application (PL for more information).

g. Develop a vaccine for Grouper as a trial with National Vaccine Centre.

Project full proposal submitted to FRDC in current round.

Nutrition and Feed development

h. Scoping papers for initial projects (Desktop study to identify needs and gaps in health (pathogens) and nutrition related to finfish (Grouper, Barra, Cobia) (YTK covered by K4P?) and octopus; Desktop gap analysis for shellfish)

Item noted. Several aspects included in proposed DAWR R&D for Profit application (PL for more information). Others components included in audit and priorities for funding will be determined from the audit results.

Business Models and ROI tools

i. Business tools - Review and collate existing business planning tools; are they useful as possible ROI decision tools for R&D investment?

Item noted. For future consideration by EC, noting work underway with ABFA.

Production systems

j. An energy efficiency workshop, including QDAF and CSIRO, how to deliver advanced technology to the new & emerging sector to improve on-farm energy efficiency? e.g. variable speed pumps.

Suggestion that a workshop or thematic workshop series for research and production facility managers would be beneficial. Budget as a component of people development.

k. Land based systems i.e. aquaponics

Item noted – for consideration by EC once Strategic Plan is developed and budget clarified.

8. Subprogram Strategic R&D Plan. Process for plan development

The EC agreed that the audit would inform the details of priorities in activities of strategic plan. However, the major heading and sections could be prepared as soon as possible, with links to the line items in the revised budget. Following the audit, a workshop would be held to finalise priorities and activities.

The EC considered the budget table provided by FRDC at the meeting \$2.52 million FRDC funds over 5 years, current unallocated funds \$1.56 million over 4 years.

Action – JC and WH to add lines for estimated expenditure for: the audit, ACIAR, People Development (Bursaries, RHD professional development), next DAWR R&D for Profit application.

Action – JC to update the framework Strategic Plan (including background, scope and governance, and headings for other sections to be completed by EC and FRDC).

9. Subprogram Workplan. Subprogram Annual Operating Plan

Action – WH and CA (FRDC) to develop the Subprogram AOP and Workplan from calendar of events/activities and the updated budget, for approval of EC and FRDC.

10. National Aquaculture Strategy (DAWR) - Subprogram contribution

JC provided recent information from Tim Bull (DAWR) on progress:

- Aquaculture Strategy - progress has been slow. No change to timeframes with full draft in next few months, and the Strategy out mid-year.
- AFMF Aquaculture Subcommittee meeting on 9th Feb & Tim will give a briefing on consultation feedback and Strategy. This will include new and emerging as a small component. Ian Lyall, Pheroze and FRDC rep are links between Aquaculture Subcommittee and Subprogram.
- Keen for the Subprogram actions/activities to reflect and link to the Strategy.
- Key 'new & emerging' related consultation feedback:
 - a. Other protein sectors are focused on 1-2 species (pork, beef, etc), and for aquaculture a 'focus on a couple of species, preferably not to try everything under the sun'
 - b. Need for white flesh fish
 - c. Multi-trophic farms
 - d. Tourism and food based industry - may not fit in the Subprogram scope, but could be seen as a new and emerging opportunity for aquaculture.

PJ added that he would be communicating with DAWR on behalf of NAC re timely strategy completion.

11. Communication strategy/plan

Audiences include:

- NAC
- State aquaculture bodies – EOs
- AFMF Aquaculture Subcommittee
- R&D providers
- Emerging industry

Individual project communications to be included in the Plan. Develop a website as a simple source of information. The EC agreed that by default all EC information (discussion, tabled documents and correspondence) will be circulated, and anything confidential will be noted at the time and distribution restricted.

Action – WH and PH (FRDC) to develop a brief Subprogram Communications Plan

Action – WH, CA and PH (FRDC) to develop a 1-page briefing document of the Subprogram framework, what species/topics are included and what is not, and brief criteria for funding.

Action – WH and PH (FRDC) to develop a Subprogram website – initially simple information, later with links to audit and other project outputs.

12. Subprogram name

EC members voted for their top three preferences of the list of names submitted.

The selected name was : New and Emerging Aquaculture Opportunities (NEAO) Subprogram

13. Next meeting date

To be advised. Communication by email for updated audit TOR and actions.

Meeting closed at 16:00.

Summary of Agreed items

- Addition of WH and IL as EC members, and CB and DW as observers.
- EC observers would be included in all EC correspondence, distribution of minutes, and could choose to attend any meeting.
- Changes to project Selection Criteria – still in draft until audit completion.
- Changes to the audit TOR to two phases of the work; a preparation phase and the audit case study phase. Final version to be endorsed by EC by email.
- Agreed potential team to conduct the audit.
- Indicative budget of \$100k for both phases of audit. Phase I with a budget ≤\$60k.
- Peter Lee take the lead on the next R&D for Profit application – tropical finfish.
- Strategic Plan could be written with major heading and sections, as soon as possible, with links to the line items in the revised budget. The audit will inform details of Subprogram activities.
- Name is New and Emerging Aquaculture Opportunities (NEAO) Subprogram
- By default all EC information will be circulated, and anything confidential will be noted at the time and distribution restricted.

