WA Shellfish Aquaculture INDUSTRY FORUM 2019

Stakeholder Summary Report

Government of Western Australia
Department of Primary Industries and Regional Development

Great Southern Development Commission

ACWA
Aquaculture Council of Western Australia

Albany Shellfish Hatchery

Foreword & Acknowledgements

The inaugural WA Shellfish Aquaculture Industry Forum 2019 was held in Albany on 21 June 2019 and presented by the Great Southern Development Commission in partnership with the Department of Primary Industries and Regional Development, the Aquaculture Council of Western Australia and the Albany Shellfish Hatchery.

Approximately 120 people participated in the Forum, representing local and state government, industry, the investment sector, research institutions and academia. The main aim of the day was to share information that would contribute to the further development of the Western Australia's shellfish aquaculture sector.

Aquaculture is an emerging industry with huge potential in Western Australia and the State Government is focused on accelerating its progress. Shellfish aquaculture has many benefits in a world that has a growing demand for quality foods. Our State's long coastline encompasses tropical and temperate waters that are clean and conducive to shellfish production.

The establishment of the Albany Shellfish Hatchery, which is a partnership project between industry and government, has been a key enabler to the growth and development of commercial shellfish farming in Western Australia. The range of shellfish aquaculture activities and projects across the regions and our proximity to markets means that existing and emerging industry operations are well positioned to take advantage of growth in consumer demand.

To this end, twenty guest speakers provided a full and insightful program for the day which concluded with a facilitated session on shellfish aquaculture priorities; challenges for the future; and how government can further assist industry and stimulate investment. The key observations from the presentation sessions and the outcomes of the facilitated session are summarised in this report.

The Forum partners would like to thank all those who participated in the day, took part in conversations and thereby contributed to the further development of the sector. However, to work well, events of this type also require a range of organisational skills and team effort. Thus, the Great Southern Development Commission would like to thank and acknowledge members of the Forum Working Group which met regularly over some 5 months in the lead up to the Forum and included people from both industry and the public sector. Members included:

Tina Thorne – Aquaculture Council of Western Australia
Jonathon Bilton – Albany Shellfish Hatchery
Jude Tyzack – Albany Shellfish Hatchery
Steve Nel – Department of Primary Industries and Regional Development
Greg Jenkins - Department of Primary Industries and Regional Development
Russell Adams - Department of Primary Industries and Regional Development
Bruce Manning – Great Southern Development Commission
Jess Ngeh (Working Group Chair) – Great Southern Development Commission

Their contribution to the development of the Forum was invaluable, but particular recognition is due to the efforts of the Commission's Senior Development Officer, Jess Ngeh, who did the hard work behind the scenes to put all the elements of the Forum together, including follow up work associated with this Forum Summary Report.

Time will tell, but if the enthusiasm of Forum participants is any indication, the Forum can be seen as marking a step-change in interest in shellfish aquaculture in Western Australia.

Bruce Manning
Chief Executive Officer
Great Southern Development Commission

Summary Report Outline

This report has been prepared by Keston Technologies Pty Ltd (ABN: 68 109 373 113) as commissioned by the Great Southern Development Commission.

Key Acronyms

Acronym	Extension
ACWA	Aquaculture Council of Western Australia
DPIRD	Department of Primary Industries and Regional Development
GSDC	Great Southern Development Commission
RDCs	Regional Development Commissions
SRO	Sydney Rock Oyster
SQAP	Shellfish Quality Assurance Program
WASQAP	Western Australia Shellfish Quality Assurance Program

Introduction to the Summary Report

This document summarises the proceedings and outcomes of the WA Shellfish Aquaculture Industry Forum 2019, held in Albany on Friday 21st June 2019. The aim is to provide industry with reference material and insights into priorities and opportunities for investment and growth in the shellfish aquaculture industry in Western Australia.

Forum Speaker Summaries

Forum Introductions

Welcome to Country

Lester Coyne (Menang Noongar Aboriginal Elder)

Lester welcomed delegates to Albany on behalf of the Menang Noongar people. He noted the importance of the ocean and shellfish to the Aboriginal people, as a source for food and trade and as a part of his people's cultural identity.

Welcome

Ross Thornton (Chair, Great Southern Development Commission)

Ross welcomed forum attendees, noting the GSDC's long-term interest in aquaculture in the region, exemplified through developments such as the Albany Shellfish Hatchery.

Overview Aquaculture Western Australia

Heather Brayford (Deputy Director General, Sustainability and Biosecurity, Department of Primary Industries and Regional Development)

Heather delivered a presentation describing WA's advantages for the aquaculture sector and opportunities in both domestic and international markets. The presentation focused on DPIRD's strategic intent in three key areas:

- To grow, including a focus on opportunities and markets in Asia Pacific.
- To protect, including sustainable resource management and building a reputation as reliable producers.
- To innovate, including exploring partnering opportunities and supporting a culture of innovation to boost economic growth and unemployment.

These areas build on two core pillars: (i) sustainability and biosecurity, and (ii) industry and economic development. DPIRD has a role in assisting industry through removing barriers to development, providing a broader scope for

industry, offering strong linkages to the RDCs, providing applied R&D and infrastructure and offering biosecurity support. Further key points were as follows:

- There is currently significant or planned investment in infrastructure in various regions (e.g. Hillarys and Waterman's Bay research and laboratory facilities, Pemberton freshwater facilities, Fremantle Marine Finfish Hatchery, Geraldton Nursery and Albany Shellfish Hatchery);
- Further investment is being delivered in aquaculture zones (Kimberley, Midwest and South Coast);
- DPIRD is providing a strong focus on management and governance, including proposed new legislation to protect the industry and its businesses (Aquatic Resources Management Act), red tape reduction and biosecurity and fish health;
- There is a range of current and emerging prospects, including shellfish, Akoya oysters, freshwater species and finfish, among others.
- The longer term DPIRD aquaculture industry goals are for investment to reduce what is currently a risky environment and the provision of infrastructure with key developments in marine finfish and marine shellfish.

Forum Overview and Introductions

Ian Stagles (Chair, Aquaculture Council of Western Australia)

Ian Stagles acted as facilitator for the forum and provided the initial overview and introduction.

