09-10 Annual Report

THE AUSTRALIAN SEAFOOD COOPERATIVE RESEARCH CENTRE

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CRC AUSTRALIA

Established and supported under the Australian Government's Cooperative Research Centres Program

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AUSTRALIAN SEAFOOD COOPERATIVE RESEARCH CENTRE

The Australian Seafood CRC is established and supported under the Australian Government's Cooperative Research Centres Programme. The Fisheries Research and Development Corporation is a major investor in the Seafood CRC with other contributions made by Seafood CRC Company members and supporting participants.

EXECUTIVE SUMMARY

Achievements and Activities of the CRC in Relation to Research, Commercialisation-Utilisation and Education Outcomes for 2009-10

At the end of our third year we have completed the planning and initiation of the majority of our targeted projects, with seventy percent of our funds contracted to projects in development, underway or completed. Most projects are not due to deliver their outputs until later years; however, there have been some promising developments which are reported below.

PROGRAM 1 - AQUACULTURE PRODUCTION INNOVATION

"Program 1 will achieve a substantial increase in the production and profitability of Australian aquaculture and selected wild-harvest fisheries".

The CRC has committed substantial resources to the oyster industry across four states of Australia to drive genetic improvement of the two species of oysters used by the industry. Of particular interest is genetic improvement in growth rate, shape, condition and weight at harvest. After three years of operation, it is pleasing to see that 25 percent of the Pacific Oyster spat used by industry is genetically improved. This can reduce the cost of production per dozen oysters from an average of $5.00 to $4.50, a saving of $1.75 million per annum across 3.5 million dozen oysters.

The oyster industry has also used its first production benchmarking report, developed by the CRC, to identify key areas for productivity improvement; these being labour efficiency and cost of spat production.

The Australian prawn farming industry uses water from estuaries in Queensland to raise prawns in ponds and the water that is discharged from these farms must have minimal nutrient content. Discharge controls are a major impediment to expansion of the industry. A new microbial floc technique developed by the CRC has been proven to substantially reduce the nutrients in pond effluent, thus enabling the water to be safely recycled on farms rather than discharged. The technique is now being adopted on several farms.

Additionally, non CRC research with an individual farm has developed a genetically improved domestic prawn *(P. monodon)* which has resulted in considerable enhancement of yields. The CRC has developed triploidy technology to produce sterile prawns which will enable the farm to make their improved prawns available to industry-wide whilst protecting their breeders' rights. The CRC is now adopting triploidy induction techniques for application on a commercial scale.

Nine recommendations for improved fisheries management of Southern Rocklobster developed from a CRC project have been adopted in the Tasmanian fishery with the potential to increase earnings from the fishery by $560 million over the next 15 years. This was achieved through involvement of key industry stakeholders working with researchers on bioeconomic modelling of the fishery. This approach is now being applied in other fisheries to develop decision support tools for improved fishery management.

Stock enhancement was not initially a major focus in the Production Innovation program but has grown in importance with the initiation of two major projects with abalone in Western Australia and Sea Cucumbers in the Northern Territory. The abalone projects are well advanced and have shown that abalone stocked as juveniles have survived and increased population size at their age class and are about to enter the commercial fishery. Commercialisation options for abalone enhancement are being actively developed. The work with Sea Cucumbers is in its early stages and is initially focused on optimisation of captive breeding protocols.

PROGRAM 2 - PRODUCT AND MARKET DEVELOPMENT

"Program 2 will achieve increased demand and access to premium markets for Australian seafood; fulfillment of consumer demands for safe, high-quality, nutritious seafood products; and increase profitability throughout the value chain".

To ensure our research into post harvest processing and market development is on track, the CRC has undertaken the largest and most current seafood consumer research across Australia. This work has provided our participants with up to date information on consumers' views about local and imported seafood, flavour, food safety, environmental standards, packaging and presentation. These results are being used to steer a range of improvement activities for a range of CRC end user participants including Barramundi, Yellowtail Kingfish, prawns, oysters, Sardines, Australian Salmon and abalone.

The developments that the CRC has supported to reduce technical export trade barriers have also begun to pay dividends. Research conducted on biotoxins was used as a basis for an Australian trade negotiation resulting in reopening of the European market for Australian abalone.

A website has been established to support seafood trade (www.seafoodservices.com.au/page/?pid=288). The website provides information for all major trading partners and includes information about all the requirements of the importing country with regard to certifications, tariffs, duties, residue maximum limits, contaminant standards as well as current and emerging trade issues. Relevant trade and market publications to assist exporters are also provided.

Research into consumers' understanding of the health benefits of seafood and how to improve communication on this subject has guided the production of test materials designed for use by seafood retailers, schools and health professionals. This information is already being used by some seafood companies and is being further evaluated in a community intervention study.

Research into lobster processing in Western Australia has shown that the installation of an automated washing tunnel is feasible and can save around $0.14 per kilo in reduced labour costs. Research into computer aided colour sorting of lobsters has also shown a measurable and predicable correlation between raw and cooked shell colour. Further experimentation to automatically segregate finished product colour grades is ongoing.

PROGRAM 3 - EDUCATION AND TRAINING

"Program 3 will achieve "industry ready" academic researchers; create CRC industry participants with the necessary skills to implement CRC research results; create a new "breed" of seafood managers and will achieve a revolution in the quality of service at the interface between consumers and the seafood industry".

Our education and training program has been adapted as much as possible to the needs of our participants. For example, a training and innovation "hub" has been established to help aquaculture hatchery staff across Australia to stay up to date and to share ideas. To date over 50 people have taken part in hub meetings and workshops.

The aLife career information pack, which promotes careers in the Australian seafood industry, has now been distributed to over 3,500 schools with a new, improved version with more career profiles redistributed in 2009.

Fifty-three students are conducting graduate studies in the CRC. This includes 35 PhD students, three MSc students and 15 Honours students. One PhD student and three Honours students have graduated and each has started their post graduate careers in seafood research or within industry.

The CRC Master Classes trained 173 people during the year. This included 43 participants in a seafood waste minimisation and processing efficiencies class, 103 people were trained in seafood marketing and 50 people were trained in a suite of business skills related to the seafood industry during 2008-2010.

Fifteen research travel grants, 17 industry bursaries and 13 visiting expert grants have been awarded to CRC participants to date.

RISKS AND OPPORTUNITIES WITHIN CRC RESEARCH

Seventy percent of Australia's seafood production is exported, much of it to Asia. We are currently conducting research into the lucrative abalone market in China. The research has found that the market is ready to accept new product forms which should enable the industry to reduce its reliance on the export of live abalone. The research is also testing new value chain arrangements. There is an opportunity to expand this research to include Rocklobster and other high value seafood products.

However, wild caught prawns, which were predominantly exported several years ago are now sold extensively throughout the domestic market. While this has seen the income to the sector drop substantially, it also provides an opportunity for the industry to identify and develop new approaches to retailing product domestically and to form new supply chain relationships to support this. To assist in this, the CRC helped the Australian Council of Prawn Fisheries establish new governance arrangements to enable planning for a new approach.

The decision by Sydney Fish Market to withdraw its Market Pride range of value added products from the market is likely to make some sectors of the industry more risk averse in relation to value adding. The CRC helped Sydney Fish Market develop the Market Pride range and everyone involved learned valuable lessons about the difficulties involved in new product launches. While this is a setback, it has also given us important experience to apply in similar projects being conducted with other CRC participants.

Despite ongoing success in the land-based production of Southern Bluefin Tuna, there are still technical details that have to be sorted out before commercial quantities of the fish can be produced in sea pens. Clean Seas Tuna Ltd and the CRC are making a renewed effort to achieve this goal in 2010-2011.

The CRC has hoped to begin commercialisation of a DNA vaccine for amoebic gill disease (AGD) in Atlantic Salmon but did not achieve the required efficacy of the vaccine. The economic opportunity to reduce or eliminate the impact of AGD on our largest aquaculture industry is very significant and the CRC is now reviewing the whole approach to solving the problem of AGD.

IMPEDIMENTS TO ACHIEVEMENT

It is pleasing to report that the two impediments reported last year have been substantially overcome. During the first two years of the CRC, some industry sectors were slow to make investment decisions. Now all industry participants have given the CRC clear direction on their R&D priorities.

The capacity in the CRC to conduct post harvest R&D was limited during the first two years. However, through a combination of industry recruitment and support for the South Australian Food Centre, the CRC now has considerably more capacity to draw upon.

AWARDS, SPECIAL COMMENDATIONS AND CRC HIGHLIGHTS

On the 28th May 2010, the Seafood CRC received a CRC Association Excellence in Innovation Award in recognition of outstanding innovation and commercial application of its research with Clean Seas Tuna Ltd.

The award acknowledged a series of research breakthroughs which have enabled the breeding and rearing of the prized Southern Bluefin Tuna in land-based hatcheries, and the impressive, scientific collaboration effort that took place. A video of the award-winning research can be downloaded from www.youtube.com/ watch?v=g84TwtxcZr0

The Seafood CRC also won the South Australian Science Excellence Awards (in the category for excellence in scientific collaboration) on the 13th August 2010.

Some of the Seafood CRC CRCA Excellence in Innovation Award winners (L to R: Dr Graham Mair, Dr Wayne Hutchinson, Dr Len Stephens, Mr Hagen Stehr AO, Mr Mike Thomson and Professor Abigail Elizur)

CONTEXT & MAJOR DEVELOPMENTS

Industry Context in which the CRC Operates

ABARE reports that in 2007-2008 the GVP of Australian aquaculture increased eight percent to $868 million while the GVP of the wild harvest fishing sector declined by six percent to 1.3 billion. This is a continuing trend globally and reaffirms the drivers for Program 1. Since 2000-2001, average prices for abalone, Rocklobster and prawns has declined by 50% due to a range of factors such as the exchange rate and competition from other countries. These facts emphasise the need for Australia to continue to improve the quality and market acceptance of our exported seafood products. Program 2 has this as its central objective.

Demand for seafood is rising in Australia, Asia and all affluent countries. Supply from wild harvest fisheries is limited which results in an increased need for aquaculture production and generally rising prices. In 2009, world aquaculture production of seafood eclipsed wild harvest and Australian fisheries and aquaculture produce only 35% of domestic demand. The industry imported lower priced fish such as white fillets and canned tuna while exporting high value seafood such as lobster, abalone and sashimi grade tuna.

The majority of Australian wild harvest fisheries will not increase profit by increasing catch and our aquaculture industries compete in price sensitive markets against Asian products. Therefore both sectors must look to maintain and improve their profitability by constantly increasing the level of customer satisfaction, concentrating on value added products, consistent quality, greater capital use efficiency, cost reduction, product marketing, and reducing technical barriers to trade.

The Western Rocklobster industry suffered a poor year with catch significantly reduced during 2009-2010. This resulted in the West Australian Government reducing allowable catch limits for future years and changing from regulatory input restrictions to a quota system. The CRC is conducting a project in Western Australia to produce decision support tools to optimise economic yield under the new arrangements.

Implementation of a free trade agreement between New Zealand and China, resulting in tariff elimination for New Zealand exports, has put Australian Rocklobster and abalone exporters at a disadvantage in their largest market. The CRC will continue to work with the Seafood Market Access Forum to identify opportunities to reduce trade barriers in China.

The seafood industry does not have a national peak body or a marketing body to coordinate promotion, market development and publicity for the industry. However the Minister for Agriculture, Forestry and Fisheries recently wrote to all seafood organisations across Australia seeking input to a proposal to implement a seafood marketing and promotion levy. If the industry accepts this proposal and establishes a national marketing capacity, the market development activity conducted by the Seafood CRC will have a faster, clearer path to implementation.

VALUE OF OUTCOMES TO DATE AS COMPARED TO EXPECTATIONS OUTLINED IN THE COMMONWEALTH AGREEMENT

In preparation for the Third Year Review, The University of Adelaide is conducting an economic evaluation of CRC projects. Initial results indicate that the expected benefits from Program 1 are broadly in line with expectations, with potential benefits coming from aquaculture tuna production, improved efficiency of the Southern Rocklobster industry, genetic improvement of oysters and Barramundi, increased abalone aquaculture production, improvements in production of Yellowtail Kingfish and increased production of Sea Cucumber for export. Expected benefits from a vaccine against amoebic gill disease in Atlantic Salmon are now unlikely to occur in the near future.

Analysis of the post harvest work in Program 2 is yet to be completed but the research is showing potential benefits from enhanced retail presentation and packaging of Australian seafood in the domestic market, better market positioning of products in China, and new product development. CRC work to reduce technical trade barriers contributes to the overall effort by Australian governments to facilitate free trade and will take some years before any benefit can be detected.

MAJOR DEVELOPMENTS AND INITIATIVES

The Australian Barramundi Farmers Association has resolved to establish a national genetic improvement program as part of the Seafood CRC. This will enable coordinated breeding for inherited traits for the first time in the sector. The program will be initiated by

the CRC and will be owned by the industry, assuming adequate funds can be raised.

A CRC project has recently begun in the Northern Territory to evaluate Sea Cucumber "sea ranching". This project will grow juvenile Sea Cucumber in land based hatcheries and seed them onto the seabed of estuaries in the Northern Territory. If successful this will significantly improve the sustainable yield of the fishery that occurs naturally in this region.

As reported in the Executive Summary, a significant number of developments and initiatives have also taken place such as the genetic improvement if two species of oysters, improved fisheries management of Southern Rocklobster, Southern Bluefin Tuna larval rearing, new microbial floc techniques, development of a genetically improved domestic prawn and triploidy technology to produce sterile, male prawns for the prawn farming industry.

A project to reposition Australian abalone in China commenced this year. The research has identified the product format and supply arrangements that top level restaurants in Shanghai require. It is apparent that the logistics and product quality attributes required by these restaurants is evolving much faster than the conventional supply chain has been able to respond. The research is linking Australian abalone exporters to new Chinese supply lines through the use of Chinese consumer marketing companies.

Methods of communicating the importance of seafood in human health are being examined in projects aimed at women of child bearing age, the elderly, children and people with specific conditions such as diabetes and obesity. Communication tools to suit these groups are about to be released and will be showcased at the International Seafood and Health Conference to be held in Melbourne in November 2010.

The Retail Transformation Program, comprising a number of projects aimed at improving the way that consumers can access and buy seafood in Australia will soon begin developing and evaluating a new range of fresh, chilled, packaged seafood in retail stores. These products are based on findings of consumer research conducted by the CRC that provided new insights to the barriers and drivers of seafood consumption and demonstrated that there were some opportunities for CRC participant businesses.

CRC research into technical barriers to international trade has been strengthened by the establishment of SafeFish – a group of technical experts able to provide advice to industry and government to support Australian trade negotiation positions. This initiative is already delivering results in international forums such as Codex.

Mobile phone messaging (SMS, MMS and video messaging) as a method of communicating research results to CRC participants has been under evaluation in the CRC for the past year. Results will indicate whether this is a viable method of communicating research results to industry and other stakeholders. If shown to be viable, the CRC will look at expanding these tools.

< Preparation of the retail transformation product concept unveiling to CRC participants

NATIONAL RESEARCH PRIORITIES

How Seafood CRC Research Fits in to Building a Better Australia

The CRC aims to achieve thirteen major outputs, as described in the Commonwealth Agreement. Most of these deal with improving the prosperity of Australia's seafood industry and a number of the project outputs correspond to the national research priorities which are provided below:

National Research Priority	Research (%)
1. AN ENVIRONMENTALLY SUSTAINABLE AUSTRALIA: Transforming the way we use our land, water, mineral and energy resources through a better understanding of environmental systems and new technologies	
Water - A critical resource	1%
Transforming existing industries	48%
Reducing and capturing emissions in transport and energy generation	1%
Sustainable use of Australia's biodiversity	7%
Responding to climate change and variability	1%
2. PROMOTING AND MAINTAINING GOOD HEALTH: Promoting good health and preventing disease, particularly among young and older Australians	
A healthy start to life	2%
Ageing well, ageing productively	3%
Preventative health care	4%
Strengthening Australia's social & economic fabric	8%

3. FRONTIER TECHNOLOGIES: **Stimulating the growth of world-class Australian industries using innovative technologies developed from cutting-edge research**	
Breakthrough science	3%
Frontier technologies	1%
Smart information use	10%
Promoting an innovation culture and economy	2%
4. SAFEGUARDING AUSTRALIA: **Safeguarding Australia from terrorism, crime, invasive diseases and pests and securing our infrastructure, particularly with respect to our digital systems**	
Critical infrastructure	2%
Protecting Australia from invasive diseases and pests	7%

GOVERNANCE & MANAGEMENT

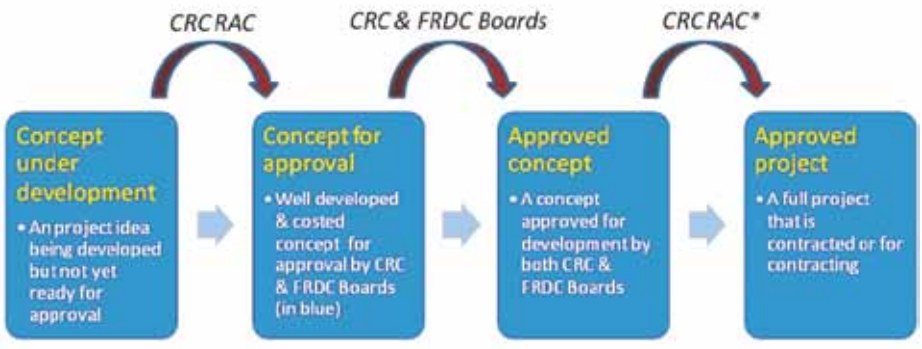
Management Structure

The Australian Seafood CRC Company Ltd's management structure comprises the Governing Board and the Research and Adoption Committee (RAC). The Seafood CRC currently has seven full-time and one part-time staff. Three of the full-time staff consists of Program Managers (supported by specialist Theme Leaders where appropriate) and Program 2 has a specialist Commercial Seafood Processing Manager.

The 2009-2010 year saw the resignation of Ms Rebecca Wilson, Business Manager whom was replaced with Ms Debra D'Aloia. The appointment of a part-time Office Administration Assistant also took place and the position was filled by Ms Leah Fergusson.

At an output level, the CRC continues to utilise the OmniFish program management system and software (the Fisheries Research and Development Corporation's project management tool) which reports progress against milestones for all projects.

In addition, an annual project outputs report, which staff use to report to the Board quarterly, enables Program Managers to monitor specific outputs and products from research and is used to hold Program managers accountable for delivery. In addition, a report on the delivery of Commonwealth Agreement milestones is used to track progress against our obligations. Program Managers are guided by their Theme Business Plans which provide the strategic framework under which projects are developed to meet the specified milestones and outputs.



The project approval process in the Australian Seafood CRC is depicted as follows:

SEAFOOD CRC COMPANY DIRECTORS

The Seafood CRC Board has nine Directors including the Managing Director. Two Directors retired during 2009 (Mr Nick Moore and Mr Roger Cotton) and two new Directors were elected at the October 2009 Annual General Meeting (Dr Craig Foster and Dr Pauline Mooney).

Within the Board structure there are also Board committees for finance, audit and risk management (the 'FARM'), a committee for appointments and remuneration and a committee for commercialisation. A summary of the Board's skills are provided in the financials section.

The Seafood CRC Board met four times face-to-face (in Port Lincoln, Adelaide and Hobart) and held one teleconference during this reporting period. During Board meetings, Directors receive reports on the CRC's progress and finances, determine investment in significant projects, track progress against theme business plans and budgets and approve policies and procedures. During this reporting period the Board approved no new policies but approved the risk management plan at its 6 July 2009 meeting.

THE SEAFOOD CRC RESEARCH AND ADOPTION COMMITTEE (THE "RAC")

The RAC provides advice to the Board through the Managing Director on matters relating to implementation and adoption of research and the development of high - quality, industry driven projects. The committee, whose members are the Seafood CRC Managing Director, CRC staff and two representatives from the Fisheries Research and Development Corporation, also provides recommendations to the Managing Director on how projects and programs can be improved to better meet the CRC's outcomes and end user needs. It is also the forum to ensure the right team is in place to conduct the research/activity. The RAC is also helpful to the Program Managers enabling them to monitor program performance and provide feedback on the themes progression.

RAC members also ensure Theme Leaders and CRC industry participants are invited to meetings where appropriate and on an as-needs basis.

The RAC is also a forum for the Fisheries Research and Development Corporation to provide technical input into projects and to advise on likely levels of co-investment by the corporation in each project.

Twice yearly Planning and Reporting Forums are also held with CRC Participants by the RAC. This enables an opportunity (in lieu of a conference) for participants to hear about the CRC's achievements and research updates as well as able to have input in to the development of future projects concepts and plans.

STATUS OF PARTICIPANTS

During this reporting period the status of a number of participants have changed. These are:

1. The University of South Australia has reduced its level of support in to the CRC and is now a supporting participant.

2. The University of the Sunshine Coast has increased its level of support and has upgraded to a core participant from a supporting participant.

3. Due to the level of involvement with hatchery research in the Southern Bluefin Tuna propagation work and the involvement of Sea Cucumber research, the Northern Territory Department of Resources (through the Darwin Aquaculture Centre) has become a supporting participant.

4. Unfortunately, the Cobia initiative which was approved last year did not eventuate and the opportunity for a replacement investment has been advertised.

2009-2010 Seafood CRC Staff

Currently the Seafood CRC has seven full time and one part-time staff with seven part- time Theme Leaders to help Program Managers implement their research and education theme business plans.

Dr Len Stephens

Len is the Managing Director of the Australian Seafood CRC and Program Manager for Commercialisation and Utilisation

Mr Bob Fleming

Bob is the Manager for Commercial Seafood Processing and is responsible for the implementation of seafood processing and product development projects within Program 2.

Dr Graham Mair

Graham is Program Manager for Production Innovation (Program 1) and is responsible for the implementation of Breeding for Profit, Aquaculture Innovation and Future Harvest theme business plans.

Ms Emily Mantilla (nee Downes)

Emily is the Program Manager for Education and Communication and is responsible for the implementation of the A,B, Sea theme business plan and communication of CRC outputs to participants and the public.

Ms Jayne Gallagher

Jayne is the Program Manager for Product and Market Development (Program 2) and is responsible for the implementation of the OzSeaValue and SellFish theme business plans.

Ms Debra D'Aloia

Debra is the Business Manager and Company Secretary. Debra is responsible for the management of CRC contracts, project agreements, human resources and finances.

Ms Alison Connelly

Alison is the Office Manager and is responsible for the management of the CRC office, events and reception

Ms Leah Fergusson

Leah is responsible for assisting the Office Manager and Program Managers in their administration duties.

2009-2010 SEAFOOD CRC THEME LEADERS

Dr Geoff Allan

Geoff the Theme Leader for the Aquaculture Innovation theme and is responsible with Program Manager 1 for consultation and implementation of projects in Aquaculture Innovation as well as coordinating the communication vehicles - the CRC Aquaculture Production Hub and the Hatchery Network. Geoff is from the NSW Department of Industry and Investment.

Dr Nick Robinson

Nick is Theme Leader for the Breeding for Profit theme business plan and with Program Manager 1 is responsible for the consultation and implementation of projects with industry. Nick is affiliated with Flinders University but is employed by NOFIMA in Norway.

Dr Caleb Gardner

Caleb is Theme Leader for the Future Harvest theme business plan and is responsible with Program Manager 1 for the consultation and implementation of projects with industry that fit within this theme. Caleb is from the University of Tasmania.

Dr Cath McLeod

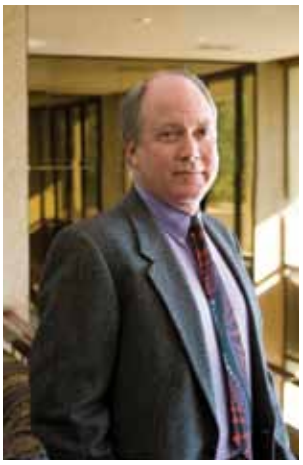
Cath is Theme Leader for the SellFish theme business plan and is responsible for trade and market access. Cath is a Seafood CRC Post Doctoral Research Scientist who is based at the South Australian Research and Development Institute

Associate Professor Tom Ross

Tom is joint Theme Leader for the theme business plan A.B, Sea and is responsible for the strategic direction of the higher education program and providing advice to CRC student appointments and projects. Tom is from the University of Tasmania.

Associate Professor Meredith Lawley

Meredith is Theme Leader for the SellFish theme business plan and is responsible for the consumer insights component. Meredith is from the University of the Sunshine Coast.



Associate Professor Mark Tamplin

Mark is joint Theme Leader for the theme business plan A.B, Sea and is responsible for the strategic direction of the higher education program and providing advice to CRC student appointments and projects. Mark is also from the University of Tasmania.

Ms Karen McNaughton

Karen is Theme Leader for the OzSeaValue theme business plan and is responsible for product and processing developments. Karen is based at the South Australian Research and Development Institute's South Australian Food Centre.

Seafood CRC Directors visit the University of the Sunshine Coast

2009-2010 Seafood CRC Company Directors

A profile of each Seafood CRC Director is found in the financial section of this annual report.

Retired Directors

The Seafood CRC acknowledges the dedication of previous Company Directors Mr Nick Moore and Mr Roger Cotton who retired at the CRC's October 2009 Annual General Meeting.

Seafood CRC Directors
2007 - 2009

Research Activities and Achievements - Program 1

Of the 19 new research projects established this reporting period, four of these fell within Program 1 (Production Innovation) with seven completed during this year. This brings the total of 39 Seafood CRC research projects directly under Program 1.

Specific information that demonstrates how Program 1 is tracking with progress against CRC outputs are:

OUTCOME 1: SUBSTANTIAL INCREASE IN THE PRODUCTION AND PROFITABILITY OF SELECTED WILD HARVEST AND AQUACULTURE SPECIES

Output 1.1 = Technically verified new aquaculture production systems on a commercial scale. The Aquaculture Innovation theme was established to drive this output through the expansion of the Southern Bluefin Tuna (SBT) aquaculture industry using propagated tuna and the establishment of a commercially viable Cobia aquaculture industry.

rogress within the SBT research profile has been extremely successful with the production of millions of SBT larvae by Clean Seas Tuna and the team of CRC scientists working with them. Following on from last year's success, the results were continuous spawning over 35 days, production of 30 million live larvae and grow out to 75 days and 20cm in length.

he proposed portfolio of projects with a new, national Cobia Consortium did not proceed due to the withdrawal of a number of key players from the consortium and will not be progressing. As a result of the loss of the Cobia Consortium, the CRC is now seeking new ideas to pick up this investment, with a focus on research that might be considered transformational and will address the CRC outputs related to verification of new aquaculture production systems.

Output 1.2 = Enhanced yields from wild-harvest innovations. The Future Harvest theme was established to drive this output. Initiatives include translocation of Rocklobster and abalone to areas of improved growth, enhancement of the number of abalone available for harvest by seeding with reared juveniles and commercial evaluation of abalone and Sea Cucumber fishery enhancement through propagation and seeding of the seedbed for harvest.