Actions

1. JC - amend the Plan of activities table to include calendar of events (K4P, IRG, SP meeting next to K4P) – becomes draft Annual Operating Plan in conjunction with revised Budget table.
2. EC to address 'Conflict of Interest' in the Governance documentation, once the Subprogram structure is finalised.
3. JC add to committee membership observers ACIAR (Chris Barlow or delegate) and RIRDC (Dave Alden or delegate). Add formal member AFMF Aquaculture Subcommittee member (Ian Lyall, Executive Officer). Add Oysters Australia representative (Wayne Hutchinson, RD&E Manager; also FRDC Project Manager – Research managing the new and emerging aquaculture subprogram).
4. FRDC (PH, CA & WH) work with GM on preparing a briefing for stakeholders on the new CRC program.
5. FRDC (PH, CA, WH) to organise a meeting with ARC to discuss processes for co-funding.
6. JC to amend the Selection Criteria document as advised by the EC.
7. PL and JC to forward the brief project proposal to CC.
8. CC to invite Paul Southgate to an IRG meeting in March.
9. JC to amend the audit Terms of Reference as advised by the EC.
10. JC to approach the proposed audit team to gauge availability and interest.
11. SC and JC to communicate re YTK Science Workshop and combined Subprogram workshop dates. Once confirmed, notify EC.
12. WH to progress the Science workshop for the Subprogram, in conjunction with the K4P Science Workshop (liaise with SC, K4P and Subprogram EC)
13. WH to arrange facilitation of professional development session for K4P PhD and Hons students (with SC, K4P researchers/supervisors)
14. JC to add related meeting dates to the Subprogram calendar/plan.
15. PL to prepare a project brief and budget request for FRDC Subprogram funds for consideration by the EC.
16. JC and WH to add Budget lines for estimated expenditure for: the audit, ACIAR, People Development (Bursaries, RHD professional development), next DAWR R&D for Profit application.
17. JC to update the framework Strategic Plan (including background, scope and governance, and headings for other sections to be completed by EC and FRDC).
18. WH and CA (FRDC) to develop the Subprogram AOP and Workplan from calendar of events/activities and the updated budget, for approval of EC and FRDC.
19. WH and PH (FRDC) to develop a brief Subprogram Communications Plan
20. WH, CA and PH (FRDC) to develop a 1-page briefing document of the Subprogram framework, what species/topics are included and what is not, and brief criteria for funding.
21. WH and PH (FRDC) to develop a Subprogram website – initially simple information, later with links to audit and other project outputs.



New and Emerging Aquaculture Subprogram Establishment Committee Meeting - Agenda

Meeting Date: 5 February 2016

Time: 08:30-16:30

Venue: ParkRoyal Hotel Melbourne Airport

Key Issues:

- Endorse terms of reference for audit of past RD&E
- Form Working Group for the next DAWR R&D for Profit application
- Explore linkages with other funding leverage – incl. ABFA, ACIAR, RIRDC
- Endorse Subprogram Workplan for 2016

Attending:

- Greg Jenkins (Challenger, Aquaculture Council WA & Marine Fish Farmers Assoc WA)
- Peter Lee (Queensland Department of Agriculture and Fisheries)
- David Whyte (Huon Aquaculture Company)
- Chris Calogeras (Indigenous Reference Group, Australian Barramundi Farmers Association)
- Graham Mair (Flinders University)
- Pheroze Jungalwalla (National Aquaculture Council)
- Steven Clarke (South Australian Research and Development Institute, EO for the Kingfish 4 Profit project)
- Wayne O'Connor (NSW Fisheries)
- Patrick Hone (Chair; FRDC)
- Crispian Ashby (FRDC Programs Manager)
- Jenny Cobcroft (Subprogram Establishment Leader)
- Dave Alden (Rural Industries Research and Development Corporation)
- Wayne Hutchinson (Oysters Australia)
- Chris Barlow (Australian Centre for International Agricultural Research)

Apologies:

- Glenn Schipp (NT DPIF) - alternate for Chris Calogeras
- Ian Lyall (AFMF - Aquaculture Committee) – represented by Wayne O'Connor

Agenda

Time		Agenda Item (indicative time; agenda will be flexible)
08:00		Arrive – tea/coffee
08:30	1	Welcome; Introductions (esp RIRDC and ACIAR); Context of Subprogram (45 min)
09:15	2	Note meeting outcomes from the planning workshop, 11-12 November 2015 (15 min)
09:30	3	Review actions from 11-12 Nov workshop (15 min)
09:45	4	Role and responsibilities of Establishment Committee and membership (15 min)
10:00		Morning Tea Break (20 min)
10:20	5	Linkages - Where are the cooperative funding opportunities? (55 min) Input from ACIAR (Chris Barlow), ABFA (Chris Calogeras), RIRDC (Dave Alden), others.
11:15	6	Existing projects (15 min): a. Update from K4P. Science workshop(s). (Steven Clarke) b. Other projects (Patrick Hone)
11:30	7	New project options (based on planning workshop, especially short-term activities, not all listed): (2 h total plus 1 h discussion over lunch) <u>Facilitation</u> a. Audit of past research and industry adoption in new and emerging aquaculture. R&D for Profit round 2 application (submitted). <u>Terms of reference</u> . Implementation process, e.g. call for tenders/EOIs. <u>Proposed action: Endorse TOR for audit (30 min)</u> b. <u>Plan for future R&D for profit rounds</u> (Round 3 likely latter half 2016). Native oysters, northern/tropical white finfish/species, seaweed <u>Proposed action: Form a working group (30 min)</u> c. Development of the project/species selection criteria to be used by the Subprogram. d. <u>K4P – science workshop – confirm date(s), 1 day for other finfish (grouper, cobia, barramundi, mullet, Murray cod, etc) and plan for delivery of RHD professional development session</u> e. Travel bursaries - e.g. Barramundi – processing – technology transfer <u>Functional</u> Health Program f. Surveillance and Farm health response g. Develop a vaccine for Grouper as a trial with National Vaccine Centre (Verbal update) Nutrition and Feed development