Session 1: Overview and Status of WA Aquaculture Industry

Aquaculture and Regional Development

Steve Nel (Aquaculture Manager, Sustainability and Biosecurity, Department of Primary Industries and Regional Development)

Steve provided an overview of WA aquaculture and regional development. Key points were as follows:

- DPIRD's priorities for aquaculture are to: (i) support existing industry, (ii) continue aquaculture R&D, (iii) develop and invest in aquaculture zones and infrastructure, (iv) continue streamlining regulation to facilitate industry growth, and (v) ensure good fish health and biosecurity.
- There are aquaculture operations underway around much of WA's coastline with a range of opportunities for development of the industry in a variety of species.
- Economies of scale is an important factor for the industry, with large players able to stimulate investment. ACWA and RCDs can play a role in ensuring a high level of collaboration between smaller industries to cohesively form larger units and drive growth.
- Growth sectors include finfish (barramundi and yellowtail kingfish) and shellfish (e.g. mussels, edible oysters and other marine molluscs. Abalone production has also increased significantly and is expected to grow into a substantial industry on the south coast
- Current investments in capital infrastructure by DPIRD include the Albany Shellfish Hatchery, a marine finfish hatchery and a marine finfish nursery.
- Aquaculture Development Zones have been established in the Kimberley and Midwest. Capacity for the Kimberley is estimated to be 20,000 tonnes, with $160m value and 600 jobs at full production. For the Midwest, capacity is was estimated to be 48,000 tonnes, $400-600m value and 1,400 direct jobs at full production. The establishment of Aquaculture Development Zones on the south coast (Albany and Esperance areas) is underway.

Research and Development Overview

Greg Jenkins (Director, Aquaculture Research and Development, Department of Primary Industries and Regional Development)

Greg delivered a presentation on aquaculture R&D and innovation. Key points from the presentation focused around the five operations in DPIRD's Aquaculture Research and Development branch and are as follows:

- Aquaculture Health (Waterman facility) – developed under state government investment, the facility works across all aquaculture sectors but with a primary focus on shellfish.
- Freshwater aquaculture facility in Pemberton – with a focus on increasing freshwater angling tourism opportunities in the South West. Lower rainfall and runoff into rivers will require change and adaption in this area.
- Fremantle Marine Fish Hatchery and Geraldton Marine Fish Annex – to culture and provide juvenile barramundi and yellowtail kingfish to the WA State Aquaculture Development Zones in the Mid West and in the Kimberley. Research into various aspects of marine fish culture of direct interest to the industry is also carried out at these sites. There are currently three key research projects underway for kingfish health and nutrition, primarily based at the Fremantle facility.
- Planning for the development of a Geraldton based Marine Fish Nursery for yellowtail kingfish is currently underway. The intention is for the Fremantle hatchery to provide fish of approximately one gram to the Geraldton facility where they will be grown to a size suitable for stocking into the sea cages for grow-out.
- The DPIRD research facilities at Hillary's will be the base for the newly created Shellfish Aquaculture research team. A new Principal Scientist position has been created and filled with the recent appointment of Dr Michel Bermudes. Dr Bermudes and his team will support the State's investment in the Albany Shellfish Hatchery by conducting research to increase the opportunity for commercial development of oyster aquaculture along the WA coastline.

Preparing for the Shellfish Boom

Michel Bermudes (Principal Research Scientist for Shellfish Aquaculture, Department of Primary Industries and Regional Development)

Michel provided a presentation on preparing for a shellfish boom, while avoiding potential pitfalls experienced previously in aquaculture across Australia (e.g. NSW Sydney Rock Oyster) through management and preparation. WA is well positioned to prepare for a shellfish boom, with many existing networks and technical capacity, but it is important to grow the supply chain and cater for demand in areas such as seed supply, investment, biosecurity, public health, grow-out areas, species, etc. Shellfish farming can take many forms from very simple to technologically advanced. Concepts such as giant clams in Pacific islands, small scale farming of tropical oysters, Sydney Rock Oysters (SRO) and Pacific Oysters in Australia were presented as examples of what can be done in the shellfish farming space and how this could apply to the context of Western Australia.

Giant Clam Farming (a delicacy in the Pacific Islands)

- Low cost hatchery with small investment requirements (low-tech and does not require large operations).
- Small volume translates to small investment (the clams grow large, so not many need to be harvested).
- Labour is the main input.
- Giant clams grow without food – as they don't need to feed, there are no range restrictions and little management required (they produce their own food and energy through symbiotic relationship with phytoplankton).
- A premium price is achievable, but it is a niche market.

Small scale farming of tropical oysters (Fiji used as an example)

- Currently small scale for livelihood/subsistence and food security.
- Wild spat collection translates as low cost and low-tech (may be different in WA).
- Labour is the main input and no hatchery is required (self-sufficient).
- Restricted natural/farming range so zoning and management is required.

SRO, Pacific Oyster

- A large, high volume market requiring large investment and a need to minimise risk.
- Relatively high labour and input requirements, so high production costs. A trained workforce is particularly important.
- Susceptible to disease and so need ensure capacity for breeding (disease resistance), biosecurity, translocation and diagnostic surveillance are addressed.
- Zoning/farming range is required (productive waters suitable for farming), with careful management in relation to shellfish quality assurance.

The Role of Governments to Support Industry Growth and Development

Deborah Pett (Director, Food and Trade Industry Development, Department of Primary Industries and Regional Development)

Deborah provided a presentation on the government's role in supporting industry growth and development. Strong connections to global markets have been established by DPIRD, but development of these connections and relationships requires further growth. WA is the most trade-exposed state in Australia, with 80% of current production coming from the mining industry and ultimately exported. Consequently, there is a strong need to diversify exports to maintain or grow WA's global market position. DPIRD provides support in trade development (export capability building, trade facilitation), information services (online export services portal), market access (market access working group, representation of WA priorities at national level, collaborative projects, etc.), delegations (in-bound/out-bound visit programs highlighting WA's competitive advantage), and partnerships (e.g. AEGIC, GIWA, Veges WA, WAFIC). With relevance to aquaculture, key points were as follows:

- DPIRD's Trade and Investment team is involved in a number of projects, providing examples of export capability development, Asian market success and food industry innovation. Capability development includes export development grants, export capability building, collaborative business models, in-bound buyer delegation, and in-market intelligence. Food industry innovation includes market intelligence services, capability building, branding and luxury market support, and knowledge building.
- A number of grants and support schemes are available to businesses, including the Agribusiness Innovation Fund, Food Industry Innovation, Investor Readiness Incentives, Asian Market Success, Cooperative Loans Scheme, Value Add Investment Incentive Fund, and Regional Economic Development grants.
- Other support schemes include R&D tax incentives, Entrepreneurs' Program: Innovation Connections, TradeStart, Export Market Development Grant, and EFIC.
- There is an exceptional market potential for aquaculture, with opportunities in: (i) developing capability to meet rising demand from the Asian growing middle class, (ii) producing high quality and traceable food, (iii) addressing growing demand in various finfish and shellfish species, and (iv) providing sustainably-farmed products.