Output 1.3 = Removal or reduction of key production constraints in selected aquaculture systems. The Aquaculture Innovation and Breeding for Profit themes were established to address this output with projects covering genetic selection for disease resistance and growth rate in a range of species, larval rearing, fish health management and control (e.g. vaccines) and feed and feeding in existing aquaculture systems.

During the second half of 2009, the most research activity for this output was occurring in the aquaculture genetics theme "Breeding for Profit". The first of these projects is to look at the opportunities for application of cryopreservation in breeding programs and the demand for cryobanking facilities in aquaculture. This is a technology that, assuming it is feasible in a number of species, has a lot of potentially valuable applications to enhance the efficiency of breeding programs, some of which may still be unrecognised by industry. Industry will use cryopreservation more widely in breeding programs over the next decade.

Significant progress in the development of genetics for both Barramundi and aquacultured prawns has also taken place during the second half of 2009 and discussions on Yellowtail Kingfish genetics is on-going. Agreeing ways forward with these breeding programs will be a precursor to further developing the theme to increase levels of collaboration and cooperation between partners. The target outcome for this suite of projects will see Australia finally moving away from the commercial farming of wild and unimproved animals and is starting to look largely achievable.

Output 1.4 = Removal or reduction of key production constraints to enhance profitability in selected wild-harvest production. The Future Harvest theme was also established to devise and evaluate new fishery management approaches to identify opportunities for improved economic efficiency of key fisheries and to better target the market.

Another major strategy in Future Harvest is the development of decision support tools, primarily through bioeconomic modelling, for our major invertebrate fisheries. Significant progress has already been made with this approach with Southern Rocklobster with changes to fishing management strategies and management changes being implemented in the Tasmanian fishery. The CRC is about to begin the component of this project on Western Rocklobster, abalone and new work with Southern Rocklobster.

It is increasingly evident within the Future Harvest theme that important decisions with major implications for the economic returns on fisheries are taken on the basis of limited knowledge and understanding of the bioeconomic issues at play at any one time in the fishery. There are thus very real opportunities to improve the efficiency of these fisheries and the CRC expects the theme to deliver some significant economic returns on its research.

Output 1.5 = Production intervention that adds value to Australian seafood. Research towards achieving this output is primarily concerned with harvest techniques to minimise stress (e.g. in wild harvest abalone), genetics to select for quality parameters and nutritional influences on quality of harvest seafood. The CRC has one major project examining a range of pre and post-harvest parameters on the quality of Yellowtail Kingfish.

Projects are in progress to improve oyster condition and harvesting of Yellowtail Kingfish and Barramundi to enhance flesh quality.


Oyster farming in Tasmania

Completed Projects in Program 1 During 2009-2010

Project Title	Outcomes	Key Research Achievements	Benefits to Industry
2005/029 Factors limiting the resilience and recovery of fished abalone populations	Outcome 1 Output 1.2 Milestone 1.2.1 Output 1.4 Milestone 1.4.2 Milestone 1.4.2	Translocation of mature abalone is a feasible and relatively low cost activity, with good survival over at least the first two years. Emigration of translocated abalone into surrounding reef habitat is inevitable. Whether this creates an effective spawning population is not yet known. Blacklip Abalone larval dispersal is highly restricted, and limited to 10's of metres. The scale of benefit of remedial activity such as adult translocation or juvenile reseeding is extremely limited, and "stock" rebuilding using interventionist methods is questionable as a valid concept in abalone fisheries. Size and location of aggregations appear to be dynamic, and some change in membership occurs on time-scales of months. Juvenile abundance increases in the presence of increased density of adult abalone. It is unknown if this is a consequence of an "attraction effect", or a reduction in juvenile mortality.	Translocation of spawning stock may provide a mechanism to restore depleted reefs.
2005/209 Industry management and commercialisation of the Sydney Rock Oyster (SRO) breeding program	Outcome 1 Output 1.3 Milestone 1.3.1	Industry breeding requirements and inputs to estimate economic values of different SRO traits determined. Respective merits and deficiencies of alternative methods of selection evaluated. Excellent progress made in respect of growth rate and QX disease and against winter mortality under mass selection. Loss of broodstock risk reduction model developed and implemented. SRO operation breeding technical manual. Review of microsatellites of current sixth generation breeding lines found no evidence of significant inbreeding.	Inform, equip and assist industry to understand and adopt technology to produce faster growing disease, resistant oysters undertaking or contemplating breeding programs.
2006/226 Protecting and enhancing the Sydney Rock Oyster (SRO) selective breeding program	Outcome 1 Output 1.3 Milestone 1.3.1	Amendments to the Select Oyster Company (SoCo) breeding plan now includes a manual of protocols for pair mating SRO. Association between PO and QX resistance confirmed and sensitive test for phenoloxidase genotypes developed. Breeding program now has a tool to genotype parents and large numbers of their progeny to assist with breeding. Protocols for cryopreservation of gametes developed so now there is a potential strategy to reduce SOCo's overall maintenance costs for the lines and increase genetic security. Non-chemical means of triploidy induction in SRO (temperature and pressure shock) tested. Techniques shown to not be as effective as existing chemical induction techniques. This has formed the basis of ongoing research to see if efficacy can be increased. 60 pair mated family lines, including 31 lines with differing phenoloxidase phenotypes produced and undergoing performance assessment in the field which will be made available to SOCo for incorporation in their industry breeding program.	Production of family lines which will be made available to Select Oyster Company for incorporation in future breeding plans

2006/227 Enhancement of the Pacific Oyster selective breeding program	Outcome 1 Output 1.3 Milestone 1.3.2	Significant changes to the Pacific Oyster breeding strategy to a more economic outcome by reducing the cost of production. Size and structure of the breeding population has changed to allow greater genetic gains on a sustainable basis. 42 families were produced for the 2009 year class, which is an increase from 24 families in the previous strategy. Implementation of a new nursery system to enable the production of the expanded population. Data collection and storage systems revised to allow more efficient data collection, more efficient storage, and safeguards against data loss. New genetic evaluation system implemented to provide more accurate selections and revised commercial deployment strategy implemented to increase supply of selectively bred spat to industry.	Upgrade and refine the breeding program by developing a program that maximises economic gains and quantifies the relative importance of traits known to be significant for the Australian Pacific Oyster sector.
2008/712 Second generation Southern Bluefin Tuna (SBT) feeds	Outcome 1 Output 1.3 Milestone 1.3.4	SBT readily accepted the manufactured diet. Diet was shelf-stable and did not require refridgeration or freezing. The volume of food that had to be fed was less, thereby reducing handling costs and diet contents were able to be manipulated to contain the desired nutrient and additive content. Further research into nutrient digestabilities of the diets fed to SBT need to be determined before the commencement of further feed trials	Manufactured feed as an alternative to baitfish has positive implications for a propagated tuna industry including a more nutrient dense diet, constant nutritional composition and a reduction in freezer and feed handling costs. A manufactured diet may reduce the possibility of disease transfer from baitfish to Southern Bluefin Tuna
2007/718 Yellowtail Kingfish juvenile quality: Identify timing and nature of jaw deformities and scope the likely causes of this condition	Outcome 1 Output 1.3 Milestones 1.3.1 Milestone 1.3.3	Improved swim bladder inflation rates. Higher larvae survival rates and reduced jaw malformations. Strategies developed to reduce labour intensive sorting and improved quality of juveniles stocked in to sea pens.	Reduction of hatchery costs by reducing the number of deformed fish juveniles produced.
2008/904 Benefit cost analysis marker assisted selection in Australian aquaculture species	Outcome 1 Output 1.3 Milestones 1.3.1 Milestone 1.3.2	Growth is controlled by the action of many genes of smaller genetic effects. Traits which are difficult to select in typical breeding programs without markers information should be considered (e.g. disease resistance, meat quality etc) Families, DNA and data collected could be a valuable resource to discover markers for the above traits. Industry should invest in a selective breeding program.	Contribution to the development and application of marker assisted selection, genomic breeding values and selection using gene expression profiling to provide faster access and greater benefit than conventional selective breeding techniques.
2009/701 Australian oyster industry benchmarking program development	Outcome 1 Output 1.3 Milestone 1.3.5	Quantitative and qualitative software benchmarking tools for ongoing use by the Australian oyster industry developed. The software tool has identified key production and marketing practices as well as individual business financial performance within the oyster growing sector. Recommendations made to the growing sector on key areas of focus for R&D activities provided to growers.	Identifying areas of business operations which have the greatest impact on business performance and what contributes to the variation in individual business performance, industry will be able to identify the key areas of focus for future R&D activities.

Program 1 Research Projects' Progress and Updates on Achievements

Project Title	Outcomes	Key Research Achievements	Benefits to Industry
2006/220 Spatial management of Southern Rocklobster fisheries to improve yield, value and sustainability	Outcome 1 Output 1.2 Milestone 1.2.1 Milestone 1.2.2 Output 1.4 Milestone 1.4.2	Translocation of Southern Rocklobster has progressed with lobsters moved from Maatsuyker Island shown to be thriving in their new environs. Survival of translocated Rocklobsters is equal to survival of resident Rocklobsters, colour change and improved growth occur within the first moult. 93% of the translocated animals remain in their new location. 28,000 undersized Rocklobsters were moved from Maatsuyker Island to 10 sites around Tasmania to assess whether it is possible to improve colour and growth rates, and therefore marketability of the small, pale lobsters from deep water. Translocation of lobsters completed and effort directed at monitoring the growth, reproduction and long-term survival of translocated Rocklobsters in their new habitat, and assessment of results as potential management options. Application of this research to fisheries management is most advanced in Tasmania with industry voting on changes proposed as a result of this project in October 2009. Collection of data on deep water stocks has progressed. Data to subdivide Tasmanian stock assessment fishing regions into shallow and deep areas collected to parameterise growth in the stock assessment model for deep water fishing areas.	Develop functional management and monitoring recommendations for the Southern Rocklobster fishery
2007/224 Increasing the profitability of *Penaeus monodon* farms via the use of low water exchange microbial floc production	Outcome 1 Output 1.3 Milestone 1.3.4 Milestone 1.3.5	Data collected indicates the importance of total ammonium nitrogen (TAN) in the establishment of a good microbial floc. Molasses is an effective and cost-effective carbon source. Concerns that the use of molasses would encourage harmful *Vibrio* bacteria species is unfounded. Water exchanges help manage microalgal blooms, such as blue-green algae. Feed conversion efficiency has been reduced to as low as 1.3 when prawns were at 30g on a trial farm. As a consequence, feed costs have been significantly reduced, Farm nutrient discharge dramatically reduced on the trial farm. Low water exchange and a microbial floc production system provide a more stable pond environment, allowing a greater capacity to manage total available nitrogen concentrations resulting in greater yields from the ponds. Establishment of a stable floc has enabled production of 12 t per hectare of *P. monodon* grown to approximately 35g at a growth rate of about 1.7 g per week.	Increase the Australian prawn farming industry's profitability through a reduction in feed costs and less labour associated with pond maintenance.

2007/707 Resolving larval rearing, juvenile development and productivity constraints for propagated Southern Bluefin Tuna (SBT) and improvements to the production of Yellowtail Kingfish (YTK) and Mulloway	Outcome 1 Output 1.1 Milestone 1.1.2 Milestone 1.1.3	SBT spawned in 2008, 2009 and 2010. In 2010, 50 million eggs produced over an extended period of 3 months. Two peptide sequences1` identified and trialed on YTK and showed a positive impact histologically on gonadal development. Shipments of eggs during 2010 successfully hatched and reared up to 48 days after being successfully transferred over distances of 280, 1856 and 2900 km. Cumulative feed conversion ratios of 3.5 to 4.0 (vs. 15 to 20 with Sardines) achieved in a new feed trial and flesh shelf life of the SBT improved by 2 to 3 days compared with a Sardine diet. Jaw malformations were reduced by lowering the initial larval rearing temperatures by several degrees but needs further investigation. Replacing fish oil with more sustainable alternatives showed large scale replacement of fish oil is desirable and very cost effective. YTK can safely be transferred to sea cages up to 1 month earlier than current practice which will dramatically alter the potential growth of fish in the sea.	Production of quality fertilised Southern Bluefin Tuna eggs for use in larval rearing, weaning trials and for commercial production of juveniles and ultimately a propagated tuna aquaculture industry. Reduction in costs associated with Yellowtail Kingfish farming through feed and grow out processes and disease management.
2007/717 Southern Bluefin Tuna (SBT) maturation and sexing: Develop and apply new technologies	Outcome 1 Output 1.1 Milestone 1.1.1 Milestone: 1.1.2 Milestone 1.1.3	Sedation methods used to safely transfer new SBT broodstock from offshore sea cages into the onshore controlled environment broodstock holding system. Use of this method resulted in consistently high survival following transfer and promoted rapid acclimation of fish to the broodstock tank. Temperature recorders surgically implanted in a small number of SBT to test the ability of the system to accumulate data related to the endothermic changes for SBT. Blood and mucous sampling from broodstock conducted safely during transfers provided material for hormone, stress and DNA assays. Classification of male histology and levels of 11-ketotestorone, testosterone and 17βestradiol in blood plasma completed. Assay for measuring circulating levels of lutenising hormone developed. Manipulation of reproductive development of SBT using environmental cues and hormonal interventions were successful as shown by the successful spawning events three years running. Information on temperature and light regime manipulations used and hormones and delivery methods deployed catalogued. Successful initial development of a sperm cryopreservation method allowed SBT sperm to retain their viability post thaw. This may allow future manipulations of SBT reproduction regimes and plans to be established for optimising this technique using other species.	A new propagated Southern Bluefin Tuna industry in South Australia

2008/217 and 2008/218 Amoebic gill disease (AGD) vaccine - Phase III	Outcome 1 Output 1.3 Milestone 1.3.3	Approval received to raise antibodies against the homologue lectin in rabbits and salmon. Recombinant proteins produced and antisera should be available by August 2010. Atlantic Salmon were injected with the same antigens. Infection tank is maintained and continues to supply amoebae. The first vaccine efficacy trial for 2009 completed with 741 Atlantic Salmon we vaccinated at the hatchery and challenged with *N. perurans* on 5 occasions. AGD progression was assessed and the disease was evident in all tanks after visual examination. All fish were euthanased and gills removed to quantify the degree of pathology. Vaccine efficacy will be assessed by a reduction in pathology.	Consistently improving fertility and survival rates from Atlantic Salmon hatcheries. The cost to industry of not solving this problem is potentially $15 to $20M per annum.
2008/705 Quantitative genetics: Post doctoral research scientist	Outcome 1 Output 1.3 Milestone 1.3.1 Milestone 1.3.2	Supervised three PhDs and 1 Honours student and prepared five research proposals during this reporting period. Analysis of breeding data for Barramundi, Sydney Rock and Pacific Oysters.	The major outcomes will be longer term breeding strategies for the three species including proposals to address the key researchable constraints in the implementation of breeding strategies.
2008/709 Larval and early juvenile marine finfish rearing: Post doctoral research scientist	Outcome 1 Output 1.1 Milestone 1.1.1	Completion of a scientific paper reporting the results of the first two Yellowtail Kingfish (YTK) experiments conducted to evaluate feeding strategies for live feeds to improve survival and growth of YTK during larval rearing and reviewed literature relevant to larval rearing of Southern Bluefin Tuna and YTK. Assistance to two CRC PhD students with various aspects of their R&D trials.	Address key production and marketing "bottlenecks" that can be targeted research on larval rearing issues.
2008/711 and 2008/725 Aquatic animal health: Post doctoral research scientist	Outcome 1 Output 1.3 Milestone 1.3.3	Field trial using praziquantel, and a tank trial using praziquantel and fenbendazole undertaken. Salinity trials completed. Finalisation of results to include the analyses of plasma osmolality and immunohistochemistry of gills. Significant differences in growth at different salinities were observed. Routine monitoring of gill and gut health to be replaced with a survey of infections by *Kudoa* and blood fluke in farmed Yellowtail Kingfish (YTK), to evaluate geographical occurrence, prevalence at each site, and at different ages. Developed a method to quantify adult blood flukes in the muscles of YTK. Health protocol for larval SBT under development. Preserved samples of larval Southern Bluefin Tuna for future archival diagnostic analyses undertaken.	Contribute to the significant reduction in production costs associated with parasites and anti-fouling in finfish aquaculture.
2008/733 Population genetic structure of Sea Cucumber in Northern Australia	Outcome 1 Output 1.2 Milestone 1.2.1 Output 1.3 Milestone 1.3.1	Suitable markers for population genetic analyses developed. A suitable region of the mtDNA and polymorphic microsatellite loci located. Sampling of individuals from 15 localities from across the fished areas of Sea Cucumber achieved. mtDNA region sequenced and 20 microsatellite loci genotyped in all individuals from the first seven populations achieved. Broodstock collected and sample vials sent to the Northern Territory hatchery. Sampling of progeny arrays and breeding has begun.	A facility with associated services to meet the medium to long term need for maintenance of this aquaculture species.

2008/745 The advancement of reproductive development in Southern Bluefin Tuna (SBT) using hormonal manipulations of kisspeptin, the gatekeepers of puberty	Outcome 1 Output 1.1 Milestone 1.1.1 Milestone 1.1.2 Milestone 1.1.3	Development of tools for the determination of the baseline levels of key reproductive hormones around the time of puberty and during reproductive development to enable the design of an hormonal treatment for advancing puberty completed and additional genes are being cloned that would contribute to the analysis. Specifically the genes encoding for KiSS1, KiSS2, and their receptors, LHβ FSHβ brain and gonadal aromatase, and oestrogen receptors have been isolated. Partial sequences of housekeeping genes (18S rRNA and acidic ribosomal1 phosphoprotein) have also been cloned. An EVAc slow release implant was utilised to facilitate delivery of KiSS1 and KiSS2 peptides to Yellowtail Kingfish. Preliminary results indicate that the KiSS peptides do enhance pubertal development, as observed from histological sections of the gonads of the treated fish.	Advance pubertal development in SBT, with the aim of reducing the time it takes to reach sexual development. This will facilitate the availability of a larger number of SBT broodstock capable of reproducing, reduce the size of the reproductively active broodstock and thus ease handling and the creation of a sustainable production of SBT seed.
2008/750 Amoebic gill disease (AGD) vaccine phase III: Sea-based trials, vaccine refinement and commercialisation	Outcome 1 Output 1.3 Milestone 1.3.3	Third sea trial undertaken to verify the promising results from the first sea trial conducted in 2007-08. A cohort of 2000 fish was sent to sea and AGD infection scored. The two vaccine formulations provided a slight reduction in gill scores. This reduction was not considered commercially relevant as the vaccinated fish required the same amount of bathes as unvaccinated fish. A laboratory based vaccine trial using two formulations of the current vaccine is in progress. One further group of 30 new clones identified. Two further vaccine trials planned for 2010/2011. The first will assess whether molecular adjuvants can boost the effectiveness of the vaccine and the second will identify specific antigens. Pertinent legislative requirements for the commercialisation of the vaccine, and the required research to adequately address any concerns have been undertaken. Project will now not deliver a commercialisable vaccine and a new approach is being reviewed.	Efficient commercial vaccination program against AGD for the Tasmanian Atlantic Salmon industry reducing production costs and freeing up valuable resources that could be redirected towards continued growth and profitability and ultimately sustainability of the industry.
2008/756 Increased seedstock production of domesticated Giant Tiger Prawns (*Penaeus monodon*) through improved male fertility	Outcome 1 Output 1.3 Milestone 1.3.1	Completed experiments evaluating spermatophore development under different temperature-diet regimes. Completed experiments quantifying variation, and assessing the utility of alternative measures of male fertility. Evaluated the reproductive tract development & spermatophore development of males reared in tanks versus ponds)	If the problem of male fertility is addressed and the fecundity of domesticated prawn improved it will extend the benefits of domesticated and eventually genetically improved prawns.
2008/757 Commercial production of all female reproductivity sterile triploid Giant Tiger Prawns (*Penaeus monodon*): Assessing their commercial performance in ponds	Outcome 1 Output 1.3 Milestone 1.3.1 Milestone 1.3.2.	Knowledge of the growth, survival, reproductive and sex ratio performance of triploid *Penaeus monodon* when grown in earthen ponds under commercial conditions in one production season achieved. Knowledge of the economic benefits of stocking farm ponds with triploids instead of normal diploids obtained. A protocol detailing methods for inducing triploidy in *P. monodon* and information on their pond performance developed.	If triploids grow faster than diploids then the technology may be applicable across the whole industry. If triploids are shown to be 100% sterile then it can be used as a mechanism for protecting breeders rights facilitating the extension of the benefits of domesticated and eventually genetically improved prawns.

2008/773 Scope of options to establish gamete cyrobanking services to genetic improvement programs in Australian aquaculture industry	Outcome 1 Output 1.3 Milestone 1.3.1	Standard questionnaire developed and used to survey industry and research providers for taxa for which genetic improvement programs exist or are planned. Taxa identified were abalone, Pacific and Sydney Rock Oysters, Atlantic Salmon, prawns, Yellowtail Kingfish and Barramundi. Feedback suggests that the needs for gamete cryobanking services within species are similar. Breeding programs for abalone and prawns require cryobanking services to assist in dissemination of genetic gains. Desk top study on cryopreservation protocols and quality control measures completed which showed the most reliable quality control tests are post thaw fertilisation rates and subsequent larval survival rates.	Use of specialised cryobanking facilities could potentially speed up the application of cryobanking services to the aquaculture industry
2008/900 Improved profitability in the Western Rocklobster fishery using a Rocklobster trap	Outcome 1 Output 1.4 Milestone 1.4.1 Milestone 1.4.2	1.2 m lobster trap trialed during 2008/09 season and found to be less successful than a modified broad based side entrance batten pot. Further trials focused on comparing a modified batten pot design against standard lobster pots. Data collected on the efficacy of the modified batten pot and a preliminary analysis of the data undertaken. Established that 1.2 m traps are less efficient at catching lobsters than standard traps.	Verification and adoption of a more efficient pot within an appropriately revised fishery management protocol applying conversion factors between existing pots and the new traps will reduce fishing costs and improve the economic efficiency of Western Rocklobster fishermen without adversely affecting the exploitation rates.
2008/903 Understanding Yellowtail Kingfish (YTK)	Outcome 1 Output 1.5 Milestone 1.5.2	Monthly sampling of YTK commenced in June 2009 and completed in May 2010. This sampling regime allowed reproductive development to be tracked in 3 separate cohorts of fish transferred into sea cages in 2008, 2009 and 2010. Results achieved include wet weight, condition factor, visceral fat, gonadosomatic index, histological assessment of gonadal development and fillet yield. Plasma samples collected from fish for the analysis of sex steroids (testosterone and estradiol), vitellogenin, growth factors (growth hormone, insulin-like growth factor-I and-II) and melatonin. Maturation research complete and a suite of flesh quality research activities are in progress.	An "ideal production strategy" will achieve forecast production levels allowing informed decisions on what size and what time stocking YTK into sea cages can be made. This will improve production through shortening the production cycle, reduction of the standing biomass in the water, ultimately increasing farm profitability. It is imperative that substantial markets are developed for YTK product. By attaining knowledge on the quality attributes, shelf life and nutritional content of the product, producers will be able to tailor a product to specific market requirements.
2009/710 Bioeconomic evaluation of commercial scale stock enhancement in abalone	Outcome 1 Output 1.2 Milestone 1.2.2 Milestone 1.2.3	Detailed literature search of bioeconomic theory in fisheries and fish stock enhancement completed. Sampling and analysis for growth, survival, and ecological effects achieved at 40 experimentally enhanced sites and 10 control sites. Genetic samples taken from 21 sites, across 4 regions.	Economically viable stock enhancement will provide the fishery with a biomass level that may only ever be achieved in an exceptional year of natural recruitment, and in the longer term, rebuilding stock numbers towards virgin levels, will increase catch rates and ultimately economic efficiency and profitability.

2009/714 Decision support tools for economic optimisation of invertebrate fisheries	Outcome 1 Output 1.4 Milestone 1.4.1 Milestone 1.4.2	Recent data suggests juveniles released in previous years are about to enter the fishery thereby increasing catches.	Bioeconomic modelling with industry participant will identify improved and more efficient management models
2009/724 Genetic technologies to support a transformation to profitability and competitiveness in *F. merguiensis* and *P. monodon*	Outcome 1 Output 1.3 Milestone 1.3.1 Milestone 1.3.2	Research in progress. Project started in August 2010.	The transformation shift to profitability for industry means that high quality Australian grown and produced prawns will continue to be presented to the Australian consumers.
2009/726 Southern Bluefin Tuna (SBT) larval and juvenile rearing	Outcome 1 Output 1.1 Milestone 1.1.1 Milestone 1.1.2 Output 1.3 Milestone 1.3.	Three small batches of SBT eggs produced with a small batch of 140,000 eggs fertilised and 70,000 incubated. After 6 days all had died, though some showed signs they started to feed. Initiation of a 35 day long period of spawning produced 50 million fertilised eggs from which 30 million larvae were hatched. Juveniles grew to over 200 days old, 500 grams in weight and up to 40 cm in length, long surpassing the age for transferring to sea cages. In order to maximise learnings, and to avoid relatively cold winter sea temperatures, it was decided to maintain the fish on land for as long as possible. Broodstock spawned over a 92 day period during which an estimated 46.5 million eggs were collected, of which approximately 26.8 million eggs were viable. Trials conducted with fingerlings reaching the 40 day plus stage. Several factors identified as important for regular supply of SBT larvae and juveniles - tank design, hydrodynamic set-up, early nutrition, weaning on to live fish larvae and manufactured diets. Cultured SBT larvae in 2010 encountered high mortality from day five following first feeding. The high early mortality was best explained by the introduction of pathogenic bacteria when larvae commenced feeding on rotifers. The second trial focused upon microbial management. Major breakthroughs in the area of tank design and hydrodynamics made in addition to the successful transfer of weaning diets and regimes.	The need to sustain, build upon and diversify the existing investment into the wild caught SBT industry which is currently limited to the availability of wild-caught SBT quota is crucial.
2009/743 Reproductive condition marketability and survival in oyster breeding strategies	Outcome 1 Output 1.3 Milestone 1.3.1 Milestone 1.3.2 Output 1.5 Milestone 1.5.3	Research in progress. New project began in next reporting period.	The Australian oyster industry requires breeding programs to focus on quality and market appeal, to increase competitiveness alongside imported and alternative products.
2009/744 Propagation and sea-based growout of Sea Cucumber stocks in the Northern Territory	Outcome 1 Output 1.2 Milestone 1.2.1 Milestone 1.2.2	Research in progress. New project began in next reporting period.	Double Tasmanian Seafood's current production of Sea Cucumbers through ranching/ stock enhancement initiatives.