		<p>h. Scoping papers for initial projects (Desktop study to identify needs and gaps in health (pathogens) and nutrition related to finfish (Grouper, Barra, Cobia) (YTK covered by K4P?) and octopus; Desktop gap analysis for shellfish)</p> <p>Business Models and ROI tools</p> <p>i. Business tools - Review and collate existing business planning tools; are they useful as possible ROI decision tools for R&D investment?</p> <p>Production systems</p> <p>j. An energy efficiency workshop, including QDAF and CSIRO, how to deliver advanced technology to the new & emerging sector to improve on-farm energy efficiency? e.g. variable speed pumps.</p> <p>k. Land based systems i.e. aquaponics</p> <p><u>Species</u></p> <p>l. Criteria to be developed</p>
12:30		Lunch - Airo Restaurant (60 min)
13:30	7	New project options (continue above) (60 min)
14:30	8	Subprogram Strategic R&D Plan. Process for plan development (30 min)
15:00		Afternoon Tea Break (15 min)
15:15	9	Subprogram Workplan. Subprogram Annual Operating Plan (20 min)
15:35	10	National Aquaculture Strategy (DAWR) - Subprogram contribution (15 min)
15:50	11	Communication strategy/plan (20 min)
16:10	12	Subprogram name (15 min)
16:25	13	Next Meeting date (5 min)
16:30		Meeting Close

Attachments:

- Meeting notes from the planning workshop, 11-12 November 2015
- List of actions from 11-12 Nov workshop
- Draft - Role and responsibilities of Establishment Committee
- Draft – Terms of reference for the audit
- Subprogram name submissions

Appendix 13

Year 1 Plan for New and Emerging Aquaculture Opportunities (NEAO) Subprogram	2015	2016				
	Dec	Jan	Feb	Mar	Apr	M
Facilitation						
Extension project application	Complete					
Finalise terms for the audit			11/3 - Revised TOR to EC			
Engage team for initial R&D data collection & risk matrix						
Audit of past & currently occurring work (Round 2 outcome est May/June 2016)					Phase I	
Outcomes from the planning workshop						
Form the Establishment Committee and have first meeting			Complete			
R&D plan				14/3 - Framework draft complete		
Conduct process assessing 'where are the funding opportunities?'						
NEAO Establishment Committee Meeting			5		13 or 20	
FRDC Board approval of Subprogram AOP & Strategic Plan						10 - 11
Species						
Plan for future R&D for profit rounds (Round 3 likely latter half 2016)			Tropical white fish - project development			
Kingfish for Profit (K4P)						
K4P Steering Committee meetings (T = teleconference)		28 T			12 or 19	
K4P Researcher Meetings/Science Workshop					13 or 20	
K4P - YTK Information Exchange Workshop (with NEAO)					12 or 19	
Functional						
NEAO Professional Development for RHD students (with K4P)					13 or 20	
NEAO Science Workshop					13 or 20	
Other associated partner events						
Indigenous Reference Group (IRG) meetings			8-9			
Australian Barramundi Farmers Association (ABFA) meetings					12-13	
NSW industry Field Days with Tom Losordo (RAS systems)						
More to add...						

Legend: Planned Dates to be confirmed

								2017
May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan

		Phase II
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12 or 19

2	24 - 26	22 - 24
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12/19 T

11 or 18

12 or 19

11 or 18

12/19 T	11 or 18	10/17 T
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12 or 19

12 or 19

28-29



Australian Government

Fisheries Research and
Development Corporation

DRAFT

New and Emerging Aquaculture Opportunities Subprogram Research and Development Plan 2016-2020 (2016 ver 1.0)

Prepared by:

FRDC New and Emerging Aquaculture Opportunities (NEAO) Subprogram

Edited by:

Dr Jennifer Cobcroft, NEAO Establishment Leader

Others...

Acknowledgement:

With thanks to the Aquatic Animal Health and Biosecurity Subprogram (AAHBS), especially Dr Mark Crane, for Strategic Plan template and advice.

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1 Introduction

This strategic R&D plan ('the Plan') of the Fisheries Research and Development Corporation's New and Emerging Aquaculture Opportunities Subprogram ('the Subprogram') will guide the Subprogram to fulfill its objectives to provide strategic leadership, direction and focus for new and emerging aquaculture research, development and extension (RD&E) and other related non RD&E activities. The Plan will assist the Subprogram in assessing new and emerging aquaculture project applications. A compilation of current R&D issues is included.