Albany Shellfish Hatchery – Development of the Model and Biosecurity Issues

Russell Adams (Regional Manager, Operations and Compliance, Department of Primary Industries and Regional Development)

Russell delivered a presentation on the Albany Shellfish Hatchery, starting with an overview and history of the two government-managed aquaculture parks in WA: Broome Tropical Aquaculture Park (BTAP) and Albany Aquaculture Park (AAP). The AAP was established in the 1990s with a number of advantages of the site including: high quality water drawn from King George Sound, close proximity to existing services and isolation from other industry. Following a 2014 ACWA-commissioned report on the need for a multi-species mollusc hatchery, the Albany Shellfish Hatchery was established in December 2017. The Department of Fisheries provided a $2.3m commitment for the hatchery along with a further $1.3m from Royalties for Regions to expand investor ready aquaculture zones. Key points from the presentation were as follows:

- There were a number of challenges in establishing the hatchery, including remodelling old infrastructure and a not fit-for-purpose facility, facilitating the production of multiple species under one roof and the associated biosecurity requirements (internal and external), and a lack of available expertise in the commercial production of shellfish spat.
- Good planning and design were essential and were achieved in consultation with both industry and government.
- Biosecurity risk mitigation has been critical both for the threat of disease and the potential spread of invasive species. Risk mitigation measures include floorplan design to allow the quarantining of areas and rooms (no thoroughfares), isolated drainage for each room and anti-syphoning valves in the plumbing, individual equipment supplied in each room with minimal movement of equipment, staff hygiene processes and standard operating procedures.
- Broodstock management is important for biosecurity risk mitigation as this is the stage of production with the highest biosecurity risk. Translocation protocols are in place and fish health certificates are required for

broodstock, particularly that is sourced from outside of the Albany area. Fisheries Compliance Officers have been in attendance during translocated stock receival to conduct inspections as per license conditions.

- Management of waste water is also a key aspect of the biosecurity measures in place, with conditions imposed by the Albany Port Authority that require no chemically-treated water to be released to King George Sound. An ultrafiltration system has been designed and implemented that allows sufficient filtration to remove organic material and pathogens as required. Waste water can be diverted to the treatment system from different rooms in the hatchery according to the risk associated with different species in production.

Jonathan Bilton (Albany Shellfish Hatchery Manager, Athair Aquaculture)

Jonathan provided an overview of the first year of production at the hatchery, explaining the hatchery is yet to reach production capacity. There is potential to expand the nursery space which is likely to cause a bottleneck for production at capacity. Early success at the hatchery has been achieved in broodstock conditioning with mussels, rock oysters and pearl oysters, with first year production summarised as follows:

- Milky Oysters - broodstock from, and spat sent back to, Pilbara and Midwest. Trials were conducted to grow-out at four different locations, but with relatively low productivity and with issues associated with shell ridging.
- Blacklip Rock Oysters – broodstock from Shark Bay and spat sent to Wooramel Bank. Results demonstrated possible hatchery production and promising shape and growth rate for commercial viability.
- Mussels – broodstock from Albany and spat sent to Albany leases and Port Lincoln, SA. Results show reliable hatchery production, positive broodstock conditioning work and benefits of hatchery seed.
- Flat oyster – broodstock from, and spat sent to, Oyster Harbour, Albany. Results demonstrate that the oysters grow well in Oyster Harbour.
- Akoya Oysters – broodstock from King George Sound, Albany and spat sent to Albany and Cockburn Sound. Hatchery production is consistent and promising results were realised on lease.

Pending production will include Blacklip Pearl Oysters, Doughboy Scallops, Tropical Blacklip Oysters, and Sydney Rock Oysters.

Questions – Session One Speakers

Question	Answer
1. What species are likely to be produced in the future and what about Pacific Rock Oysters and other non-endemic species?	Jonathon Bilton: There was an application some time ago to bring in Pacific Rock Oysters with assessments conducted by consultants to identify risk. Importation was refused at that stage, in part due to pest status. Once 100% biosecurity systems are established in the hatchery, Sydney Rock Oysters will be a focus.
2. Regarding biosecurity, what monitoring of water quality is being undertaken and is it being conducted out of the area?	Jonathon Bilton: Currently none whilst growing local species but testing will need to be implemented once the biosecurity plant is fully functional. There is no intention to test intake-water as it is such high quality, but waste water will be tested as per the license conditions. Samples are likely to be sent to labs in Perth.

Session 2: Commercial Experience and Opportunities

Staged Commercial Development; Trail-blazing and Innovation

Craig Kestel (Managing Director, 888 Abalone)

888 Abalone purchased the Bremer Bay Abalone farm from administrators in 2010 and is now the largest single employer in Bremer Bay. Programs of improvement have been implemented to increase product quality, reduce mortality and increase production and growth rates. Since then, 888 Abalone has brought production up from a 50 tonne per annum farm to 75 tonne in 2016/17 and 95 tonne last financial year. Craig Kestel delivered a presentation on lessons learned from this operation:

- Water quality is of prime importance in aquaculture. No two waters are the same, necessitating individual analysis and adaptation to different conditions with every new site. 888 Abalone tests seven different variables every three months. Temperature is directly related to growth and mortality rates. There is balancing act between the best water quality and commercial efficiencies - high-quality waters are found further away from cities, but efficient transport networks and support services are often lacking in these areas.
- With regard to staged commercial development, there is a need to test and prove systems, address challenges, and risks faced. It is important to have room to grow and to learn from others.
- The Bremer Bay operation experienced various water system problems, with sand and weed blockages and poorly designed intakes. The previous operators had attempted filtration, but high water volumes and small lines made this difficult. 888 Abalone replumbed the whole farm, installing larger lines and intakes together with flushing valves to allow pipes to be more easily cleaned. A 20% improvement in growth was recorded immediately following the upgrades. New tank systems were also developed, where abalone are grown on sheets and then placed in slab tanks.
- Continuing R&D is required to adapt infrastructure and find more cost effective or efficient solutions. Little off-the-shelf equipment is available and so in-house innovation is often an important factor in the development of equipment and infrastructure for aquaculture.