2009/749 Improvements in Yellowtail Kingfish (YTK) larval and juvenile survival and quality	Outcome 1 Output 1.3 Milestone 1.3.1 Milestone 1.3.3 Milestone 1.3.5	Analysis of data collected during each commercial Yellowtail Kingfish production run was compared with data collected during 2008. Jaw malformation assessment completed for all larval tanks and at the end of the nursery phase for the five CST hatchery runs in 2008 and for most larval tanks for the five runs in 2009. A batch of 400,000 YTK eggs were transported by air to Darwin from Fremantle. The quality of the YTK eggs was high and the eggs were in a very uniform stage of development . The amount of egg drop out experienced in previous trials was reduced. Larvae were observed to have ingested the micro-diet after 15 days post hatch (DPH) and grew on average 6.2mm, with a maximum total length of 17.29 mm. Rate of swim bladder inflation varied greatly between sampling days and ranged between 5% on 5 DPH and 80% on 15 DPH. Three production scale YTK trials conducted. All trials were not successful resulting in relatively low numbers of weaned fingerlings. A trial was conducted to investigate early weaning of YTK. This trial demonstrated that delaying weaning may improve YTK fingerling production through increased survival and better growth. Results show that the rate of deformity of 24 DPH larvae increased at higher water temperatures but further investigation is required.	The direct benefit to Clean Seas Tuna Ltd. of reducing malformations in Yellowtail Kingfish is estimated to be $1 million p.a. In this example a reduction in malformations from 40% to 20% could produce a further 400,000 good quality juveniles @ $2.50 (market value). This equates to $1,000,000.
2009/759 Towards an all fermale *P.monodon* populations using androgenic gland manipulations	Outcome 1 Output 1.3 Milestone 1.3.1	Post larvae were injected with hypertrophied androgenic gland extract. This was repeated 2 weeks later with an increase in dosage. 317 prawns survived and were re-injected. 31 prawns were subjected to a third round of implantation 2 weeks later. Post larvae fed with a combination of MT enriched live Artemia nauplii and MT enriched post larval particulate diet totalling 88 days of treatment. Freshly hatched Artemia nauplii were lipid enriched at various treatment concentrations for a period of 24 hours. Sampling of MT enriched Artemia, MT treated particulate diets and post larvae conducted for analysis.	All female populations are expected to improve harvest yields by 20-30%.
2010/731 Discovery and manipulation of *Neoparamoeba* aquaporins as a means to treat amoebic gill disease (AGD)	Outcome 1 Output 1.3 Milestone 1.3.3	Research in progress	AGD is the number one health concern related to the production of Atlantic Salmon in Tasmania, accounting for approximately 10% of production costs of this industry, which has a current GVP of some AU$360 million p.a and shows strong signs of continued growth.

Research Activities and Achievements - Program 2

Of the 19 new research projects established this reporting period, 15 of these fell within Program 2 (Market and Product Development) with nine completed during this reporting period. This brings the total of 62 Seafood CRC research projects directly under Program 2.

The focus of Program 2 during 2009-2010 has been on developing capacity and capabilities to support the end users' research needs in product and market development. To do this, Mr Bob Fleming was recruited to Commercial Seafood Processing Manager. A program management framework was also established with three themes. Each theme has a theme leader who works with the Program Manager to coordinate capacity building activities and to facilitate information sharing and networking.

A research leaders' group has also been established and a number of specialist advisers engaged to mentor the theme leaders and other researchers in the three themes - trade and market access, consumer insights and product and process development. In addition, a number of focused industry bursaries, research travel and visiting expert grants have been supported to accelerate development and understanding of research needs and international trends in seafood product and market development.

This investment is beginning to deliver on overdue milestones not achieved during the 2008-2009 reporting year. Some of the milestones for 2009-2010 are still lagging but the majority of these are expected to be on target by 2010-2011. As some of the original milestones are no longer relevant, a milestone review and revision process is underway to establish a set of more relevant milestones for consideration at the third year review due in 2011.

OUTCOME 2: INCREASED ACCESS TO PREMIUM MARKETS THROUGH FULFILLMENT OF CONSUMER DEMANDS FOR SAFE, HIGH-QUALITY, NUTRITIOUS AUSTRALIAN SEAFOOD

Output 2.1 = Traceability technologies to assure seafood quality and integrity and to deliver value chain efficiencies. The OzSeaValue theme business plan was established to develop approaches such as technologies for tracking fresh seafood for review and testing in commercial facilities.

Several projects are trialing traceability technologies as a key tool for improving supply chain performance. These projects are expected to deliver real time results to the end user investors. The results of these studies will be reported in the 2010/2011 annual report.

Output 2.2 = Diagnostic systems to ensure seafood quality and integrity. A review of diagnostic needs has been completed and two Post Doctoral Research Scientists have been funded to help develop capacity to support achievement of this output. A number of new projects have recently commenced targeting many of the unmet milestones.

The OzSeaValue theme business plan involves projects where tools are developed to predict level of freshness and quality in specific supply chains.

Output 2.3 = Predictive tools to increase value chain efficiency. A predictive model for the viability of *Vibrio parahaemolyticus* in Australian oysters has been built. The model has been validated and verified with both Pacific Oysters and Sydney Rock Oysters. Results show that the predictive model was fail safe for both species. This model will help establish cost-effective regulation for ensuring the safety of Australian oysters. A benefit cost evaluation is currently underway.

In addition, several new Quality index Schemes have been developed to assist supply chains monitor and manage quality of product. To achieve this, a QIM panel has been trained by Curtin University. The panel is being used in several market and product development projects currently underway.

Output 2.4 = Optimised technical market access. The SellFish theme business plan contains projects that facilitate seafood exporters

by conducting technical and policy research to assist CRC participants and government in tariff/quota negotiations and responses to technical trade barriers.

The Seafood Access Forum (SAF) is operational, with SAF secretariat managed by Seafood Services Australia (SSA). SSA conducts the SAF forum meetings every 6 months as well as convening SAF executive meetings as needed. The SAF is the major policy and priority setting forum for seafood trade and market access issues. CRC has contributed to the operations of SAF on behalf of all its participants.

The CRC has also supported projects to reduce technical export trade barriers. In 2007, export of Australian abalone to the EU ceased due to requirements to undertake an intensive monitoring regime for marine biotoxins. CRC research demonstrated an extremely low risk to consumers and the project findings assisted AQIS to re-negotiate access for Australian abalone to the potentially lucrative EU market. A minimal risk-based entry regime has now been implemented and Australian companies are currently in preparation to export abalone to the EU.

Another exciting initiative is the implementation of the "SafeFish" partnership. SafeFish provides technical advice to government negotiators on current trade and food safety issues important to the seafood industry. This is done by facilitating input from technical experts, industry representatives and government organisations. In the past 12 months, SafeFish has provided input into many key Codex issues and has assisted in negotiating the removal of requirements for all seafood to be labelled as 'high risk' due to potential presence of Vibrios and viruses. Overly stringent requirements proposed by South Africa for the abalone sector were also successfully overturned with the draft Codex standard sent back for revision.

Output 2.5 = Communication of consumer health benefits and risks. A key achievement has been the joint establishment with the Western Australian Government of the Centre of Excellence for Science, Seafood & Health. The Centre conducts systematic reviews of current literature around seafood and health to inform the development of policy, educational materials and interventions aimed at increasing the regular consumption of seafood. Evidence relating to the prevention, treatment and management of nutrition-related chronic conditions is also critically reviewed on an ongoing basis to maintain currency of evidence for translation into relevant outputs.

Factors that impact on consumers' understanding of the health benefits of seafood and how to effectively communicate on this subject has guided the production of resources designed for use by seafood retailers, consumers, schools, vocational trainers and health professionals. These resources are currently being trialed within a community setting. It is expected the intervention will lead to: increased consumption of seafood as part of a healthy diet; a better informed consumer; integration and institutionalisation of vocational, primary and secondary resources within existing curriculum; and a series of evidence-based resources for general practitioners to provide to patients who present with nutrition-related chronic conditions.

In addition there are two projects underway that are investigating specific benefits and risks for women of child bearing age and for the elderly. The results of these projects will be reported in 2010/2011.

Output 2.6 = Market access database. All milestones within this output have been met. The SellFish theme business plan involves a project that establishes a service that can be used by all seafood exporters to identify commercial and technical requirements of each country that imports Australian seafood.

The Trade and Market Access Database is online and available to people who register. Information is continuously updated through CRC research outputs.

The website is being continuously improved from a usability perspective. Currently there are 867 registered users who regularly access the site for information to assist with exporting product. The underlying database also informs the development of trade and market access negotiation priorities which in turn are progress through the SAF and SafeFish forums (see Output 2.4).

Output 2.7 = Removal or reduction of barriers to seafood consumption. Consumer research that helps define change in presentation, packaging and promotion required to lift seafood consumption and evaluation of new approaches in export and domestic markets is critical. The retail transformation program is a suite of projects that addresses a number of end-user investor needs. A major initiative within the program is the chilled, pre-packed seafood category development project. This is a syndicate project involving eight end user participants and two CRC research providers.

A significant initiative this reporting period is attempting to analyse product differentiation opportunities for Australian wild caught abalone in China. This project aims to evaluate the effectiveness of different business to business and business to consumer activities to enable the end user investor to make decisions about continued investment in market development activities. The initiative involves activities in China and Australia to create a new product and service offering in the changing and increasingly sophisticated Chinese market. The importance of this project lies in the fact that the majority of Australian wild caught abalone is exported to China and the corresponding need to maintain (and potentially increase) market share and business profitability by ensuring that customer expectations for product and service are met.

Progress towards this output has also been enhanced by the " Repositioning Australian Farmed Barramundi in the domestic market" project which consists of an initial study of the market and a workshop to identify market/business development barriers and to generate ideas for overcoming them. Work will commence in the 2010-2011 reporting period on developing some repositioning options which can then be trialed and evaluated.

The Omnibus Seafood Consumer Survey is a communal project run by the Ehrenberg- Bass Institute (University of South Australia) which was designed to deliver two outcomes for the CRC and the seafood industry: i) to track consumers' seafood consumption over time; and ii) to measure the consumer acceptance of specific seafood offerings and innovations.

The impetus for the Omnibus project was the widespread realisation in the seafood industry that competition from other food options is intensifying. The industry needs to attract more people to eat more seafood and to do so on a more regular basis. To actually do this, however, requires that businesses have greater understanding of what consumers value and demand, so that it can take advantage of changing consumer dietary preferences. From understanding and anticipating any changes in consumer preferences, the seafood businesses will be better able to add value to seafood products which will therefore better meet this demand from consumers, and ultimately helping improve their profitability.

As part of this output, the CRC has partnered with SARDI to establish a seafood product development capacity at the South Australian Food Centre in Adelaide. This will provide assistance to CRC participants in undertaking product and market development projects and bring much needed skills to the Seafood CRC. Demand for these skills and knowledge is considered a high research priority for Program 2.

Completed Projects in Program 2 During 2009-2010

Project Title	CRC Outcomes	Key Research Achievements	Benefits to Industry
2008/717 Improving post-harvest quality of Sardine through utilisation of flow ice technology	Outcome 2 Output 2.8 Milestone 2.8.1 Milestone 2.8.2 Milestone 2.8.6	Work to date has been significantly hampered by technical difficulties with the flow-ice machine. Other delays have been due to timing of fishing activity in relation to vessel renovation and suitable weather. Trials were carried out and fish were sent to fish markets for appraisal and sale. Data collected indicates the greater cooling effectiveness of flow ice and its effect on fish quality (lower QIM scores). Further work is necessary to explore the potential of flow ice, particularly at higher fish:cooling medium ratios.	There is a need to trial technology that will remove heat from fish immediately post harvest more efficiently than current practices. This will reduce spoilage and extend the shelf-life for value-added grade fish.
2008/790 Coolfish Stage 1: Traceability and product sensor technologies to manage seafood cool chains	Outcome 2 Output 2.1 Milestone 2.1.2	Report produced that highlights key issues, challenges, trends and drivers facing the entire Australian seafood industry and provides insight into current logistics issues and challenges in Tasmania's Salmon cool chains. Report developed and produced that reviewed established and commercially available traceability and sensor technologies including standards; and considers those with most potential for deployment in Phases 2 and 3 of project. Further research on hold pending end user participation	There is a need to integrate both traceability and freshness technologies into a single platform, so that all pertinent information can be collected as the product moves through the supply chain from processing to wholesale/retail, and to remedy unnecessary costly project rejection.
2008/793 Prawn industry black spot management: Problem size and appropriate research	Outcome 2 Output 2.8 Milestone 2.8.2	Black spot issues vary with each fishery. Key areas of achievement include most appropriate dipping regimes to use for specific operations, effective use of the dip to maintain consistent residues through increasing dip times for bulk dips and/or a dip meter to monitor solution concentrations and inform decisions on appropriate dipping times, when to top-up and when to dump).	There is a need to better define the issues surrounding the effective use of sodium metabisulphite by the Australian prawn industry, and to refine the associated research requirements. This relates specifically to the reduction in dip effectiveness with successive dips and the development of on-boat dip concentration meter – a "metameter".
2008/796 Increasing seafood consumption in elderly people	Outcome 2 Output 2.5 Milestone 2.5.3	Literature review indicated clear mechanistic link between the role of n-3 PUFA (polyunsaturated Fatty Acids) and inflammation. Potential links may be found in other diseases. Epidemiology studies appeared to show a positive association between increased fish consumption and reduced levels of inflammation and reduced risk for macular degeneration. No conclusive evidence showed increasing consumption of fish to be associated with reduced risk for depression, Type 2 diabetes or cancer. Some evidence points towards a reduction in inflammatory markers following daily fish oil supplementation, however no such recommendation can be made to reduce the incidence of some diseases.	Diet may play a key role in ameliorating inflammation and reducing the burden of a number of diseases. Interventions that reduce inflammation may be a key link in attenuating this pathology, and may ultimately slow the progression of inflammatory related conditions. Fish, seafood and fish products can be a good dietary source of many nutrients most notable for their anti-inflammatory effects.

2008/909 European Union market access for abalone	Outcome 2 Output 2.4 Milestone 2.4.2	Australian abalone have a low propensity to accumulate significant levels of marine biotoxins. Commercial abalone canning processes significantly reduce the levels of toxins further. A human health risk assessment suggests that the probability of consumers becoming ill from PSP via the consumption of canned wild caught Australian abalone is negligible. Findings are corroborated by the lack of documented and anecdotal human cases of PSP illness associated with the consumption of abalone worldwide.	Information generated will provide regulatory authorities and industry with the necessary data to support technical market access discussions to assist input into the development of the Codex abalone standard and for technical discussions with other key markets such as China.
2009/742 Farmed prawns in Sydney and Brisbane: A consumer study	Outcome 2 Output 2.7 Milestone 2.7.1	Results show a strong expressed preference amongst Australians for locally grown prawns, but not necessarily behaviour that supports this attitude. Clear preferences for fresh over frozen and whole over peeled product forms, with an even spread between cooked and green forms, and expressed lack of interest in pre-packaged prawns. Price is by far the most common reason people don't buy prawns. Most consumers do eat prawns, however only 1 in 3 young consumers is likely to purchase his/ her own prawns. Buying behaviour of prawns is generally low in involvement and habitual. Consumers buy from repertoires, so may 'switch' between prawns and other meat/seafood products from one purchase situation to the next. Six strategies recommended to improve brand attributes of farmed prawns.	Little is known about consumer choices and barriers to consumption of Australian farmed prawns. Results will feed in to the larger "Passion for Prawns" and "Retail Transformation" projects by providing both primary and secondary research data on consumers in Sydney and Brisbane.
2009/752 Overseas market access for shellfish	Outcome 2 Output 2.4 Milestone 2.4.1`	Maintenance of eligibility of Australian shellfish for export and sale on the domestic market (with reference to marine biotoxins). Improved relationships between the EU and Australian industry, science and regulatory representatives	This project aims to assist in maintaining the current EU regulatory limits for marine biotoxins to allow the current amount of shellfish to be exported to the EU and avoid other markets being influenced.
2010/715 Cobia market analysis	Outcome 2 Output 2.7 Milestone 2.7.1	Analytical scoping exercise on Cobia globally completed including an overview of the production of cobia worldwide, specifically in terms of production and pricing.	Develop a collaborative, whole of chain approach to launching this new species so that the market is carefully developed and supplied with fish of consistent quality at economically sustainable prices.

Program 2 Research Projects Progress and Update on Achievements

Project Title	CRC Outcomes	Key Research Achievements	Benefits to Industry
2007/704 Assessment of new market opportunities and development of effective market penetration strategies for Australian Southern Rocklobster in the USA, Middle East and Europe	Outcome 2 Output 2.1 Milestone 2.1.1 Output 2.4 Milestone 2.4.3	Have targeted the traditional Chinese food service sector with large, live Southern Rocklobsters in Los Angeles, Las Vegas, San Francisco, Vancouver and New York. Processed and developed value-added products for the US retail sector. Continued to pursue the high-end western food service sector with value added and live Southern Rocklobster. Conducted other market development activities in line with the market research strategy.	This project builds on previous R&D to identify new global markets for Southern Rocklobster, and then test and evaluate strategies for appropriate and efficient supply chain development aimed at market penetration – this includes evaluation of market requirements, product standards, shipping protocols, traceability, quality parameters, survival technologies, data management and information flow.
2007/719 Protecting the safety and quality of Australian oysters with integrated predictive tools	Outcome 2 Output 2.2 Milestone 2.2.1 Milestone 2.2.2 Milestone 2.2.3	Predictive model for the viability of *Vibrio parahaemolyticus* in Australian oysters built. Model validated for performance with oysters that contained natural populations of Vp. Predictive model verified with natural populations of Vp in both Pacific Oysters (PO) and Sydney Rock Oysters (SRO) harvested in NSW. Enumeration of natural Vp populations, the Most Probable Number (MPN) technique used to enrich for Vp, and then Vp detected by the polymerase chain reaction method. Results showed the predictive model developed for Tasmanian PO was 'fail-safe' for both PO and SRO species. Results showed preselected 6-strain *V. parahaemolyticus* mixture included the desired set of species and virulence markers.	Producing a tool that allows companies to monitor real-time conditions of the cold chain and thus the safety and quality of a highly-valued seafood product will result in improved product safety,an optimised cold chain, higher product quality, greater access to export markets and a more cooperative regulatory environment.
2008/708 Seafood processing: Post Doctoral Research Scientist	Outcome 2 Output 2.8 Milestone 2.8.1 Milestone 2.8.2 Milestone 2.8.3 Milestone 2.8.4 Milestone 2.8.5 Milestone 2.8.6 Milestone 2.8.8	Provides technical support for CRC industry participants including processing techniques providing adequate shelf life are run economically by ensuring efficient product handling and processing techniques. Support and lead to commercial companies interested in introducing new products and various processing and packaging solutions. New product development briefs produced for new product concepts.	Establish alliances with other relevant research groups and to integrate industry activities with existing research projects requiring seafood processing expertise and to adopt world's best technologies, processes and practices to improve Australian seafood quality and marketability
2008/710 Benchmarking consumers physical and mental availability for seafood products and brands : Post doctoral research scientist	Outcome 2 Output 2.7 Milestone 2.7.1 Milestone 2.7.2	Managed and contributed to the consumer insight work of the Omnibus survey. Collaborated with researchers nationally and internationally to produce research results to better understand consumer barriers and drivers.	Increased consumption of selected seafood products sold by Australian Seafood CRC participants, through an increased level of product satisfaction by existing customers and through the recruitment of new customers.

2008/720 A community intervention approach to increasing seafood consumption	Outcome 2 Output 2.5 Milestone 2.5.1 Milestone 2.5.2 Milestone 2.5.3 Output 2.7 Milestone 2.7.1	Review of health benefit research and development relevant to the Australian seafood industry and members of the Australian Seafood CRC completed. Review of literature and resources relating to health benefits of regular consumption of seafood as part of a healthy diet completed. Vocational skills set training package completed and health benefit communication materials for school children developed and completed. 'Point of Sale' (POS) consumer resources developed and completed and tested with consumers and through the omnibus survey. General Practitioner and allied health professional resources developed and completed. Trial of community intervention resources in progress.	Translate the most up-to date evidence around the health benefits of regular seafood consumption into a suite of resources and educational programs specific to the needs of various sectors within the community. The developed resources will be piloted and evaluated based on a number of evidence-based models and frameworks. These resources are expected to increase seafood consumption in target sectors thereby benefiting multiple end-user participants within the Seafood CRC.
2008/729 Shellfish safety: Post doctoral research scientist	Outcome 2 Output 2.2 Milestone 2.2.1 Milestone 2.2.2 Milestone 2.2.3	Post Doc developed a number of projects to support sustainable business development of the prawn industry through addressing food safety and market access issues. Facilitate technical and scientific input into trade and market access issues via the engagement of the Seafood Trade Expert Panel chaired by the Post Doc. Assess feasibility of developing diagnostic capability for marine biotoxins in Australia. Post Doc has taken on management of 4 full time staff members, 1 part time staff member, 1 PhD student and another PhD student is set to begin in July 2010.	Currently Australia has no capacity to test for the presence of enteric viruses in shellfish and relies on indicator organisms, which may not correlate well with virus presence in product. As test methodologies improve and become standardised throughout the world, there will be increasing demands on Australian product (or growing areas) to be certified 'virus-free'. This Post Doc will develop diagnostic systems to assure seafood quality and safety.
2008/744 Seafood productivity engineer: Post doctoral research scientist	Outcome 2 Output 2.8 Milestone 2.8.1 Milestone 2.8.2 Milestone 2.8.3 Milestone 2.8.4 Milestone 2.8.5 Milestone 2.8.6 Milestone 2.8.8	Post Doc commenced duties on 7th September 2009 and developed a number of projects surrounding an electronic sodium meta bisulphite sensor and minimising the floatation loss of aqua feed pellets.	Guide and resource the development of new products, make better utilisation of products, improve value chain performance, reduce seafood product wastage, extend shelf life, increase quality and integrity which will lead to improved profitability and sustainability of the Australian seafood industry.

2008/768 Seafood molecular biologist: Post doctoral research scientist	Outcome 2 Output 2.2 Milestone 2.2.2 Milestone 2.2.3 Milestone 2.2.6	Bacterial communities identified in hatchery water, algal cultures and broodstock. DNA fingerprinting technique found a high degree of variability in the microbial community structure in the oyster hatchery and in feed algal cultures. Changes in the way algae were cultured resulted in significant shifts in the microbial community structure, however this did not correspond with more successful production of oyster larvae. Vibrio strains were not detected in the clone library, indicating that Vibrio are not a dominant member of the microbial community. Methods optimised to collect samples and perform analyses using DNA-based methods. Results show significant inter-pack variation in microbial communities present on modified atmosphere packaged (MAP) salmon 15 days after packaging. Distinct differences in microbial communities were detected on salmon 3 days and 15 days after processing and packaging. Microbial communities present on salmon 3 days after packaging were similar to each other but were significantly different to communities observed at 15 days. Culture-based methods indicate that *Shewanella* and *Pseudomonas* are more important in MAP salmon. As expected, numbers of bacteria increased over 12 days of storage, with a corresponding change in the ratio of lactic acid to total bacteria.	A well-tested, direct-detection DNA-based method will provide a more complete profile of microbial contamination, identify the species that cause the problem, and assist in designing strategies to produce a solution.
2008/779 Tracking seafood consumption and measuring consumer acceptance of innovation in the Australian seafood industry	Outcome 2 Output 2.7 Milestone 2.7.1 Milestone 2.7.2	Preparation of the "Omnibus Consumer Research" findings. Report documents findings of the first wave of a national consumer panel 'omnibus' survey conducted in late November to early December 2009. Survey administered to 2,643 people between the ages of 18 and 70. Results consist of two main research areas: Usage and attitudes study regarding seafood and seafood consumption; and investigation into what value-added factors are important to Australian consumers when purchasing prawns and Barramundi from the supermarket.	Industry needs to attract more people to eat more seafood and on a more regular basis. To do this requires industry to completely understand and anticipate what consumers value and demand, so that it can take advantage of changing consumer dietary preferences. Therefore, industry will be better able to add value to seafood products to fulfil this demand, which will ultimately improve the industry's profitability.
2008/781 Australian Seafood Productivity Improvement Centre ("The Seafood Centre")	Outcome 2 Output 2.8 Milestone 2.8.1 Milestone 2.8.2 Milestone 2.8.3 Milestone 2.8.4 Milestone 2.8.5 Milestone 2.8.6 Milestone 2.8.7 Milestone 2.8.8	Seafood Centre established within the South Australian Food Centre, Adelaide. Provided free of charge support services to prawn, Rocklobster and general processing sectors during the reporting period. Technical advice and input identified approximately $500,00 annualised savings for industry within the first six months of operation. Full roll out of support service packages to occur in 2011	There are very few scientists with experience in seafood processing, packaging, new product development and retailing. As a consequence, most seafood processing companies import their staff or use staff from other food industries. There is also very little support for seafood processors wishing to start new ventures, develop new products, install new machinery or solve processing problems. ASPIC will overcome these issues.

2008/794 Retail transformation: Identifying opportunities for creating consumer focused Australian Salmon value added products	Outcome 2 Output 2.7 Milestone 2.7.1 Milestone 2.7.2	Sensory attributes and perceptions of Australian Salmon among consumers versus competitive seafood species, as well as exploring branding and brand positioning ideas completed. Comprehensive consumer research in to chilled, pre-packaged seafood including barriers, drivers and opportunities in progress. Stage 2 of project to include product development based on research findings and Stage 3 will involve test marketing.	Development of low value Australian seafood options will give the Australian seafood consumer the chance to purchase local seafood at accessible price points
2008/905 Australian seafood compositional profiles portal	Outcome 2 Output 2.2 Milestone 2.2.5 Milestone 2.2.6 Output 2.4 Milestone 2.4.2 Milestone 2.4.3 Output 2.6 Milestone 2.6.1 Milestone 2.6.2	Seafood Services Australia (SSA) is now hosting industry generated data sets. Food Standards Australia/New Zealand is updating its online food composition program web portal following results of project.	The project will assist in meeting industry needs for promoting the public health benefits of seafood consumption more generally and allowing rapid access to credible information to counter negative media claims. This project will also address current and future technical market challenges and allow industry to quickly respond to market access threats.
2008/906 Seafood trade and market access portal (SafeFish)	Outcome 2 Output 2.2 Milestone 2.2.5 Output 2.6 Milestone 2.6.2 Milestone 2.6.2	Secure password protected web portal service in operation on the Seafood Services Australia website (www.seafoodservices.com.au) with access to the first priority countries. Web portal contains information on certification requirements, emerging market access issues, detentions, maximum residue limits, and tariffs for China, the European Union, Hong Kong, Japan, Taiwan (Chinese Taipei) and the US. Information for South Korea, Russia, India, Malaysia, New Zealand, Singapore and Thailand nearing completion. Information for other countries that are export destinations for Australia seafood have commenced. Information included for Australia and Codex, which provides a default for countries with no explicit trade standards.	This project will address a core need for timely, simple access to international residue and contaminant standards, export certification requirements, tariff and customs information to support export activities. Currently this information does not exist in an easily accessible, simple format to inform industry of its technical market access needs.
2008/907 Seafood access forum (SAF)	Outcome 2 Output 2.2 Milestone 2.2.5 Output 2.6 Milestone 2.6.2 Milestone 2.6.2	Seafood Services Australia successfully organised and maintained operation of the SAF with three full meetings held since July 2009. Each meeting has reviewed and determined the priority activities for trade and market access.	The CRC has identified the need to prioritise trade and market access research activities and to have a forum where government and industry can agree on appropriate trade and market access negotiation strategies. The SAF provides this service for the CRC end user's and a solid, rigorous and inclusive process for systematically tackling seafood trade and market access barriers.