This strategic R&D plan is a 'working document'. It has been developed for a four-year period (2016-2020) after which a full review will be conducted.

However, the Plan will also be reviewed annually and amended accordingly.

The Plan:

- Describes the Subprogram including its role, objectives and structure;
- Describes criteria used in defining a project under the Subprogram;
- Outlines the key research areas;
- Will be used by the Subprogram to assist in assessing new and emerging aquaculture project applications;
- Lists current R&D priorities; and
- Will be reviewed annually with wide stakeholder consultation.

2 Background

The FRDC's 2015-20 RD&E strategy identified the development of new and emerging aquaculture growth opportunities as a national research priority. Aquaculture currently contributes 43% and \$1 billion to the value of Australian seafood production, and has increased 12% from 2002-03 to 2012-03 (ABARES 2014). Increases were predominantly in finfish, specifically salmonids (worth \$497 million, 48% of aquaculture value in 2012-13), and edible oysters (currently 9% aquaculture value) (ABARES 2014). Other established key aquaculture species are wild-caught and farmed Southern Bluefin Tuna (15% value) and prawns (6% value).

In a global context, aquaculture production is projected to expand by 2030 to provide almost two-thirds of fishery product consumption (World Bank and FAO). An increase of around 36% in aquaculture production (29 million tonnes from 2010 to 2030) is needed to meet this demand. In Australia, apparent seafood consumption is increasing (3% p.a. 2000-01 to 2012-13), and imported seafood currently supplies two-thirds of product consumed (ABARES, 2014). Consequently, there are increasing opportunities for Australian-grown high value aquaculture products in domestic and export markets. In response to the increased demand, there are initiatives in Australia to expand production of established industries: for

example, Atlantic Salmon in Tasmania, and prawn and Barramundi in the north (WA, NT and QLD). However, to meet the market for seafood, now is a critical time to develop sustainable, productive and profitable new aquaculture industries that will complement growth in established sectors.

3 New and Emerging Aquaculture Opportunities Subprogram

The Subprogram was established to lead the FRDC's priority activity in new and emerging aquaculture development, and to coordinate the strategic planning, funding and project administration related to the initiative. New and emerging opportunities/species for aquaculture will be identified that would benefit from RD&E funding to achieve rapid results in terms of industry establishment, production increases and profitability.

3.1 Mission

<p><i>“To provide RD&E support for the development of new and emerging aquaculture growth opportunities in Australia”.</i></p>

3.2 Objectives

The Subprogram's key objectives are to:

1. Collaborate with industry and government agencies to set strategic directions for new and emerging aquaculture growth opportunity research and development in Australia
2. Coordinate NEAO Subprogram research and ensure the quality and relevance of projects (project applications, project management, communication)
3. Identify and pursue opportunities for cross-sector and inter-agency research to enhance aquaculture development in Australia
4. Coordinate and undertake the communication of results from new and emerging aquaculture opportunity research and development

3.3 Role

The Subprogram focus is strategic planning, research coordination, communication, and extension related to new aquaculture opportunities. The Interim Establishment Committee, and the Steering and Research Advisory Committee will have an expert advisory role along with industry partners in relation to RD&E and commercialisation of new aquaculture ventures.

The role of the Subprogram is to:

- Implement the Subprogram strategic RD&E Plan;
- Set RD&E priorities to maximise investment in new and emerging aquaculture, avoid duplication and achieve the greatest potential return;
- Invite RD&E applications to address those priorities;
- Maximise collaboration among researchers, and between researchers, aquaculture managers and aquaculture industry interests;

-
- Attract other RD&E funding and influence the way in which other funding entities apply their investments in that field;
 - Standardise the best scientific methods;
 - Communicate regularly with potential beneficiaries; and
 - Support extension and influence the adoption of R&D results by industry.

3.4 Outcomes

By 2020, develop at least two new aquaculture industry growth opportunities to the point of significant commercialisation, with profitable business operations. Industry growth measured by an increase in production volume of 4,000 tonnes from 2012-13 level (1,420 tonnes, 'aquaculture other fish'; ABARES, 2014) to greater than 5,420 tonnes in 2020.

The Subprogram's activities will contribute to:

1. Reduced risk of RD&E and industry investment in new and emerging aquaculture
2. Improved productivity and profitability of the aquaculture sector
3. Improved standard of RD&E in new and emerging aquaculture
4. Cost-effective RD&E
5. Increased awareness of new and emerging aquaculture issues

6. Market access ...

3.5 Scope within FRDC

The scope of the NEAO Subprogram is to provide a strategic RD&E plan for new and emerging aquaculture growth opportunities (species and/or technologies) and for the cooperation of existing industries (e.g. Yellowtail Kingfish and Cobia) to increase production from Australian aquaculture. The Subprogram will focus on high quality science, and state-of-the-art approaches in support of positive growth in Australian aquaculture. Networking and collaboration among stakeholders will be supported by targeted communication (topics prioritised by stakeholders) and face-to-face workshops.