Brad Adams (Managing Director, Ocean Grown Abalone)

Ocean Grown Abalone (OGA) is a world leader in sea ranching technology for greenlip abalone. Purpose-built reefs (ABITATS) have been constructed for the purpose and there are now 10,000 ABITATS on the OGA ranch in Flinders Bay, Augusta. OGA has received significant support from government (DPIRD), which has been instrumental in the success of the project. As of December 2018, OGA has biomass of 210 tonne and 2.3m abalone on the reefs. A $3m OGA facility was completed in June 2019 for processing and value-adding at Augusta Marina. OGA is now undertaking a comprehensive, bankable feasibility study to develop a large land-based abalone farm and hatchery in Esperance, with an expected production of 500 tonne per year, requiring a $30m+ investment and leading to the creation of over 50 local jobs.

Scallops the Next Big Thing?

Clayton Nelson (Director, One Sea)

One Sea invested in the South West Trawl Managed Fishery (SWTMF) adjacent to Rottnest Island and harvested 1m scallops in 2012. However, after a significant branding exercise in 2013 and winning Producer of the Year, One Sea didn't have any scallops to sell in 2014. Scallop catches are highly variable and unpredictable but catch data are the only real indicator of population structure. Climate-related changes are also having a major impact on larval transport and settling locations and therefore on recruitment success. In response One Sea has been looking at the potential for re-seeding and managed grow-out.

Other recent activity in the sector has been at Shark Bay Scallop Managed Fishery, Abrolhos Island and Midwest Trawl Managed Fishery, and the South Coast Trawl Fishery. All these sites are highly variable with long periods of non-production at various times.

The key points from Clayton's presentation were as follows:

- The impact of highly variable scallop catches: there is high demand for scallops but inconsistent supply. This weakens supply chains and marketing and has a direct impact on fishing investment and local economies. It also opens the market to imported scallops where quality can be an issue and product substitution is a large factor.
- The main focus for the future is stock enhancement: identifying the suitability of species/fisheries for enhancement and delivering a high-value product with wide geographic distribution. There are well-developed stock enhancement programs (via aquaculture) and markets in Asia. It has been found that not a lot needs to be put back into the water to see great success; even a 10% recovery rate leads to high returns.

- The principal scallop aquaculture needs are: broodstock, spawning, larval rearing, juvenile grow-out, and adult deployment. One Sea is addressing all these areas except for larval rearing and settlement, which is covered by DPIRD's Hillarys facility.
- Scale-up is the overall priority: One Sea, Blueshift and RMB Aquaculture are developing commercial aquaculture plans for a hatchery facility, juvenile grow-out sites, deployment and monitoring, and harvesting. A scallop enhancement pilot project is due to commence in August 2019, with One Sea injecting $1.5m in cash and in-kind and DPIRD $1m in-kind. FRDC funding is currently being sought and co-investment opportunities are available.

Attracting Investment in the WA Aquaculture Industry

Russell Barnett (Founding Partner, Australian Venture Consultants)

Australian Venture Consultants (AVC) was founded in 2002 to help clients develop and achieve strategic commercial outcomes for innovative projects, with a diverse multi-sector and international client base. AVC's work in aquaculture has mainly been policy-based; for example, as member and chair of the Aquaculture Development Council, assessment of governance options for Albany Shellfish Hatchery, and a review of the Government of Western Australia's investment in aquaculture infrastructure. The key points from Russell's presentation were as follows:

- Industry development strategies are an important tool for attracting investment. Articulating how industry will develop and who will do what provides investors with confidence in the sector.
- Commercial strategies need to be industry-led, with the community defining what it does or doesn't want, and government setting the boundaries and supporting/facilitating industry.
- Strategy needs to be achievable and resilient to be able to survive changes in the long term (e.g. change of government).
- WA was second most lucrative fishery behind Tasmania in 2013-14, predominantly from wild catch (90%) and specifically the Western Rock Lobster (approximately 80%). Based on these statistics, the industry is highly vulnerable. 2017-18 doesn't look much different, but the 'other aquaculture' segment has grown considerably (with some having almost doubled gross value of production).
- Fundamental challenges remain, such as: limited suitable sites, high costs of doing business, regulatory burdens and unclear species advantage (many can be produced elsewhere cheaper). The largest sectors are still research, government and consultants.
- The pioneers continue to successfully develop and grow and these include 888 Abalone, Ocean Grown Abalone, Indian Ocean Fresh, Blue Lagoon Dep Sea Mussels, Latitude Gallery and Maxima.
- However, there have been new developments over the last three years, such as the Cone Bay Barramundi Asia acquisition, the Aarli Mayi project, Huon Yellowfin trials and Midwest Aquaculture Development Zone leases - all helping to more firmly establish the WA aquaculture industry.
- What is needed for developing the sector is:
    - ACWA to present strong investment cases: be a professional promoter, remembering that aquaculture is small in the WA seafood industry and a minute part of the overall WA economy.
    - The government to continue with regulatory reform; the amount that government can invest has limits, but the industry can capitalise on the opportunities brought by the changes government make. The government should also ensure that policy is sensible and predictable.
    - Development of a comprehensive Western Australian marine aquaculture strategy with a focus on two sectors: marine finfish and shellfish. There is existing infrastructure for strategies at a local level, through the RDCs, that can build on competitive advantages (e.g. clean, green, and high level of biosecurity). The sector can also build on indigenous produce through partnerships, jobs, leadership opportunities, etc.

Oysters – Experience and Opportunities

John Collison (Bowen Fresh Oysters)

John presented a video of his family's history in the aquaculture industry and current family operations in Bowen Queensland. Having tried many different approaches in oyster aquaculture over the years, John and his family evolved with the industry and adapted, moving on from hand- made spat collectors and manual loading to complex machinery over time. In 1990 John was taught how to operate an oyster nursery by Geoff Diemer a Port Stephens

farmer and also moved into production of triploid pacific oysters. Their first Sydney Rock oyster nursery was established in Crookhaven/Shoalhaven River, before a second nursery was set up in a 40-foot refrigerated sea container. For growing hatchery Pacific Oysters, they shifted technology to floating baskets on plastic poles. A fully automatic shellfish grading system was then purchased to increase production efficiency. A new oyster lease location was acquired in Bowen, Nth Qld, initially a 10 hectare lease, with another 5 recently added. John noted that Black-Lip oysters are an industry waiting to happen.