2008/910 Automation of Western Rocklobster processing	Outcome 2 Output 2.8 Milestone 2.8.4 Milestone 2.8.6	Wash tunnel and colour vision grader were installed and initial testing of both prototypes undertaken. Wash tunnel has been in constant service for commercial production since the beginning of November 2009. Initial calculations based on the performance of the wash tunnel have demonstrated significant savings in labour associated with washing of whole cooked lobsters. The rate of lobster washing for each staff member has more than doubled. When the tunnel was first installed, rework rates were ~6% (i.e. 6 lobsters in every 100 required rewashing), since that time distribution has been improved and this has reduced the rework rate to less than 3%. Wash tunnel moved to a new site where it will continue to be tested for the remainder of the season. A number of small (<300 lobsters) trials have been conducted to test performance of the grader, determine the function of the software and establish colour limits for each grade. When the groups of lobsters were sorted by the colour vision unit, there was significant overlap between colour groups. Gate mechanisms on the Linco grader were found to be too rough to handle whole cooked lobsters without causing significant damage. Damage was caused by lobsters dropping onto one another out of the gate. A prototype modified chute design is being tested further. Verification that the calibration of the colour vision unit is stable over 72 hour period of continuous operation completed.	This project will investigate options for automation from a position of commercial and industry knowledge and scientific expertise to produce definitive cost/benefit assessments.
2008/911 Using smart processing and packaging techniques to transform Australian seafood, including underutilised and undervalued species, into commercially viable products in the "Market Pride" product range	Outcome 2 Output 2.8 Milestone 2.8.3	Improved modified atmosphere packing strategies for two product groups. Thermal processing methods designed that use technologies to reduce come-up and come-down times, maximise product quality and achieve food safety performance objectives. Developed and evaluated meat extraction processes - making new ingredients from untransformed raw seafood. Stabilisation of minces has occurred. In Jan 2010, Sydney Fish Market ceased investment in "Market Pride".	To achieve the goals of a broad range of value-added convenient seafood products, it is essential to understand relevant safety and quality issues on these potential products and to understand what novel strategies exist for the extension of their shelf life, There is also a critical requirement for processes which deliver cost effective recovery and transformation of Australian seafood (raw material) into useable 35 formats to help drive NPD innovation.
2009/721 'Eat More Fish": Expanding the consumption of seafood through retail channels	Outcome 2 Output 2.7 Milestone 2.7.1	3 of the 4 research stages completed and developed in to reports providing insights and understanding regarding consumer behaviour issues. The three stages of research have laid the foundation for the final stage of research, which is the online survey stage, designed to quantify the findings on a nationally representative basis. At present, the online survey questionnaire is undergoing review.	Detailed understanding of consumer attitudes towards in-store location of seafood purchasing; and acceptability of fish species and sustainability to develop a minimum of 6 new product concepts and marketing strategies that could be implemented to realise an increase in seafood consumption.

2009/722 Development and evaluation of Yellowtail Kingfish consumer products	Outcome 2 Output 2.7 Milestone 2.7.2	Phase 1 of project (market research component) completed. Sensory and qualitative consumer research in the Australian market undertaken to achieve a comprehensive consumer view of Kingfish, the Clean Seas brand and market opportunities. In the US market, a market analysis report has been undertaken in order to build a comprehensive opportunity assessment for Clean Seas Kingfish in the US retail and foodservice. European market analysis report undertaken in order to build a comprehensive opportunity assessment for Clean Seas Kingfish in the EU retail and foodservice. Concept product ranges recommended for the Australian, US and EU market developed. This includes price, weight, packaging, branding etc). The product ranges are recommended based on consumer perceptions of product, brand and seafood category (Australian market); and trade opportunities identified through interviews with chefs and distributors (EU and US market). Next stage for project is to develop and then trial the implementation of these product ranges.	Optimise returns from the whole fish improving profits and reducing wastage.
2009/723 Analysis of product differentiation opportunities for Australian wild caught abalone in China	Outcome 2 Output 2.7 Milestone 2.7.2	New products and service offerings developed in the Chinese market. Product launch in Shanghai, China scheduled for 25th August 2010.	This project will test whether a value proposition exists for Australian wild caught abalone among the emerging affluent Chinese consumers particularly focusing on the fusion cuisine trend.
2009/727 Integrated value chain performance benchmarking studies: Post doctoral research scientist	Outcome 2 Output 2.4 Milestone 2.4.3 Milestone 2.4.4	Developed networks that identified complementary technical capacity inside and outside the CRC (both public and private organisations). Provided input and expertise in entire suite of value chain projects.	CRC end-users identified a need for accurate, consistent and scientifically sound baseline compositional data of commercially traded seafood species. Information generated from this project can be used to substantiate product label claims, including nutrition panel information and health claims; to promote the benefits of seafood and seafood consumption as part of a balanced diet, to inform dietary modelling activities and nutrition calculations, to gain and maintaining market access and to respond to bad publicity as well as to benchmark production processes
2009/739 Compositional profiles of Australian seafood: Strategic analysis and method development	Outcome 2 Output 2.4 Milestone 2.4.3 Milestone 2.4.4	Research in progress. New project.	Information generated from this project can be used to substantiate product label claims, including nutrition panel information and health claims; to promote the benefits of seafood and seafood consumption as part of a balanced diet, to inform dietary modelling activities and nutrition calculations, to gain and maintaining market access and to respond to bad publicity as well as to benchmark production processes

2009/752.10 The Seafood Trade Expert Panel (Safe Fish))	Outcome 2 Output 2.4 Milestone 2.4.1	Research in progress.	Will provide negotiations relating to seafood, and will coordinate robust technical advice for input to international trade for a such as Codex and bilateral and multilateral trade agreement discussions. It will deliver a multi disciplinary approach to often very complex trade issues and ensure that participant business operations and practices are considered in developing Australia's negotiating positions as well as fostering open communication between Australia's technical trade experts and assist early detection of issues. It will also identify and act on opportunities for national and international collaboration.
2009/770 Retail Transformation: Chilled, pre-packaged seafood category development	Outcome 2 Output 2.7 Milestone 2.7.2	An Australian Seafood Manufacturing Scheme identified and recommended. This was constructed from a comparison of certification standards in use in Australia and a review of a broad range of seafood manufacturers across Australia. Pathway to implementation defined which identifies service providers able to help with implementation, potential costs, time scales and possible funding sources to help implement. The range is being developed based on consumer research. The consumer research is well underway (research provider selected and data collection complete). The next step is the interpretation of the data to inform specific product development. Concept product range developed and tested for the consumer research. An experienced product development technologist has been recruited to develop this range (based on the research findings). Draft category management plan developed, for review pending the final selection of the retail partner and results of the consumer research. A verbal agreement has been reached with a potential partner retailer to trial a product range in their stores.	Research has identified a market opportunity to develop and trial a range of Australian chilled, pre-packaged products in the domestic retail sector.
2009/771 Business plan for a collaborative seafood processing hub in South Australia	Outcome 2 Output 2.8 Milestone 2.8.1 Milestone 2.8.2 Milestone 2.8.3 Milestone 2.8.4 Milestone 2.8.5 Milestone 2.8.6 Milestone 2.8.7 Milestone 2.8.8	Capital and unit cost models developed. Key industry partner has reduced or delayed volumes. Project not likely to proceed in South Australia but may be viable in Victoria.	This project aims to confront many of the issues common to CRC industry partners including high costs / low volumes / niche markets / margin erosion / brand equity etc. Collaborative, novel methodologies will be employed to drive change resulting in a profitable, sustainable enterprise operating in the upper quartile of sales value.

2009/773 Western Australia dried seafood products - A pilot study	Outcome 2 Output 2.8 Milestone 2.8.6	Market evaluation complete. Nutritional evaluation of existing products complete.	There is a demand for dried seafood product for the Asian market. Development of such a suite of products would increase the market opportunities available to Western Australian seafood producers, expand the types of seafood that can be produced in a commercially viable manner and counteract the challenges of distance by extending shelf-life. Regional development opportunities for seafood processing capability may also be realised.
2009/775 Prevention of "muddy" taints in Barramundi	Outcome 2 Output 2.8 Milestone 2.8.6	Research to begin in August 2010.	End chain customers have learnt to expect muddiness flavours which causes a negative barrier to purchase. The impact of market perception is farmed Barramundi has remained at 7-$10/kg (farm-gate price) for >10 years. This project will benefit industry by identifying effective mitigation and trialling selected protocols on-farm and assessing the effectiveness. Additionally, there is an opportunity to further assess the potential to enhance Barramundi flavour.
2009/786 The whole prawn - Prawn value chain analysis	Outcome 2 Output 2.7 Milestone 2.7.2	Interviews with chain partners, both domestic retail and restaurants completed. Understanding of map product flow through the chain established and information flow between links in the chain and relationships 'at work' in the chain established. Analysis of the summaries undertaken and will form the basis of developing costed intervention and improvement activities.	The Spencer Gulf fishery gain significant benefit from a detailed assessment of their current value chain to develop a strategy to improve the value of the fishery. An assessment of the current value chain is seen as an appropriate step in understanding the status of the fishery before marketing strategies and programs can be put in place.
2009/787 The whole prawn - Prawn market access defenders	Outcome 2 Output 2.4 Milestone 2.4.2 Milestone 2.4.3	Research in progress.	This project aims to develop a rapid method that distinguishes pathogenic and non pathogenic *V. parahaemolyticus, V. cholerae* and *V. vulnificus* to underpin domestic and international trade requirements and to provide a risk-benefit assessment on cadmium in prawns to underpin further multi-lateral trade negotiations and Codex.
2010/705 Evaluation of bifilar coil sensors for sodium metabisulphite concentration	Outcome 2 Output 2.8 Milestone 2.8.6	Proof of concept and initial testing completed. Results show a correlation between sodium metabisulphite concentration and sensor impendence. Bigger project to test on site being developed.	Using a possible electronic handheld sodium meta bi-sulphite sensor with a fast response, the concentration of Sodium Meta Bi-Sulphite in any solution can be monitored nearly in real time. This can give the users the ability to maintain and control the concentration and thus manage the useful life time of the solution.

2010/706 Accelerated new product development: Blue Swimmer Crab pilot	Outcome 2 Output 2.7 Milestone 2.7.2	Intensive end-user consultation complete. Nine products taken to kitchen development, costing, shelf-life evaluation etc. completed. Five products developed to be shown and evaluated by end-users in September 2010.	The success of new product development has been hindered by the business needing to commit significant financial outlay for production despite uncertainties of the marketability of the product. The innovative product development and marketing methodology to be developed and piloted in this project aims to decrease the risk in product development
2010/707 Loss minimisation in farmed prawns through improvements in shelf-life and colour	Outcome 2 Output 2.8 Milestone 2.8.6	Research to commence in August 2010.	By maximising astaxanthin level at harvest and reducing degradation during storage, consistent premium red-orange colour of prawns will be assured for the retail market.
2010/708 International and domestic business: Post doctoral research scientist	Outcome 2 Output 2.7 Milestone 2.7.1, Milestone 2.7.2, Output 3.7 Milestone 3.7.1, Output 3.9 Milestone 3.9.2	Research to commence in August 2010.	This project is aimed at increasing the capacity to provide Australian seafood businesses with assistance in identifying potential domestic and export market opportunities which will allow for further market coverage and less reliance on existing market segments. The research output will also provide strategies and recommendations to help shortcut the export process.
2010/738 Reducing inflammation in the elderly	Outcome 2 Output 2.5 Milestone 2.5.3	Research to commence in August 2010.	The aged care population is growing significantly, and health care costs are increasing. The elderly often consume low intakes of food and micronutrients and have high incidences of inflammation, vascular function and oxidative stress which have all have been implicated in the development of cardiovascular disease and other chronic disorders Intake of essential fatty acids, zinc, selenium and iodine may be increased through increased consumption of fish
2010/744 The whole prawn - Product development ideation	Outcome 2 Output 2.7 Milestone 2.7.2	Development expert recruited to begin in August 2010. Initial contact with industry and ongoing development concept in progress.	Over the last 3 years significant changes in currency exchange rates have made exporting increasingly difficult and industry has been forced to compete domestically with an ever growing imported range of products . This project will achieve engagement with 6 to 8 prawn processors and demonstrate the potential financial validity of the developed products
2010/748 Investigating markets for seafood in East Asia	Outcome 2 Output 2.6 Milestone 2.6.2	Research to begin in August 2010	With the Australian dollar at historic highs, the need to help industry to determine which markets can give the best return on members' investment. This project will benefit industry through gathering high-quality market information at the Asian Seafood Expo.

Research Activities and Achievements Outputs and Milestones

RESEARCH PROGRAM 1: PRODUCTION INNOVATION

Output/ Milestone	Description	Contract Date	Achieved (Y/N)	Reasons Why Not Achieved	Strategies to Achieve Unmet Milestones
Output 1.1	**Technically verified new aquaculture production systems on a commercial scale**	**June 2012**	**N**	**Not yet due**	–
MS 1.1.1	Pilot-scale systems operational in at least two new production systems	June 2009	Partially	Achieved for SBT (a full commercial SBT hatchery has been commissioned by CST in first quarter 2010 but pilot scale grow out is now projected for mid 2011). A second system compromised by withdrawal of Lonsec's investment in inland saline system due to drought and the failure to initiate the Cobia consortium.	Investment in a new system is being sought and thus timing of fulfillment of this milestone is difficult to project.
MS 1.1.2	Key researchable constraints identified and characterised in at least two new production systems	June 2010	Partially	Constraints to SBT breeding and larval rearing have been identified and partially addressed. Constraints to development of Cobia aquaculture were identified but may not be addressed.	Major research investment in 2010/11 into larval rearing is target pilot scale culture of juvenile SBT. Revised Cobia proposal is under review with smaller scale production.
MS 1.1.3	Key researchable constraints successfully addressed in at least two new production systems	June 2012	N	Not yet due	–
Output 1.2	**Enhanced yields from wild-harvest innovations**	**June 2012**	**N**	**Not yet due**	–
MS 1.2.1	Key constraints to increased production characterised and research prioritised in at least one selected fishery	July 2008	Y	–	–
MS 1.2.2	Production interventions implemented in at least one fishery	July 2009	Y	–	–
MS 1.2.3	Annual production characterised and interventions optimised in at least one fishery	Dec 2010 Dec 2011 Dec 2012	N	Not yet due	–
Output 1.3	**Removal or reduction of key production constraints in aquaculture systems**	**June 2013**	**N**	**Not yet due**	–
MS 1.3.1	New genetic tools and/ or appropriate breeding strategies developed for genetic management and improvement of at least two aquaculture species	Dec 2008	Y	–	–

MS 1.3.2	Genetic parameters estimated for key commercial traits; genetic improvement programs designed and implemented for at least two aquaculture species	June 2010	Y	–	–
MS 1.3.3	Strategic disease management approaches and technologies developed for at least two aquaculture species	Dec 2009	Partially	The main focus is on AGD in Atlantic Salmon and fluke treatments in Yellowtail Kingfish. Focus on vaccine development for amoebic gill disease has not delivered benefit to industry.	Overall approach to AGD R&D will be reviewed to identify the best focus going forward. A management approach for flukes in YTK based on anti fouling treatments and in-feed medications will be developed by mid 2011.
MS 1.3.4	New low-cost aquaculture diets targeting improved feed conversion developed and evaluated	Dec 2010	N	Not yet due	–
MS 1.3.5	Production efficiency gains from genetic, health management and nutritional interventions quantified to inform long-term strategies and estimate commercial benefits	June 2013	N	Not yet due	–
Output 1.4	**Removal or reduction of key production constraints to enhance profitability in selected wild-harvest production**	**June 2011**	**N**	**Not yet due**	–
MS 1.4.1	Harvest technology innovations developed for at least two selected fisheries	June 2009	Partially	Project 2008/900 identified benefits of new lobster batten pot over 2 day soaks.	Project 2009/714 (Decision support tools) is likely to identify innovations by mid 2012
MS 1.4.2	Gains in efficacy and efficiency from new harvest technologies quantified in at least two selected fisheries to inform long-term strategies and estimate commercial benefits	June 2011	N	Not yet due	–
Output 1.5	**Production interventions that add value to Australian seafood**	**June 2012**	**N**	**Not yet due**	–
MS 1.5.1	Diets contributing to enhanced product quality developed for at least two aquaculture species	Dec 2010	Partially	There are no projects that have enabled this milestone to be met by 2010. The CRC is supporting research that addresses other production parameters affecting quality but not diet development.	New projects proposed for YTK and SBT feed and feeding including a suite of Honours projects, should address quality. Milestone may be met during 2011/2012
1.5.2	Management systems for improved and more uniform condition of selected aquaculture species at harvest developed for at least two aquaculture species	June 2011	N	Not yet due	–

MS 1.5.3	Genetic strategies for improved product quality developed in at least one target aquaculture species	June 2012	N	Not yet due	–

RESEARCH PROGRAM 2: PRODUCT AND MARKET DEVELOPMENT

Output/ Milestone	Description	Contract Date	Achieved (Y/N)	Reasons Why Not Achieved	Strategies to Achieve Unmet Milestones
Output 2.1	**Traceability technologies to assure seafood quality and integrity and to deliver value chain efficiencies**	**June 2011 and ongoing**	**N**	**Not yet due**	–
MS 2.1.1	Frontier traceability systems applicable to Australian seafood value chains identified and demonstrated in at least two seafood sectors	June 2009 and June 2011	Partially	Stage 1 of Coolfish has been finalised but no other CRC participant was interested in pursuing stage 2 so it has been cancelled. One PhD project is researching micro-mobile information systems in the cool chain.	The WA finfish supply chain project is trailing technology. The CRC has 4 new value chain studies in concept development where trace technologies will be used to demonstrate benefits.
MS 2.1.2	Technology and capability to support implementation of ongoing traceability systems developed	June 2010	Y	–	–
MS 2.1.3	Commercial roll-out of traceability technologies commenced	June 2011	N	Not yet due	–
Output 2.2	**Diagnostic systems to assure seafood quality and integrity**	**June 2014**	**N**	**Not yet due**	–
MS 2.2.1	Rapid diagnostic needs assessed; commercially available rapid diagnostic tools evaluated for Australian value chains and technology gaps identified	June 2009	Partially	Projects slow to establish but a review has been completed.	Two Post Docs created to support milestone achievement. The Barramundi taints project has been approved. A project focused on developing new diagnostic methods and capability for high priority issues is underway (however milestones are 9 months overdue). A diagnostic capability map for marine biotoxins and prawn market access defenders projects have been approved. The Post Doc at Curtin University working on supply chains will also identify needs and help trial new technologies in various supply chains

MS 2.2.2	Novel rapid diagnostic systems developed for at least one seafood microbial hazard to support technical market access of Australian seafood	June 2010, June 2012 and June 2014	Partially	Projects slow to establish	See 2.2.1
MS 2.2.3	Novel rapid diagnostic system developed for at least one seafood spoilage process to ensure product quality	June 2010, June 2012 and June 2013	Partially	Projects slow to establish	See 2.2.1
MS 2.2.4	Diagnostic technologies and capabilities developed for at least one chemical or residue hazard to support technical market access of Australian seafood	June 2009, June 2011 and June 2013	N	The prawn defenders project will address this milestone	Further projects to be developed.
MS 2.2.5	Technology and capability developed to authenticate labelling of seafood to underpin integrity claims	June 2014	N	Not yet due	_
MS 2.2.6	Technology and capability developed to support industry access to timely diagnostic services underpinning quality and integrity claims	June 2014	N	Not yet due	_
Output 2.3	**Predictive tools to increase value chain efficiency**	**June 2014**	**N**	**Not yet due**	_
MS 2.3.1	Quality Index Method (QIM) for 50 commercially important Australian species developed	June 2010	Partially	CRC did not adopt project as no end users were prepared to invest. A key participant was investing in the current project but were not willing to pay the end user contribution for all of it as benefits are and will accrue to many other end users.	Some projects (particularly PhDs) will develop QI schemes as part of their project outputs. The retail transformation syndicate project may provide an opportunity to use the QIM as part of the development of an Australian seafood manufacturing standard and several supply chain projects currently proposed may need QIM.
MS 2.3.2	Refrigeration index developed, validated and implemented to enable cost-effective, efficient temperature management in Australian seafood supply chains	June 2011	N	Not yet due	_
MS 2.3.3	Predictive tools developed, trialled and available to industry to better manage food safety risks associated with microbiological hazards in the Australian seafood cool chain	June 2014	N	Not yet due	_

Output 2.4	Optimised technical market access	June 2014	N	Not yet due	_
MS 2.4.1	Technical market access panel established and initial work plan set	Dec 2007	Y	_	_
MS 2.4.2	Two completed, internationally reviewed, integrated health benefit and risk assessments available for market access negotiations and for consumer risk advisories	June 2009	Partially	A number of health benefit reviews were commissioned by the CRC and a workshop was held in December 2007. That workshop identified the lack of consistent comparable information about nutrient compositions of key Australian species.	The product composition profile project was approved in April 2009. Diet studies will look at the benefit risk profile for two consumer groups. These milestones were reviewed in early 2010 as part of the planned review of Program 2. The prawn market access defenders also includes a benefit/risk component.
MS 2.4.3	Integrated health benefit and risk assessment methodology accepted internationally and available for use with standard-setting, market access negotiations and "clean and green" claims and for differentiating Australian product in premium price markets	June 2010	Partially	Once again, a lack of information about nutrient compositions of key Australian species was identified	See MS 2.4.2
MS 2.4.4	Additional completed, internationally reviewed, integrated health benefit and risk assessments available for market access negotiations and for consumer risk advisories	June 2012 and June 2014	N	Not yet due	_
Output 2.5	**Communication of consumer health benefits and risks**	**June 2010**	**N**	**See milestones 2.5.1, 2.5.2 and 2.5.3**	**See below**
MS 2.5.1	Key factors influencing consumers' behavioural responses to seafood health benefit and risk communication identified	June 2008	Partially	WA Health Benefits communication project, the Whyalla study, the Flinders PhD looking at the seafood diet for intergenerational health and the elderly diet projects will contribute to this milestone. Simplot have indicated a willingness to invest in the health communication area so work will commence on scoping a project up that helps meet this milestone.	These milestones can still be achieved but at a later date than anticipated and will need investment in social sciences research.
MS 2.5.2	Draft guidelines for health benefit and risk communication strategies issued for use by industry and government, based on an understanding of consumers' behavioural responses to risk advisories	June 2009	Partially	As per MS 2.5.1, these projects are underway which will contribute to this milestone	See MS 2.5.1

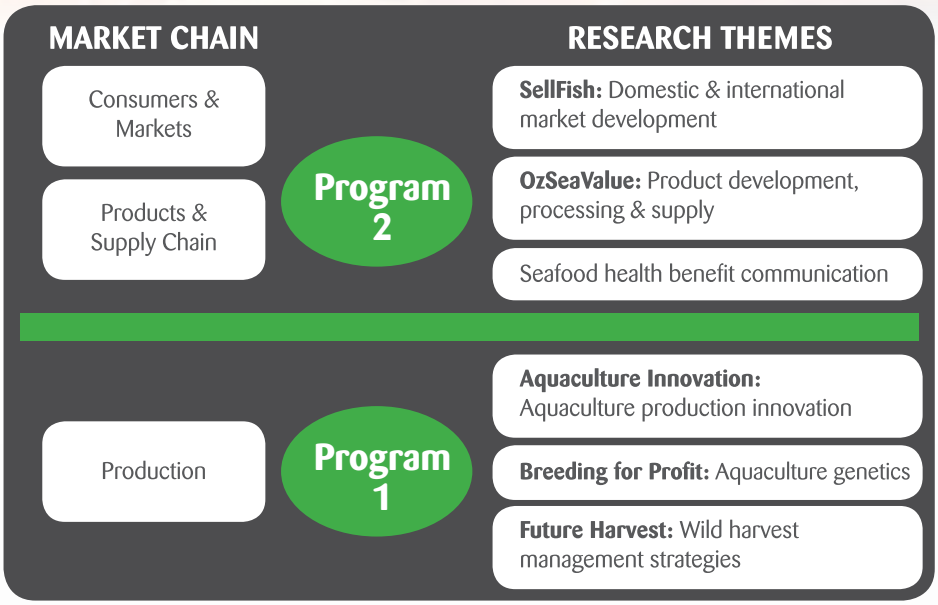
MS 2.5.3	Health benefit and risk communication strategies trialled for four sectors, consumer responses analysed and guidelines refined	June 2010	Partially	As per MS 2.5.1 and 2.5.2, these projects are underway which will contribute to this milestone	See MS 2.5.1
Output 2.6	**Market access database**	**June 2009**	**Y**	–	–
Output 2.6.1	Market access database established and maintenance program agreed	June 2008	Y	–	–
Output 2.6.2	Market access database expanded to cover additional elements relevant to market access and available on secure website	June 2009	Y	–	–
Output 2.7	Removal or reduction of barriers to seafood consumption	June 2010 and then ongoing	Y	–	–
MS 2.7.1	Barriers to and drivers of seafood consumption identified in at least two new domestic or overseas consumer groups annually	June 2008 and then annually thereafter	Y	–	–
MS 2.7.2	Individually tailored approaches to overcoming barriers trialled and evaluated in at least two new domestic or overseas consumer groups annually	June 2009 and then annually thereafter	Y	–	–
Output 2.8	Smart processing technologies and practices	June 2008 and ongoing	Partially	See milestones 2.8.1, 2.8.2, 2.8.3, 2.8.4, 2.8.5, 2.8.6, 2.8.7 and 2.8.8	See below
MS 2.8.1	Microbiological, physical and biochemical spoilage mechanisms determined through chain for each of three types of seafood per annum	June 2008 and annually thereafter to June 2014	Partially	The Western Australian supply chain project will address this milestone as will a PhD project that is researching microbial and biotechnical properties leading to extended shelf-life in Goldband Snapper.	WA CoESSH has engaged a supply chain Post Doc who will focus on this area. Several concepts are in development and projects have recently been approved for contract that will contribute to this milestone
MS 2.8.2	Innovative technologies for controlling spoilage to enhance shelf-life and marketability developed and evaluated for each of three types of seafood per annum	June 2009 and annually thereafter to June 2014	Y for June 2009 Partially for June 2010	SFM product development project has delivered on this milestone.	SASI I (an extension of the first SFM project and the WRL automated processing project) will also contribute to these milestones. The proposed prawn loss minimisation project and the Barramundi taint projects will contribute to this milestone

MS 2.8.3	Innovative technologies for controlling spoilage to enhance shelf-life and marketability developed and evaluated for each of three types of seafood per annum	June 2009 and annually thereafter to June 2014	Y for June 2009 Y for June 2010	–	–
MS 2.8.4	Innovative technologies and approaches to recover under-utilised product (by-catch and processing by-products) trialled and evaluated from at least one sector per annum	Every two years; June 2009, June 2011 and June 2013	Partially	One project, SRL live transport practices, has been withdrawn. There was a proposal to look at mortalities in WRL supply chains but this was not supported by WAFIC.	New funded abalone projects will help address this milestone
MS 2.8.5	Innovative technologies to enhance the effectiveness of live seafood export practices evaluated in at least one value chain every two years	Every two years; June 2009, June 2011 and June 2013	Partially	One project, SRL live transport practices, has been withdrawn. There was a proposal to look at mortalities in WRL supply chains but this was not supported by WAFIC.	Supply chain projects should assist with achievement of this milestone
MS 2.8.6	Harvest, post-harvest and processing practices evaluated and enhanced to maximise and protect quality attributes and nutritional properties for at least two seafood products every two years	Every two years; June 2009, June 2011 and June 2013	Partially	Lack of capacity and slow establishment of projects	Two PhDs supported. Supply chain projects will address this in the future.
MS 2.8.7	Culinary practices evaluated and enhanced to maximise and protect quality attributes and nutritional properties for at least two seafood products every two years	Every two years; June 2009, June 2011 and June 2013	Partially	Lack of capacity and slow establishment of projects	Some of the proposed NPD projects will help address this milestone
MS 2.8.8	Technology and capability to support innovation of new seafood products developed	June 2009	Y	–	–

Wild abalone

Collaborative Activities in the Seafood CRC

The theme business plans for each program topic allows the Seafood CRC to identify research and development providers as well as industry participant groups to collaborate on projects. This is further enhanced through specialised workshops used to consult with industry and get approval of the business plan concepts and research direction. The following diagram explains the research theme concept and how each plan fits within each segment of the seafood market chain:



Tuna Symposium participants with Kinki University representatives

PROGRAM 1 COLLABORATIVE ACTIVITIES

The stakeholder engagement plan for Program 1 involves:

- An annual workshop for all Seafood CRC participants involved in production innovation. The Planning and Review Forum is used to review progress with production projects, identify priorities for future research and training and facilitate greater collaboration by bringing participants together and exploring potential synergies and allows the Seafood CRC management to provide an update of key overarching issues.

