Workshop - Aquaculture opportunities in northern Australia

Solutions and Strategies

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July 2020

FRDC Project No **2019-096**

ISBN 978-0-6486803-4-5

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2019-096

2020

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Acknowledgments

The workshop organising team comprised Jennifer Cobcroft, Sandra Hughes and Melissa Joyce of James Cook University, and Wade Clarke of Rockhampton Regional Council. Jo-Anne Ruscoe provided writing support in preparation of the application for this FRDC project.

Support to promote the workshop and communicate with potential participants was provided by: Rob Bell of Blueshift Consulting, Greg Coman and Simon Irvin of CSIRO, Kim Hooper and Camilla Thompson of the Australian Prawn Farmers Association, Jo-Anne Ruscoe of the Australian Barramundi Farmers Association, Michael Davis of the Indigenous Land and Sea Corporation, Carla Keith and Sally Leigo of the Cooperative Research Centre for Developing Northern Australia, Wayne Hutchinson of FRDC, and Matt Osborne of NT Department of Fisheries.

Jess Fitzgerald (Blueshift Consulting) is thanked for provision of the Mentimeter slides. We thank all of the speakers and presenters at the workshop, as named in Table 1.

We appreciate the contributions of all attendees to the conversations and activities in the workshop, and for devoting two days, plus travel time, to participate in the workshop.

The team at CocoBrew are thanked for their catering and agility in hosting the workshop event.

Abbreviations

Acronym	Definition
ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences
ABFA	Australian Barramundi Farmers Association
APFA	Australian Prawn Farmers Association
CoOL	Country-of-Origin Labelling
CRCNA	Cooperative Research Centre for Developing Northern Australia
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DPIR	Department of Primary Industry and Resources, Northern Territory Government
DPIRD	Department of Primary Industries and Regional Development, Government of Western Australia
FRDC	Fisheries Research and Development Corporation
GVP	Gross Value Product
ILSC	Indigenous Land and Sea Corporation
IRG	Indigenous Reference Group, an advisory committee to the FRDC
NA	Northern Australia
NAC	National Aquaculture Council
NT	Northern Territory
ONA	Office of Northern Australia
QDAF	Queensland Department of Agriculture and Fisheries
QLD	Queensland
RAC	Research Advisory Committee
SPR	Specific Pathogen Resistant
WA	Western Australia

Executive Summary

What the report is about

This report provides a summary of the 'Aquaculture opportunities in northern Australia: Solutions and Strategies Workshop' held in Rockhampton, 5-6 February 2020. This FRDC project supported James Cook University, the Australian Barramundi Farmers Association, Australian Prawn Farmers Association and Rockhampton Regional Council to organise and host the workshop. The Cooperative Research Centre for Developing Northern Australia (CRCNA) commissioned an Aquaculture Situational Analysis to understand the current situation and future challenges and opportunities for aquaculture in northern Australia. This facilitated stakeholder workshop brought together 85 key stakeholders and enablers from across northern Australia to (a) test, refine and gain buy-in for the 'Vision 2030 for aquaculture in northern Australia' and (b) prioritise recommendations to enable industry expansion. The workshop gathered current feedback for inclusion in the final CRCNA situational analysis report and for consideration in parallel strategies under development for the FRDC and a number of its industry partners (barramundi and prawns, in particular, developing their 5 year plans, and the National Aquaculture Council is looking to reinvigorate its strategic direction).

Background

Northern Australia has multiple advantages for aquaculture industry development especially linked to natural resources and proximity to export markets. However, there are challenges to expansion such as remote locations and lack of infrastructure. The value from aquaculture in northern Australia was around $223 million in 2016-17, only 17% of the national industry value. It is constituted by production of pearls (non-edible) (31%), prawns (32%), barramundi (33%) and other species (tropical rock oysters, redclaw and other finfish) making up the remaining 3% of value. Existing aquaculture producers are investing, as are new investors, to expand barramundi, prawns, and tropical rock oysters largely focused on domestic market supplies. New lobster and redclaw projects targeting overseas markets are also being developed. The situational analysis project estimates that at least 1400 direct new jobs, at a range of skill levels, will be created through planned aquaculture expansion in northern Australia by 2030. There is industry optimism that given the right incentives and conditions, the overall aquaculture industry in northern Australia could reasonably expand to five times its current production and achieve gross value product (GVP) of greater than $1b per annum by 2030. This project supported a stakeholder workshop to refine and endorse the industry Vision 2030 for expansion and the recommendations for action that will protect and catalyse the realisation of aquaculture's potential in northern Australia.

Objective

The project objective was to facilitate a successful workshop to refine and strengthen a Northern Australia Aquaculture Industry Vision 2030 and Situational analysis, with a focus on defining strategy, actions and solution providers.

Methodology

The situational analysis project steering committee oversaw planning and carriage of the workshop organisation including the program and logistics. Invitations were sent to over 350 stakeholders, including key representatives recommended by FRDC and the FRDC's Indigenous Reference Group.

Results/key findings

Stakeholders endorsed the Northern Australia Aquaculture Industry Vision 2030: "*In 2030, northern Australian aquaculture will be a nationally significant ($1b a year GVP), cohesive, sustainable, respected industry, providing premium products to Australian and international markets, that contributes to the prosperity and diversification of regional and Indigenous communities across the north.*"

Participants emphasised the need to de-risk investment and enhance expansion of aquaculture in northern Australia through: bolstered biosecurity; market development and access; aquaculture infrastructure investment; building and retaining skills; creating opportunities in Indigenous aquaculture; stronger governance; and industry focussed RD&E. Stakeholders reiterated that bolstering biosecurity for northern Australian aquaculture was their highest priority. Additional action pathways and potential solution providers were added to the recommendations of the situational analysis study.

Implications for relevant stakeholders

The workshop contributed to the northern Australia aquaculture industry situational analysis report which will be distributed to a broad group of stakeholders including industry, political leaders, government agencies, funding agencies, universities, research organisations, training organisations, Indigenous organisations, NGOs, and the broader community. The priorities and pathways documented can be used by decision-makers in industry, the community and government to enhance aquaculture development in northern Australia.

The workshop report contributes information and perspectives that may inform other national and industry strategic plans - including for the FRDC, ABFA, APFA, and NAC.

Recommendations

The northern Australian aquaculture industry's highest priority is to reduce the risk of exotic or endemic disease, which threatens both current production and adds risk to investment in industry expansion. A more collaborative approach of industry and biosecurity agencies was advocated, through open conversation and a good flow of information, with resolution of the Aquatic Deed a key sector priority. Inclusion of a range of stakeholders (aquaculture producers, wild fishers, recreational fishers and the Indigenous community) was seen as an important mechanism to communicate the scientific evidence and urgency required in biosecurity policy and risk assessment review, and implementation at the border and at enterprise level, to protect species in aquaculture and within their natural habitat.

Market access and market development are key needs driven by the projected increase in product volume in northern Australia, and the high volume required to access some markets. Enhanced understanding of consumer trends and future needs will support the interests of different sized companies in the market. There is currently a gap in 'hubs' in aquaculture in northern Australia required to achieve market-scale production for both domestic and export supply and well-planned infrastructure investment is a priority. A collaborative approach among industry, government and training organisations is required to address the need for at least 1400 new staff and to retain skilled people in aquaculture in northern Australia. Bringing Indigenous groups together to share experiences in aquaculture, and the inclusion of industry mentoring in development activities, will build opportunities for greater Indigenous economic development and independence in the aquaculture industry.

The workshop discussion identified that research priorities for the key sectors (barramundi, prawns and pearls) are well-defined within association strategic plans. The RD&E priorities of those industries are predominantly funded by industry partnership with FRDC through Industry Partnership Agreements (IPAs). However, the communication to the jurisdictional Research Advisory Committees of priorities for new and emerging sectors in northern Australian aquaculture, and pan-northern cross-sector RD&E needs, should be improved to provide increased awareness of opportunities and support for sector development in northern Australia.

Keywords

Aquaculture; Northern Australia; Indigenous aquaculture; Barramundi; Black Tiger Prawn; Banana Prawn; Pearl Oysters; Redclaw; Groupers; Cobia; Barcoo Grunter; Tropical Rock Oysters; Tropical Rock Lobsters; Moreton Bay Bugs; Freshwater Prawns; Sea cucumbers; Macroalgae; Microalgae; Ornamentals; Giant Clams; tropical freshwater fish; tropical marine fish

Introduction

Background

Northern Australia has multiple advantages for aquaculture industry development especially linked to natural resources and proximity to export markets. However, there are challenges to expansion such as remote locations and lack of infrastructure. Pearl oysters, prawns and barramundi, all high value products, are the largest sectors with all or substantial production in northern Australia. In 2016-17, northern Western Australia, the Northern Territory and northern Queensland, comprised 17% of national aquaculture value (calculated from ABARES data; Mobsby, 2018). Data from the "Northern Australia aquaculture industry situational analysis" funded by the Cooperative Research Centre for Developing Northern Australia (CRCNA), revealed annual GVP (2016-17) from aquaculture in northern Australia was around $223 million (Cobcroft et al, 2020a). It is constituted by production of pearls (non-edible) (31%), prawns (32%), barramundi (33%) and other species (tropical rock oysters, redclaw and other finfish) making up the remaining 3% of value. Industry sentiment and estimates indicate a probable doubling of production by 2030 to achieve an annual value of at least $535 million. Existing aquaculture producers are investing, as are new investors, to expand barramundi, prawns, and tropical rock oysters largely focused on domestic market supplies. New lobster and redclaw projects targeting overseas markets are also being developed. The project estimates that at least 1400 direct new jobs, at a range of skill levels, will be created through planned aquaculture expansion in northern Australia by 2030. There is industry optimism that given the right incentives and conditions, the overall aquaculture industry in northern Australia could reasonably expand to five times its current production and achieve GVP of greater than $1b per annum by 2030.