The Subprogram is responsible for coordinating new aquaculture opportunity research projects submitted to the FRDC or funded by FRDC RD&E, and aims to work cooperatively with existing Industry Partner Agreements (IPAs) and other subprograms to leverage funding. Where projects are jointly funded with IPAs or other subprograms, prime carriage of projects would be determined according to project scope. These subprograms/IPAs (e.g. Barramundi; Edible oysters) would have projects specific to their species, and the NEAO Subprogram would ensure cross-linkage and advice where appropriate. The NEAO Subprogram will have prime carriage of projects where the other subprogram/IPA species is a smaller component of a project with broader industry application. Opportunities to value-add to research through collaboration would be pursued (e.g. with ACIAR, IRG, ARC, RIRDC and FRDCs Social Sciences and Economics Research Coordination Program (SSERCP)). The

NEAO Subprogram will facilitate engagement of marine and freshwater aquaculture industry sectors in common interest workshops and/or an international technical study tours.

The preferred process for submission and assessment of project applications where another subprogram/IPA has prime carriage is as follows:

1. Following consultation with the species-specific subprogram/IPA an EOI or full application is submitted to the species-specific subprogram/IPA, which assesses its need and priority.
2. If supported by the species-specific subprogram/IPA, the EOI or full application is forwarded to the NEAO Subprogram for advice on technical feasibility and merit.
3. The full application should gain support from both subprograms/IPA before submission to the FRDC Board for final assessment.
4. If approved, the project is then managed by the species-specific subprogram/IPA; the NEAO Subprogram provides advice on milestone reports and the final report as required.

3.6 Scope and links with other bodies

The Subprogram consults on new and emerging aquaculture growth RD&E priorities and strategies with the AAHBS, AFMF Aquaculture Subcommittee – representing state and territory aquaculture managers and regulators, National Aquaculture Council (NAC) – the aquaculture industry peak body, other funding agencies engaged in new and emerging aquaculture R&D (RIRC, ACIAR, ARC), IPAs and the IRG. Consultation is primarily through membership of the Subprogram Establishment Committee or observer status at Subprogram meetings.

3.7 NEAO Subprogram Management

Subprogram Leader

The role of the Subprogram Leader is to manage the NEAO Subprogram to ensure that:

- Strategic planning for new aquaculture opportunities is co-ordinated nationally, and FRDC RD&E investment is prioritised
- Administration project milestones are met on time
- Projects are coordinated and integrated in the Subprogram
- Communication and cooperation with other Subprograms and IPAs
- Meetings and workshops are organised effectively to engage participants, share knowledge, and support industry adoption of research results
- Subprogram reports and newsletters are coordinated and delivered
- Advice is provided to both the Interim Establishment Committee and the Research and Strategy Advisory

Interim Establishment Committee

A volunteer Interim Establishment Committee (IEC) will be established until the completion of the strategic plan (January - December 2016), with a maximum of 12 members, selected on the basis of their expertise in developing new aquaculture opportunities and strategic planning for aquaculture, with a member of the FRDC staff and the Subprogram Leader. Specific expertise will cover North (tropical) and South (temperate), finfish, crustaceans and/or molluscs, new and emerging species, and production systems (onshore and/or offshore). Where additional expertise is required external advice will be sought, for example from AAHBS for health.

Agreed members are:

- Greg Jenkins (Challenger IT, Aquaculture Council WA & Marine Fish Farmers Association WA)
- Peter Lee (Queensland Department of Agriculture and Fisheries)
- David Whyte (Huon Aquaculture Company)
- Chris Calogeras (Indigenous Reference Group (IRG), Australian Barramundi Farmers Association (ABFA)), alternate Glenn Schipp (NT DPIF)
- Graham Mair (Flinders University)
- Pheroze Jungalwalla (National Aquaculture Council (NAC))
- Steven Clarke (South Australian Research and Development Institute (SARDI), EO for the Kingfish 4 Profit project (K4P))
- Wayne O'Connor (NSW Fisheries)
- Crispian Ashby (FRDC Programs Manager or delegate)
- Wayne Hutchinson (Oysters Australia RD&E Manager; FRDC Project Manager – Research)
- Ian Lyall (EO Australian Fisheries Managers Forum (AFMF) Aquaculture Subcommittee; Wayne O'Connor nominated alternate)
- TBA (Subprogram Leader)

Agreed observers are:

- Chris Barlow (or delegate; Australian Centre for International Agricultural Research (ACIAR))
- Dave Alden (or delegate; Rural Industries Research and Development Corporation (RIRDC))

Terms of Reference

The IEC and the Subprogram Leader would:

- advise on the approach to a national planning workshop

-
- identify new aquaculture development opportunities, prioritise research needs, and develop funding strategies, informed by the national workshop and audit of past research
 - contribute to the draft and endorse the final version of the NEAO Subprogram Strategic Plan 2016-2020
 - call for EOIs in priority RD&E topics for the Subprogram

Steering and Research Advisory Committee

Once the NEAO Subprogram Strategic Plan is complete, and the scope of research projects is known, a volunteer Steering and Research Advisory Committee (SRAC) will be established (January 2017-June 2020), with a maximum of 10 members. Members will be selected on the basis of their expertise in commercial production of key species, regulatory environments, research field, and will include a member of the FRDC staff. The membership term will be for the life of the Subprogram funding (3.5 years, January 2017 to June 2020).