- The "Production Innovation Hub" (also incorporating the "Finfish Hatchery Network" and the "Shelllfish Hatchery Network") coordinates aquaculture research under the Seafood CRC, facilitates improved communication and assists in the development of new collaborative projects. The Hub brings together industry participants and research providers and fosters a better understanding of the research challenges faced by industry and the capacity and potential for researchers to address these challenges. The Hub arranges face-to-face meetings and helps people stay in touch through email, teleconferences, a Hub section on the CRC website, text messaging and other forms of communication. In addition, the Hub manages two hatchery networks, one for shellfish and one for marine finfish. The aim of the networks is to help hatcheries access and adopt the latest technologies and identify key research, training and education priorities.

- The Aquaculture Innovation, Breeding for Profit and Future Harvest business plans are circulated annually to relevant participants (and are available on the CRC website - member's area). Each year, an Annual Operating Plan is prepared to document all approved and proposed projects, updates on the expected and achieved outputs and details the budget. The Annual Operating Plan also details the links between each theme and all other CRC themes.

- A number of communal projects are planned or underway for the development of national services to support breeding programs such as development and commercialisation of generic data management purchases for breeding programs, national cryopreserved sperm gene banks

and provision of cost-effective genetic marker analyses. It is hoped that these communal projects will act as a catalyst for greater collaboration and cooperation across genetic breeding programs in Australian aquaculture.

- A strategic partnership with NOFIMA in Norway, the world leaders in development and commercialisation of aquaculture genetic programs involves stakeholders participating in an active exchange and training program which commenced in 2009/2010.

- The Seafood CRC also won the South Australian Excellence in Science Awards for excellence in scientific collaboration for the tuna propagation research.

PROGRAM 2 COLLABORATIVE ACTIVITIES

The stakeholder engagement plan for Program 2 involves:

- All CRC participants having the opportunity to benefit from improved trade and market access negotiation infrastructure and support services and to have the capacity and capability to ensure rapid response to trade issues through the Seafood Access Forum (SAF).

- Enabling CRC participants, both end users and research providers, to build capacity and capability by providing opportunities to co-invest with other seafood industry sectors (not members of the CRC) and with other food sectors.

- Twice yearly, Program 2 holds workshops to initiate research leadership to strategically identify new projects that will fill current gaps and identify opportunities for collaboration within the CRC community as well as internationally.

- An annual workshop is held for all Seafood CRC participants involved in product and market development. The planning and review forum is used to review progress with projects, identify priorities for future research and training and facilitate greater collaboration by bringing participants together and exploring potential synergies and allows the Seafood CRC management to provide an update of key overarching issues.

- The OzSeaValue and SellFish business plans are annually circulated to relevant participants (and are available on the CRC website). Each year, an Annual Operating Plan is prepared to document all approved and proposed projects, updates on the expected and achieved outputs and details the budget. The Annual Operating Plan also details the links between each theme and all other CRC themes.

OTHER COLLABORATIVE LINKAGES WITHIN THE CRC

During this reporting period, Seafood Services Australia continues to provide a number of administrative and communication support activities for the CRC as well as developing and taking responsibility for the Seafood Market Access Form and the Seafood CRC Bookshop.

The CRC has also engaged a number of consulting groups but only when the skills and capacity are not available within the CRC's participants.

The consultants engaged have included Corvel Management, Colmar Brunton, WKH Group, CDI Pinnacle, NCS International, Market Strategy, Grey Group, Aquaculture Support Services, Food Innovation Partners and Shearwater Consulting. The consultants provide specialist advice, independent reviews, consumer research and commercial benchmarking.

Other details of specific collaborative activities with non-CRC participants that were undertaken in research projects are shown in the following tables:

PROGRAM 1 PROJECT COLLABORATIVE ACTIVITIES WITH NON-CRC PARTICIPANTS

Project	Collaborative Organisation	Research Collaboration Activity
2005/209 Industry management and commercialisation of the Sydney Rock Oyster (SRO) breeding program	Animal Genetics and Breeding Unit, University of New England, Armidale	Technical evaluation of the program and research input through a Masters student not connected with the CRC
2006/226 Protecting and enhancing the Sydney Rock Oyster selective breeding program	Cawthron Institute, New Zealand	Cryopreservation techniques suitable for Sydney Rock Oysters
2007/707 Resolving larval rearing, juvenile development and productivity constraints for propagated Southern Bluefin Tuna and improvements to the production of Yellowtail Kingfish and Mulloway	Tokyo University, Japan American Tropical Tuna Commission, Panama Kinki University, Japan Hellenic Center for Marine Research, Greece Heinrich-Heine Universität, Germany SELFDOTT and REPRODOTT, European Research Consortiums University of Maryland, USA Stanford University, USA	Memorandum of Understanding with the American Tropical Tuna Commission (IATTC). MOU and technical exchange program with Kinki University. MOU with the EU tuna research consortiums SELFDOTT and REPRODOTT. Members of IATCC and Kinki University continue to visit Clean Seas Tuna's hatchery. Clean Seas Tuna staff have visited the European hatcheries involved in REPRODOTT.
2007/717 Southern Bluefin Tuna maturation and sexing: Develop and apply new technologies	See Project 2007/707	As above
2008/711 and 2008/725 Aquatic animal health: Post doctoral research scientist	Queensland Museum and University of Queensland	Sensitive detection protocol for *Kudoa*. This will become available to all project recipients
2008/712 Second generation tuna feeds	Hayashikane Sangyo Co. Ltd, Shimonoseki, Japan	Assistance with supply, license and installation of a feed production unit in Brisbane
2008/733 Population genetic structure of Sea Cucumber in Northern Australia	Dalian Fisheries University (China)	Information exchange of DNA extraction and microsatellite loci trails. Information about PCR inhibitors present in Sea Cucumber tissue have been obtained
2008/773 Scope of options to establish gamete cyrobanking services to genetic improvement programs in Australian aquaculture industry	Australian Phenomics Facilities, Australian National University Australian Phenomics Facilities, University of Queensland Cryogenetics Ltd, Norway.	Direction and advice on cyropreservation facilities. A software system specific for cyrobanking purpose is under development at the Australian Phenomics Facilities which will be of use in this project
2008/903 Understanding Yellowtail Kingfish	American Tropical Tuna Commission, Panama Kinki University, Japan	American Tropical Tuna Commission and Kinki University visited Clean Seas Tuna to review Yellowtail Kingfish broodstock and larval rearing plans.
2008/904 Benefit cost analysis marker assisted selection in Australian aquaculture species	NOFIMA, Norway	The Principal Investigator of this project was seconded from NOFIMA, Norway to undertake this project
2009/726 Southern Bluefin Tuna larval and juvenile rearing	See project 2007/707	See project 2007/707
2009/749 Improvements in Yellowtail Kingfish larval and juvenile survival and quality	Atlantium, Israel	Willingness to work with industry to trial their HOD UV units in Australia and the potential opportunity to place a unit at Clean Seas Tuna

PROGRAM 2 PROJECT COLLABORATIVE ACTIVITIES WITH NON-CRC PARTICIPANTS

Project	Collaborative Organisation	Research Collaboration Activity
2008/710 Benchmarking consumers physical and mental availability for seafood products and brands in different buying situations (post doctoral research scientist)	University of Cantabria, Spain. Montpelier, SupAgro, France.	Collaboration with the Spanish and French on consumers' perceptions and behaviour of seafood, wild-caught vs famed and provided a cross-cultural context.
2008/720 A community intervention approach to increasing seafood consumption	Cardiovascular Education, Heart Foundation, Perth Behavioural Research in Cancer Control, Perth Challenger TAFE Institute of Technology, Fremantle Naturalist Discovery Research Centre, Perth Cardiovascular and Chronic Care, Sydney Royal Perth Hospital and Derbyl Yerrigan Health Services Department of Health, WA Australian Sustainability Development Institute University of Wollongong Scitech Discovery Centre	Project advisors
2008/794 Retail transformation: Identifying opportunities for creating consumer focused value added products	Colmar Brunton, Sydney	Conducted independent, sensory evaluation studies of Australian farmed Barramundi
2008/905 Australian seafood compositional profiles portal	FAO Food Standards Australia New Zealand National Residue Survey New Zealand Food Safety Authority	An internationally recognised expert from FAO in food composition and public health nutrition is as an independent public health nutritional adviser for this project All others sit on the national technical expert panel and provide technical input
2008/906 Seafood trade and market access portal	Australian Embassy Tokyo, Japan Australian Embassy, Beijing, China Australian Embassy, Brussels, Belgium Australian Consulate-General, Hong Kong, China Australian Consulate-General, Guangzhou, China Australian Embassy, Hanoi, Vietnam Australian Commerce and Industry Office, Taipei, Taiwan Australian Embassy, Seoul, Republic of Korea Australian Embassy, Bangkok, Thailand Australian Quarantine and Inspection Service, Canberra,	On going support and technical advice
2009/722 Development and evaluation of Yellowtail Kingfish consumer products	Colmar Brunton, Sydney	Domestic consumer research and sensory analysis with 100 Australian Kingfish consumers and five focus groups which concentrated on consumer perceptions of Kingfish and the Kingfish brand. The resultant report gave an analysis of the sensory perceptions of the Australian consumer towards Kingfish, detailed consumer perceptions of Kingfish and the Clean Seas brand, and recommended product development concepts for the Australian domestic market.
Suite of projects involving value chain analysis	Massey University , New Zealand	Analysis of the value proposition

Commercialisation and Utilisation Strategies and Activities

The Australian seafood industry is composed of many small sectors across the country and there are very few service providers who can assist in the implementation of research. Much of this work therefore falls to industry associations, most of whom have few resources and other priorities. To overcome this block to adoption of R&D results, the CRC uses some of our commercilisation and utilisation funds to support the appointment of part time research and extension officers by these associations. The CRC currently contributes towards staff employed by the Australian Council of Prawn Fisheries, the Australian Prawn Farmers Association, the Oyster Consortium, Southern Rocklobster Limited, the Abalone Council of Australia and the Australian Barramundi Farmers Association. These staff contribute to the planning of R&D and are responsible for bringing industry participants together as needed to facilitate information transfer.

The first three years of the CRC have been primarily concerned with project planning and implementation. Nearly 300 projects have now been established and the CRC budget is 75% committed. The CRC will now enter into a new phase of communicating and commercialising the outputs from these projects. This will begin in the coming year with a survey of CRC participants to gain a detailed understanding of their communication requirements.

When the R&D requires new commercial arrangements to be delivered, the CRC has prepared business plans to fully examine the possibilities. This year the CRC examined the establishment of a commercial centre for breeding genetically improved Barramundi. The plan was accepted by the Australian Barramundi Farmers Association and funds are now being sought to implement the plan. Another business plan examined the feasibility of establishing a state-of-the-art communal seafood processing centre whereby small seafood processors could achieve economies of scale through collaboration. This plan has not yet been implemented.

During the year Clean Seas Tuna Ltd confirmed new funding until the end of the CRC in June 2014. This required a Memorandum of Understanding to be signed between Clean Seas Tuna, Fisheries Research and Development Corporation, Primary Industries and Resources of South Australia and the CRC.

INTELLECTUAL PROPERTY MANAGEMENT

Soon after the Seafood CRC Company Ltd was incorporated, the Board approved changes to the intellectual protection policy so that all new intellectual property generated during Seafood CRC funded projects is owned by the Seafood CRC Company Ltd. Participants have a non-exclusive, royalty free right to use the intellectual property for research and commercial purposes. Valuable intellectual property can be further protected by commercialisation agreements on a project by project basis. These agreements are used where there are proposals for exclusive licences, performance targets, royalties etc.

To date there have been no patents lodged by the Seafood CRC and no spin-off companies formed to commercialise R&D results.

2009-2010 COMMUNICATION STRATEGY

The Seafood CRC understands that communication is a major component of a successful centre - especially as one as large and diverse as the Seafood CRC.

One of the aims of the Australian Seafood CRC is to ensure that the results of research are made available to potential users and converted to outcomes for industry to support or drive commercial and economic growth. Without effective communication, our CRC participants may not receive vital information, which will ultimately affect awareness and adoption.

A communication plan for 2009-2010 was established in the last reporting period which aimed to create effective two-way communication, to establish useful and relevant channels for flow of information, to build meaningful rapport between participants with CRC staff and ensure ongoing commitment and support by all participants. The plan provided strategies which fostered improved collaboration, delivered knowledge and built and maintained company activities.

The major communication activities conducted this reporting period have included:

- Twice yearly Planning and Reporting Forums (also incorporating a mini-science forum).
- CRC website, secure on-line members area and CRC bookshop.
- Quarterly magazine and research summary fact sheets (written in plain English).
- Significant presence and support at the Australasia Aquaculture 2010 conference.
- Media releases and contributions to trade magazines where appropriate.
- Undertaking a communications pilot project with the Oyster Consortium to trial communication of research results via SMS, MMS and through an in-house TV program called Seafood TV Industry News (news reader style program).
- Presence and input from CRC staff at all industry association meetings and conferences to inform industry of CRC research progress.
- Preparation for the CRC communications review with all CRC participants to determine uptake of information from communication vehicles established. This review will be conducted in the next reporting period with an independent consultant (Robbie Sefton and Associates)
- Actively seek award nominations as recognition of excellent scientific and collaboration work and as a medium for information disemmination through media and other communication publications.
- Establishment of a Seafood CRC YouTube and CRC FaceBook page including research featured in video style formats.
- Academia continue to publish in peer reviewed journals.
- Establishment of networking “hubs” for aquaculture production innovation and hatcheries which coordinates communication and training activities.

PROGRAM 4 COMMERCIALISATION AND UTILISATION PROJECTS

Project Title	CRC Outcomes	Key Research Achievements	Benefits to Industry
2006/215 Southern Rocklobster industry research and development planning, implementation and extension	Outcome 1 Output 5.1 Milestone 5.1.1 Milestone 5.1.4 Output 5.4 Milestone 5.4.1 Milestone 5.4.4	Southern Rocklobster Limited (SRL) established and maintained high levels of awareness about the organisation, its objectives, plans and related programs amongst the wider industry, government and stakeholders. Annual R&D review, planning and prioritisation process completed.	Develop a SRL Strategic Plan/ Extension Plan and revision of the strategic direction and extension program. It will also form the basis to manage R&D projects and SRL operations.
2007/715 Oyster Consortium - Communications, extension and management of research and development results	Outcome 1 Output 5.1 Milestone 5.1.1 Milestone 5.1.4 Output 5.4 Milestone 5.4.1 Milestone 5.4.4	Development of an oyster industry business plan manage projects on a national and state by state basis	This project ensures collaboration within projects for the oyster industry are maintained and research results are adopted in to industry in a timely manner.
2008/715 Australian abalone industry research and development planning, implementation and extension	Outcome 1 Output 5.1 Milestone 5.1.1 Milestone 5.1.4 Output 5.4 Milestone 5.4.1 Milestone 5.4.4	Re-design of key projects to meet industry priorities Consultation with abalone processors and coordination of key wild abalone projects - including launch in to China	Enable the abalone industry to work collaboratively and improve the quality of products supplied to the market and to maintain market share in major exports.
2008/748 Research planning, implementation, extension and consultation for the Australian Council of Prawn Fisheries	Outcome 1 Output 5.1 Milestone 5.1.1 Milestone 5.1.4 Output 5.4 Milestone 5.4.1 Milestone 5.4.4	Facilitation of prawn industry project results, particularly in relation to the development of new products and new markets. Coordination, planning, implementation, and reporting of R&D projects conducted to achieve the outcomes specified in the ACPF Strategic Plan.	Better co-ordinated R&D and linkages to industry development plans as well as facilitate effective communication and coordination at all levels
2008/751 Business plan for the Australian Barramundi industry	Outcome 1 Output 5.1 Milestone 5.1.1 Milestone 5.1.4 Output 5.4 Milestone 5.4.1 Milestone 5.4.4	Development of a business plan for the ABFA completed.	Definition of the priorities and allocation of financial and human resources available to the Australian Barramundi Farmers Association.
2008/764 Research and development planning, implementation, extension and utilisation for the Australian Prawn Farmers Association	Outcome 1 Output 5.1 Milestone 5.1.1 Milestone 5.1.4 Output 5.4 Milestone 5.4.1 Milestone 5.4.4	Facilitation of prawn farming industry extension and utilisation of project results. Coordination, planning, implementation, and reporting of R&D projects conducted to achieve the outcomes specified in the APFA Strategic Plan.	Project planning and reviewing and relevance of the R&D strategy maintained.
COMPLETE 2008/775 One day workshop to define oyster "condition" and to review the techniques available for its assessment	Outcome 1 Output 5.1 Milestone 5.1.1 Milestone 5.1.4 Output 5.4 Milestone 5.4.1 Milestone 5.4.4	'Condition' should be replaced by 'marketability' or 'reproductive condition'. The determining characteristics of 'marketability' should be: meat quantity relative to shell cavity volume (measured by condition index determined using the soft tissue's wet weight and "fatness") and meat colour assessed by visual examination against a standard series of photographs. The determining characteristics of 'reproductive condition' should be meat quantity relative to shell cavity volume (measured by condition index determined using the soft tissue's dry weight) and macroscopic gonad development. Future projects should, if possible, include preliminary observation of the sensory characteristics of some selected families within the breeding programs.	The project identified what constitutes 'condition' in the eyes of marketers and growers, and how it might best be measured, so that new, proposed selective breeding projects can be developed appropriately.

2008/791 Economic evaluation of the Seafood CRC: Post doctoral research scientist	Outcome 1 Output 5.1 Milestone 5.1.1 Output 5.4 Milestone 5.4.1	Methods for the economic evaluation of the Seafood CRC were set. Specifically the quantitative questionnaire for project investigators and industry partners, a qualitative questionnaire for project investigators and a qualitative questionnaire for industry partners. Procedure for data collection and analysis produced which included the analysis of an initial set of projects to pilot test the established methods.	It is imperative that the CRC is accountable for its expenditure and is able to measure any benefits derived against the triple bottom line. There is also a need to evaluate the impact of projects as they are completed to determine their effectiveness and efficiency and to analyse some project proposals to determine their potential return on investments, to assist in the project selection process.
2008/915 Research and development planning implementation, extension and utilisation for the Australian Barramundi Farmers Association (ABFA)	Outcome 1 Output 5.1 Milestone 5.1.1 Milestone 5.1.4 Output 5.4 Milestone 5.4.1 Milestone 5.4.4	R&D plan for the industry developed and approved by the membership as a major part of the Business Plan for the industry. R&D Committee formed. ABFA actively engaged with the CRC on developing key priority projects and deciding how best to undertake the research needed by industry. ABFA business and R&D plan updated including key priority areas.	The 25 Barramundi business ventures have little or no capacity to coordinate investment in, and manage industry development. There is great difficulty in providing a whole of industry perspective on R&D and hence difficulty in capturing the benefits of scale arising from investment in innovation. Collective action on R&D will help capture the benefits of R&D and deliver future growth.
COMPLETE 2009/729 Australian edible oyster industry business plan	Outcome 1 Output 5.1 Milestone 5.1.1 Milestone 5.1.4 Output 5.4 Milestone 5.4.1 Milestone 5.4.4	Detailed report that provided a total of 11 prioritised recommendations for the industry to consider when developing future projects to improved consumption and/or profit sustainability.	Facilitate industry growth, value and increase farm profitability, hence the reason for a Business Plan rather than a strategic plan. The Consortium will achieve profitability and growth goals and will propose models for conducting the future 'business' of the oyster industry, one of which is likely to be a new incorporated national entity.
COMPLETE 2009/731 Develop priority projects for the Australian Council of Prawn Fisheries	Outcome 1 Output 5.1 Milestone 5.1.1 Milestone 5.1.4 Output 5.4 Milestone 5.4.1 Milestone 5.4.4	Project identified a number of projects that have been approved by the CRC. Industry members invited to a R&D forum to discuss suggested projects with CRC staff. 47 people attended.	This project will benefit the end user by identifying high priority R&D project areas.
2010/749 Analysis of non-monetary benefits and impacts of Seafood CRC market development projects	Outcome 1 Output 5.1 Milestone 5.1.1 Milestone 5.1.4 Output 5.4 Milestone 5.4.1 Milestone 5.4.4	Project in progress	This project will tackle this strategic challenge to meet the need to enhance industry engagement and research adoption of CRC market development projects. It will also meet DIISR's requirements of presenting a cost-benefit analysis of the Seafood CRC projects.