The CRCNA commissioned an Aquaculture Situational Analysis to understand the current situation and future challenges and opportunities for aquaculture in northern Australia. JCU was the lead for this analysis. The situational analysis project secured input from stakeholders on what northern Australian aquaculture development could look like by 2030, and to identify some of the roadblocks and RD&E that needs to be addressed before the industry can truly reach the economic potential that is envisaged. Input has been provided from Indigenous stakeholders; aquaculture sectors (barramundi, prawns, pearls, redclaw, other marine and freshwater fish, tropical rock lobsters and slipper lobsters, and blacklip oysters); Commonwealth, State and Territory Government agencies; research agencies; funding agencies; education and training providers; feed and equipment suppliers; and aquatic health and biosecurity experts. An online survey, detailed production surveys and five workshops (Torres Strait, Broome, Townsville, Cairns, Darwin) were the key elements for providing preliminary input to the vision prior to the workshop in Rockhampton (this project). An important output of the situational analysis project is to deliver an industry-supported Vision 2030 for aquaculture in northern Australia, and prioritised recommendations for the support required to enable industry expansion.

Need

At completion of the CRCNA funded "Northern Australia aquaculture industry situational analysis" there was a need for a facilitated stakeholder workshop to bring together the key stakeholders and enablers from across northern Australia to (a) test, refine and gain buy-in for the 'Vision 2030 for aquaculture in northern Australia' and (b) to prioritise recommendations to enable industry expansion. Additionally there was a need to ensure that the workshop provided an opportunity to discuss how the project outcomes could align and inform parallel strategies in development for the FRDC and a number of its industry partners (barramundi and prawns, in particular, are developing their 5 year plans, and the NAC is looking to reinvigorate its strategic direction).

The FRDC plays a critical role in funding RD&E that underpins aquaculture industry growth nationally. With a federal policy and investment focus on the North, it is vital that we align RD&E funding priorities, identify solution providers across multiple stakeholder groups, and ensure synergies in activity among industry, research providers, and funding agencies.

This workshop supported alignment and efficiencies across multiple sectors and provided valuable input to the FRDC's own strategic plan.

Objectives

- To facilitate a successful workshop to refine and strengthen a Northern Australia Aquaculture Industry Vision 2030 and Situational analysis, with a focus on defining strategy, actions and solution providers.

The only change from the original proposed objective was the date for the Industry Vision, which was revised from 2028 to 2030.

Method

The workshop was originally planned to be held in November 2019 at Rockhampton. Following consultation with industry, specifically to avoid peak production activities in November-January, the workshop was deferred until 5-6 February 2020.

The CRCNA project steering committee oversaw planning and carriage of the project. Fortnightly teleconferences were held in November-December 2019, progressing to weekly meetings from January until the conference date, and one de-briefing meeting after the event. The key tasks for workshop implementation were:

1. Workshop date and venue was confirmed on 11th December 2019 and facilitator/s were confirmed by 28th January 2020.
2. The process for allocation and disbursement of travel funds was agreed and documented in December 2019.
3. ABFA and APFA directly coordinated representation and travel support funding for their association members, within the project allocated budget.
4. Following consultation with FRDC and FRDC's Indigenous Reference Group (IRG), Indigenous representatives were invited to attend and offered travel funding support (within the allocated project budget). Initially invitations were sent to three organisations/individuals in each of four areas: Torres Strait, Queensland, Northern Territory and Western Australia. If invitations were declined, another representative was invited from the same jurisdiction.
5. Invitations were distributed to the project stakeholder database with over 350 contact names, and to some additional stakeholders suggested by FRDC, on 11th December 2019.
6. A workshop flyer was prepared and included in the invitation outlining the workshop objectives and background as follows:
   <u>Workshop objectives:</u>
   - explore the recommendations of the northern Australia Aquaculture Industry Situational Analysis project, discuss gaps to address the recommendations
   - propose solutions, strategies and next actions to address barriers or develop opportunities, and identify potential solution providers
   - network with stakeholders across jurisdictions and diverse industry sectors in tropical aquaculture

   <u>About the Workshop</u>
   Northern Australia has multiple advantages for aquaculture industry development especially linked to natural resources and proximity to export markets. However, there are challenges to expansion such as remote locations and lack of infrastructure.
   The CRCNA commissioned a 'Northern Australia Aquaculture Industry Situational Analysis' to understand the current situation and future challenges and opportunities. An important output of the project is to deliver prioritised recommendations for the support required to enable industry expansion.
7. Teleconference capacity was established for selected regional sites - determined by demand and location. However, given an associated videoconference was held early in December 2019, which was accessible with the use of personal devices, the Rockhampton Workshop was focussed as much as possible on face-to-face interaction and group discussion.
8. The final workshop agenda was approved by the project steering committee on 31st January 2020, and presentations were drafted by 4th February.
9. Workshop scribes were appointed from the steering committee and workshop administrative support team.
10. A draft report {this document} was approved by the steering committee and forwarded to FRDC by 13th February 2020.

Results, Discussion and Conclusion

The 'Aquaculture opportunities in northern Australia: Solutions and Strategies Workshop' program was a full two days, commencing with scene setting in the Australian aquaculture RD&E environment and the local Queensland context (Table 1). This was followed by a summary of the findings of the northern Australia aquaculture situational analysis study. The delegates then discussed six of the seven proposed project recommendations in facilitated workshops and provided additional suggestions for pathways to address the recommendations. On day 2, there were presentations on developments in aquaculture in QLD, WA and NT, along with industry sector initiatives for redclaw in QLD, barramundi in NT, and seaweed in QLD. Allen Harian (Blue-X) led a workshop on aquaculture innovation and prioritisation of challenges. After lunch, presentations covered a broad scope of practical information for aquaculture including: nutritional strategies, supply chains, AI and IoT applications, NAIF financial support, energy retail partnerships, and global aquaculture standards. The final session was an informal discussion of aquaculture development in greenfield sites, particularly relevant to landholders, new entrants and aquaculture development areas in QLD.

The workshop was attended by 85 people overall, 79 in person in Rockhampton and six additional people by Zoom teleconference (Table 3). Many of these delegates had not attended previous workshops during the situational analysis study. Nonetheless, there was agreement of the Rockhampton workshop group with the stakeholders consulted during online survey (n = 117 respondents) and regional workshop (over 150 attendees) data collection phases of the situational analysis to inform the recommendations and pathways for action proposed.

Contributions of the workshop participants to the situational analysis recommendations are documented below, along with general discussion observations. Where presenters gave permission, a PDF copy of presentations is included in the appendices.

Figure 1. Participants in the 'Aquaculture opportunities in northern Australia: Solutions and Strategies Workshop'

Workshop Agenda

Table 1. Aquaculture opportunities in northern Australia: Solutions and Strategies Workshop agenda

Day 1	Wednesday 5th February 2020	Comments/Details
08:15 – 08:30	Registration	Arrival tea and coffee
08:30 – 08:40	Welcome to Country	George James, Darumbal
08:40 – 08:45	Housekeeping	Dean Jerry, JCU
08:45 – 09:00	Welcome to Rockhampton (region's aspirations for aquaculture)	Mayor Margaret Strelow, Rockhampton Regional Council
09:00 – 09:10	Aquaculture in Queensland	Queensland Government
	Workshop Introduction	
09:10 – 09:25	CRCNA – northern Australia development – perspective of broader situational analyses	Jed Matz, CRCNA
	Aquaculture strategy – national and northern Australia	
09:25 – 09:40	FRDC's strategic 2020-25 RD&E Plan – update	Wayne Hutchinson, FRDC
09:40 – 09:50	CRCNA Aquaculture industry situational analysis – proposed recommendations	Jennifer Cobcroft and Rob Bell
09:50 – 10:10	Industry participant perspective and expectations and goals for the workshop	Facilitated Q&A
10:10-10:30	Morning Tea	
10:30-11:30	Recommendation: Bolster Biosecurity (border, regional and enterprise level) - Status government (Commonwealth and State) and industry perspectives	Facilitated discussion - Linking current status, activity, and gaps, with next actions for northern Australia, including identified solution providers.
11:30-12:30	Recommendation: Market Development and Access (building the market and expanding aquaculture production)	Facilitated discussion - Status; Gaps; Actions for northern Australia; identified solution providers.
12:30 – 13:15	Lunch	
13:15 – 14:15	Recommendation: Aquaculture Development Hubs (infrastructure to increase efficiency and establish production in identified aquaculture areas and zones in NA)	Facilitated discussion - Status; Gaps; Actions for northern Australia; identified solution providers.
14:15 – 15:15	Recommendation: Build Skills	Facilitated discussion - Status; Gaps; Actions for northern Australia; identified solution providers.
15:15 – 15:45	Working Afternoon Tea	
15:15 – 16:15	Recommendation: Indigenous engagement and independence through aquaculture Case study of Indigenous aquaculture ventures - (Case study NT, Matt Osborne)	10 min presentation(s) followed by facilitated discussion. Status; Gaps; Actions for northern Australia; identified solution providers
16:15 – 17:15	Recommendation: Aquaculture Governance	Facilitated discussion - Status; Gaps; Actions for northern Australia; identified solution providers.
17:15– 17:30	Wrap-up day 1	Feedback from recommendations and ways forward
19:00-22:00	Dinner for registered participants - CocoBrew - 114 William St, Rockhampton	