John finished his presentation by showing a documentary trailer (SHELLSHOCKED: Saving oysters to save ourselves) which listed the following impacts:

- Oysters feed on algae which has considerable nutritional benefits and the benefits of the algae is passed on to the consumer.
- A single adult oyster can filter 50 gallons of water per day.
- New York harbour once had half the world's population of oysters which have now gone, and 85% of historic heritage reefs around the world are functionally extinct. The restoration of the world's decimated oyster populations is critically important to future health of all marine ecosystems

Questions – Session 2 Speakers

Question	Answer
1. What kind of diseases have you experienced in Milky and Blacklip Oysters?	John Collison: Over 5 years of production, none seen. Queensland and WA are both lucky to have extensive coastline away from high population centres and industry that can have negative impacts. In Townsville, the rain event that killed Milky Oyster populations, had no impact on the hardier Blacklips.
2. In the wet season in Queensland, with all the rain and run-off, have you had any E. coli closures, and will urban growth ever affect you in the future?	John Collison: Selling occurs from April through November, when the wet season starts. Harvesting and grading through the wet season rather than selling in this period, so this avoids the associated effects. Spawning begins thereafter. There is almost pristine barrier reef water in Bowen, and tests show excellent water quality. The area is very sandy, so rainfall tends to filtrate into the ground rather than run-off into the ocean. The area is largely agricultural farmland, and there are no major developments planned. Bowen is very far from major urban areas.
3. How closely related are the Queensland Blacklip Oyster to Western Australian ones?	Mike Snow: He is confident that they are same species but with different names. There may be some genetic separation in different areas (QLD, NT, WA). He can't give a clearer answer other than this but would need to ensure careful governance (management), for example in translocation to mitigate any risk.

Session 3: Effective Industry Development

WA Government Priorities and Plans for Aquaculture Development

Michelle Rodan (Chief Veterinary Officer, Department of Primary Industries and Regional Development)

Michelle presented on animal health biosecurity and welfare. Key points were made as follows:

- The World Trade Organisation (via the Sanitary and Phytosanitary Agreement) and World Organisation of Animal Health (OIE) establish key principles of global biosecurity to facilitate trade and safeguard human and animal health. Import requirements must be consistent with that agreement, must not use unnecessary measures, must be science-based, must not be arbitrary or constitute restriction to trade, must align with the national agreement for common import risk analysis process, and be subject to National Biosecurity Committee and Animal Health Committee consideration of inter-state border requirements.
- Export market access requirements include the demonstration of Australia's biosecurity status to trading partners via a two-year program to provide proof of freedom of disease. Every quarter, the CVO is required to sign off on a QAD report and terrestrial disease report.

- Interstate trade is underpinned by the Intergovernmental Agreement on Biosecurity (IGAB) to improve national systems, which includes requirements for significant testing. WA relies heavily on export markets, with trading partners more closely scrutinising import and export requirements.
- The notifiable aquatic disease risk list for Australia is monitored regularly for the QAD report (i.e. identifying what is out there and what needs to be put in place to protect WA industry). If risks are identified, restrictions on trade can be put in place to mitigate those risks. Once no longer required, and in order to reduce red tape restricting industry development, restrictions can then be lifted.
- Animal biosecurity has been undertaken for many years terrestrially, with consultation groups established for cattle, sheep, pigs and avian. Ideally, a similar consultative committee for aquaculture will be established to better understand what industry hopes to achieve and to ensure that conditions are in place allow healthy trade.

Rowan Kleindienst (School of Molecular and Life Sciences, Curtin University)

Rowan delivered a presentation focused on the WA Shellfish Quality Assurance Program (WASQAP). This is a Department of Health program of environmental and shellfish monitoring requirements that need to be met prior to the harvest of shellfish for human consumption. WASQAP is based on the Australian SQAP and is designed to comply with both Food Standards Australia and New Zealand Food Standards Codes. Key points from the presentation were as follows:

- Bioaccumulation of toxins from shellfish can cause serious illness including Diarrhetic Shellfish Poisoning, Paralytic Shellfish Poisoning, Neurotoxic Shellfish Poisoning and Amnesic Shellfish Poisoning.
- An example of the potential impact of a toxicity event on industry is the Paralytic Shellfish Toxin (PST) bloom in Tasmania in 2012/13. Multiple fisheries were closed and the damage to the industry is ongoing, with a total cost to date estimated at $23m. Following the event, the Marine Biotoxin Monitoring and Management Plan (MBMMP) was developed under WASQAP to require regular industry monitoring, gain a better understanding of risk level, mitigate risk of contaminated shellfish reaching the consumer, and collect and analyse biotoxin data that may assist with sampling requirements in the future.
- Producers need to be aware of requirements for site classification/sanitary surveys prior to harvest, with the Department of Health needing to run studies to catalogue site quality and ensure sites meet criteria for growing. The testing regime includes tests of water for quality, phytoplankton, and shellfish flesh for chemical contaminants, bacteria and biotoxins. Testing costs can be around $25-35,000 per annum for routine sampling, with adverse event sampling costing up to $5,000 more.
- Limitations and challenges of the WASQAP program are that: (i) it may be cost prohibitive for small operators, (ii) samples need to be analysed within 24 hours (causing issues for remote farms in getting samples to the lab in time), (iii) extended closures for adverse events leads to loss of jobs and income, (iv) there is currently a lack of capacity, flexibility and support services in the implementation of the program, and (v) updates to the technology required for screening in WA have been slow (mostly due to high cost).
- There are potential solutions to these challenges, such as sharing samples and costs from common harvest locations, exploring the use of sentinel species and building capacity within government to allow industry expansion.

Cecile Dang (Aquatic Animal Health Research Laboratory, Department of Primary Industries and Regional Development)

Cecile delivered a presentation on the challenges associated with shellfish disease. The impact of diseases on the shellfish industry was illustrated through the example of *Perkinsus marinus* disease in Chesapeake Bay, USA. Between 1981 and 1988, oyster production fell from 80,000 to 15,000 tons as a result of this disease.

The Aquatic Animal Health Research Laboratory provides support to industry and a range of tools to assist aquaculture producers particularly with translocation. This includes risk assessment, environmental impact assessment, and investigation of potential impact of translocation on genetics of native populations.

Four main pathogens of concern for the shellfish aquaculture industry are currently being researched:

- *Perkinsus olseni:* Affects growth and productivity and results in marketability issues due to blemishes. The pathogen has produced mass mortalities in Europe and Asia in various species. It was first detected in WA in 1992-94 and detected again in 2003.
- *Marteilia sydneyi* (QX disease) parasite*:* Affects feeding (parasite in gut) and results in 95-100% mortality. It was detected in WA in rock oysters from NT and the south coast and in Blacklip Pearl Oysters in the Abrolhos Islands.
- *Bonamia exitiosa:* Lethal infection for some species and a potential problem for trade. It affects white blood cells and infection can become systemic. It has been reported from many states and in WA it killed off a trial oyster farm in Denmark.
- *Steinhausia:* Reproductive parasite that decreases fertility. It has been detected in south coast WA mussels but can also affect oysters.