COMMERCIALISATION ACTIVITIES AND ACHIEVEMENTS OUTPUTS AND MILESTONES

Output/ Milestone	Description	Contract Date	Achieved (Y/N)	Reasons Why Not Achieved	Strategies to Achieve Unmet Milestones
Output 4.1	**Technology transfer leading to successful commercialisation and utilisation of CRC outputs**	**June 2013**	**N**	**Not yet due**	–
MS 4.1.1	Commercial potential of all research projects evaluated; commercialisation and utilisation plans prepared for projects	December 2007 and ongoing	Y	On going through the Research and Adoption Committee and final report evaluation process for each project	–
MS 4.1.2	Research outputs evaluated by the Commercialisation, Utilisation and Communication Committee and large scale commercialisation trials initiated for projects meeting commercial selection criteria	June 2010	Partially	This task is now carried out by the Research and Adoption Committee on a regular basis, as needed	Regular, quarterly meetings of the RAC
MS 4.1.3	Large, commercial-scale trials demonstrating technical and economic viability of selected research outputs completed	June 2012	N	Not yet due	–
MS 4.1.4	Implementation plan to ensure rapid industry adoption completed for the selected research outputs	June 2013	N	Not yet due	–
Output 4.2	**Intellectual property protected for the benefit of the Australian seafood industry and research community**	**September 2007**	**Y**	**Intellectual property registers for each project have been established and maintained**	–
MS 4.2.1	Intellectual property strategy approved by the CRC Board	September 2007	Y	–	–
MS 4.2.2	A patent attorney contracted to work on behalf of CRC	September 2007	N	A patent attorney is not yet needed	–
MS 4.2.3	Intellectual property register established	September 2007	Y	–	–
MS 4.2.4	Intellectual property and status of existing intellectual property reviewed annually	June 2008 and annually thereafter	Y	Internal audits of intellectual property are on-going and reviews are conducted with every project and IP registers updated as appropriate	–

Output 4.3	**Communication tools developed and delivered**	**June 2008**	**Y**	_	_
MS 4.3.1	Communication strategy developed; CRC logo and brand launched	June 2008	Y	_	_
MS 4.3.2	CRC conference and trade show conducted	Dec 2008 and every two years thereafter	Y	There is no need for a single, CRC-specific conference. There are several major conferences and industry meetings held each year in the seafood industry to which the CRC contributes significantly. For example 40 of 100 speakers at AustAsia 2010 were from the CRC. Biannual participants forums also provide a forum to highlight key developments.	_
MS 4.3.3	Communication tools, including media products, developed	Dec 2008 and annually thereafter	Y	CRC website, magazine, SMS, fact sheets, Seafood TV News all established. Many projects have specific communication outputs. Review of communications scheduled for July 2010. New communications committee established	_
Output 4.4	**Technology transfer leading to successful commercialisation and utilisation of CRC outputs**	**June 2013**	**N**	**Not yet due**	_
MS 4.4.1	Commercial potential of all research projects evaluated; commercialisation and utilisation plans prepared for projects	December 2007 and on-going	Y	On-going	_
MS 4.4.2	Research outputs evaluated by the Commercialisation, Utilisation and Communication Committee and large scale commercialisation trials initiated for projects meeting commercial selection criteria	June 2010	Partially	This task is now carried out by the Research and Adoption Committee on a regular basis, as needed	Regular, quarterly meetings of the RAC
MS 4.4.3	Large, commercial-scale trials demonstrating technical and economic viability of selected research outputs completed	June 2012	N	Not yet due	_
MS 4.4.4	Implementation plan to ensure rapid industry adoption completed for the selected research outputs	June 2013	N	Not yet due	_

Output 4.5	**Intellectual property protected for the benefit of the Australian seafood industry and research community**	**September 2007**	**Y**	**No protectable IP developed to date**	–
MS 4.5.1	Intellectual property strategy approved by the CRC Board	September 2007	Y	–	–
MS 4.5.2	A patent attorney contracted to work on behalf of CRC	September 2007	N	A patent attorney is not yet needed	–
MS 4.5.3	Intellectual property register established	September 2007	Y	–	–
MS 4.5.4	Intellectual property strategy and status of existing intellectual property reviewed annually	June 2008 and annually thereafter	Y	Ongoing and internal intellectual property audits for each project are implemented and reviewed	
Output 4.6	**Communication tools developed and delivered**	**June 2008**	**Y**	–	–
MS 4.6.1	Communication strategy developed; CRC logo and brand launched	December 2007, strategically reviewed annually	Y	–	–
MS 4.6.2	CRC conference and trade show conducted	Dec 2008 and every two years thereafter	Y	There is no need for a single, CRC-specific conference. There are several major conferences and industry meetings held each year in the seafood industry to which the CRC contributes significantly. For example 40 of 100 speakers at AustAsia 2010 were from the CRC. Biannual participants forums also provide a forum to highlight key developments	–
MS 4.6.3	Communication tools, including media products developed	December 2008 and annually thereafter	Y	CRC website, magazine, fact sheets, SMS, Seafood TV News all established. Many projects have specific communication outputs. Review of communications scheduled for July 2010. New communications committee established	

Dr Len Stephens, Seafood CRC Managing Director with CRC Visiting Expert, Dr Jim Anderson

END-USER BENEFITS OF SEAFOOD CRC RESEARCH

End User Name	Relationship	End-User Location	Activity	Nature/Scale of Benefit to End User)	Actual or Expected Benefit to End User
Australian Abalone Growers' Association, CRC Oyster Consortium Australian Barramundi Farmers' Association	Industry participant	SA, TAS, QLD, NSW, NT	Development of breeding plans, software and molecular tools to assist a national breeding program	Genetic improvement of stocks	Reduced cost of production through improved feed conversion, growth rate and fertility
Abalone Council of Australia	Industry participant	SA, TAS	Market research in Asia	New market niche established in China for wild-harvested Australian abalone	Maintain markets in the face of competition
Australian Barramundi Farmers' Association	Industry participant	QLD, SA, NT	Domestic market research	Repositioning Barramundi as an Australian icon product	Improved prices
Australian Prawn Farmers' Association	Industry participant	QLD	New algal "floc" system of water treatment and feeding	Natural, algal sources of nutrients produced in ponds on farm as feed source	Reduced cost of production. Reduced nutrient content of pond water discharges
Simplot Australia, Sydney Fish Market, Australian Prawn Farmers' Association, Australian Council of Prawn Fisheries, Australian Barramundi Farmers' Association, Western Australian Fishing Industry Council and Clean Seas Tuna Ltd	Industry participants	National	Innovative, chilled. seafood product development	New product ranges suited to consumer preferences available in the domestic retail market	Improved returns along the value chain and protection of margins against imports. Increased seafood consumption in the community
Clean Seas Tuna Ltd	Industry participant	SA	Research in to harvest methods	Examination of flesh quality of fish harvested using alternative methods	Reduced level of B grade fish sold at a discount
Clean Seas Tuna Ltd	Industry participant	SA	Commercialisation	Propagation of Yellowtail Kingfish and Southern Bluefin Tuna	Sustainable production of Southern Bluefin Tuna and Yellowtail Kingfish
Geraldton Fishermen's Cooperative	Industry participant through WAFIC	WA	Rocklobster processing improvements	Rapid method for washing and colour grading	Labour efficiency savings of $0.14 per kilo of lobster
Oyster Consortium	Industry participant	TAS, NSW, SA	Business benchmarking	Forty oyster growers have contributed to data for industry financial and production benchmarks	Highest costs found to be labour and spat purchase. Projects now in place to reduce these costs
Oyster Consortium	Industry participant	TAS, NSW, SA	Genetic improvement	Improved growth rate and shell shape of oysters	Improved spat now used by 25% of the industry. More than 50c decrease in cost of production per dozen

Southern Rocklobster Ltd	Industry participant	SA	Redesign of fishery management system	Introduce lobster translocation regulatory arrangements	$500 million over 15 years
All Participants	Industry and research provider participants	National	International trade and market access research	Provision of research papers and technical data to support international trade negotiations at government and enterprise level	Reduced tariffs and quota restrictions for exports to Asia and the EU. Enhanced capacity of companies to meet technical specifiications for exports
All end users	All industry participants	National	Seafood consumer research	4,000 consumers in Australia surveyed for attitudes to seafood and pattern on consumption	Detailed reports on market opportunities available for participants and their marketing partners
All end users and community	All industry participants and general public	National	Delivery of messages about the health benefits of seafood	Development and testing of information packs for industry, schools and health professionals	Increased seafood consumption, producing community health benefits

Education and Training in the Seafood CRC

HIGHER EDUCATION

The CRC now has a total of 35 PhD projects that have been approved. Of the 35 PhD projects, 33 scholarships have been filled by candidates. The Seafood CRC plans to have a total of 40 PhD students in place by 2011 and is confident it will reach this target with a new round for PhD applications to be called in July 2010 and a process whereby 3-5 of the CRC Honours students finishing at the end of the 2010 academic year will be targeted for enrolment in to PhDs. Currently, CRC PhDs are either on a full scholarship at the APAI rate or have APA or university scholarships that are "topped" up to this rate.

The Seafood CRC also has three Masters by Research students in the higher education program with two students starting their studies during the latter half of 2009 (one project currently remains unfilled). The Seafood CRC also has supported 15 Honours students as a mechanism of addressing the slow influx of academically gifted students wanting to conduct projects in the Australian seafood industry. The Seafood CRC has a target of supporting 10 Masters by Research students and 10 Honours students throughout the life of the CRC. From the results presented, the CRC has exceeded its target for Honours students and the final 8 Masters by Research students will need to be in place by early 2012. During this time, a further three calls for Masters projects will take place with the aim of appointing the final 8 students.

All CRC PhD and Masters by Research students are given yearly funds towards supporting the student's relationship with their industry mentor and to partake in formal student/mentor activities as developed by the Seafood CRC. In addition, all Honours students are welcome to attend all these activities.

SIPP Retreat Field Trip

SEAFOOD INDUSTRY PARTNERS' PROJECT (SIPP) RETREAT

The Higher Education personal development activity for students, early careers scientists (such as CRC Post Doctoral Research Scientists) and their industry mentors that was conducted in 2009 was in a retreat style format called SIPP. The SIPP program ensures our graduates and young scientists obtain essential and pertinent knowledge about the seafood industry and specific seafood sectors. It will also ensure students and early career scientists are able to communicate with industry about R&D enabling industry to realise the benefits. They will also gain confidence and communication skills promoting industry ready graduates and ensure the retention of graduated students in the Australian seafood industry. Additionally, industry mentors, or project partners, will have the opportunity to gain new skills.

Activities undertaken during SIPP 2009 from 27-28 October included:

- Student, post doctoral research scientist and industry mentor welcome dinner
- Student presentations at the CRC participant dinner and at the CRC mini-science forum.
- Oral presentation training
- Mentoring/coaching training for mentors
- A workshop run by postdoctoral researchers on "top tips for a successful PhD"
- Student review workshop
- Field trip to the South Australian Food Centre where participants learnt from a chef the usage of seafood in a commercial environment - topics covered included sensory evaluation, flavours, waste and usage, preparation, seafood quiz and cooking demonstrations.

YOUNG SCIENTISTS IN AQUACULTURE PROJECT

In May 2010, the leading Australian and Asian aquaculture conference 'Australasia Aquaculture' was held in Hobart which attracted over 1000 scientists and industry from the Australasian region. Ten Seafood CRC aquaculture PhD students were supported to attend and present their work to their academic peers and to industry. Attendance at this conference also allowed the students to connect with their industry mentors and other industry personnel enriching their academic experience.

HIGHER EDUCATION STUDENTS IN THE AUSTRALIAN SEAFOOD CRC

Student	University	Project Title	Program	Industry Mentor	Employment
Full Seafood CRC Scholarship - PhD					
Judith Fernandez	University of Tasmania	2008/700 Protecting the safety and quality of Australian oysters using predictive models integrated with "intelligent" cold chain technologies	2	Scott Parkinson (Shellfish Culture)	Not yet completed
Miriam Fluckiger	University of Tasmania	2008/701 Understanding quality in abalone	2	New mentor to be appointed	Not yet completed
Andrew Foote	Flinders University	2008/713 Understanding penaeid prawn sex determination and developing monosex induction strategies for commercial application	1	Brian Murphy	Not yet completed
Lily Chan	Flinders University	2008/731 Development of a healthy high Australian seafood diet that will be acceptable to women of child bearing age: The Australian seafood diet for intergenerational health	2	New mentor to be appointed	Not yet completed
Jenna Bowyer	Flinders University	2008/736 Nutritional factors influencing the performance of Yellowtail Kingfish cultured at low temperatures	1	Chester Wilkes (Clean Seas Tuna)	Not yet completed
Rachel Tonkin	Curtin University	2008/737 An investigation of the microbiology and biotechnical properties leading to the extended shelf-life in Goldband Snapper	2	Richard Stevens (WA Fishing Industry Council)	Not yet completed
Sam He	Flinders University	2008/738 Characterisation of selected fish processing co-products and development of novel integrated bioprocesses for value-added food and non-food products	2	New mentor to be appointed	Not yet completed
Vinh Dang	Flinders University	2008/739 Antiviral activity and resistance to abalone virus ganglioneuritis	1	Ben Smith (SA Seafoods)	Not yet completed
Vipul Pare	University of South Australia	2008/740 Understanding and forecasting seafood suppliers and buyers behaviour trading at Sydney Fish Market	2	Gus Dannoun (Sydney Fish Market)	Not yet completed
Felicity Brake	Flinders University	2008/741 Human enteric viruses in Australian bivalve molluscan shellfish	2	Tony Troup (Camden Haven Oyster Supplies)	Not yet completed
Yadollah Bahrami	Flinders University	2008/742 Processing Sea Cucumber viscera for bioactive compounds	2	New mentor to be appointed	Not yet completed
Victoria Valdenegro Vega	University of Tasmania	2008/749 Using the mucosal antibody response to recombinant Neoparamoeba perurans attachment proteins to design an experimental vaccine for amoebic gill disease	1	New mentor to be appointed	Not yet completed

Tom Madigan	University of South Australia	2008/763 Quality, shelf-life and value adding of Australian oysters	2	Judd Evans (Kiwi's Oysters)	Not yet completed
Zhenhua"John"Ma	Flinders University	2009/700 Improvement of Yellowtail Kingfish production efficiency through food and feeding management	1	Morten Deichmann (Clean Seas Tuna)	Not yet completed
"Top Up" Seafood CRC Scholarship - PhD					
Arani Chandrapavan	University of Tasmania	2006/220 Translocation of the Southern Rocklobster, Jasus edwardsii, to improve its yield and marketability	1	Caleb Gardner (TAFI)	Research Officer, Dept of Fisheries, WA
Steven Cambridge	University of Tasmania	2008/734 Methodologies for implementation of micro-mobile systems in the cold chain	2	New mentor to be appointed	Not yet completed
Paula Lima	University of Tasmania	2008/750 Examination of the immune response of Atlantic Salmon vaccinated with a DNA vaccine for DNA	1	David Mitchell (Huon Aquaculture Company)	Not yet completed
Chris Chapman	University of Tasmania	2008/761 Proactive control of oyster spat production by controlling microbiological contamination	2	Michel Bermudas (Shellfish Culture)	Not yet completed
Kelli Anderson	University of the Sunshine Coast	2008/762 The effect of temperature on reproductive development of maiden and repeat spawning farmed Atlantic Salmon: Understanding the molecular basis for improved egg quality and survival	1	Dr Harry King (SALTAS)	Not yet completed
Erin Bubner	Flinders University	2008/780 Determination and manipulation of reproductive status of the captive reared Southern Bluefin Tuna	1	Craig Foster (National Aquaculture Council)	Not yet completed
Lindsey Woolley	Flinders University	2009/733 Body buoyancy and distribution of fish larvae: exploring the mechanism of mass mortality in post-larvae	1	Adrian McIntyre (Clean Seas Tuna)	Not yet completed
Mark Oliver	University of the Sunshine Coast	2009/725 Paving the way for sustainable aquaculture development in Queensland's marine environment through effective policy based decision making processes	1	Trevor Anderson (Sea Farm)	Not yet completed
No Student Appointed	University of Tasmania	2009/756 Managing fisheries to maximise profits by understanding and reducing variable costs of fishing	1	New mentor to be appointed	Not yet completed
Celeste Knowles	Flinders University	2009/757 Profiling host-parasite dynamics of amoebic gill disease using molecular DNA methods: Applications to vaccine development, selective breeding and offshore aquaculture	1	David Mitchell (Huon Aquaculture Company)	Not yet completed

No Student Appointed	Flinders University	2009/758 Fishing to market: Product quality based harvest strategies to increase profitability for Greenlip Abalone	1	New mentor to be appointed	Not yet started
Pollyanna Hilder	University of Tasmania	2009/760 Development of vision and first feeding behaviour of Southern Bluefin Tuna and Yellowtail Kingfish	1	Allan Mooney (Clean Seas Tuna)	Not yet completed
Jasha Bowe	University of South Australia	2009/761 The role of inbound Chinese tourists in promoting Australian food products in China	2	New mentor to be appointed	Not yet completed
Tim Emery	University of Tasmania	2009/762 Assessing the costs and benefits of changing shot rotation practices in the Southern Rocklobster fishery	1	New mentor to be appointed	Not yet completed
Daniel Pountney	University of Tasmania	2010/722 Optimising prawn nutrition for growth performance under suboptimal conditions	1	Matt West (Australian Prawn Farms) and Richard Smullen (Ridley AquaFeed)	Not yet completed
Fucheng Yu	Flinders University	2010/723 Improving safety and marketability of Australian oysters in China	2	Tony Troup (Camden Haven Oyster Supplies)	Not yet started
Penny Miller	University of Tasmania	2010/724 Development of tools for the sustainable management of genetics in polyploid Pacific Oysters	1	Scott Parkinson (Shellfish Culture)	Not yet completed
Shannon Loughnan	Flinders University	2010/725 Capturing and maintaining genetic variation when initiating selective breeding programs for aquaculture	1	Mike Thomson (Clean Seas Tuna)	Not yet completed
Vijay Mareddy	University of the Sunshine Coast	2010/726 Towards a female P. monodon population using endocrine manipulations	1	Matt West (Australian Prawn Farms)	Not yet completed
Omar Mendoza Parras	Flinders University	2010/727 Molecular assessment of spawning cues in temperate abalone	1	New mentor to be appointed	Not yet started
Abby Fisher	University of Tasmania	2010/728 Development and optimisation of anaethetics for use in the abalone aquaculture industry	1	New mentor to be appointed	Not yet completed
"Top Up" Seafood CRC Scholarship - Masters by Research					
No Student Appointed	University of Adelaide	2009/728 Evaluation of two electronic methods to assess sea cage biomass for on-farm feeding and harvesting strategies for Yellowtail Kingfish	1	New mentor to be appointed	Not yet started
Linda Moss	University of the Sunshine Coast	2009/765 Nutritional genomics and its application to aquaculture	1	Mark Porter (Ridley AquaFeed)	Not yet completed

Rasha Abousaada	University of South Australia	2010/743 Fresh Prawns: Maintenance of optimum quality for Western King Prawns	2	New mentor to be appointed	Not yet completed
Seafood CRC Student Support Scholarship - Honours					
Ying Ying Lee	University of the Sunshine Coast	2008/785 Understanding the role of Kiss/Kiss1r system in controlling puberty in Yellowtail Kingfish and Southern Bluefin Tuna	1	n/a	PhD in Medical Research
Matthew Osborne	Flinders University	2008/786 Evaluation of a saline water cladoceran as new live food for fish larvae	1	n/a	Aboriginal Heritage Officer and seeking employment in the environmental/ fisheries sector
Kerri Choo	Curtin University	2008/787 Novel products from Blue Swimmer Crabs	2	n/a	Seafood Product Development, Curtin University
Daniel Tan	Flinders University	2009/762 Impact of commercial hatchery practices on the contribution of broodstock to offspring and genetic diversity	1	n/a	Not yet completed
Joel Kellam-Stock	Flinders University	2009/763 Impact of acid sulphate soils on the survival of adult Pacific Oysters challenged by bacterial extracellular products	1	n/a	Not yet completed
Nthabiseng Tito	University of Tasmania	2009/766 Development of near infra-red method to detect and control microbial spoilage	2	n/a	Not yet completed
Karl Hansel	Curtin University	2009/773 Evaluation of the applicability of ambient temperature vacuum drying in the production of dried seafood products for the Asian market	2	n/a	Not yet completed
Nicole Ertl	University of the Sunshine Coast	2009/776 Sustaining Australia's aquaculture competitiveness by developing technological advances in genetics: Discovery of functional genes for commercial traits	1	n/a	Not yet completed
Hannah O'Brien	University of the Sunshine Coast	2009/777 Australian farmed prawns: A gender comparison of perceptions of relationship marketing	2	n/a	Not yet completed
Matthew Bransemer	University of Adelaide	2009/778 The effects of feeding alternative protein sources on the intestinal mucus layer and mucosal architecture in Yellowtail Kingfish	1	n/a	Not yet completed

Kopano Mosa Machailo	Flinders University	2009/779 Improved Yellowtail Kingfish growth response, flesh quality and PUFA content through biorefinery microalgae LC-PUFA aqua-feed additives	1	n/a	Not yet completed
Geoffrey Collins	Flinders University	2009/780 Effect of temperature and plant protein inclusion on the growth factor gene expressions in Yellowtail Kingfish	1	n/a	Not yet completed
Hamish King	Flinders University	2009/781 Omega 3 fatty acid metabolism in Yellowtail Kingfish and Southern Bluefin Tuna cell cultures	1	n/a	Not yet completed
Nathan Rout-Pitt	Flinders University	2009/782 Impact of fish oil replacement on the expression of antioxidant genes and genes involved in the synthesis of high unsaturated omega 3 fatty acids in Yellowtail Kingfish liver and muscle tissues	1	n/a	Not yet completed

UNDERGRADUATE UNIVERSITY EDUCATION PROJECTS

During this reporting period three initiatives took place with undergraduate university students. These were as follows:

- Two, third year undergraduate marketing students from the University of South Australia undertook a six month consumer study of farmed prawns in Sydney and Melbourne, working with the Australian Prawn Farmers Association as part of the subject "Marketing Practicum".

- As part of the undergraduate subject at the University of Tasmania "Food Microbiology", seven students were involved in two projects related to the modified atmosphere packaged salmon project. The students investigated the best ways of culturing and isolating microorganisms from salmon fillets and also identified the dominant culturable microbes.

- A team of ten, third year undergraduate research students from the University of the Sunshine Coast along with three CRC industry participants (James Calvert, Willliam Ferguson and Jonas Woolford) undertook a market research project in Shanghai, China to collect market intelligence on the export potential of Australian seafood in China with a specific reference to abalone, Southern Rocklobster and Pacific Oysters. The opportunity also created a great partnership between early career scientists and industry. Building on the success of this initiative, a similar experience will be offered in September 2010 for CRC industry groups and third year students to undertake a similar market intelligence project in Beijing, China.

University of the Sunshine Coast undergraduate students with CRC industry participants

HIGH SCHOOL EDUCATION AND TRAINING PROJECTS

The Seafood CRC recognises that to attract the future generation in to careers in the Australian seafood industry effort needs to be directed to high school aged students. A number of projects have taken place in high schools to address the skills shortage issues and they include the following:

- Through project 2008/720, a suite of seafood health benefit communication materials for school-aged children called "KidZone" have been developed and distributed though Western Australia. These include teacher lesson plans and assessments, seafood quizzes and an interactive computer/video game. The team met with educational experts to ensure the resources developed could also be used by students in regional, rural and remote areas. Effort will now take place to roll-out the materials to schools on a national basis.

- A high school engagement initiative was launched which has developed two high school case studies focusing on the implementation of aquaculture training and the creation of a High School Aquaculture Program Implementation Manual which includes: A guide for integrating aquaculture into existing curriculum, a strategy for initiating a fisheries and aquaculture vocational training program from the Seafood Industry Training Package, a model for effective industry engagement and schematic diagrams and estimated costs for the construction of three different school based aquaculture training facilities.

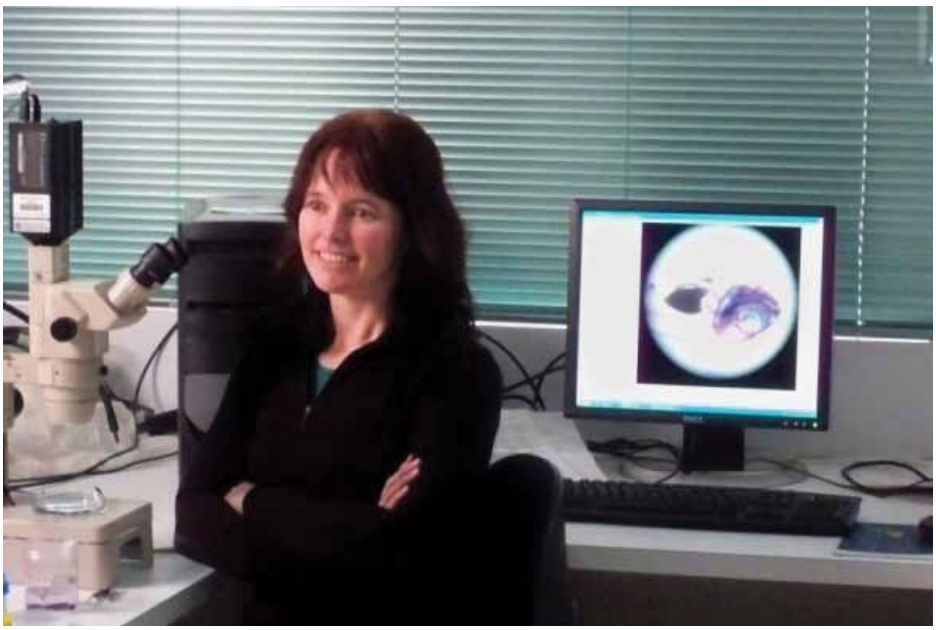
- The Seafood CRC has continued to work with aLife and invested in a further five profiles as part of aLife 2 which highlight careers in the Australian seafood industry through savvy mechanisms to educate the younger geneation about careers beyond year 12. aLife is being used more and more by high school teachers to teach the compulsory year 10 subject 'personal learning program'. aLife2 was launched and distributed to every secondary school (3,500) in Australia during November 2009. Since launching aLife2, 15,000 additional disks from schools requesting additional copies of aLife have also been distributed. These copies are either distributed directly to students, via the teachers or used at regional career education fairs and/or parent teacher career sessions. aLife now has 968 registered users of the alife.net.au site. A database of careers advisers, guidance counsellors, teachers, parents, students, HR professionals and government officials has now been established using results from the outbound calling program ran from the aLife call centre from early 2009. A series of lesson plans surrounding each profile have also been developed. The Seafood CRC industry career profiles feature in the Top 100 most viewed profiles.

Industry Training Initiatives

SEAFOOD CRC MASTER CLASSES

- The Seafood CRC continues its suite of Master classes for the seafood industry (and research community where applicable) from outputs from research programs 1 and 2. The Master Classes conducted during this reporting period include:

- The Seafood Marketing Master Class series was developed when the Seafood CRC identified that its industry participants did not have a basic core understanding of the fundamentals of marketing. It was also identified that CRC industry participants demonstrated a lack commitment of towards marketing research projects. In response to this, the Ehrenberg Bass Institute of Marketing Science via University of South Australia were engaged to run a series of Master Classes in the basic principles of marketing with a seafood focus. 110 people were trained in the basics of marketing principles over eight locations during 2009 and 2010. A workbook was also developed including a Rocklobster case study and presentation slides and the classes were generally very well received with feedback of 4/5 + for satisfaction across all venues.



- The "Minimising Waste and Maximising Profit through Process Efficiency" Master Class series was run in February 2010 over four locations and introduced participants to basic concepts of improving productivity in the seafood sector, with emphasis on small and medium sized enterprises. Participants learnt strategies, tools and techniques used for identifying waste and inefficiencies in their own processes and utilised case studies to demonstrate how their new knowledge will improve productivity, long term viability and finances of seafood businesses. In total, 43 participants were trained in basic process mapping techniques, concepts of the value-adding process and Muda and concepts of performance measurement. A workbook was also developed including an Irish case study and presentation slides. The module was generally very well received and feedback showed a weighted score of 87.2% for satisfaction across all venues Investigation in to the interest of CRC members to conduct a Diploma in Seafood Processing with the Seafood CRC and the Grimsby Institute occurred at the same time but whilst interest was high, commitment was low so the CRC did not pursue the development of this postgraduate course.

- In July 2010, the Seafood CRC will launch its suite of "Future Harvest" Master Classes across eight locations in Australia to assist participants in thinking economically about their future harvest. The class is designed to challenge participant's thinking about the role of fisheries management and the use of economics.

SEAFOOD CRC PROFESSIONAL DIPLOMA IN ENTREPRENEURSHIP (BUSINESS SKILLS 101)

The Seafood CRC's suite of Business Skills 101 modules, with a strong seafood focus, are run over a course of eight months, with one module per month facilitated in either Brisbane, Melbourne, Adelaide or Sydney lasting two full days in duration. This is the second year in which the program has run and to date 40 participants have taken part in the course. Module topics include: Creative thinking and entrepreneurship, marketing products and services, learning how to look for business opportunities and determine if they are viable, how to conduct a risk analysis, human resource management, leadership, how to prepare a business plan, how to raise money for a business, how to read financial statements and principles of effective writing, speech and presentation. Each module is designed to be delivered as a stand-alone module (e.g. pre-requisite knowledge is not required and it is not assumed participants have attended other modules). Participants may choose to participate in modules of choice or complete all modules and "homework" and present a business plan to receive a Professional Diploma in Entrepreneurship. The course also credits participants who obtain the Professional Diploma 18 points towards a Masters in Business Administration (MBA).

NATIONAL SEAFOOD LEADERSHIP PROGRAM 2010

The Seafood CRC continues to support three industry personnel per year to take part in this program which provides personal development opportunities centred around effective leadership. During 2009-2010, those supported to take part in the course were Matthew West of Australian Prawn Farms, Jedd Routledge of Natural Oysters and Ben Cameron of Cameron of Tasmania.

TRAINING NEEDS ANALYSIS - THE CONTINUATION

Several CRC hatcheries have participated in an analysis of training needs in hatchery and genetic technology, conducted on behalf of the Seafood CRC by the Agri Food Skills Council. The CRC hosted a breakfast on the 26th May 2010 during the Australasian Aquaculture Conference to discuss the findings and gain feedback. Upon completion of the study, the CRC, through the Aquaculture Innovation Hub and Hatchery network, will initiate specific training from the findings.

NOFIMA EXCHANGE PROGRAM

The NOFIMA exchange program presents a number of opportunities for CRC participants to engage with some of the world's leading and most experienced genetics experts. During the latter half of 2010, a number of researchers will visit NOFIMA as part of the exchange program.