Day 2	Thursday 6th February 2020	
08:45-09:00	Registration	Arrival tea and coffee
09:00 – 09:45	Plans to meet your 2030 goals for aquaculture in northern QLD 1. Aquaculture Development Area uptake and future strategy (Stephen Smith, QDAF) 2. QDAF RD&E Plan (Paul Palmer, QDAF) 3. Production expansion of redclaw in QLD (Josh McNally, Fusion Farming)	All day option for breakout session(s): Industry-led project development – capturing details of industry needs on priority projects (e.g. barramundi market development) 12 min each, followed by Q&A.
09:45 – 10:30	Plans to meet your 2030 goals for aquaculture in northern Australia 1. Northern Australia Water Resource Assessment study: land-based aquaculture opportunities in NA (Greg Coman, CSIRO) 2. Opportunities in seaweed aquaculture (Alexandra Campbell, USC) Plus 15 min facilitated discussion on seaweeds.	12 min each, followed by Q&A.
10:30 – 10:50	Morning Tea	
10:50 – 11:35	Plans to meet your 2030 goals for aquaculture in northern Australia 3. Update on DPIRD aquaculture initiatives in northern WA (DPIRD) 4. NT aquaculture strategy and R&D (Matt Osborne, DPIR) 5. A snapshot of the Humpty Doo Barramundi story (Dan Richards, Humpty Doo)	12 min each, followed by Q&A.
11:35 – 12:35	Aquaculture product innovation (Allen Harian, Blue-X)	Presentation and workshop activity.
12:35-13:30	Lunch	
13:30-15:00	Making the most of innovation for production performance, efficiency and markets 1. Optimising nutritional strategies for barra and prawns – what we know about cost and performance drivers from more rigorously studied species. (Leo Nankervis, JCU) 2. Challenges of developing aquaculture supply chains: The case of oysters. (Peggy Schrobback, CQU) 3. Improving farm efficiency, environmental risk management, and increased aquaculture business revenue with AI and IoT. (Andy Davison, Umitron) 4. Northern Australia Infrastructure Facility – how does it work for aquaculture? (Peter Ross, NAIF) 5. Improving Energy Productivity in Queensland Aquaculture through retail partnerships (Brendan Young & Jackie Barber, Energy Market Matters) 6. Global standards for tropical aquaculture species: Environmental and Market Implications and Opportunities for the Australian farming sector (Geoffrey Muldoon & Simon Miller, WWF)	12 min each, followed by Q&A.
15:00 – 15:30	Facilitated discussion, next steps for the NA Situational Analysis Project	
15:30-15:50	Afternoon Tea	Option for people travelling to depart (e.g. 5:05pm flight)
15:50 – 16:30	What are the key requirements to drive greenfield aquaculture? (Facilitated discussion)	
16:30 – 17:00	Workshop wrap-up	Jennifer Cobcroft and Rob Bell

Workshop Participants

The workshop participant representation is described in the table addressing project key performance indicators (Table 2). In summary, the event was attended by 85 people, 79 in person and six by Zoom teleconference. Participants covered diverse interest groups from production, aquatic animal health, supply chain, feed companies, equipment suppliers, regional development, aquaculture policy, research, education and training, Indigenous business development, environment NGO, local landholders and potential new entrants.

Table 2. Workshop project performance indicators

Performance Indicators	**Achievement**	**Comment**
1. Number of Attendees: 75	85 attendees	79 participants in person and 6 via teleconference
2. Key sectors are represented: Six Aquaculture industry sectors (Barramundi, Prawns, Pearls, Redclaw, Lobster, Oysters)	Five sectors represented	Five of the six key industry sectors were represented (barramundi, prawns, redclaw, tropical oysters and lobsters). Pearls were the only sector not represented. 17% of attendees were producers and association representatives (n=14).
12 Traditional owners (inclusive of WA, NT, QLD and Torres Strait traditional owner (TO) groups)	Eight delegates, including four that received travel funding support from the project.	Traditional owner and Indigenous organisations were represented by 4 delegates from QLD, one from the Torres Strait, plus two from the Torres Strait Regional Authority (TSRA). There was also one representative of FRDC's IRG from NT.
Government (Regional development, Aquaculture Policy)	19 delegates	Government department support was strong, comprising 22% of attendees, with 1 delegate from a federal agency (ACT), 1 from NT, 2 from TSRA (as above), 3 dialling in from WA, and 12 from QLD.
Funding agencies (FRDC, CRCNA)	Three delegates	FRDC and CRCNA represented.
Project partners (JCU, CSIRO, ILSC, Blueshift)	All four partners represented	
Research & education	14 delegates	The research and education sectors comprised 16% of participants.
Aquatic animal health (AAH)	Three delegates	Three delegates directly linked to AAH.

Supply chain	One delegate	
Feed companies	Three delegates	8% were feed company and supplier representatives (n=7).
Equipment suppliers	Four delegates	
3. Significant progress as a result of the workshop to finalise an industry-supported Vision 2030 for aquaculture in northern Australia and prioritise recommendations for the support required to enable industry expansion.	No changes were suggested to the proposed Vision 2030, which is now included in the final situational analysis report. The group noted that aquaculture RD&E prioritisation is predominantly addressed through FRDC and industry association strategic planning. Additional priority actions were added to the recommendations.	

Feedback on Recommendations

Text in blue is the content proposed in the preliminary Stage 1 situational analysis report and discussed by participants (Cobcroft et al, 2019). Black text is new, based on contributions from the workshop participants.

Bolster Biosecurity

The proposed recommendation is to bolster aquaculture biosecurity through:

- review of policy and meeting the requirements for improved risk assessments and R&D programs to better understand biosecurity risk and management at the border
- increased pathogen understanding, documented risks, transmission pathways, and practical surveillance implemented for the aquaculture industry in northern Australia
- establishment of the most effective structures to develop high health lines for key production species.

There were no suggested changes in relation to the nature of the recommendation and this was supported as the NA aquaculture industry's highest priority recommendation.

Potential action owners and potential key partners presented to the workshop participants were:

- Commonwealth Department of Agriculture
- State and territory responsible departments and agencies
- Industry
- Animal Health Australia
- FRDC, Aquatic Animal Health Subprogram
- Australian Animal Health Laboratory, CSIRO, Victoria
- Universities
- Diagnostic laboratories
- Veterinary service providers

Additions from participants were:

- Innovation Hubs to develop tech-based solutions
- Border Force (ballast water control)
- Recreational fishers
- Consumers
- General public
- Industry Associations/consortium to pursue the Aquatic Deed and policy review
- Re high health lines for prawns – APFA, Corporate producers and CSIRO conversation
- Local government staff
- Indigenous Rangers trained and resourced for on the ground expertise
- NRM's Oceanwatch – potential new player

Potential pathways to implementation and timeline presented to the workshop participants was:

Policy

- Resolution of Aquatic Deed
- Implement existing sector biosecurity plans and complete plans for other NA sectors
- Improve the working relationship between producers and agencies
- Support sector-specific biosecurity plan writing for NA enterprises
- Complete emergency response drills
- R&D to better understand biosecurity risk and threats from imports
- Commence R&D on transmission pathways
- Review policy and risk assessment with clear government – industry communication
- Implement accountability measures
- Review biosecurity architecture aligned with NA industry growth
- Industry Associations need to unify or unite on biosecurity
- Propose a summit for state, territory, federal government and industry to understand the risk assessment process and breakdown the opacity of decision making and policy. The summit would plan a pathway to policy change which would inform any RD&E or industry planning/implementation undertaken. (proposed by ABFA and APFA)
- Ensure emergency response plans are in place for all species – consider a levy in place to support this
- Assumptions present in risk assessments need to be assessed through research
- Identify/establish a clear reporting process to influence future biosecurity policy formation
- Include protection of wild stocks (value for ecosystem services, biodiversity, iconic species protection, traditional fisheries, wild capture fisheries)
- Increase the consideration of biosecurity risk in NA with current biosecurity management agencies
- Identify pathways for disease incursion (biosecurity risk) from NA neighbours
- Resolve the Aquatic Deed (it is not until a disease happens that this is activated) to establish clear prior agreement of response management, cost sharing and compensation, including Commonwealth government (border responsibility) state and industry (farm, enterprise-level) responsibilities.
- Ensure each stakeholder has capacity to fulfil biosecurity commitments as it is a shared responsibility
- Industry Risk Assessments (IRAs) need to be flexible and updated when new risks emerge
- Address frozen imports through enhanced border surveillance
- Develop biosecurity training accreditation for industry to improve enterprise level biosecurity and to represent industry during disease response events.

- Leverage other agencies
- Consideration of human health in conjunction with aquatic animal health for access to more resources (this occurs in Singapore)

Pathogen understanding & surveillance

- Prioritise tests not currently available in NA for timely diagnostics – on-farm and NATA-accredited labs
- New co-funded positions to establish diagnostics in NA
- Develop 'farm guides' for early identification and implement monitoring
- Integration of land and sea Rangers in surveillance and monitoring
- Increase the focus to clearly identify the impact of endemic disease and address improved management
- Establish a co-ordinated approach to analysis of the large amount of data collected
- Establish baseline surveillance data (currently no or limited baseline data)
- Enhance diagnostic resources for endemic and exotic pathogens
- Annual training for industry, including updates on biosecurity and an update and refresher on responses
- Clarify the financial benefits to industry of undertaking disease monitoring/testing
- Quantify the economic cost (including social impact and business risk) of a disease incursion, the biosecurity risk, and the cost of surveillance and management
- Achieve faster approval for rapid test kits on farm (this currently requires approval from the state)
- Surveys are needed to collect data on (potential) transmission pathways and to quantify the risk of exposure
- Establish a national network of diagnostic laboratories with consistent methodologies
- Establish an education program for producers, including provision of sampling kits to enable producers to send viable samples
- Health management and stress reduction
- Alternative cropping practices – intensive and protection
- Establish a 'biosecurity levy' on imports to support surveillance costs
- Propose establishment of a national database of endemic disease and a benchmarking project to compile 3-4 years of PCR screening data that is currently private. The prawn sector (APFA members) have data which could be released (with farmer agreement, and anonymously shared through a third party), to benchmark prevalence and explore trends. APFA could drive it and propose funding through FRDC's Aquatic Animal Health Subprogram.