The appointment process will be through a call for expressions of interest in membership (Oct-Nov 2016) including a list of expertise required and the availability commitment. Members will be appointed by FRDC. If positions become vacant during the Subprogram funding, a call for EOIs will be made to replace vacant industry and/or researcher position(s).

The Steering and Research Advisory Committee (SRAC) will comprise both government and industry representatives.

Positions on the Steering and Research Advisory Committee (SRAC) are defined:

- Subprogram Leader
- Aquaculture (NAC Chair or delegate)
- AAHBS (AAHBS Leader or delegate)
- Federal Government representative (DAWR)
- FRDC (FRDC Programs Manager or delegate)
- New and emerging aquaculture industry sector (2 positions)
- State Government representative with expertise in new and emerging aquaculture (AFMF – Aquaculture Subcommittee nominee)
- New and emerging aquaculture scientific advisors (2 positions)

Member expertise to include the following:

- North (tropical)

-
- South (temperate)
 - Systems (Landbased; Marine Pens)
 - Crustaceans
 - Finfish
 - Molluscs
 - Nutrition
 - Health

While full representation is not possible within the Steering and Research Advisory Committee (SRAC) structure, many of the major stakeholders will be represented. In addition, a Reference Group will be established for all stakeholders, starting from participants and invitees of the planning Workshop in November 2016. The Reference Group will be open to any interested stakeholder.

Terms of Reference

The SRAC and the Subprogram Leader would:

- develop an Annual Operating Plan (AOP) for key stakeholders including the FRDC Board
- review the Subprogram Strategic R&D Plan on a regular (at least annual) basis
- ensure that research objectives are commercially focused and outcome driven
- call for EOIs in priority RD&E topics for the Subprogram
- review EOIs, revised EOIs and full applications for the Subprogram
- meet face-to-face twice per year to review EOIs, applications and current project progress (other meetings/input are proposed quarterly by teleconference)
- ensure no duplication of efforts in research or communications
- review project progress against KPIs in the Strategic Plan and AOP
- review of research priorities supplied by the FRDC prior to the annual industry, jurisdictional and subprogram meeting
- advise on additional project leverage from external sources (industry investment, alternative funding agencies)
- coordinate industry and research provider involvement to maximise usage of available resources, in cooperation with the Research Provider Network (RPN)
- facilitate industry extension and technology transfer
- promote the Subprogram projects and activities

Special tasks of the scientific advisors members:

-
- To scientifically assess new research proposals, *inter alia* to ensure that the research proposed is scientifically feasible, and to advise the SRAC on new funding applications.
 - To advise on scientific problems with project progress as well as identify remedial action, to ensure scientific objectives and milestones are met.
 - To foster and develop collaboration amongst researchers.
 - To co-opt, as required, additional aquaculture experts to assist in the provision of advice.

Reference Group

This group will provide advice to the IEC and SRAC on new and emerging aquaculture RD&E. Membership is open to all stakeholders interested in Subprogram activities from industry, regulators and research.

Conflict of Interest

Insert section on the policy and procedure to manage conflicts of interest within the Committees and governance structure.

4 Stakeholders

The key stakeholders in the Subprogram, i.e. those beneficiaries that have the greatest stake in the success of the Subprogram and with whom the Subprogram consults to identify new and emerging aquaculture RD&E needs, are (in alphabetical order):

- Australian Government Department of Agriculture and Water Resources (DAWR)
- Emerging aquaculture industries (barramundi, yellowtail kingfish, cobia, grouper, marron, yabbies, seaweeds, and others)
- Indigenous Reference Group (IRG)
- FRDC
- Major aquaculture industries (salmon, tuna, edible oysters, pearls, prawns)
- National Aquaculture Council
- Research providers
- State/Territory Departments of Fisheries/Natural Resources/Agriculture

It is acknowledged that the list of beneficiaries is much longer, including e.g. aquaculture investors, the post-harvest industry, research investors, extension services, consumers of seafood, and the public at large.

5 Methods

The Subprogram fulfils its role by:

- Being accountable for actions outlined in this strategic plan;

-
- Adopting a proactive approach to new and emerging aquaculture growth opportunities;
 - Adopting clear directions and processes;
 - Providing a focal point for research;
 - Promoting a collaborative/cooperative RD&E environment;
 - Advocating the importance of new and emerging aquaculture growth; and
 - Communicating with Research Advisory Committees (RACs) and other FRDC subprograms/IPAs on:
 - ⇒ Research EOIs and full project applications received by the Subprogram – informing and seeking comment by RACs/subprograms/IPAs;
 - ⇒ Subprogram assessment of research EOIs and full applications; and
 - ⇒ Advice sought on new and emerging aquaculture related EOIs and full applications submitted to RACs or other subprograms/IPAs.

The IEC and SRAC assist the Subprogram in fulfilling its role and managing its projects.

5.1 FRDC R&D projects

The Subprogram follows the FRDC's standard operating procedures for project approval and management, especially regarding communication with other subprograms, IPAs and RACs.