The NOFIMA Exchange Project also hosted a workshop on the "analysis of quantitative genetic data and design of aquaculture selective breeding programs" which was run during the Australasia Aquaculture Conference in May 2010.

INDUSTRY TRAINING THROUGH PROJECTS

Through project 2008/757, triploid *P. monodon* families were produced at a commercial hatchery and hatchery staff received training in induction methods. During these inductions the hatchery manager and Technical Officer of Gold Coast Marine Aquaculture had the opportunity to learn current triploid induction techniques and how triploids are handled and induced. This hatchery run was invaluable for both the industry and scientists involved.

The Aquaculture Innovation Hub Project also held a "Hatchery Technology Workshop" focusing on egg disinfection with ozone, seawater disinfection (ozone and UV) and live feeds management, including some hands on training. This workshop took place after the Australasia Aquaculture Conference with more than 30 people taking part.

Oyster hatchery technician at the CRC hatchery technology workshop

Visiting Experts

The CRC Visiting Expert Scheme allows experts to impart their knowledge and experience and potentially develop longer term linkages with the CRC and its projects. This scheme also supports visiting specialists to assist the Seafood CRC participants with problems and identify potential solutions. During this reporting period a large number of visiting experts visited the CRC and its participants and they were:

- **Bjarne Gjerde and Kari Kolstad (NOFIMA, Norway)**. Bjarne and Kari are senior researchers from the Breeding and Genetics Group in NOFIMA. They attended the Australasian Aquaculture conference and presented plenary and keynote talks on the latest developments in aquaculture genetics. Also as part of the NOFIMA exchange project they conducted a workshop on data management and analyses in aquaculture breeding programs.

- **Jim Anderson (University of Rhode Island).** Jim is a senior scientist working in fisheries and aquaculture economics with a profile in seafood price forecasting, analysis of seafood markets and trade, and the relationship between the seafood market and environmental policies and regulation. Jim presented at the Australasian Aquaculture conference and spoke at one of the Chairman's lunches. Jim also participated in workshops on fishery performance indicators in Adelaide and Hobart during May 2010.

- **Niels Svennevig (Sintef Fisheries).** Niels is head of international affairs at Sintef Fisheries an aquaculture and fishery consultant with extensive experience with finfish aquaculture. He has been playing a major role in the recent and successful development of Cobia aquaculture in Vietnam. Niels was sponsored through the Aquaculture Innovation Hub project and presented a paper at the Australasian Aquaculture conference.

- **Gavin Burnell (AQUA TT).** Gavin was instrumental in forming AQUA TT, an aquaculture training and communication organisation operating across Europe. AQUA TT has the goal of bridging the knowledge gap between the R&D environments and the progressive commercial sector. Gavin hosted workshops on communication and networking in the seafood industry in Perth and Adelaide during his visit in June 2009.

- **Peter Redmond (Vice President of Development, Administration and Communication, Global Aquaculture Alliance and past Vice President/Divisional Merchandise Manager for Wal-Mart Stores, Inc. and Commercial Manager for ASDA).** Peter presented a number of keynote and plenary presentation at the Australasian Aquaculture conference and met with a number of CRC industry participants due to his experience in the retail sector in the USA and Europe. Peter also was scheduled to present at the Business SKills 101 module.

INDUSTRY BURSARIES AND RESEARCH TRAVEL GRANTS

The Seafood CRC continues to offer a formal system that supports industry personnel, researchers and students to attend personal development opportunities. The aim of the research travel grant is to enhance R&D providers to seek solutions and options for industry to improve production and reduce costs. The travel grants are not for the sole purpose of subsidising conferences etc (this is to come from project budgets) but rather for exchanges and academic travel in association with projects. The aim of the Seafood CRC industry bursary is to develop the capabilities of our industry participants and strengthen the capacity for Seafood CRC industry to commercialise and utilise research outcomes. Ultimately the program will assist collaboration and knowledge across the Seafood CRC, support industry access to and understanding of international research and development and enhance knowledge transfer and communication relating to learnings from attending a variety of seafood related activities.

The bursaries and grants approved during the 2009/2010 reporting period were:

Name	Activity	Objectives	Benefit to CRC/Industry
Research Travel Grants			
Andrew Foote (PhD student)	Flow of cytometry methods course and workshop	Develop knowledge and skills in flow cytometry to advance the progress of the PhD project.	If successful tetraploidy techniques are developed (with the aid of flow cytometry), commercial production of all triploid progeny may be possible. This will also require substantial use of flow cytometry to determine ploidy status.
Dr Benita Vincent(Researcher)	Short term lab placement at Aberdeen	To conduct a short term lab placement at the Marine Laboratories in Aberdeen to gain skills in new techniques including producing and maintaining primary cell cultures from gill explants and tissues	Technique to obtain primary gill cell lines from Atlantic Salmon gill tissue using trypsin digestion refined. To date, the researcher has maintained several primary cultures of gill cells morphologically similar to epithelial cells for up to 15 days. Ongoing development of this project may further knowledge of host- pathogen interactions associated with amoebic gill disease of Atlantic Salmon and lead to identifying potential targets for disease mitigation
Tom Madigan (PhD student)	Workshop and training on physical and biochemical methods for analysis of fish as food, Grimbsy Institute	Developing biochemical markers for oyster quality will be a direct benefit to the associated PhD project.	Information gathered on the latest biochemical techniques for the analysis of quality changes post mortem. These techniques have relevance for all sectors of the CRC. Up-to-date methods obtained for the analysis of marine vibrios which will be of direct benefit to Vibrio work in prawns.
Dr Bennan Chen (Post Doctoral Research Scientist	Zooplankton research tour and fish hatchery farm visits, Taiwan	Seek optimal copepod production techniques for the ongoing Australian Seafood CRC Yellowtail Kingfish (YTK) and Southern Bluefin Tuna (SBT) larval rearing projects (2008/746 and 2008/718).	Opportunity to review international technologies and gain practical knowledge and hands-on experience on seawater zooplankton culture to produce good-quality live food for YTK and SBT larvae. This information will help to establish proper feeding regimes for next season's SBT and YTK larval rearing research at SARDI, and potentially influence procedures used at Clean Seas Tuna (CST) for commercial SBT larval production.

Dr Malcolm Brown (Researcher)	Visible near infra-red spectroscopy workshop	To develop expertise in visible-near infrared spectroscopy (VNIRS) to apply in current and future Seafood CRC projects assessing and discriminating seafood quality and to establish scientific networks with VNIRS expertise as potential collaborators for current or future Seafood CRC projects	Immediate project outcomes are an enhancement of the researcher's capability in VNIRS and establishment of international contacts with high-level expertise. As this enhanced capability is employed, i.e. in current (oyster and abalone) or future CRC projects, more tangible industry-linked outcomes should follow. If research can demonstrate that VNIRS can act as an effective tool for oyster quality-associated discrimination, this would greatly assist selective breeding and more generally could be adopted by industry as a tool to assist in quality discrimination.
Paula Lima and Celeste Knowles (PhD students)	Micromon recombinant DNA techniques course	Participate in the Micromon recombinant DNA techniques course at Monash University, to learn relevant molecular biology techniques and skills essential for the progress of PhD studies	The PhDs are part of a current Seafood CRC project – Amoebic gill disease (AGD Vaccine Phase III) and the knowledge gained during the course will affect the progress of the PhDs as the commercialisation of the 6 antigen AGD vaccine relies on the results of the project.
Kelli Anderson (PhD student)	Training in endocrine diagnostic techniques and hormone analysis of thermally challenged female Atlantic Salmon broodstock	Gain experience in molecular techniques such as gene isolation and cloning, quantitative polymerase reaction (qPCR) and microarray analysis will allow the student to train in the field of finfish endocrine diagnostic technologies and broaden her skill set by working with experienced scientists.	The work will contribute to industry practices concerning broodstock husbandry. Specifically, if hormonal treatment is successful in alleviating the negative effects of thermal challenge, a new broodstock management strategy will be developed for the industry that will improve egg quality in female Atlantic Salmon regardless of thermal environment. This will increase industry confidence, productivity, sustainability and lower industry running costs. In addition, management protocols that are developed will be broadly applicable and relevant to farmers that produce species other than Atlantic Salmon, and are faced with the same problems associated with climate change and elevated water temperature
Miriam Fluckiger (PhD student)	Confocal laser microscope training to examine the muscle structure properties of abalone	This microscopy technique produces high resolution images at selected depths with minimal sample preparation The muscle structure of abalone subjected to different treatments will be investigated, as well as using archived samples to study the effect of season, reproductive status and diet. Additionally a staining technique can be developed to examine the distribution of glycogen in the foot tissue of abalone.	A greater understanding of how abalone meat quality is affected by factors such as season, diet and reproductive status has the potential to give the industry the ability to market product of a known level of quality. Similarly, knowing when abalone have different textural properties may allow for the specific grading of abalone meat, helping to determine which are best suited for different processing treatments (e.g. live transport, freezing, canning etc.)
Pollyanna Hilder (PhD student)	Training workshop on physiology and aquaculture of pelagics, Achotines Laboratory, Panama	Learn culture methodologies applied to Yellowfin Tuna, which can then be transferred to species relevant to Australian aquaculture, as well as establishing professional relationships with academic and industry peers.	Workshop produced a number of outcomes which may be trialled in the impending SBT larviculture season. If these protocols can make a significant improvement in the growth and survival, it would be expected that these protocols would be incorporated into commercial rearing techniques.

Industry Bursaries			
Ian Duthie, Hayden Dyke, Mike Cameron, Giles Fisher, Peter Bowers, Adam Butterworth and Greg Kent (Oyster Consortium)	Group study tour to New Zealand	Information gained from this study tour will be able to be immediately integrated into the business plan and strategic review for the improvement of the entire Australian oyster industry.	The visit to the New Zealand industry is an opportunity to see why New Zealanders are able to effectively export NZ$16.9 million worth of oysters overseas, much of it value added. New Zealand are also growing Pacific Oysters to a market size in 12 -18 months, considerably faster than most Australian producers. There is also considerable interest by large mussel producers to incorporate Pacific Oyster production, with research and development currently underway.
Basil Lenzo (Geraldton Fisherman's Cooperative)	Australian National Business School/University of Western Australia, "Business in Asia" course	Acquire the necessary international business skills, to understand how business works across cultural and national boundaries by gaining hands on experience on how business is conducted in Asia.	Opportunity both culturally and socially to achieve a better understanding about the company's biggest trading partner's needs and wants when it comes to doing business and to gain a sustainable competitive advantage in the market place for premium lobsters.
William Ferguson (Ferguson Australia)	Study tour to Europe	Research and identify new export opportunities for Australian seafood products, identify new processing/ packaging methods and conduct general market research.	The European market is not as sophisticated as the Australian market but a lot can be learnt in future trends.
Maria Mitris (Pacific Reef Fisheries)	Monash University Agribuisness Executive Program	Gain insights in to key consumer and retail trends, manage relationships between manufacturer and retailer, learn about marketing and brand management and move forward on development of a business.	Develop tools necessary to develop marketing strategies to better position the company in the market place.
Grahame Turk (Sydney Fish Market)	The Australian Rural Leadership Foundation's Inaugural TRAILblazers Program	TRAILblazers' syllabus is designed to expose established leaders to learning opportunities in three key areas which are critical to expanding capacity as a leader.	Increase the contribution the participant will make to the six industry bodies that he is involved in.

Students shown how to get aLife

EDUCATION AND TRAINING ACTIVITIES AND ACHIEVEMENTS OUTPUTS AND MILESTONES

Output/ Milestone	Description	Contract Date	Achieved (Y/N)	Reasons Why Not Achieved	Strategies to Achieve Unmet Milestones
Output 3.1	**Graduation of about 25 PhD students**	**20 by June 2012; another 5 by June 2014**	**N**	**Not yet due but one student has graduated**	–
MS 3.1.1	Education and training committee established and work plan and operating processes developed	February 2008	Y	–	–
MS 3.1.2	Initial students recruited, inducted and paired with appropriate industry mentors	February 2008	Y	–	–
MS 3.1.3	Initial students gain PhD and selected students embark on career pathways in seafood	December 2011	N	Not yet due	–
Output 3.2	**Research education and training through Research Program 1**	**June 2014**	**N**	**Not yet due**	–
MS 3.2.1	Research into the processes of knowledge transfer in the Australian seafood industry completed to determine the factors affecting skill supply, deployment and development	December 2008	Y	–	–
MS 3.2.2	Outputs from Research program 1 customised to develop education and training tools and processes, training conducted and suitability of tools and processes evaluated	June 2009 and ongoing	Y	–	–
MS 3.2.3	Two case studies illustrating industry application of outputs from Research Program 1 completed	One by June 2011; the other by June 2013	N	Not yet due	–
MS 3.2.4	CRC induction program for participants developed and implemented	December 2007	Y	–	–

Output 3.3	**Postgraduate ualifications available**	**June 2010**	**N**	**Research outputs have only just realised some potential skill sets for post graduate qualifications**	**The Aquaculture production Hub will be the vehicle for developing post graduate qualifications**
MS 3.3.1	Demand for postgraduate qualifications with seafood specialisations relevant to Program 1 identified and at least one postgraduate course developed and offered	February 2010	N	Research outputs have only just realised some potential skill sets for post graduate qualifications	The Aquaculture production Hub will be the vehicle for developing post graduate qualifications
MS 3.3.2	Vocation and education training level skills set and new competencies relating to the outputs of Research Program 1 identified and submitted for inclusion in the National Seafood Industry Training Package	June 2009	N	Research outputs have only just realised some potential skill sets for post graduate qualifications	A project is currently being developed to address this milestone and will begin in early 2011 with the project leader an ex TAFE lecturer and course coordinator in aquaculture
Output 3.4	**Incorporation of external expertise into Research Program 1**	**June 2014**	**Y**	**Numerous visiting experts and exchange programs have taken place already in Program 1**	–
MS 3.4.1	Two international researcher exchanges completed	One by June 2010; the other by June 2013	Y	–	–
MS 3.4.2	Program of CRC training and education opportunities (national and international) developed and at least two bursaries or scholarship opportunities for Program 1 disbursed each year	June 2008	Y	–	–
MS 3.4.3	Annual program of professional development training seminars, workshops and forums relevant to Research Program 1 outputs completed	December 2008	Y	–	–
Output 3.5	**Establishment of recruitment pathways for the seafood industry and research providers**	**June 2014**	**N**	**Not yet due**	–
MS 3.5.1	Case studies on engagement in CRC activities of young people involved in VET at two rural high schools documented and reviewed and expansion of activity evaluated	March 2008	Y	–	–

Output 3.6	**Graduation of about 15 PhD students**	**10 by June 2012; another 5 by June 2014**	**N**	**Not yet due**	–
MS 3.6.1	Initial students recruited, inducted and paired with appropriate industry mentors	February 2008	Y	–	–
MS 3.6.2	Initial students gain PhD and selected students embark on career pathways in seafood	December 2011	N	Not yet due	–
Output 3.7	**Knowledge from Research Program 2 converted into educational and training tools**	**June 2014**	**N**	**Not yet due**	–
MS 3.7.1	Knowledge from Research Program 2 customised to develop education and training tools and processes, training conducted and suitability of tools and processes evaluated	June 2009	Y		
Output 3.8	**Postgraduate qualifications available**	**June 2010**	**Y**	–	–
MS 3.8.1	Demand for postgraduate qualifications with seafood specialisations relevant to Research Program 2 identified and at least one postgraduate course developed and offered	February 2010	Y	–	–
MS 3.8.2	Vocation and education training level skills set and new competencies relating to the outputs of Research Program 2 identified and submitted for inclusion in the National Seafood Industry Training Package	June 2009	N	Research outputs have only just realised some potential skill sets for post graduate qualifications	A project is currently being developed to address this milestone and will begin in early 2011 with the project leader an ex TAFE lecturer and course coordinator

Output 3.9	Successful incorporation of external expertise into Research Program 2 activities	June 2014	Y	–	–
MS 3.9.1	Two international researcher exchanges completed	One by June 2010; the other by June 2013	Y	–	–
MS 3.9.2	Program of CRC training and education opportunities (national and international) developed and at least two bursaries or scholarship opportunities for Research Program 2 disbursed each year	June 2008	Y	–	–
MS 3.9.3	Annual program of professional development training seminars, workshops and forums relevant to Research Program 1 outputs completed	December 2008	Y	–	–

FINANCIAL STATEMENTS

Seafood CRC Company Ltd

ABN 51 126 074 048

Financial report
For the year ended 30 June 2010

AUSTRALIAN SEAFOOD COOPERATIVE RESEARCH CENTRE

Pitcher Partners
160 Greenhill Road
Parkside SA 5063

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SEAFOOD CRC COMPANY LTD
ABN 51 126 074 048

DIRECTORS' REPORT

The Directors present their report together with the financial report of Seafood CRC Company Ltd for the year ended 30 June 2010 and auditors report thereon.

Directors names

The names of the Directors in office at any time during or since the end of the year are:

Mr P Dundas-Smith

Prof C Buxton

Mr R Cotton (Retired 28 October 2009)

Mr R Cox

Mr C Elder

Dr C Foster (Appointed on 28 October 2009)

Dr P Hone

Prof P Mooney (Appointed on 28 October 2009)

Mr N Moore (Retired 28 October 2009)

Ms E Starling

Dr L Stephens

The Directors have been in office since the start of the year to the date of this report unless otherwise stated.

Company Secretary

Mrs R Wilson (Resigned 05 October 2009)
Qualification: LLB/LPl, BA

Mrs Debra D'Aloia (Appointed on 05 October 2009)

Results

The profit of the company for the year after providing for income tax amounted to $NIL (2009: $NIL).

Review of operations

The company continued to engage in its principal activity, the results of which are disclosed in the attached financial statements.

SEAFOOD CRC COMPANY LTD
ABN 51 126 074 048

DIRECTORS' REPORT

Significant changes in state of affairs

There were no significant changes in the company's state of affairs that occurred during the financial year, other than those referred to elsewhere in this report.

Company objective

The company's objective is to contribute substantially to national economic growth and the industrial and commercial growth of the Australian seafood industry by assisting end-users of its research to profitably deliver safe, high-quality, nutritious Australian seafood products to premium markets, domestically and overseas.

Principal activities

The principal activity of the company during the year were to:

(a) Continue the operation of a Cooperative Research Centre (CRC) to pursue research to:

(i) substantially increase in the production and profitability of selected wild-harvest and aquaculture species.

(ii) increase demand and access to premium markets for Australian seafood; fulfillment of consumer demands for safe, high-quality, nutritious seafood products; and increased profitability throughout the value chain.

(iii) develop the skills of persons working in, and in support of, the Australian seafood industry.

(b) promote the objective of the Australian Government's CRC program;

(c) commercialise intellectual property in such a manner as to ensure that the maximum benefit accrues to Australia, including Australian industry and the Australian economy generally;

(d) manage commercialization income and project intellectual property in accordance with the participants Agreement.

(e) manage the financial affairs of the Company in accordance with the Participants Agreement.

No significant change in the nature of these activities occurred during the year.

Company performance

The Company delivers on its objectives through two inter-related research and development programs:

Research Program 1 – Production Innovation

Research Program 2 – Product and Market Development.

Program 1 is about substantially increasing the quantity of highly profitable species available for transformation under Program 2 into safe, high-quality, nutritious Australian seafood products.

The achievement of objectives is measured against milestones agreed with the Company Members.

After balance date events

No matters or circumstances have arisen since the end of the financial year which significantly affected or may significantly affect the operations of the company, the results of those operations, or the state of affairs of the company in future financial years.

Likely developments

The company expects to maintain the present status and level of operations.

Environmental regulation

The company's operations are not regulated by any significant environmental regulation under a law of the Commonwealth or of a State or Territory.

Dividends paid, recommended and declared

No dividends were paid or declared since the start of the year. No recommendation for payment of dividends has been made.

Information on directors

Mr P Dundas-Smith	Chair
Qualifications	psc, Management Studies (Grad Dip), FAICD (Dip).
Experience	Director, OceanWatch Australia Ltd. Former Fisheries Research and Development Corporation's Executive Director, Former Chairman of the CRC for the Sustainable Aquaculture of Finfish. Other appointments held were: Director of Seafood Services Australia Ltd and Vice President of Australian Fisheries Academy. He has also been a member of advisory bodies related to the fishing industry and the science community. Extensive knowledge of the operations and interests of the commercial and non-commercial components of the fishing industry, and of the research sector.
Special responsibilities	Chair of Appointments and Remuneration Committee
Prof C Buxton	Director
Qualifications	BSc (Hons), MSc (cum laude), PhD, FAICD (Dip).
Experience	Director of the Tasmanian Aquaculture and Fisheries Institute and Former Director of the CRC for the Sustainable Aquaculture of Finfish and CRC Aquaculture.
Special responsibilities	Member of Commercialisation and Utilisation Committee and Deputy Chairman of Seafood CRC

Mr R Cotton	Director
Qualifications	JP, FPNA, FAICD, FAIM, AATF.
Experience	Expertise in corporate business development, brand stewardship and market positioning. Former CEO of the National Institute of Accountants, Former Chairman of Southern Rock Lobster Limited
Special responsibilities	Member of Finance, Audit and Risk Management Committee
Mr R Cox	Director
Qualifications	BBus (Acctg/Computing), FCA, FAICD (dip), FTIA.
Experience	Principal of a chartered accounting practice. Director of Marine Culture and a stakeholder in his own right. Extensively involved in industry activities and holds appointments to the boards of the Tasmanian Oyster Research Council and Australian Seafood Industries Ltd.Has worked with the South Australian Oyster Research Council and the NSW Selective Oyster Company in the pursuit of product enhancement. Has held senior positions in a number of Australian Government departments and in Price Waterhouse.
Special responsibilities	Chair of Finance, Audit and Risk Management Committee
Mr C Elder	Director
Qualifications	BSc (Microbiology and Human Biology)
Experience	Technologist, Executive General Manager, Quality and Innovation Simplot Australia. Member of the Board of Management of the major vertically integrated food company, Simplot Australia. Graduate of the Management Development Program (Graduate School of Management) University of Adelaide.
Special responsibilities	Member of Appointments and Remuneration Committee and Chair of Commercialisation and Utilisation Committee
Dr C Foster	Director
Qualifications	B.V.Sc , B.V.Biol, GAICD
Experience	Chairman National Aquaculture Council. Previous positions include Managing Director, Skretting in Australia and Managing Director Marine Harvest in Australia.
Special responsibilities	Member of Finance, Audit and Risk Management Committee
Dr P Hone	Director
Qualifications	BSc (Hons), PhD.
Experience	Executive Director of the Fisheries Research and Development Corporation. Former Director of the CRC for the Sustainable Aquaculture of Finfish.
Special responsibilities	Member of Finance, Audit and Risk Management Committee

Prof P Mooney	Director
Qualifications	BSc (Hons) (cum laude), MSc (cum laude), PhD, MAICD(Dip), Affiliate Professor University of Adelaide
Experience	Executive Director of the South Australian Research and Development Institute (SARDI). Former positions include Deputy Executive Director SARDI, Director R&D SARDI, Acting General Manager, HortResearch, Sector Leader HortResearch, Portfolio Manager/Capability Leader, Scientist
Special responsibilities	Member of Appointments and Remuneration Committee
Mr N Moore	Director
Experience	General Manager of Gold Coast Marine Aquaculture. Former General Manager, Seafarm Pty Ltd, President of the Australian Prawn Farmers Association
Special responsibilities	Member of Commercialisation and Utilisation Committee
Ms E Starling	Director
Qualifications	MAICD, MBA (Distinction).
Experience	Managing Director of Indian Ocean Fresh Australia Pty Ltd. Actively involved in seafood processing and marketing since 1994. Awarded the RIRDC Rural Women's Award in 2003. Member of Women Industry Network Seafood Community (WINSC).
Special responsibilities	Member of Commercialisation and Utilisation Committee
Dr L Stephens	Managing Director
Qualifications	Dip Agr Sci, BVSc, MSc, PhD, FAICD(Dip).
Experience	Director Dairy Australia Ltd. Former positions include CEO of Australian Wool Innovation Limited, General Manager, Livestock Innovation with Meat and Livestock Australia Ltd, senior executive with Agriculture Victoria, founding Director of the Victorian Institute of Animal Science.
Special responsibilities	Managing Director

Meetings of directors

Directors	Directors' meetings		Finance, Risk and Audit Management		Appointments & Remuneration		Commercialisation & Utilisation	
	Number eligible to attend	Number attended	Number eligible to attend	Number attended	Number eligible to attend	Number attended	Number eligible to attend	Number attended
Mr P Dundas-Smith	5	5	4	3	-	-	-	-
Prof C Buxton	5	5	-	-	-	-	-	-
Mr R Cotton	3	3	2	2	-	-	-	-
Mr R Cox	5	3	4	2	-	-	-	-
Mr C Elder	5	5	-	-	-	-	-	-
Dr C Foster	2	2	2	1	-	-	-	-
Dr P Hone	5	5	4	4	-	-	-	-
Prof P Mooney	2	2	-	-	-	-	-	-
Mr N Moore	3	2	-	-	-	-	-	-
Ms E Starling	5	5	-	-	-	-	-	-
Dr L Stephens	5	5	4	4	-	-	-	-

Mr P Dundas - Smith and Dr L Stephens attended the Finance, Risk and Audit Management Committee meetings in the capacity of observers.

Options

No options over unissued shares or interests in the company were granted during or since the end of the year and there were no options outstanding at the end of the year.

Members guarantee

The company is incorporated under the *Corporations Act 2001* and is a company limited by guarantee. If the company is wound up, the Constitution states that each member is required to contribute to a maximum of $10 each towards meeting any outstandings and obligations of the group. At 30 June 2010 the number of members was 25. The combined total amount that members of the company are liable to contribute if the company is wound up is $250.

Indemnification of officers

During or since the end of the year, the company has given indemnity or entered an agreement to indemnify, or paid or agreed to pay insurance premiums as follows:

During the reporting period, the Company paid a premium in respect of a contract insuring the directors of the Company (as named above), the Company Secretary, and all executive officers of the Company against any liability incurred as such a director, secretary or executive officer to the extent permitted by the Corporations Act 2001.

Further disclosure required under section 300(9) of the corporations law is prohibited under the terms of the contract.

SEAFOOD CRC COMPANY LTD
ABN 51 126 074 048

DIRECTORS' REPORT

Indemnification of auditors

No indemnities have been given or insurance premiums paid, during or since the end of the year, for any person who is or has been an auditor of the company.

Auditor's independence declaration

A copy of the auditor's declaration under section 307C of the Corporations Act 2001 in relation to the audit for the financial year is provided with this report.

Proceedings on behalf of the company

No person has applied for leave of Court to bring proceedings on behalf of the company or intervene in any proceedings to which the company is a party for the purpose of taking responsibility on behalf of the company for all or any part of those proceedings.

Signed in accordance with a resolution of the board of directors.