High health lines for key species

- Determine best (cooperative) model for high health, domesticated lines of key species (e.g. prawns, barramundi, pearls, oysters)
- Establish high health lines
- Potential to streamline provisions to amend the live import list to trial/access pathogen-free strains
- Disperse broodstock across different geographic locations to mitigate disease outbreaks
- Establish a broodstock quarantine method for all sectors
- Evaluate the potential to develop a post-entry quarantine facility in WA that supports the introduction of new/better genetics on a commodity basis
- Establish a single point of policy influence/advocacy at a Federal level – re importation of high health lines

- Bring importers who are creating the risk of disease introduction into the frame of policy discussion and risk assessment
- Any high-health aspiration needs to broach wild stock broodstock sourcing before any cohesive breeding program can develop
- Data sharing and timelines is critical to regional and national programs – diagnostics (spend) is a bottleneck
- Establish program for breeding for resistance
- Species resistant to disease – Specific Pathogen Resistant (SPR) and alternative crops for business resilience

General workshop discussion – Biosecurity

Biosecurity is perceived as a critical issue for the aquaculture industry (producers), wild fishers, recreational fishers and the Indigenous community. The group discussed the need for a more collaborative approach with Biosecurity agencies, through open conversation and a good flow of information. There was concern about mixed messages, such as "If it's {exotic pathogen(s)} not serious enough to stop it coming in across the border, why is it serious enough to come on farm and kill all the stock". The current situation is that it is industry's responsibility to provide evidence of the risk associated with the importation of products. This requires that industry provide the science that informs revision of risk assessments. However, it was acknowledged that this is a complex environment linked to trade negotiations and requires strengthened industry representation and communication of research evidence to federal government decision-makers.

Both exotic and endemic pathogens and parasites are recognised as posing a risk to the aquaculture (specific activities listed above).

Resolution of the Aquatic Deed, which will clarify cost-sharing arrangements in the event of a disease outbreak, was determined as an urgent need for sign-off before an event.

Inclusion of a range of stakeholders (aquaculture industry (producers), wild fishers, recreational fishers and the Indigenous community) was seen as an important mechanism to communicate the scientific evidence and urgency required in policy and risk assessment review, and implementation at the border and at enterprise level, to protect species in aquaculture and within their natural habitat.

Market Development and Access

The proposed recommendation is to support the northern Australia aquaculture industry in market development and access (domestic and international).

There were no suggested changes in relation to the nature of the recommendation and this was supported as the NA aquaculture industry's second priority recommendation.

Potential action owners and potential key partners presented to the workshop participants were:

- Industry
- Consultants
- Universities
- Austrade
- Industry associations

Additions from participants were:

- Capital and market investors – Impact investors – Funds looking into 'Green' investment
- State and Territory governments, e.g. InvestNT, Trade and Investment QLD
- Global standards & certification bodies – marketing departments
- National certification bodies
- Exporters
- Other successful industries (for consultation and experience)
- Aligned industry such as wild fishers (e.g. Love Australian Prawns)
- Supermarkets (responsible seafood policies drive purchasing and certification will be needed moving forward to access this market)
- Statutory Authorities (e.g. ILSC working on certification and branding of Kakadu Plums)
- FRDC (can fund research to inform marketing campaigns; the Primary Industries Research and Development Act has recently changed to allow funds to be used for industry marketing, e.g. Love Australian Prawns)
- Indigenous partners (involve communities, embrace and share their story)
- Tourism sector (linked to aquaculture; e.g. Broome for pearls, barramundi and oysters)
- Commonwealth Department of Agriculture (negotiating import and export protocols)
- Seafood Brokers (driving demand for the product/commodity through the supply chain)
- Government (especially linked to Country-of-Origin Labelling (CoOL) – opening the market for Australian products)

Potential pathways to implementation and timeline presented to the workshop participants was:

- Define data gaps and analysis needs for seafood trade and market data for key production species, through a pre-competitive roundtable discussion
- Understand consumer trends and future needs
- Economic analysis of the potential impact of higher product volumes, to inform sector market strategy
- Undertake trade delegations to potential international markets (e.g. US and China), combined with a consumer analysis in export countries (what do they buy?; product types; certification needed) to inform the delegation before travel
- Develop sector branding
- Use R&D to address consumer needs, create verification and traceability tools for consumers to understand unique NA aquaculture product(s), integrity, and that engage with innovation in the tools available (including blockchain) and under development to determine provenance (proposed that industry associations take the lead)
- Promote CoOL in seafood – add the northern Australian voice to the national campaign; add at least one other jurisdiction for CoOL
- Understand digital opportunities for northern Australian aquaculture – sales, promotion, and reduced supply chain connections and costs
- Enhanced consumer and community awareness campaigns
- Product development and value-add opportunities
- Strengthening the quality/accuracy of available, anonymised, jurisdiction and national production data (to allow the measurement of trends and efficiencies (yield per pond area in production), track growth of the sector, and volume will underpin market development and access particularly with links to export markets) (propose that industry associations and government agencies address this in partnership)
- Understand international production trends (e.g. for barramundi) which links to CoOL
- Explore market development options in view of at least doubling production, e.g. support for export market development, value adding and product diversification (ABFA)
- Undertake an analysis of market opportunities for products from northern Australia
- Production forecasting to allow focussed timing of marketing (e.g. as implemented in the oyster industry in southern Australia)

- Engagement campaigns to strengthen social licence from general community (not just consumers)
- Investigate methods to change and measure change in consumer trends over time (e.g. shift from cooked to green prawns, where R&D could be applied to improve the attractiveness of green prawns)
- Investigate unique naming opportunities for the NA aquaculture industry, e.g. with trademark/ownership of some names, such as 'barramundi'. Consider Fish Names Standards, especially in relation to imported Asian sea bass that is required to be labelled Barramundi in Australia. Add provenance to names to assist marketing, potentially supported by blockchain (e.g. Patagonian toothfish with Austral Fisheries)
- Use 'local' in branding and marketing
- Capture the 'remote and clean waters' in marketing of product from NA
- Embrace Indigenous country of origin in marketing
- Regional festivals to build markets, connection with community and social licence
- Explore tourism with enterprise, sector, and northern Australia approach
- Learn from sectors and supply chains that work well, specifically through investigation of the role of actors in the supply chain and evaluating the value they add or could add

General workshop discussion – Market development and access

There was discussion around the perceived need for third party (global) certification, and some producers expressed the hope that certification would not be required, especially for domestic markets and smaller retailers. The importance of building consumer trust in a product or brand was deemed critical to reduce the need for certification.

Investigation of organic aquaculture standards was discussed briefly, with most relevance for EU markets. This was considered very difficult to achieve in an Australian context where there are inputs from sources outside of the control of aquaculture producers.

There is a large amount of market and seafood trade data already available on the FRDC website (www.frdc.com.au/services), and it is important not to duplicate what is already done and available.

The value of trade delegations was considered, and the importance of visiting a country/market multiple times to speak with the right people at the right time. An example of accessing China was discussed where a high volume (containers) and consistent supply is critical. This would require a much higher production volume than currently exists in northern Australia. In addition, barramundi was not perceived as a high value product in a Chinese market.

There is a 20-30,000 t product replacement opportunity in the domestic seafood market (predominantly comprised of large suppliers and supermarkets). In addition, encouraging existing customers to increase purchases will have an immediate impact on domestic sales. Supermarket scan data is available for purchase, and there was discussion of the potential role of FRDC to purchase that. Market and end consumer sector measures are important to understand (imported vs domestic; product form).

There are lessons to be learned from new investors, who are promoting the 'remote and clean water' environment for aquaculture in northern Australia.

For application of blockchain for the NA aquaculture industry, CRCNA could assist with a market and supply chain project. There is a need to define whether that data is for domestic or international markets, which platform to use, data management, data integrity/security/transparency and to capture benefits from data sharing.

In terms of sector branding, there may be a perception of inferior product, and enhanced communication is required to demonstrate product quality. In addition, communication should address ethically and socially responsible production.

The group considered some issues involved in 'understand consumer trends and future needs', including: focus on data gaps and analysis; improve relationships with supermarkets; work closely with major retailers; adopt traceability technologies/provenance systems, e.g. QR codes; promote competitive advantage on environmental efficiencies (e.g. improved FCRs and lower energy use); consumer testing and focus groups.

In relation to increasing production to higher volumes, and the high volume required to access some markets, it was recognised that this is difficult for SMEs to manage and stay competitive. For example, it is difficult to change the product (fish size) for market based on the decision of a wholesaler. Working together in a pre-competitive space will support the interests of different sized companies.

Aquaculture Development Hubs

The proposed recommendation is to facilitate infrastructure development for key Aquaculture Development Hubs in northern Australia.

There were mixed comments received about this recommendation. Some were in favour of ground-truthing, infrastructure development, hub biosecurity plans, water remediation, and seed supply for development of greenfield sites (e.g. for pre-approved Aquaculture Development Areas (ADAs)). Other delegates suggested the type of hub support is different for different places and may be centred on infrastructure for supply chain needs, potentially in partnership with other sectors, rather than a hub for production. Further comments indicated that infrastructure development may occur in a region to support the activities near/of a single company, as opposed to a shared hub facility.