5.2 Meeting Objectives

The Subprogram achieves its four key objectives through the following methods:

Objective 1: Collaborate with industry and government agencies to set strategic directions for new and emerging aquaculture growth opportunity research and development in Australia

A) Planning

- Development of the initial NEAO Subprogram strategic RD&E plan
- Establishment and annual review of strategic RD&E plan (update; identify gaps)

National Strategy Development (2015-16)

A planning workshop was held in November 2015 to scope the initial steps in Subprogram establishment. The participants formed the initial 'Reference Group' and included industry, research provider and government (DAWR) participants, with input sought from regulator stakeholders through the AFMF Aquaculture Subcommittee. A feasibility analysis and audit of past new and emerging aquaculture research and industry adoption was agreed as a priority activity for 2016. At a meeting in February 2016, the Interim Establishment Committee advised on modifications of terms of reference for the audit of past research and adoption. The audit will be conducted in 2016 in two phases. Phase I will involve an initial data analysis from past RD&E projects and the development of a risk matrix that could be used to evaluate new and emerging aquaculture opportunities (including risk decision points). Phase II will involve a detailed audit of case study RD&E projects, determined by the NEAO Subprogram Interim Establishment Committee (IEC), with consideration of Phase I results. The output of the two phases will include a risk decision matrix to be used by the IEC

and others, enabling projects to be accepted or rejected with a high degree of confidence based on experience and assessment.

Objective 2: Coordinate NEAO Subprogram research and ensure the quality and relevance of projects (project applications, project management, communication)

A) Development of applications

Project applications submitted to the Subprogram:

- Commissioned, unsolicited or forwarded (by FRDC, RACs or other subprograms/IPAs)

B) Assessment of applications

- Determine whether application fits criteria¹ (if not, provide advice/expertise/leadership)
- Evaluate need
- Evaluate feasibility
- Determine overall priority (against other applications)

C) Application funding

- Identify appropriate funding body/ies

D) Project management facilitation

- Assessment and execution of projects
- Communication/extension of results
- Encourage/facilitate adoption of results

E) Governance

- Reporting/accountability (FRDC)
- Structure (IEC; SRAC – expertise based)

F) Linkages

- Establish strategic alliances (including ACIAR, RIRDC, ARC)

Objective 3: Identify and pursue opportunities for cross-sector and inter-agency research to enhance aquaculture development in Australia

- Establish current RD&E issues in consultation with stakeholders, e.g. through the feasibility analysis and audit of past R&D aquaculture projects, including detailed case studies
- Establish strategic alliances (including ACIAR, RIRDC, ARC)
- Annual update of strategic RD&E plan
- Full review of strategic RD&E plan every 5 years

Objective 4: Coordinate and undertake the communication of results from new and

¹ See 6.1 below

emerging aquaculture opportunity research and development

Develop a communication strategy that may include:

- NEAO Subprogram newsletter
- Scientific workshops
- Website
- Provide scientific advice and communication to other subprograms/IPAs and RACs regarding new and emerging aquaculture research pre-proposals, applications, projects and results
- Databases

6 Research, Development and Extension

This section outlines the criteria used to determine whether a project falls within the Subprogram. Key research areas for the Subprogram are listed as a guide for applicants in developing projects for funding under the Subprogram.

6.1 Criteria (Draft only – pending outcome of feasibility analysis and audit of past R&D)

The Subprogram will apply the FRDC's implementation framework in relation to investment in new aquaculture initiatives. Briefly, FRDC will invest in new aquaculture initiatives that are 'exploratory funding', 'industry ready' or 'strategic partnerships' to:

- contribute to the objectives outlined in the FRDC RD&E Plan
- contribute to successful resource access for new aquaculture initiatives
- foster new ideas in a timely and tactical manner
- reduce elements of risk associated with establishing new aquaculture initiatives
- assist in attracting the level of capital investment and scale required to ensure success of new aquaculture businesses

To meet FRDC's criteria for funding new aquaculture initiatives, at least three of the following criteria will need to be met:

1. The species builds on successful existing wild caught species with high value and large domestic and/or export markets.
2. There exists a planning framework and access to resources to allow for its timely and orderly development; or the research investment could significantly assist in the granting of resource access.
3. The development is being driven by industry with significant existing investment. The activity is market driven and involves at least one commercial partner. Potential must also exist for Australia to exploit this market, or generate a local return from the market for aquaculture product. This requires evidence of existing market size, value, growth and existence of distribution pathways to supply it. There is evidence

that the activity can be adequately resourced (capital, personnel, expertise) to deliver a successful commercial outcome. This may follow a preliminary scoping and evaluation. The cost of production is competitive relative to the price point in the market. Normally this has meant high value market prices to offset the high cost of production in Australia.

4. The investment significantly enhances aquaculture or promotes the generation of a new business or regional development.
5. Investment will generate outputs that have capacity to attract additional or on-going investment.
6. Investment will address barriers to aquaculture production, including: disease management or health promotion*; feeds or feeding systems; hatchery production technologies; genetics or selective breeding; husbandry; or production technology.