To mitigate or minimise health and productivity issues in shellfish, there are three key steps: (i) identification of the cause, (ii) developing a better understanding of the problem (R&D), and (iii) identifying tangible solutions for the aquaculture industry (e.g. by adjusting husbandry practices, choosing optimal sites for culture, and/or selecting animals for resilience through breeding programs). Current relevant R&D projects being conducted by the Aquatic Animal Health Research Laboratory are:

- Contributing to development of an R&D plan for the pearling industry.
- Looking into common microorganisms associated with healthy oysters.
- Northwest Shoals to Shore Research Program – monitoring the health of pearl oysters exposed to marine seismic survey sources (funded by oil and gas).
- Developing new detection tools for parasites (*perkinsus olseni*) in abalone supported by the abalone industry.

Opportunities for Large-scale Bivalve Aquaculture in WA

Greg Harvey (Managing Director and CEO, Harvest Road Group)

Harvest Road Group is the agricultural arm of Andrew and Nicola Forrest's Minderoo Group. The Harvest Road Group brings four strategic perspectives to agri-food, agribusiness and aquaculture:

(i) As a commercial operator, there is a need to build an integrated value chain,
(ii) A focus on the protein food segment: by 2050, the world's production of protein will need to increase by 55% and aquaculture conversion to protein from source (almost 1:1) is far higher than for beef (1:7),
(iii) Asia: Harvest Road Group exports to over 28 countries, mostly in Asia. Asia is the largest growth market in the world, with an estimated ~50% increase in middle class forecast.
(iv) 'Food citizens' – people want to express their rights for safety, cleanness, greenness, convenience, ethics, etc.

Key points from the presentation were as follows:

- There is a large global potential for aquaculture. Global mussel production is increasing steadily: growth in consumption is already at 8% CAGR, outstripping supply which is growing at a rate of only 3%. Oyster production is also increasing steadily. Australia is a net importer of both mussels and oysters, with exports not currently significant in terms of production. This means that there is capacity for increased supply without supply demand issues and a clear export potential.
- WA has the most isolated primary production industry in the world. This provides a competitive advantage in aquaculture particularly as a provenance story for clean and pristine waters. Harvest Road Group's market research in Asia shows a 30% premium on WA shellfish produce compared to competitors.
- Various models exist for how stakeholders can work together (e.g. through partnerships with regulators), with good case studies in New Zealand and Norway. A long-term view of the industry is important.
- There is a large number of stakeholders in aquaculture business. It is important to take a holistic approach and clearly demonstrate the benefits the industry brings in the interest of all stakeholders and satisfying community interests and desires. Harvest Road Group wants to show that large-scale aquaculture farms can operate in

sensitive areas well (e.g. world heritage areas), and in communities with diverse views and aspirations, such as Carnarvon.

- Harvest Road Group's vision for aquaculture in WA is to support the South Coast Aquaculture Development Zone and work with regulators to unlock the region's potential. Supply is the greatest limitation, particularly to provide consistent quality product and get customers to recognise the importance of the premium. Opportunities for the Midwest were also identified as part of the vision, with the ambition for the Carnarvon trial area to develop and produce over 6,000 tonnes of oysters per annum. The project will open up new job opportunities in the Midwest through a focus on export products. Harvest Road Group are also very focused on indigenous employment.

Models for Aquaculture Marketing, Packaging and Distribution

Tim Pauly (Executive Chairman, Marine Culture)

Marine Culture's goal in marketing is to maintain consistency of supply and quality. The complexity of the business is largely due to control inputs and unpredictable geographic and seasonal variability. The company's response is to be a knowledge-driven organisation that develops and implements toolkits to manage operations in complex environments. An example is Marine Culture's Tasmanian and South Australian farms. Using historic data, they saw a pattern where production dips in one, saw increases in the other. It seemed as though they were competing with themselves based on relative stockquality. Consequently, Marine Culture looked for strategies to sustain operations by identifying independent markets to level out peaks and troughs. The company has developed modified atmosphere mapping tools and other products to ensure quality. New lines provide opportunity to build brand value. The company is currently mid-implementation for its mapping tools and is underway with the process of protecting IP.

Sam Gordon (Managing Director, Blue Harvest)

Blue Harvest, established in 2005 is an Australian-owned, seafood sales and marketing agency specialising in aquaculture production. Blue Harvest currently manages sales of >1m dozen SRO and 500k dozen Pacific Oysters and expects this to grow by 20% per annum. The company has a good relationship with all major supermarkets and has people based in most Australian capital cities. Key points from the presentation were as follows:

- Supply chain transparency is critical. Organisations should get rid of extra links if they are not adding value (streamline the supply chain). It is particularly vital that the whole supply chain understands where it stands and what their individual roles are. Everything in the supply chain should be about the consumer and players should have collaborative working relationships, recognising that each one has differing needs for margin depending on their own costs. It is also important to realise that retailers will find other product elsewhere (nationally / internationally) if they cannot get it here.
- There is a new market opportunity associated with recovery from POMS (e.g. Tasmania starting to recover, NSW opening up and investment in Sydney Rock Oyster industry, South Australia getting back on track slowly, and WA coming up in the industry). Compared to fine dining (although still an important market), the supermarket sector is not well tapped into oysters. For example, 65-70% of Australian seafood is sold through major retailers, but only 10% are Australian oysters. The supermarkets themselves recognise that they not doing a good job at marketing shellfish. The approximately 750 Woolworths stores across Australia are selling only 5 dozen oysters per week per store. It was similar in the past with prawns, but this has seen a significant change since they began to be properly promoted by supermarkets.
- Scale of operations is also an important factor to consider. For example, small producers may be better suited to farm gates and local sales with their own marketing. After scaling up, however, companies need to start thinking about the best utilisation of time (for example considering the need to use consultants or employing their own marketing team). Where credit risk may be an issue, a marketing agency may help. Depending on the size of the business, an organisation should be realistic about its approach in order to drive profitability.
- A number of other points are also important to consider, including accounts receivable, economies of scale (i.e. freight and packaging), continuity of supply, dealing with quality complaints, market leverage, market intelligence, and market access.

Mark Allsopp (CEO/Executive Director, Australia's Oyster Coast)

Australia's Oyster Coast (AOC) was founded in 2013 by a collective of oyster farmers with an objective to have a united approach to marketing to identify value and promote SROs. Mark presented a short video on the company. AOC has 45 farmer shareholders across the NSW coast, employing over 70 people. Additional resources have recently been added to the management of marine operations, quality assurance, sales and marketing. The organisation has implemented various programs over time, including large acquisitions of water in strategically important locations, upgrading leases to move from stick/rack and rail infrastructure to floating and swinging baskets, bringing in expertise from other oyster regions in New Zealand and Tasmania. AOC's vision for future growth includes further acquisitions to secure spat and grow-out leases, increasing employment and sales of over 2m dozen oysters.