Regardless of the focus of investment activity, the recommendation remains a priority for increasing production, production efficiency and/or supply chain connectivity, as it seeks to maximise the benefit of limited funds for appropriate infrastructure for key regions. The goal is to capture efficiencies and synergies with broader development in northern Australia. The planning of hubs is considered a task for government agencies in conjunction with industry, ideally with the oversight of a northern Australian aquaculture governance body (see recommendation below).

Potential action owners and potential key partners presented to the workshop participants were:

- Office of Northern Australia
- Infrastructure Australia
- Northern Australia Infrastructure Facility (NAIF)
- Commonwealth Department of Agriculture
- State and territory responsible departments and agencies
- Regional development agencies
- Local government
- Industry
- Investors
- Consultants

Additions from participants were:

- Registered Training Organisations (RTOs)

- Universities
- Statutory Authorities (e.g. ILSC)
- Airports
- Traditional Owners and Indigenous organisations

Potential pathways to implementation and timeline presented to the workshop participants was:

- Obtain funding for master-planning, aligned with developing NA initiatives and existing development
- Include Traditional Owners in Hub planning
- Clearly identify and prioritise infrastructure, supply chain, and service gaps and synergies for each region to inform Hub location
- Decide on the optimum number of Hubs
- Gauge political appetite to agree on at least one Hub site per high growth region, target three (3) agreed in 2020
- Develop costed feasibility and investment models to attract funding and investors
- Identify Hubs, user groups, and allocate development responsibility
- Establish the Hub infrastructure, that may include State/Territory owned assets
- Monitor the uptake of greenfield aquaculture areas associated with Hub investment
- For at least one greenfield site – undertake technical studies, site and biological assessments, establish zone specific policies
- Promote Hubs and monitor uptake and business/production efficiency
- Environment monitoring and review of Hubs associated with production
- Establish value-add processing facilities
- Engage with RD&E to address any identified impediments
- Engage incubators for new aquaculture businesses
- Benchmark hub outcomes and review next phase of development
- Link hubs with the biosecurity priority recommendation – especially more laboratory capacity (terrestrial animal surveillance occurs in NA, but there is currently no aquatic animal surveillance)
- Undertake environmental risk assessment, and define the carrying capacity of production-focussed hubs, with consideration of potential cumulative impacts (QLD government included cumulative impacts in ADA planning)
- Include facilities, plans and regulation to mitigate environmental impacts – potentially a more efficient way to manage industry growth in hubs
- Engage with regional needs for training and education

General workshop discussion – Aquaculture development hubs

It was noted that NAIF is a lender and supports businesses and projects to underpin ventures such as hubs. However, any proposal must satisfy the NAIF board that the loan will be repaid. CRCNA projects can play a role in R&D to de-risk investment, although there is still a gap in the funding support available for feasibility analysis and developing projects to a "lending-ready" stage for an application to NAIF. A 3-year review of NAIF is currently underway and there is an identified need for grants that will explore feasibility, and this may be considered by NAIF.

There is currently a gap in 'hubs' in aquaculture in northern Australia and a mechanism is sought that will aggregate the needs/opportunities, logistics and supply chain to achieve market-scale production for both domestic and export supply. This required a broader and collective approach.

There was discussion of energy infrastructure, and the benefit of weaving solar energy and sustainable production systems into marketing. Systems that protect water, value people and wildlife are received well by the community.

Aggregated purchasing of power is also an opportunity, and power is critical for the development and planning of any hub.

The group emphasised the importance of engaging with Indigenous communities in workshops, consultation and in partnership in developments where they have an interest on-country. Historically they are told what's happening (especially when someone else owns the block) rather than being consulted. An example was given of researchers who met with community, after 40 years working on-country, to apologise that they had never spoken to them previously. There are models for engagement around hub development, such as three Traditional Owner groups engaging with management of a Marine Protected Area (MPA).

There was a brief description of FRDC's Indigenous Reference Group (IRG). It was apparent that some Indigenous groups in northern Australia were not aware of the IRG. There is currently a high representation from wild fisheries on the group, and potentially an opportunity to increase the aquaculture focus. Contact people for more information are: Chris Calogeras, Stan Lui, and Matt Osborne.

The group discussed export capacity being strengthened at Cairns airport (to complement freight out of Toowoomba). Infrastructure for smaller export packaging is being established to assist local agri-producers. There is a proposal to redevelop Curtin Airbase, to support tourism, beef and hemp production in the Broome region, with potential advantage for local aquaculture producers.

The sites identified by CSIRO in the Northern Australia Water Resource Assessment study (Irvin et al, 2018), did not apply the same Commonwealth and state/territory constraints as the QLD ADAs, such as regulatory conditions and areas owned by Traditional Owners. During the situational analysis project, Indigenous groups expressed interest in understanding more about the options (such as aquaculture) for the use of their land, to inform their own land use choices.

It was noted that there are prime aquaculture ponds vacant near Darwin. This indicates that aquaculture zoning alone will not address all of the barriers/challenges associated with undertaking an aquaculture business. Larger companies 'will do their own thing', likely independent of hubs.

The Darwin Aquaculture Centre is already an aquaculture hub, providing a collaborative environment, infrastructure, RD&E, seed supply, and industry co-location. Hubs will need to be contextually relevant in relation to species and the local industry needs. Importantly, hub planning needs to consider and learn from past experience (e.g. failed developments) and be relevant to the context.

Build Skills

The proposed recommendation is to build skills to meet industry growth needs in the northern Australia aquaculture industry.

Meet the gap in skilled personnel to fill at least 1,400 new jobs in aquaculture in northern Australia by 2030.

Retain skilled staff in northern Australia.

There were no suggested changes in relation to the nature of the recommendation and this was supported as a key recommendation of the NA aquaculture industry.

Potential action owners and potential key partners presented to the workshop participants were:

- Commonwealth government departments and agencies
- State and territory government departments and agencies
- Australian Industry and Skills Committee
- Aquaculture and Wild Catch Industry Reference Committee
- Skills Impact (Skills Service Organisation)
- Universities
- TAFEs (VET)
- CSIRO
- Regional Jobs Committees (QLD)
- Regional Development Authorities
- Indigenous Reference Group for Developing Northern Australia
- Government – Indigenous agencies
- Industry associations and individual producer and supplier companies
- Regional Councils
- Regional schools

Additions from participants were:

- Registered Training Organisations (RTOs)
- State/Territory Industry Training Advisory Bodies (ITABs)
- Natural Resource Management (NRM) organisations

Potential pathways to implementation and timeline presented to the workshop participants was:

- Engage with Skills Australia and responsible government agencies on the critical immediate issues and emerging staff need for the aquaculture industry in NA
- Discussion leading to improvement of the skilled worker visa conditions and programs to better facilitate skilled migrant employment to fill the current gap in skilled personnel, especially in the short-term (2020-2024)
- Coordinate, boost and resource available training
- Align training with business needs and monitor progress
- Address inter-jurisdictional barriers, e.g. some State/NT subsidies for VET training are only available for residents of a State working in that State
- Include professional development training for current staff to foster career progression
- Develop industry-tailored training (e.g. VET-industry collaborative training centres and/or on-farm)
- Increase the number of qualified VET trainers (RTOs)
- Enhance innovation and entrepreneurship skills in aquaculture curricula
- Increase technology skills training, with a view to more automation
- Improve the image of sustainable aquaculture, through 'career opportunity' campaigns to attract new people to the sector – include celebrity endorsement
- Industry funded prizes/traineeships/scholarships for schools, VET and university
- Increase training engagement (enrolments) and promote aquaculture career pathways, from secondary education, for Australians committed to living and working in northern Australia
- Establish demonstration farms for training (could be aligned with Hubs)
- Establish appropriate models of training and mentoring for Indigenous Australians
- Establish international exchanges for NA aquaculture trainees/students/staff professional development
- Establish skills/career training pathways from High school (cert I and II) to higher education (Cert III and IV, and undergraduate) – partnership across institutions and with industry

- Build training packages that are contextualised to the commodity (species produced) – possibly through short training courses
- Train school teachers to help retain students interested in aquaculture at school, rather than leaving for employment before completion
- Increase engagement with high schools through: presentations; sponsorships, prizes; targeted school media describing opportunities for school leavers
- Actively engage industry-driven advice on required skills (underway for VET through Skills Impact) – goal to gain appropriate skills for the positions available
- Include school programs for aquaculture industry awareness, VET options, Junior rangers programs, promotion of aquaculture as a career for school leavers
- Increase aquaculture skills for local people
- Increased access to skilled migrants with appropriate classification on Visa skills list
- Include pathways for 'awareness – education – skills'
- Train the trainers for Indigenous communities – train an indigenous person to train others in the community
- Investment in vocational training – including communication of available finding support and establishing policy to maintain/increase funding for training
- Attract existing skilled people from the south and from overseas
- Support skills development in supply chains & for chefs (these drive product demand) – e.g. mentorship and video training series
- Retain skills – develop Indigenous employment and engagement strategies (e.g. trainers, assessors)
- Build skills – encourage meaningful engagement with Indigenous communities around training development and delivery on-country
- Upskilling of companies (industry staff) on standards and certification
- Seek funding to establish a YouTube channel and seed with some videos to become a virtual hub for technique sharing – e.g. 'how to' series: collect and submit samples to a lab; *Artemia* culture – this could be complemented by face-to-face workshops
- R&D to understand barriers for attraction/retention of staff – e.g. wage, location, type of work – then frame solutions based on known barriers
- Map skills required for aquaculture in NA
- Retain skills/staff through creation of a decent employer company approach, give staff a future – capacity building for companies to create this environment
- Include education in civil society on standards and certification (by eNGOs e.g. WWF, ASC)
- Link the delivery of skills and training to aquaculture development hubs
- Explore apprenticeships and subsidised supervision of traineeships with on-farm training

General workshop discussion – Build skills

The group had many ideas and a passionate discussion about building skills, attracting and retaining new staff in the aquaculture sector in northern Australia.