The FRDC adopts a base position that investment in new aquaculture initiatives will generate know-how and public information rather than protectable IP.

* Note: Biosecurity is an important consideration in new and emerging aquaculture and is managed through Aquaplan with selected R&D supported through FRDC's Aquatic Animal Health and Biosecurity Subprogram (AAHBS).

Draft list of criteria (from Nov 2015 workshop)

- Market driven, industry led
- Competitive business model
- National – broad support
- Economic leverage – aligned to other funding sources; targeted to attract investor support based on results
- Technology status of the industry (are different criteria relevant depending on the stage of industry development?)
- R&D need/question
- Return on investment (financial, production volume (t), jobs, social and cultural)
- Risk balance (in Subprogram research portfolio)
- Predominantly pre-competitive
- To avoid market failure
- Species must be suitable for aquaculture
- Planning approvals are in place

-
- Where applicable, species suitable for remote locations – eg do not need to be fed
 - Species is endemic to Australia?

6.2 Key research, development and extension themes

When developing project applications for funding through the Subprogram, the outcomes of the project should address at least one of these key RD&E areas. Current priorities for NEAO are listed under pertinent themes.

6.2.1 Facilitation

SCOPE

Update – consider notes from the November 2015 workshop & audit findings.

- Subprogram strategic planning and coordination
- Facilitate R&D knowledge transfer in new and emerging aquaculture
- Human capital development
- Facilitate the development of training and extension tools
- Communications

Proposed 20% of Subprogram funding 'sheltered' for facilitation.

CURRENT PRIORITIES

- Audit - review current and previous progress on species RD&E across Australia
- Facilitate and partner with conference (biennial), targeted workshops (common need/interest/issue)
- Facilitate professional development of research higher degree candidates
- Facilitate bursaries, technical exchange, workshop/conference attendance

6.2.2 Species

SCOPE

Update – consider notes from the November 2015 workshop & audit findings.

- Overcoming production barriers and industry growth issues potentially for:

Finfish

Tropical – groupers, barramundi, cobia

Temperate – yellowtail kingfish, snapper, freshwater Murray cod

Cool temperate – Blue eye trevalla

Shellfish

Tropical oysters

Temperature – oysters, flat oysters, native oysters, pipis, cockles, etc

Other

Octopus

Crustaceans

Polychaetes

Algae

CURRENT PRIORITIES

- Audit - review current and previous progress on species RD&E across Australia
- Decision support matrix for RD&E project evaluation

6.2.3 Functional

SCOPE

Update – consider notes from the November 2015 workshop & audit findings.

- Health Program
- Nutrition and Feed development
- Business Models and ROI tools
- Production systems

CURRENT PRIORITIES

Some work needed to reduce/prioritise these and align with budget table

- Surveillance and Farm health response (Crustacean, Mollusc and Finfish) – early pathogen detection
- Extension of results to farmers and how to manage identification and diagnostics, record keeping, control manual protocol
- Disease management or health promotion
- Develop a vaccine/treatment for VNN in grouper
- Environmental health detection in ponds and tanks – e.g. Cobia model; eDNA technology
- Nutritional gap analysis – whole body analysis, proximate analysis for finfish, crustacean and octopus
- Nutrition/FCR/Feeds/gut microbiomes-probiotics
- Small feed batch production – include information on capability
- Evaluate immunostimulants – increase awareness of immunostimulant trials
- Feeding delivery – type of feeds, frequency, density etc
- Review and collate existing business planning tools - possible ROI decision tool for R&D investment

6.3 The application process

A general guide to developing research proposals for submission to FRDC is provided on the FRDC Website (http://frdc.com.au/research/applying_funding/Pages/default.aspx) and

should be followed. The following guide is specific for submissions directed to the FRDC NEAO Subprogram. In addition, PIs may contact any of the NEAO committee members to obtain advice of the relevance of any project idea to the NEAO.

In the sections that require text, it may be useful to draft these using your normal word-processor (e.g. MS Word) so that you can use tools such as spell-check and word-count and then copy and paste the final text into the on-line application. Thus poor presentation will not distract reviewers from the proposal content.

6.3.1 The time-line

The project development and review process for new proposals will normally take up to 12 months, according to the following schedule:

To be completed with current/standard process

Also need to include procedures for 'out of round' submissions

7 Current *and completed* projects within the New and Emerging Aquaculture Opportunities Subprogram

Projects are listed according to the most relevant key RD&E themes and as such some projects may be listed more than once because they are relevant to more than one key research area. For completed projects the date of the Final Report is included.

7.1 Facilitation

2014/246.20: New & emerging aquaculture opportunities Subprogram: Establishment.
(Jennifer Cobcroft) TBA.

List projects

7.2 Species

List projects

K4P subprojects

NSW Fisheries Kingfish

Cobia – DAFF

Etc.

7.3 Functional

List projects

8 Further information

- **New and Emerging Aquaculture Opportunities Subprogram website:**

Go to the FRDC website www.frdc.com.au and follow the links: Research/New & Emerging Aquaculture

- **Contact New and Emerging Aquaculture Opportunities Subprogram:**

NEAO Leader

Tel: ?? Fax: ??

Email: TBA

- **Postal Address:** FRDC