Key points were as follows:

- The current domestic market size is estimated to be 12m dozen oysters per annum, having been as large as 20m dozen in the past. The end consumer market value is estimated to be $320m.
- There are clear opportunities for supermarkets; although they have been regarded as the dumping ground for poor quality produce in the past, this is changing as they improve their marketing and as demand for oysters increases.
- Other markets include the food service segment ($26.2m growth available) and major retailers ($5.9m growth available).
- Potential challenges for the WA industry are: (i) transportation (cold chain logistics), (ii) limited market data on new edible oyster species, and (iii) visibility of a WA brand in the face of significant branding in the east coast.

Opportunities for Indigenous Involvement in Aquaculture

Paul Stenson (Ngadju Native Title Aboriginal Corporation)

Paul delivered a presentation on the opportunities for indigenous Australians to become involved in industries outside of mining and, specifically, the aquaculture industry. A key issue that indigenous Australians face, with approximately 105 communities in WA, is that claim groups rely heavily on the mining industry to provide compensation for operations on their lands through native title processes. It is important to help them to transition into other industry areas by diversifying their focus and skills.

Pre-feasibility investigations have shown a promising potential in the aquaculture sector. In order to make this work, joint venture partnerships are needed where traditional owners can invest in aquaculture operations. For skills development, apprentices and trainees could become involved over time, gradually playing a larger part in the industry and potentially leading to their own initiatives and operations. It is important to acknowledge the 'shyness' that traditional owners may have toward new business ventures and to overcome this in order to build capacity and commercial relationships.

Questions – Session 3 Speakers

Question	Answer
1. Acknowledging that the cost of phytoplankton samples is expensive, what research might be being done around making samples cheaper and what movement exists in this space to help?	Screening for toxins is possible but samples have to be sent to the eastern states which can be a lengthy process. Traditionally, these costs did not have to be factored in, but this biosecurity requirement is now a significant cost contributor. Phytoplankton blooms are transient in nature and may not be detected in water samples. Flesh testing is therefore the best indicator.
2. We are surprised that we have not heard much about international certification programs, do you see these as a way the aquaculture industry here can grow?	For the export market we have found these programs are not completely applicable to the rock oyster industry and creating specific parameters for self-certification was the best option. Engaging with the international certification bodies will be important in the future to collaborate and align policy.

3. Why set up in world heritage area and, if you succeed, will that pave way for others to work alongside you in the zone?	Harvest Road Group: The site is attractive in terms of what is available. We are operating well in Carnarvon and see great potential. It made sense in terms of the research we have conducted, so we will run the trials and see how it goes. In terms of others, it is premature to start thinking about that, so we will focus on the trials to see what they tell us.
4. If supermarkets are considered to be the greatest growth market, what should we start doing to convince supermarkets this is the best place for them to be?	Conversations to date indicate that supermarkets already know they are doing a bad job. The supply chain was broken with controls of wholesalers negotiating prices (set price) so they would look for the cheapest. The supply chain was changed to fix this problem, so quality is now not determined by the wholesaler, and they are paid a distribution fee instead. Despite demand outstripping supply, supermarkets are not doing a good job at capitalising on shellfish – we are looking at things like certification programs, natural packaging, and breaking down barriers to market place in response to this.
5. How do the marketing people view the Aquaculture Stewardship Council (ASC), Marine Stewardship Council (MSC) or others over the next 15 years or so?	In terms of value as a gold standard for sustainability programs, we put ASC at the top and a diminishing scale for all others thereafter, with Friends of the Sea at the bottom. The ASC are benchmarked against global standards with their activity monitored externally by SEDEX (i.e. independent auditors keep ASC regulated). It should be noted, however, that the landscape is subject to change; for example, where ASC or MSC may not be as prominent in the future. Regardless, it is best to ensure that you have a sustainability program in place so that you are protected for the future and are more likely to be accredited by these or other bodies as the landscape does change.

Forum Small Group Workshop

Session 4: Let's Get Together – Marching Forward (Y)our Priorities

Facilitated Session and Small Group Work

Facilitated by: Ian Stagles (Chair, Aquaculture Council of Western Australia)

Forum attendees were organised into 14 table working groups with the intention that each table would include a diverse knowledge base. Each table was asked to consider and record their answers for each of four questions. Selected tables were asked to present on each of the four questions.

1. What do you see as your top aquaculture priorities and challenges in the next 12-24 months?

Common Themes		
Priority		**Number of Tables**
1.	WASQAP approval, models, costs, processes, effectiveness and/or alignment to industry needs	10
2.	Translocation protocols	7
3.	Species identification for WA	5
	Guarantee of seed supply / access to spat / ensure hatchery capacity grows to meet industry expansion	5
	Timely access to investment zones / future sites / trial areas	5
4.	Disease and biosecurity – impacts, lack of knowledge/expertise in marine species in Australia, ensuring industry is biosecure and healthy, government response, impact of pollution and wastewater management, etc.	4

	Access to skills and knowledge / training and capability (e.g. university, TAFE, high schools, next generations)	4
5.	Politically neutral R&D support and investment over long term	3
6.	Attracting investment / finding capital	2
	Red tape reduction /regulation - e.g. exemptions, streamlining processes, online system, ARMA	2

Other Priorities/Challenges	
• Best practice models • Government support (regulatory support) • Environmental change • Access to labour – remoteness • Development of alternative technologies for remote areas for WASQAP requirements (i.e. can't send bacteriological samples if transport is over 24hrs) • Data – where/how do we source data? • Collaboration for scale – e.g. information, marketing, industry services • Market intelligence and branding	• WA provenance • WA risk averse • Lack of standards between states / need for national framework • Cost & transfer of leases – transparency / certainty, need clear framework and optimisation of leases • Quality control – support required • Development of nurseries • Unknown risks • Site suitability against criteria – e.g. swell • Social License – e.g. misinformation and community buy-in

2. What do you see are the biggest supply chain/ logistical issues and what solutions can you recommend?

Common Themes		
Priority		**Number of Tables**
1.	Transport logistics / freight costs / tyranny of distance / isolation & remoteness / cold chain R&D / time to market – solution: (i) suggested for R&D into specialised transport techniques; (ii) co-ops/clusters.	13
2.	Cold chain in northern WA required	2
	Cost of air freight – freight options analysis suggested	2
	Access to suitable sites for nursery and fattening	2
	Seed supply – consistency of quality and quantity	2