While the projected growth of industry production in NA by 2030 will require at least another 1400 new staff, the flipside is that in order to provide career opportunities that growth must be achieved (successful investment and expansion) and maintained.

There was reflection on the quote from Richard Branson – "Train people well enough so they can leave, treat them well enough so they don't want to".

Industry representatives emphasised the importance of having 'trainable' staff that are ready to learn, with a preference to train their own staff. It was considered important to attract staff who fit

the company culture and then focus on tailored skills development for employees. Training is required across the business needs, from business managers to farm hands.

The issue of skilled migrant visas was mentioned, specifically that the current approved skill list is high level, requiring tertiary qualifications, and then people must leave after 6 years. This is creating a challenge in attracting and retaining people with appropriate skills, and in the transfer of skills to local staff. There is a need for more technical level staff through a skilled migrant visa system. These are people who understand the technology and want to work with fish. There are some people with experience of cattle but not fish, and this may be linked to the relative community/societal awareness of cattle farming compared with fish farming in northern Australia.

Attracting international or interstate skilled workers may be a good short-term solution. However, retention issues can impact the long-term value of recruiting people from other places. Succession planning and training pathways for the local workforce capacity is needed. As indicated in several of the pathways to implementation, local Indigenous communities are a potential source of local staff.

Vocational training is recognised as an important mechanism to deliver core skills, e.g. manual driver's licence, boat licence, aquatic animal husbandry, forklift ticket. There was discussion of Central Queensland University in Rockhampton introducing a VET course in aquaculture.

There was discussion that the education sector has had the wrong strategy in the past, for example with 100 veterinary science graduates each year and only four jobs available. For aquaculture, there is a need to get back to more technical skills and then if people want to progress, provide them with a career path and additional training.

A presentation was delivered by Michelle Inglis-Smith (Skills Impact) to present an overview of their activities including: provision of an annual seafood sector report (covers wild fisheries and aquaculture VET training); the consultation process to make a case for change of VET modules in the seafood certificates (refresh, add or remove); and barriers to the uptake of training. It was noted that many of the training packages (publicly available) are used informally by companies for staff training. This has an impact on low enrolments in some packages but supports the case that they remain important to maintain and are industry relevant.

Aquaculture as a means for Indigenous economic development and independence

The proposed recommendation is to build the northern Australia aquaculture industry as another option for greater Indigenous economic development and independence.

There were no suggested changes in relation to the nature of the recommendation and this was supported as a key recommendation of the NA aquaculture industry and workshop participants.

Discussion of this priority was framed around the processes that will help the engagement of Indigenous people in aquaculture. It was not talking about decision making.

Potential action owners and potential key partners presented to the workshop participants were:

- Indigenous Reference Group for Developing Northern Australia
- FRDC's Indigenous Reference Group
- Torres Strait Regional Authority
- North Australia Indigenous Land and Sea Management Alliance
- Indigenous Land and Sea Corporation
- Aboriginal and Torres Strait Islander Corporations and Land Councils
- Industry

Additions from participants were:

- Government – federal, State and Territory
- Investment partners

Potential pathways to implementation and timeline presented to the workshop participants was:

- Invest in existing programs of research and pilot-scale aquaculture ventures to maintain long-term development, relationship, mentoring and support
- Address tenure, and establish/partner with appropriate business governance models and economic frameworks
- Facilitate connection between aspiring Indigenous groups and new and existing business
- Build the capacity and availability of mentors in government agencies and service providers
- Incentivise industry involvement in indigenous development/mutually beneficial partnerships that are long-term
- Undertake feasibility studies and invest in economically viable opportunities
- Education and awareness opportunities
- Indigenous equity mobilisation and deployment
- Prototype projects, ventures and corporations
- Share aquaculture business stories and learn from past experiences
- Mentoring among Indigenous business to encourage new Aboriginal and Torres Strait Islander groups to engage
- Supply decision support tools for Aboriginal Corporation boards and an "Aquaculture Business development toolbox"
- Integration with Aquaculture Development Hubs (e.g. training, establishment of microbusinesses, employment)
- Support community champions and drivers
- Scholarships for Indigenous students
- Align ventures with cultural needs and community definition of success
- Investigate the feasibility of microfinancing to support small business establishment
- Support projects with continued engagement and emphasis on handover of operations to Indigenous partners/owners while still supporting as appropriate in the transition phase
- Support Indigenous branding, certification and provenance
- Aquaculture opportunities shared by Indigenous organisations/people at appropriate events, such as the annual Rangers Conference
- Create a "process map" to assist Indigenous communities in engagement with aquaculture business development, and for non-Indigenous aquaculture business to engage with traditional Owners and local community

General workshop discussion – Indigenous aquaculture

The group supported and endorsed the list of pathways proposed, with the additions of a process map and suggesting the annual Rangers Conference as an appropriate event for opportunity sharing.

There was discussion of an example of a process to establish an Indigenous-owned business in WA. The business attracted seed funding to get started, then a RED grant, which led to a joint venture and further investment by Sydney based A1 Investments and Resources Ltd. The investment enabled the purchasing of boats and processing facilities and reduced a 5-year business plan to 1.5 years. This opened up other opportunities in training. The Indigenous business owner will benefit from JV participation in the supply chain to market.

ILSC indicated they have about 6 aquaculture projects in some form of development – in progress from opportunities to investment and production ready phases. There is a need for the right capability partners. Indigenous groups approach them with opportunities.

In the Torres Strait there is a focus on skills development, mentoring and training to improve unemployment. For example, training people to run freezers and keep the books to support fishing businesses.

In Hope Vale, north of Cooktown, there is interest and investment in tropical rock oysters.

The group agreed that funding programs need to be long-term, funded for at least 10 years in order to deliver meaningful outcomes. This requires early clarity around funding availability.

In Indigenous aquaculture business development, it was emphasised that:

- both production and the end market need to be achieved/arranged at the same time
- the right capability connection must be brokered
- the right site needs to be selected
- include honest conversations about aquaculture business development – such as site suitability, that will drive business success or failure
- species selection and culture system must fit the community lifestyle
- appropriate and respectful mentoring is important
- establishing a generation of 'champions' will be vital to engagement
- training on-country is critical (could this be supported by an Aquaculture training trailer?)
- it is important to consult well with community on-country and provide service delivery on-country
- there is limited funding available for capital and feasibility assessment, funding for R&D is available
- start-up capital and community champions are keys to success
- official certification of products by Traditional Owners is likely to give a marketing and provenance advantage

The workshop participants agreed that it was important to find a way to bring Indigenous groups together to share experiences in aquaculture, and to include industry mentoring. This may involve people travelling from the south to train/support people on-country in the north.

Stronger Governance

The proposed recommendation is that the Minister for Northern Australia establishes a body charged with the development of aquaculture in northern Australia.

The proposed role of the body would be to:

- ensure co-ordination between Commonwealth agencies and between jurisdictions
- identify priorities for Government investment, taking into account efficiencies and opportunities arising from scale, co-location, coordination and existing facilities and infrastructure
- identify actions that would increase participation by and create business and economic opportunities for Aboriginal and Torres Strait Islander people in the northern Australian aquaculture industries
- liaise with industry to understand industry priorities and encourage private sector investment
- over-see the implementation of the CRCNA aquaculture industry situational analysis project recommendations.

Potential action owners and potential key partners presented to the workshop participants were:

- Minister for Northern Australia
- Office of Northern Australia (ONA)
- Commonwealth government departments and agencies
- State and territory government departments and agencies

Potential pathways to implementation and timeline presented to the workshop participants was:

- Establish the government body, hosted by ONA
- Scheduled meetings to deliver the role
- Regular reports to Minister and CRCNA
- Facilitate independent evaluation of progress

General workshop discussion – Stronger and adaptive governance

The group discussed the bodies and groups that are already in place to service the sector.

At a national level, the Australian Fisheries Management Forum (AFMF) includes jurisdiction ministers and director general (DG) level members. There is an Aquaculture Subcommittee of AFMF, comprised of State/Territory managers, a commonwealth representative and FRDC. Scope of business in the subcommittee is operational issues, discussion in relation to investment attraction (such as visiting delegations), legislation, translocation and licencing activities across borders. Delegates suggested that the Subcommittee is lucky to meet twice a year and not all jurisdictions are regularly represented.

There is also a Subcommittee for Aquatic Animal Health (SCAAH) which is an advisory committee to the Animal Health Committee (AHC) of the Department of Agriculture Water and the Environment (DAWE). It is comprised of representatives from "Australian, State, Northern Territory and New Zealand governments, the Commonwealth Scientific Industrial Research Organisation, Australian Animal Health Laboratory and Australian universities. Specialists on aquatic animal health from academia, industry and the private sector may also be invited to participate as required" (DAWE 2020). There are generally two face-to-face meetings each year, and these are more frequent in the event of a disease response. Conversations include aquaculture development and sharing of key

issues. There is an AQUAPLAN workshop in March where DAWE will seek input to the next 5-year plan and this would be an important opportunity for the NA industry to raise/include specific needs.

The National Aquaculture Council (NAC) includes representatives from all major industry sectors. There is a good working relationship between industry and government agencies. Cross-sector collaboration has been ad hoc and declined since the end of national conferences (last one in 2014).