Other Priorities/Challenges	
• Traceability • Consumer education and buying opportunities – e.g. supermarkets • Developing key influences on product quality across all levels of supply chain • Have hatchery, need nurseries • Distance and initial thin demand (scale-up) - identify markets and then work back to complete the cold chain • Challenges in Asian markets (export development issues) • Hatchery issues associated with isolation (biosecurity risk protection), supply security, and capacity to produce more than required as backup plan • Utilities supply, cost and quality (energy and water) • Inter-sector collaboration • Product substitution or provenance transparency	• Current industry scale limited – need growth • Demand – oversupply • Quality product benchmarking • Market readiness (marketing, quality, supply chain) • Time to undertake WASQAP – need to research solutions for quicker response • Access to appropriate skilled/non skilled workers – suggested government and private investment into infrastructure and export capacity • Lack of coordinated marketing of primary produce • Spat supply • Carbon footprint – possible offset due to carbon sequestration • Capital investment • Feed access – fingerlings/hatchery • Market visibility for small producers – solution through co-ops and branding

3. How can government further assist industry in the next 12-24 months?

Common Themes		
Priority		**Number of Tables**
1.	Very clear and transparent, simple and achievable guidelines around WASQAP – decide on requirements and stick to it (also includes comment of WASQAP review and action plan, looking at other states' solutions, and continued R&D into WASQAP)	6
2.	Social License – collaborative approach (includes promotion of positive effects on community and environment, awareness, open discussion, etc.)	5
3.	Training - includes comments on in-region training capacity building for new entrants, and a state-wide coordinated training program	4
	Policy/guidelines on translocation	4
	Streamline process – make easier for industry / remove red tape	4
4.	Marketing / promotion of aquaculture positive image (e.g. clean and green. Positive protein stories, efficient conversion of nutrients to food, ecosystem services, biosecurity/lack of significant disease event, social license, etc.)	3
	Continued efforts and investment in R&D	3
	Species identification – R&D to identify suitable species for different areas, including marketability	3
5.	State-wide strategic planning / action plan and infrastructure review (may also include freight and logistics and other relevant state-wide reviews/action plans)	2
	Utilities infrastructure (namely power and fresh water)	2
	Facilitate support cross-industry and/or industry-community engagement and discussion	2
	Access to sites / site identification and development zones	2
	More innovation and infrastructure funds / access to them	2
	Funding fish health capacity / ensure fish health and biosecurity	2

Other Priorities/Challenges	
• Incorporation into curriculum (education system) • Endemic WA species developed to commercial capacity – natural competitive advantages • Cost of exemption applications to run trials • Assistance to new entrants (small or large) • Freight and logistics review and action plan • WASQAP review and action plan – look at other states' solutions • Government need to listen to industry as industry will always outlast government – government can set goals, but need industry to achieve them • Coordination – with a clear vision for all to follow • Grant funding opportunities for feasibility (assistance) studies on new projects	• Industry liaison managers from DPIRD to assist industry development – better communication of available DPIRD assistance • WASQAP resources, certification and analytical services/laboratories • Whole system approach to aquaculture and agriculture • Awareness / education with regulations / requirements for start-ups • Rapid response to biosecurity risk – more support to operators to maintain supply (JV government & industry team approach to biosecurity process and monitoring) • Facilitating experimental farming • Land based zoning infrastructure

4. How can we stimulate investment and industry participation?

Common Themes		
Priority		**Number of Tables**
1.	Good regulatory conditions / clear regulatory framework / streamlining regulatory process – providing certainty for investment	10
2.	Certainty around lease conditions / tenure terms in lease agreements / fees /security of tenure	7
3.	Government to de-risk industry (WASQAP, fish health and biosecurity related)	6

4.	Investment in and government support to trials new species / hatchery production of small batch emerging species / support for small scale experimental farming / species flexibility	5
5.	Species suitability identification for regions/zones and as most applicable to market	3
	Infrastructure (utilities, roads, marinas, etc.) to stimulate new investment	3
	Branding / promotion – highlight strategic advantages of WA	3
6.	Social license improvements	2
	Government to pick winners and back them / develop winners to be investment ready	2
	Supporting existing enterprises to be visibly viable/profitable / providing proof of concept for the financial viability of enterprise	2
	Better communication between government and industry	2

Other Priorities/Challenges

- Assisting with flexible agri-business to diversify investment
- WASQAP
- De-risk investment with research
- Help classify new areas for WASQAP
- Encourage investment from Indigenous corporations
- Attracting big players
- Investigate other investable areas and why they are successful (e.g. other countries)
- Encourage strong biosecurity standards – e.g. 'three strikes you are out' strategy
- Integrity and transparency of production – all operators and whole industry policed
- Promotion of ecological benefit of shellfish farming – social license
- Ground work required – economic models and data
- Adapting demonstration / extension / incentivisation / adoption processes used in terrestrial primary production to existing aquaculture enterprises (using public funds) to improve practices and environmental outcome
- Global competition challenge – high cost of production and scale/supply on global markets
- Training for industry – students (TAFE job ready graduates) – sector specialists
- De-link R&D from investment
- Good planning and environmental policies
- Mechanism for matching investment with aquaculture operations
- Small scale pilot study
- Grant/leverage funding
- Discussions/events/forums – knowledge sharing
- Site ready prospectus documents with approvals, identified species, logistical links to advertise to markets, etc. - industry ready projects
- Audit of existing/past projects
- Department collaboration – facilitators
- WA risk averse
- Government support upfront – community consultation, zone selection, environmental impact studies, etc.
- Ask pioneering successful businesses what the top three things are impeding growth (e.g. list of priority areas)
- Reduce sovereign risk
- Pre-approvals (zones)
- Mapping exercise to identify sites
- Consider industry levies for certain initiatives
- Tax incentives (e.g. like oil and gas)
- Incorporate awareness raising and information sharing within schools to stimulate next generation farmers
- Support information sharing and peer to peer learning from established operators in other states and countries
- Be profitable and don't be ashamed about profit – profit attracts investment
- Reliable seed supply

Forum Close

Closing Statement

So Long and Where to from Here?

Speaker: Bruce Manning CEO, (Great Southern Development Commission)

The forum was closed by Bruce Manning, who provided an overview of the day's proceedings. He described some of the many challenges faced in getting to the present point. He said it was clear that shellfish aquaculture still has many

areas of significant potential. Mr Manning noted that communication and cooperation between government and industry is essential to address key development issues in the sector. As the industry moves to maturity, he suggested, the relationship between enterprise and government remains critical, and could be seen as one of interdependence.