Established industries have well-run associations and provide a model for emerging sectors. New and emerging sectors were encouraged to engage with jurisdiction Research Advisory Committees (RACs) and FRDC's Indigenous Reference Group particularly for RD&E needs. A workshop was held in Darwin in 2018 to discuss tropical oyster strategic priorities, and this is another beneficial approach for documenting the research needs of emerging species. The emerging tropical oyster sector was encouraged to engage with Oysters Australia (OA), as the representative peak body. OA members have a commitment to protect the brand of 'oysters'.

There was discussion about the need for a voice in Canberra and whether there should be strengthening of bodies to support representation of the needs of aquaculture development in northern Australia.

Government agency delegates suggested that the role of government in a 'new' governance model would depend on the goal. If the intention is to champion a sector-driven issue that requires a government response, then government representatives should not be involved. On the other hand, if the goal is development/investment planning, improved regulation, de-risking investment and communication to the appropriate Minister, then government agencies have an important role to play.

An important consideration presented by delegates was 'why/what do we need' to support the adoption of the priorities of the situational analysis study. In terms of biosecurity as the first priority, the industry would like flexible Import Risk Assessments (IRAs). Industry is tasked with getting the risk on the record so that appropriate risk mitigation can be initiated. The group recognised the value of broader links with groups that represent/are responsible for environment management and Indigenous culture, to achieve change in biosecurity policy.

The industry emphasised that they are asked to be members of multiple bodies – industry sector association, NAC, Seafood Industry Australia (SIA), etc. They do not want any dilution of effort and are mindful of taking resources (financial and time) from functioning structures. Any new governance structure needs to add value and not take away from what is already being done. There must be a strong value proposition. More planning is needed to develop a structure and/or strengthen existing bodies in order to enhance industry development in NA.

The conclusion from the discussion about this recommendation was that **more work is needed by industry and government stakeholders to clarify a body/structure that will improve aquaculture development in northern Australia**. A short consultancy project and roundtable workshop is recommended, with delegates based on the advisory group that established the terms of reference for the situational analysis project (a government representative from each jurisdiction and representation of major industry associations). It is proposed that the workshop: (1) document the existing structures in aquaculture governance applicable to northern Australia (NA); (2) document actual activity; (3) include case studies of different types of successful governance models from other sectors; and (4) recommend an approach to strengthen aquaculture governance for NA.

Target RD&E to Industry Needs

The proposed recommendation is that RD&E is focussed on industry outcomes, and is aligned with the National Aquaculture Strategy 2017, the FRDC RD&E Plan 2020-25 (when complete), and jurisdiction and industry association plans.

General workshop discussion – Target RD&E to industry needs

This recommendation was briefly considered at the Rockhampton workshop. Established sectors (barramundi, pearls and prawns) are well represented by existing strategic plans and Industry Partnership Agreements with FRDC to support investment in priority RD&E. More work is needed for emerging sectors to communicate their research needs to RACs and FRDC's Indigenous Reference Group (IRG). The situational analysis study includes a summary of RD&E needs in emerging sectors. Cross-sector and pan-northern needs are captured in the recommendations of the situational analysis report that will be shared with other funding bodies, the RACs and IRG.

Feedback on Vision 2030

No changes were suggested to the industry-endorsed Vision 2030 as presented:

"In 2030, northern Australian aquaculture will be a nationally significant ($1b a year GVP), cohesive, sustainable, respected industry, providing premium products to Australian and international markets, that contributes to the prosperity and diversification of regional and Indigenous communities across the north."

Additional Key Observations from the Workshop

Tropical rock oyster aquaculture in Queensland – priority RD&E need

Considerations in funding support of a tropical rock oyster hatchery in QLD

Tropical rock oysters are an emerging aquaculture species and there is much interest in culturing them across Northern Australia. This has been recognised by the CRCNA's investment in research and development of the species ($1.2 million).

Reliable spat supply is a well-recognised bottleneck for commercial production due to low numbers of wild spat recruitment, mixed species collection and a lack of hatchery production. This is addressed in Sub-Project 2 'Securing commercial spat (juvenile) supply' of the CRCNA. These efforts are focussed in WA (Albany) and the NT (Darwin). The CRCNA project for Northern Australian Tropical Rock Oyster R & D has very limited participation from Queensland, however the only current commercial farmer of tropical oysters is based in Bowen (QLD). His knowledge of oyster farming (which he shares freely, including travelling to CRCNA project workshops in NT and WA) is crucial to the future development of the industry, especially so, as he may consider retirement within the next 5 years.

Commercial production at the QLD tropical oyster farm is currently severely limited by the lack of reliable spat. An attempt to spawn oysters from Bowen at the Albany facility has recently failed. The workshop highlighted five serious issues with oyster spat production for an emerging aquaculture industry: 1) the optimal species (or strain) for production in QLD is different to the WA oyster, but the same as the species under investigation in the NT, and it requires different and specific hatchery

techniques; 2) there are substantial biosecurity and supply chain risks moving broodstock from QLD to WA and spat from WA back to QLD; 3) there is a rapid increase in the number of oyster licenses approved in WA in the last 8 months, with the implication that the WA hatchery will be at production capacity for the local species and industry; 4) the QLD government is initiating an ADA process to identify potential sites for oyster culture which is likely to stimulate an ongoing demand for a hatchery supply of spat to support new farms; and 5) edible tropical rock oyster culture is a sector of interest to Indigenous communities in QLD that requires local supply of spat and extension of transport, handling and grow-out technology.

Direct support for the emerging Queensland tropical oyster industry is critical. The industry is at a vulnerable stage of development now and support of Australia's only commercial tropical rock oyster farmer is vital for QLD and other jurisdictions. All tropical oyster business development endeavours in QLD, Indigenous and non-Indigenous, will be constrained by spat supply. Oyster hatcheries require high quality water supply, specific infrastructure, a high level of biosecurity and hygiene, and skilled technical staff for successful spat production. To be successful, an appropriate facility must be selected and dedicated staff (i.e. experienced hatchery technician(s)) and aquarium resources are required to undertake hatchery production. In addition, knowledge of hatchery production techniques should continue to be actively shared across all three states to ensure successful development of the industry in NA.

Workshop Conclusion

The Aquaculture opportunities in northern Australia: Solutions and Strategies Workshop was attended by 85 participants from diverse industry sectors and achieved the project objective, performance indicators (Table 2), and all of the proposed outcomes.

Workshop participants reviewed the Northern Australian Aquaculture Industry Vision 2030 statement and no changes were made. The findings of the CRCNA aquaculture industry situational analysis were refined and strengthened by defining the strategy, actions and solution providers for the study recommendations. Workshop input was incorporated in the final Situational Analysis Report, and the Industry Vision 2030 submitted to CRCNA in March 2020 (Cobcroft et al, 2020b).

The key challenges and opportunities facing the northern aquaculture industry were considered along with potential solutions, and strategic research efforts needed for further investment were prioritised for the situational analysis recommendations. This included discussion of infrastructure, policy, investment, environmental, production, workforce development, knowledge, training and human capital gaps and the strategic actions and research and development solutions to address them.

The workshop report forms part of the larger situational analysis, which will inform the CRCNA strategic research investments, assist with coordination of investment across the northern Australian aquaculture sector and improve strategic alignment across the research, policy and service delivery arms of the sector.

Implications

The northern Australia aquaculture industry's highest priority is to reduce the risk of exotic or endemic disease, which threatens both current production and adds risk to investment in industry expansion. Biosecurity is perceived as a critical issue for the aquaculture industry (producers), wild fishers, recreational fishers and the Indigenous community. A more collaborative approach of industry and biosecurity agencies was advocated, through open conversation and a good flow of information. Resolution of the Aquatic Deed remains a sector priority. Inclusion of a range of stakeholders was seen as an important mechanism to communicate the scientific evidence and urgency required in policy and risk assessment review, and implementation at the border and at enterprise level, to protect species in aquaculture and within their natural habitat.

Market access and market development are key needs driven by the projected increase in product volume in northern Australia, and the high volume required to access some markets. Working together in a pre-competitive space to understand consumer trends and future needs will support the interests of different sized companies. There is currently a gap in 'hubs' in aquaculture in northern Australia and a mechanism is sought that will aggregate the needs/opportunities, logistics and supply chain to achieve market-scale production for both domestic and export supply. Infrastructure investment is a priority for increasing production, production efficiency and/or supply chain connectivity, although the type of infrastructure required varies among northern Australian regions. A collaborative approach among industry, government and training organisations is required to address the need for at least 1400 new staff and to retain skilled people in aquaculture in northern Australia. In support of building opportunities in the northern Australia aquaculture industry as another option for greater Indigenous economic development and independence it was considered important to bring Indigenous groups together to share experiences in aquaculture, and to include industry mentoring in any development activity.

The workshop discussion identified that research priorities for the key sectors (barramundi, prawns and pearls) are well-defined within association strategic plans. The RD&E priorities of those industries are predominantly funded by industry partnership with FRDC through IPAs. However, the communication to the jurisdictional RACs of priorities for new and emerging sectors in northern Australian aquaculture, and pan-northern cross-sector RD&E needs, should be improved to provide increased awareness of opportunities and support for sector development in northern Australia.

The workshop report contributes information and perspectives that may inform other national and industry strategic plans - including for the FRDC, ABFA, APFA, and NAC.

Recommendations

Communication of RD&E priorities to funding bodies and government agencies should be improved, especially for pan-northern cross-sector issues and species groups outside of existing industry associations and without Industry Partnership Agreements with FRDC (including, tropical rock oysters, tropical rock lobsters, tropical slipper lobsters, grouper, cherabin, sea cucumbers, ornamental species).

The Situational Analysis report will be made available to stakeholders to increase awareness of issues and opportunities in support of aquaculture sector development in northern Australia.

Extension and Adoption

By nature, the Workshop itself was an extension activity that communicated findings and proposed recommendations of the northern Australia Aquaculture Industry Situational Analysis project to participants.

Stakeholder input documented in this Workshop report has informed the final report for the situational analysis (Cobcroft et al, 2020b), which is available online through CRCNA website, and distributed widely.

The distribution list for the Workshop report will include: participants; identified stakeholders (as per methods and performance criteria); and a broader audience through professional networks.

Presentations will be delivered in 2020 at the Developing Northern Australia Conference, APFA annual conference, ABFA general meeting, and other relevant events such as the Indigenous Economic Development Forum.

Two co-investigators on the Workshop project are EOs of the ABFA and APFA, and are NAC directors. They are ideally placed to ensure outputs inform industry sector strategy setting. FRDC representatives will be able to use the workshop to inform its own strategic direction.

Project coverage

Media releases

19 December 2019. Northern Australian aquaculture project to discuss findings at CQ workshop. Available here

5 February 2020. Northern Australian aquaculture project to discuss findings at CQ workshop. Available here

Media interviews

Cobcroft, Jennifer. 2020. Pre-recorded interview with James Cook University Researcher. ABC Southern Queensland, Toowoomba, Rural Report, Lydia Burton 17 Feb 2020 6:25 AM Duration: 2 mins 17 secs • ASR AUD 560 • QLD • Australia • JCU Radio & TV • ID: X00082146708

> Pre-recorded interview with James Cook University Researcher Jennifer Cobcroft. Cobcroft says Central Queensland could become a hub for aquaculture in Northern Australia in the next 10 years. She notes the growth in aquaculture in North Queensland has been around 3% per annum on average. She adds there is a huge potential for expansion without damaging the natural environment. She notes there is a huge potential for prawns and barramundi in Capricornia. She adds there are also freshwater opportunities, such as red claw crayfish and freshwater fish. Cobcroft says they are seeing around 1400 extra jobs across Northern Australia in the foreseeable future.

Cobcroft, Jennifer. 2020. Central Qld has a huge potential. ABC Capricornia, Rockhampton, 06:30 News, Newsreader 17 Feb 2020 6:33 AM Duration: 0 min 48 secs • ASR AUD 98 • QLD • Australia • JCU Radio & TV • ID: X00082147303

Cobcroft, Jennifer. 2020. Central Qld has a huge potential. ABC Tropical North, Mackay, 06:30 News, Newsreader 17 Feb 2020 6:34 AM Duration: 0 min 45 secs • ASR AUD 92 • QLD • Australia • JCU Radio & TV • ID: X00082146851

Presentation

Cobcroft, J.M. and Bell, R. 2020. Key findings and updated recommendations of the Northern Australia Aquaculture Industry Situational Analysis (commissioned by CRCNA), including highlights of the FRDC funded workshop (this project). Presentation to North Queensland Regional Organisation of Councils (NQROC) on 14 February 2020.

Report

In addition to this report for FRDC, the Situational Analysis report was completed for CRCNA including stakeholder feedback from this workshop.

Project materials developed

- List of attendees with contact information provided separately to FRDC as in-confidence information to protect participant privacy.
- Presentations, where speakers gave permission for a PDF of their presentation to be provided to FRDC. See attached PDF file “0_FRDC_PPTs.pdf”. This file is not for public dissemination.

Appendices

Appendix 1. List of researchers and project staff

Table 3. Project staff members

Project staff member name	Organisation	Role	FTE – paid by project	FTE – in-kind
Jennifer Cobcroft	JCU	Principal Investigator – lead workshop planning and report writing	0.033	
Melissa Joyce	JCU	Administrative assistance – workshop event organisation and communications	0.07	
Dean Jerry	JCU	Co-Investigator – industry engagement, workshop planning and attendance		0.033
Sandra Hughes	JCU	Research Project Officer – workshop event organisation and communications		0.033
Jo-Anne Ruscoe	Australian Barramundi Farmers Association	Co-Investigator – workshop planning, ABFA member communication and workshop attendance	0.01	0.005
Camilla Thompson	Australian Prawn Farmers Association	Co-Investigator – workshop planning, APFA member communication and workshop attendance	0.01	0.005
Wade Clark	Rockhampton Regional Council	Co-Investigator – workshop planning, Rockhampton region stakeholder communication and workshop attendance		0.02

Table 4. CRCNA project steering committee with oversight of workshop planning

Steering Committee member name	**Organisation**
Rob Bell	Blueshift Consulting
Jennifer Cobcroft	JCU
Greg Coman	CSIRO
Michael Davis	Indigenous Land and Sea Corporation
Amy Diedrich	JCU
Jess Fitzgerald	Blueshift Consulting
Kim Hooper	Australian Prawn Farmers Association
Simon Irvin	CSIRO
Dean Jerry	JCU
Sally Leigo	CRCNA
Kylie Penehoe	Indigenous Land and Sea Corporation
Jo-Anne Ruscoe	Australian Barramundi Farmers Association
Jan Strugnell	JCU
Camilla Thompson	Australian Prawn Farmers Association
Kyall Zenger	JCU

Appendix 2. References

Cobcroft, J., Bell, R., Fitzgerald, J., Diedrich, A. and Jerry, D. (Eds) 2020a. Northern Australia aquaculture industry situational analysis. Stage 1 Report. CRCNA Project A.1.1718119. 97p.

Cobcroft, J., Bell, R., Fitzgerald, J., Diedrich, A. and Jerry, D. 2020b. Northern Australia Aquaculture Industry Situational Analysis. Final Report. CRCNA Project A.1.1718119.

Department of Agriculture Water and the Environment (DAWE). 2020. Sub-committee on Aquatic Animal Health (SCAAH) website. Accessed 13 March 2020. https://www.agriculture.gov.au/animal/aquatic/committees/sub-committee_on_aquatic_animal_health_scaah

Irvin, S., Coman, G., Musson, D., Doshi, A., Stokes C. 2018. Aquaculture viability. A technical report to the Australian Government from the CSIRO Northern Australia Water Resource Assessment, part of the National Water Infrastructure Development Fund: Water Resource Assessments. CSIRO, Australia. 126p.

Mobsby, D. 2018. Australian fisheries and aquaculture statistics 2017, Fisheries Research and Development Corporation project 2018-134, ABARES, Canberra, December. CC BY 4.0. https://doi.org/10.25814/5c07b19d3fec4

FRDC FINAL REPORT CHECKLIST

Project Title:	Workshop - Aquaculture opportunities in northern Australia: Solutions and Strategies		
Principal Investigators:	Jennifer Cobcroft		
Project Number:	2019/096		
Description:	The Aquaculture opportunities in northern Australia: Solutions and Strategies Workshop was attended by 85 participants from diverse industry sectors and achieved all of the proposed outcomes. Workshop participants reviewed the Northern Australian Aquaculture Industry Vision 2030 statement and no changes were made. The findings of the CRCNA aquaculture industry situational analysis were refined and strengthened by defining the strategy, actions and solution providers for the study recommendations. Workshop input was incorporated in the final Situational Analysis Report, Industry Vision 2030 submitted to CRCNA in March 2020. The key challenges and opportunities facing the northern aquaculture industry were considered along with potential solutions, and strategic research efforts needed for further investment were prioritised for the situational analysis recommendations. This included discussion of infrastructure, policy, investment, environmental, production, workforce development, knowledge, training and human capital gaps and the strategic actions and research and development solutions to address them. The workshop report forms part of the larger situational analysis, which will inform the CRCNA strategic research investments, assist with coordination of investment across the northern Australian aquaculture sector and improve strategic alignment across the research, policy and service delivery arms of the sector. The workshop report contributes information and perspectives to inform other strategic plans - including for the FRDC, ABFA, APFA, and NAC.		
Published Date:	07/2020 (if applicable)	**Year:**	2020
ISBN:	978-0-6486803-4-5	**ISSN:**	not applicable
Key Words:	Needs to include key subject areas and species name (see www.fishnames.com.au) Aquaculture; Northern Australia; Indigenous aquaculture; Barramundi; Black Tiger Prawn; Banana Prawn; Pearl Oysters; Redclaw; Groupers; Cobia; Barcoo Grunter; Tropical Rock Oysters; Tropical Rock Lobsters; Moreton Bay Bugs; Freshwater Prawns; Sea cucumbers; Macroalgae; Microalgae; Ornamentals; Giant Clams; tropical freshwater fish; tropical marine fish		

Please use this checklist to self-assess your report before submitting to FRDC. Checklist should accompany the report.

	Is it included (Y/N)	**Comments**
Foreword (optional)	N	
Acknowledgments	Y	
Abbreviations	Y	
Executive Summary		
– **What the report is about**	Y	
– **Background – why project was undertaken**	Y	
– **Aims/objectives – what you wanted to achieve at the beginning**	Y	
– **Methodology – outline how you did the project**	Y	

– **Results/key findings – this should outline what you found or key results**	Y	
– **Implications for relevant stakeholders**	Y	
– **Recommendations**	Y	
Introduction	Y	
Objectives	Y	
Methodology	Y	
Results	Y	Combined results, discussion and conclusion
Discussion	Y	Combined results, discussion and conclusion
Conclusion	Y	Combined results, discussion and conclusion
Implications	Y	
Recommendations	Y	
Further development	N	
Extension and Adoption	Y	
Project coverage	Y	
Glossary	N	
Project materials developed	Y	Two files in-confidence for FRDC use
Appendices	Y	Two appendices in main report
EXTENSION		
Extension plan developed?	**Y**	
Extension undertaken?	**Y**	
If extension was undertaken, who was it undertaken with and was it successful? **(Detail answer in comments section)**		As described in the report, the Workshop report and situational analysis report informing industry and government strategy and decision-making
If No, then is further extension necessary? **With who?** **How? (detail answer in comments section)**		