Director: _____
Mr P Dundas-Smith

Director: _____
Mr R Cox

Dated this 21st day of September, 2010

RSM Bird Cameron Partners
Chartered Accountants

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AUDITOR'S INDEPENDENCE DECLARATION

As lead auditor for the audit of the financial report of Seafood CRC Company Limited for the year ended 30 June 2010, I declare that, to the best of my knowledge and belief, there have been no contraventions of:

(i) The auditor independence requirements of the Corporations Act 2001 in relation to the audit; and

(ii) Any applicable code of professional conduct in relation to the audit.

RSM Bird Cameron Partners

RSM Bird Cameron Partners
Chartered Accountants

G M STENHOUSE
Partner

Canberra, Australian Capital Territory
Dated: 21 September 2010

SEAFOOD CRC COMPANY LTD
ABN 51 126 074 048

STATEMENT OF COMPREHENSIVE INCOME
FOR THE YEAR ENDED 30 JUNE 2010

	Note	2010 $	2009 $
Revenue			
Contribution	3	10,058,144	8,922,308
Other income	3	284,883	142,262
	3	10,343,027	9,064,570
Less: expenses			
Employee Benefits		(744,195)	(556,617)
Depreciation & Amortisation	4	(15,063)	(12,525)
Program Expenses	4	(9,220,655)	(8,028,465)
External Service Providers		(90,177)	(165,763)
Other Expenses	4	(272,937)	(301,200)
		(10,343,027)	(9,064,570)
Profit for the year		-	-
Other comprehensive income for the year		-	-
Total comprehensive income		-	-

The accompanying notes form part of these financial statements.

SEAFOOD CRC COMPANY LTD
ABN 51 126 074 048

STATEMENT OF FINANCIAL POSITION
AS AT 30 JUNE 2010

	Note	2010 $	2009 $
Current assets			
Cash and cash equivalents	7	4,819,729	4,742,838
Receivables	8	2,296,564	1,988,158
Prepayments		1,797	830
Total current assets		7,118,090	6,731,826
Non-current assets			
Plant and equipment	9	58,692	55,249
Total non-current assets		58,692	55,249
Total assets		7,176,782	6,787,075
Current liabilities			
Payables	10	499,366	1,168,095
Other liabilities	11	6,629,735	5,582,750
Provisions	12	28,188	24,624
Total current liabilities		7,157,289	6,775,469
Non-current liabilities			
Provisions	12	19,493	11,606
Total non-current liabilities		19,493	11,606
Total liabilities		7,176,782	6,787,075
Net assets		-	-

The accompanying notes form part of these financial statements.

SEAFOOD CRC COMPANY LTD
ABN 51 126 074 048

STATEMENT OF CHANGES IN EQUITY
FOR THE YEAR ENDED 30 JUNE 2010

	2010 $	2009 $
Balance as at the beginning of the year	-	-
Total comprehensive income for the year	-	-
Balance at the end of the year	-	-

The accompanying notes form part of these financial statements.

SEAFOOD CRC COMPANY LTD
ABN 51 126 074 048

STATEMENT OF CASH FLOWS
FOR THE YEAR ENDED 30 JUNE 2010

	Note	2010 $	2009 $
Cash flow from operating activities			
CRC Program funding received from Commonwealth Government		5,363,400	5,758,788
Contributions received from participants		6,700,831	5,404,579
Interest received		270,163	142,128
Other Cash received		14,720	134
Payments to suppliers		(498,643)	(319,019)
Payments to employees		(732,744)	(546,571)
Net GST paid		(312,312)	(301,865)
Program Expenditure		(10,710,018)	(7,789,203)
Net cash provided by operating activities	15(b)	95,397	2,348,971
Cash flow from investing activities			
Payment for property, plant and equipment		(18,506)	(11,955)
Net cash provided by / (used in) investing activities		(18,506)	(11,955)
Reconciliation of cash			
Cash at beginning of the financial year		4,742,838	2,405,822
Net increase in cash held		76,891	2,337,016
Cash at end of financial year	15(a)	4,819,729	4,742,838

The accompanying notes form part of these financial statements.

SEAFOOD CRC COMPANY LTD
ABN 51 126 074 048

NOTES TO FINANCIAL STATEMENTS
FOR THE YEAR ENDED 30 JUNE 2010

NOTE 1: STATEMENT OF SIGNIFICANT ACCOUNTING POLICIES

The financial report is a general purpose financial report that has been prepared in accordance with Australian Accounting Standards, Interpretations and other authoritative pronouncements of the Australian Accounting Standards Board and the *Corporation Act 2001*.

The financial report was approved by the directors as at the date of the directors' report.

The financial report is for the entity Seafood CRC Company Ltd as an individual entity. Seafood CRC Company Ltd is a company limited by guarantee, incorporated and domiciled in Australia.

The following is a summary of the material accounting policies adopted by the company in the preparation and presentation of the financial report. The accounting policies have been consistently applied, unless otherwise stated.

(a) Basis of preparation of the financial report

Historical Cost Convention

The financial report has been prepared under the historical cost convention, as modified by revaluations to fair value for certain classes of assets as described in the accounting policies.

(b) Revenue

Revenue from sale of goods is recognised when:
-the risks and rewards of ownership have been transferred to the buyer;
-the Company retains no managerial involvement nor effective control over the goods;
-the revenue and transaction costs incurred can be reliably measured; and
-it is probable that the economic benefits associated with the transaction will flow to the Company.

Revenue from rendering of services is recognised by reference to the stage of completion of contracts at the reporting date. The revenue is recognised when:
- the amount of revenue, stage of completion and transaction costs incurred can be reliably measured;and
- the probable economic benefits with the transaction will flow to the Company.

The stage of completion of contracts at the reporting date is determined by reference to the preparation that costs incurred to date bear to the estimated total costs of the transaction.

Receivables for goods and services, which have 30 day terms, are recognised at the nominal amounts due less any provision for bad and doubtful debts. Collectability of debts is reviewed at balance date. Provisions are made when collectability of the debt is no longer probable.

NOTE 1: STATEMENT OF SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

Government grants are not recognised until there is reasonable assurance that the Company will comply with the conditions attached to them and the grants will be received.

Government grants whose primary condition is that the Company should purchase, construct, or otherwise acquire non-current assets are recognised as deferred income in the Balance Sheet and recognised as income on a systematic and rational basis over the useful lives of the related assets. Other government grants are recognised as income over the periods necessary to match them with the related costs which they are intended to compensate, on a systematic basis.

Interest revenue is recognised when it becomes receivable on a proportional basis taking in to account the interest rates applicable to the financial assets.

Revenue from the disposal of non-current assets is recognised when control of the asset has passed to the buyer.

Refunds from research organisations are taken to account when received.

Revenue from contributions are recognised when the Company becomes legally entitled to call on participants contributions under the participants Agreement.

Cash contributions from government and participants on account of future costs to be incurred by the Company are treated as liabilities, until the associated costs are incurred.

Other revenue is recognised when the right to receive the revenue has been established.

All revenue is stated net of the amount of goods and services tax (GST).

(c) Income tax

Current income tax expense or revenue is the tax payable on the current period's taxable income based on the applicable income tax rate adjusted by changes in deferred tax assets and liabilities.

A balance sheet approach is adopted under which deferred tax assets and liabilities are recognised for temporary differences at the applicable tax rates when the assets are recovered or liabilities are settled. No deferred tax asset or liability is recognised in relation to temporary differences if they arose in a transaction, other than a business combination, that at the time of the transaction did not affect either accounting profit or taxable profit or loss.

Deferred tax assets are recognised for deductible temporary differences and unused tax losses only if it is probable that future taxable amounts will be available to utilise those temporary differences and losses.

Current and deferred tax balances attributable to amounts recognised directly in equity are also recognised directly in equity.

NOTE 1: STATEMENT OF SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

(d) Cash and cash equivalents

Cash and cash equivalents include cash on hand and at banks, short-term deposits with an original maturity of three months or less held at call with financial institutions, and bank overdrafts. Bank overdrafts are shown within borrowings in current liabilities on the statement of financial position.

(e) Financial instruments

Financial assets at fair value through profit or loss

Investments in listed securities are carried at fair value through profit and loss. They are measured at their fair value at each reporting date and any increment or decrement in fair value from the prior period is recognised in the profit and loss of the current period. Fair value of listed investments are based on current bid prices.

Non-listed investments for which the fair value cannot be reliably measured, are carried at cost and tested for impairment.

Held-to-maturity investments

Fixed term investments intended to be held to maturity are classified as held-to-maturity investments. They are measured at amortised cost using the effective interest rate method.

Loans and receivables

Loans and receivables are measured at fair value at inception and subsequently at amortised cost using the effective interest rate method.

Available-for-sale

Available-for-sale financial assets include any financial assets not included in the above categories and are measured at fair value. Unrealised gains and losses arising from changes in fair value are taken directly to equity. The cumulative gain or loss is held in equity until the financial asset is de-recognised, at which time the cumulative gain or loss held in equity is recognised in profit and loss.

Financial liabilities

Financial liabilities include trade payables, other creditors and loans from third parties including inter-company balances and loans from or other amounts due to director-related entities.

Non-derivative financial liabilities are recognised at amortised cost, comprising original debt less principal payments and amortisation.

Non-interest bearing loans and payables are payable on demand and are therefore recognised at their face value at inception.

NOTE 1: STATEMENT OF SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

(e) Financial instruments (Continued)

Hedge accounting

Certain derivatives are designated as hedging instruments and are further classified as either fair value hedges or cash flow hedges.

At the inception of each hedging transaction, the company documents the relationship between the hedging instruments and hedged items, its risk management objective and its strategy for undertaking the hedge transaction. The company also documents its assessment, both at hedge inception and on an ongoing basis, of whether the derivatives that are used in hedging transactions have been and will continue to be highly effective in offsetting changes in fair value or cash flows of hedged items.

(i) Fair value hedge

Changes in the fair value of derivatives that are designated and qualified as fair value hedges are recorded in the income statement, together with any changes in the fair value of the hedged asset or liability that are attributable to the hedged risk.

(ii) Cash flow hedge

To qualify as a cash flow hedge the underlying transactions generating the cash flows must be highly probable.

Changes in the fair value of derivative that are designated and qualified as cash flow hedges are recognised in equity in the cash flow hedging reserve. This gain or loss is released to profit or loss in the same period when the forecast transactions occur, thereby mitigating any exchange fluctuations that would have transpired in the absence of the hedge.

NOTE 1: STATEMENT OF SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

(f) Property, plant and equipment

Each class of plant and equipment is carried at cost or fair value less, where applicable, any accumulated depreciation and any accumulated impairment losses.

Plant and equipment

Plant and equipment is measured on the cost basis.

Plant and equipment is measured on the cost basis, except for purchases costing less than $500, which are expensed in the year of acquisition (other than where they form part of a group of similar items which are significant in total).

The carrying amount of plant and equipment is reviewed annually by directors to ensure it is not in excess of the recoverable amount from those assets. The recoverable amount is assessed on the basis of the expected net cash flows which will be received from the assets employment and subsequent disposal. The expected net cash flows have been discounted to present values in determining recoverable amounts.

Depreciation

The depreciable amount of all fixed assets are depreciated over their estimated useful lives commencing from the time the asset is held ready for use.

Leasehold improvements are depreciated over the shorter of either the unexpired period of the lease or the estimated useful lives of the improvements.

Class of fixed asset	Useful lives	Depreciation basis
Leasehold improvements at cost	Lease period	Straight line
Plant & machinery at cost	3-5 years	Straight line
Software	4 years	Straight line

(g) Research and development expenditure

Expenditure on research activities is recognised as an expense when incurred.

Expenditure on development activities is capitalised only when technical feasibility studies identify that the project will deliver future economic benefits and these benefits can be measured reliably. Capitalised development expenditure is stated at cost less accumulated amortisation. Amortisation is calculated using the straight-line method to allocate the cost of its estimated useful life commencing when the intangible asset is available for use.

Software

The Company's intangibles comprise of software for internal use. These assets will be carried at cost.

Software is amortised on a straight-line basis over its anticipated useful life. The useful lives of company's software is 4 years. Other development expenditure is recognised as an expense when incurred.

NOTE 1: STATEMENT OF SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

(h) Impairment

Assets with an indefinite useful life are not amortised but are tested annually for impairment in accordance with AASB 136. Assets subject to annual depreciation or amortisation are reviewed for impairment whenever events or circumstances arise that indicate that the carrying amount of the asset may be impaired. An impairment loss is recognised where the carrying amount of the asset exceeds its recoverable amount. The recoverable amount of an asset is defined as the higher of its fair value less costs to sell and value in use.

(i) Provisions

Provisions are recognised when the company has a legal or constructive obligation, as a result of past events, for which it is probable that an out flow of economic benefits will result and that outlfow can be reliably measured.

The amount recognised as a provision is the best estimate of the consideration required to settle the present obligation at reporting date, taking into account the risks and uncertainties surrounding the obligation. Where a provision is measured using the cash flows estimated to settle the present obligation, its carrying amount is the present value of those cash flows.

When some or all of the economic benefits required to settle a provision are expected to be recovered from a third party, the receivable is recognised as an asset if it is virtually certain that reimbursement will be received and the amount of the receivable can be measured reliably.

(j) Leases

Leases are classified at their inception as either operating or finance leases based on the economic substance of the agreement so as to reflect the risks and benefits incidental to ownership.

Finance Leases

Leases of fixed assets, where substantially all the risks and benefits incidental to the ownership of the asset, but not the legal ownership, are transferred to the company are classified as finance leases. Finance leases are capitalised, recording an asset and a liability equal to the present value of the minimum lease payments, including any guaranteed residual values. The interest expense is calculated using the interest rate implicit in the lease and is included in finance costs in the statement of comprehensive income. Leased assets are depreciated on a straight line basis over their estimated useful lives where it is likely that the company will obtain ownership of the asset, or over the term of the lease. Lease payments are allocated between the reduction of the lease liability and the lease interest expense for the period.

Operating leases

Lease payments for operating leases, where substantially all the risks and benefits remain with the lessor, are recognised as an expense on a straight-line basis over the term of the lease.

Lease incentives received under operating leases are recognised as a liability and amortised on a straight-line basis over the life of the lease term.

NOTE 1: STATEMENT OF SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

(k) Employee benefits

Liabilities arising in respect of wages and salaries, annual leave, accumulated sick leave and any other employee benefits expected to be settled within twelve months of the reporting date are measured at their nominal amounts based on remuneration rates which are expected to be paid when the liability is settled. All other employee benefit liabilities are measured at the present value of the estimated future cash outflow to be made in respect of services provided by employees up to the reporting date.

Contributions made by the company to an employee superannuation fund are recognised in the balance sheet as a liability, after deducting any contributions already paid and in the income statement as an expense as they become payable. Prepaid contributions are recognised as an asset to the extent that a cash refund or a reduction in the future payment is available.

(l) Borrowing costs

Borrowing costs can include interest, amortisation of discounts or premiums relating to borrowings, ancillary costs incurred in connection with arrangement of borrowings, foreign exchange losses net of hedged amounts on borrowings.

Borrowing costs are expensed as incurred, except for borrowing costs incurred as part of the cost of the construction of a qualifying asset are capitalised until the asset is ready for its intended use or sale.

(m) Goods and services tax (GST)

Revenues, expenses and assets are recognised net of the amount of GST, except where the amount of GST incurred is not recoverable from the Tax Office. In these circumstances the GST is recognised as part of the cost of acquisition of the asset or as part of an item of the expense. Receivables and payables in the statement of financial position are shown inclusive of GST.

Cash flows are presented in the statement of cash flows on a gross basis, except for the GST component of investing and financing activities, which are disclosed as operating cash flows.

(n) Participant in-kind contributions

The Company is the recipient of participant in-kind contributions primarily in relation to program activities. In-kind contributions represent goods and/or services provided to the Company for nil or nominal consideration. Minor in-kind corporate secretarial services are also provided to the Company. On an annual or more regular basis Participants provide formal declarations for the value of in-kind contributions provided to the Company during the reporting period. The value of participant in-kind contributions are not recognised in the accounts.

(o) Onerous contracts

Present obligations arising under onerous contracts are recognised and measured as a provision. An onerous contract is considered to exist where the Company has a contract under which the unavoidable costs of meeting the obligations under the contract exceed the economic benefits expected to be received under it.

NOTE 1: STATEMENT OF SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

(p) Projects

The Company recognises project liabilities as project agreements that require the research provider to perform services or provide facilities, or to meet eligibility criteria. In these cases, liabilities are recognised to the extent that the services required have been performed or the eligibility criteria have been satisfied by the research provider.

(q) Contingent liabilities and contingent assets

Contingent Liabilities and Contingent Assets are not recognised in the Balance Sheet but are reported in the relevant schedules and notes. They may arise from uncertainty as to the existence of a liability or asset, or represent an existing liability or asset in respect of which settlement is not probable or the amount cannot be reliably measured. Contingent assets are reported when settlement is probable, and contingent liabilities are recognised when settlement is greater than remote.

(r) Comparatives

Where necessary, comparative information has been reclassified and repositioned for consistency with current year disclosures.

NOTE 2: NEW ACCOUNTING STANDARDS AND INTERPRETATIONS

The following standards or interpretations have been issued at the reporting date but are not yet effective. When adopted, these standards or interpretations are likely to impact the financial information presented, however the assessment of impact has not yet been completed.

1. AASB 9: Financial Instruments and AASB 2009–11: Amendments to Australian Accounting Standards arising from AASB 9 [AASB 1, 3, 4, 5, 7, 101, 102, 108, 112, 118, 121, 127, 128, 131, 132, 136, 139, 1023 & 1038 and Interpretations 10 & 12] (applicable for annual reporting periods commencing on or after 1 January 2013).
These Standards are applicable retrospectively and amend the classification and measurement of financial assets. The Company has not yet determined any potential impact on the financial statements.
The changes made to accounting requirements include:

- simplifying the classifications of financial assets into those carried at amortised cost and those carried at fair value;
- simplifying the requirements for embedded derivatives;
- removing the tainting rules associated with held-to-maturity assets;
- removing the requirements to separate and fair value embedded derivatives for financial assets carried at amortised cost;
- allowing an irrevocable election on initial recognition to present gains and losses on investments in equity instruments that are not held for trading in other comprehensive income. Dividends in respect of these investments that are a return on investment can be recognised in profit or loss and there is no impairment or recycling on disposal of the instrument; and
- requiring financial assets and to be reclassified where there is a change in an entity's business model as they are initially classified based on: (a) the objective of the entity's business model for managing the financial assets; and (b) the characteristics of the contractual cash flows.

2. AASB 124: Related Party Disclosures (applicable for annual reporting periods commencing on or after 1 January 2011).
This Standard removes the requirement for government-related entities to disclose details of all transactions with the government and other government-related entities and clarifies the definition of a 'related party' to remove inconsistencies and simplify the structure of the Standard. No changes are expected to materially affect the Company.

3. AASB 2009–4: Amendments to Australian Accounting Standards arising from the Annual Improvements Project [AASB 2 and AASB 138 and AASB Interpretations 9 & 16] (applicable for annual reporting periods commencing from 1 July 2009) and AASB 2009–5: Further Amendments to Australian Accounting Standards arising from the Annual Improvements Project [AASB 5, 8, 101, 107, 117, 118, 136 & 139] (applicable for annual reporting periods commencing from 1 January 2010).
These Standards detail numerous non-urgent but necessary changes to Accounting Standards arising from the IASB's annual improvements project. No changes are expected to materially affect the Company.

4. AASB 2009–8: Amendments to Australian Accounting Standards — Company Cash-settled Share-based Payment Transactions [AASB 2] (applicable for annual reporting periods commencing on or after 1 January 2010).
This Standard clarifies the accounting for company cash-settled share-based payment transactions in the separate or individual financial statements of the entity receiving the goods or services when the entity has no obligation to settle the share-based payment transaction. The amendments incorporate the requirements previously included in Interpretation 8 and Interpretation 11 and as a consequence, these two Interpretations are superseded by the amendments. These amendments are not expected to impact the Company.

NOTE 2: NEW ACCOUNTING STANDARDS AND INTERPRETATIONS (CONTINUED)

5. AASB 2009–9: Amendments to Australian Accounting Standards — Additional Exemptions for First-time Adopters [AASB 1] (applicable for annual reporting periods commencing on or after 1 January 2010).
This Standard specifies requirements for entities using the full-cost method in place of retrospective application of Australian Accounting Standards for oil and gas assets and exempt entities with existing leasing contracts from reassessing the classification of those contracts in accordance with Interpretation 4, when the application of their previous accounting policies would have given the same outcome. These amendments are not expected to impact the Company.

6. AASB 2009–10: Amendments to Australian Accounting Standards — Classification of Rights Issues [AASB 132] (applicable for annual reporting periods commencing on or after 1 February 2010).
This Standard clarifies that rights, options or warrants to acquire a fixed number of an entity's own equity instruments for a fixed amount in any currency are equity instruments if the entity offers the rights, options or warrants pro rata to all existing owners of the same class of its own non-derivative equity instruments. The amendments are not expected to impact the Company.

7. AASB 2009–12: Amendments to Australian Accounting Standards [AASBs 5, 8, 108, 110, 112, 119, 133, 137, 139, 1023 & 1031 and Interpretations 2, 4, 16, 1039 & 1052] (applicable for annual reporting periods commencing on or after 1 January 2011).
This Standard makes a number of editorial amendments to a range of Australian Accounting Standards and Interpretations, including amendments to reflect changes made to the text of IFRSs by the IASB. The Standard also amends AASB 8 to require entities to exercise judgment in assessing whether a government and entities known to be under the control of that government are considered a single customer for the purposes of certain operating segment disclosures. The amendments are not expected to impact the Company.

8. AASB 2009–13: Amendments to Australian Accounting Standards arising from Interpretation 19 [AASB 1] (applicable for annual reporting periods commencing on or after 1 July 2010).
This standard makes amendments to AASB 1 arising from the issue of Interpretation 19. The amendments allow a first-time adopter to apply the transitional provisions in Interpretation 19. This Standard is not expected to impact the Company.

9. AASB 2009–14: Amendments to Australian Interpretation — Prepayments of a Minimum Funding Requirement [AASB Interpretation 14] (applicable for annual reporting periods commencing on or after 1 January 2011).
This Standard amends Interpretation 14 to address unintended consequences that can arise from the previous accounting requirements when an entity prepays future contributions into a defined benefit pension plan.

10. AASB Interpretation 19: Extinguishing Financial Liabilities with Equity Instruments (applicable for annual reporting periods commencing from 1 July 2010).
This Interpretation deals with how a debtor would account for the extinguishment of a liability through the issue of equity instruments. The Interpretation states that the issue of equity should be treated as the consideration paid to extinguish the liability, and the equity instruments issued should be recognised at their fair value unless fair value cannot be measured reliably, in which case they shall be measured at the fair value of the liability extinguished. The Interpretation deals with situations where either partial or full settlement of the liability has occurred. This Interpretation is not expected to impact the Company.

SEAFOOD CRC COMPANY LTD
ABN 51 126 074 048

NOTES TO FINANCIAL STATEMENTS
FOR THE YEAR ENDED 30 JUNE 2010

	Note	2010 $	2009 $
NOTE 3: REVENUE			
DIISR program funding received		3,927,147	3,037,208
Participant contributions received		6,130,997	5,885,100
Interest Income		270,163	142,128
Other revenue		14,720	134
		10,343,027	9,064,570
NOTE 4: EXPENSES			
Depreciation of plant and equipment		15,063	12,525
Remuneration of auditors for:			
- Audit services		28,005	16,175
Program Expenses:			
Production Innovation - Program 1		3,346,909	3,418,043
Product and Market Development - Program 2		4,099,056	2,053,016
Education & Training - Program 3		1,143,270	439,368
Commercialisation, Utilisation & Communication - Program 4		631,420	645,465
General Program Expenses		-	1,472,573
		9,220,655	8,028,465

	Note	2010 $	2009 $
NOTE 5: KEY MANAGEMENT PERSONNEL COMPENSATION			
Compensation received by key management personnel of the company			
- short-term employee benefits		366,825	341,402
- other long-term benefits		22,241	10,851
		389,066	352,253

Directors who have held office during the year are:

Name	Appointment / resignation details
Mr P Dundas-Smith	
Prof C Buxton	
Mr R Cotton	(Retired 28 October 2009)
Mr R Cox	
Mr C Elder	
Dr C Foster	(Appointed on 28 October 2009)
Dr P Hone	
Prof P Mooney	(Appointed on 28 October 2009)
Mr N Moore	(Retired 28 October 2009)
Ms E Starling	
Dr L Stephens	

Directors' Remuneration Bands	
$Nil - $14,999	5
$15,000 - $29,000	4
$30,000 - $49,999	1
$215,000 - $229,999	1

NOTE 6: INCOME TAX

(a) Prima facie tax payable

The prima facie tax payable on profit before income tax is reconciled to the income tax expense as follows:			
Prima facie income tax payable on profit before income tax at 30.0% (2009: 30.0%)		-	-
Income tax expense attributable to profit		-	-
(b) Deferred tax assets not brought to account			
Timing Differences - Employee Provisions		14,304	10,869

	Note	2010 $	2009 $
NOTE 7: CASH AND CASH EQUIVALENTS			
Cash on hand		300	300
Cash at bank		4,819,429	4,742,538
		4,819,729	4,742,838
NOTE 8: RECEIVABLES			
CURRENT			
Trade debtors		1,631,489	967,302
Amounts due from Participants		-	931,441
Other receivables		665,075	89,415
		2,296,564	1,988,158
NOTE 9: PLANT AND EQUIPMENT			
Plant & equipment			
Plant & machinery at cost		81,685	73,679
Plant & machinery at cost (acc dep'n)		(32,990)	(18,430)
		48,695	55,249
Software		10,500	-
Software at cost (acc amortisation)		(503)	-
		9,997	-
Total plant and equipment		58,692	55,249
(a) Reconciliations			
Reconciliation of the carrying amounts of property, plant and equipment at the beginning and end of the current financial year			
Plant & equipment			
Opening carrying amount		55,249	55,819
Additions		8,006	11,955
Depreciation expense		(14,560)	(12,525)
Closing carrying amount		48,695	55,249

	Note	2010 $	2009 $
NOTE 9: PLANT AND EQUIPMENT (CONTINUED)			
(a) Reconciliations (Continued)			
Software			
Opening carrying amount		-	-
Additions		10,500	-
Amortisation expense		(503)	-
Closing carrying amount		9,997	-
NOTE 10: PAYABLES			
CURRENT			
Trade creditors		50,035	181,356
Sundry creditors and accruals		449,331	986,739
		499,366	1,168,095
NOTE 11: OTHER LIABILITIES			
CURRENT			
Grants received in advance		6,629,735	5,582,750
NOTE 12: PROVISIONS			
CURRENT			
Provisions - annual leave	(a)	28,188	24,624
NON CURRENT			
Provisions - long service leave	(a)	19,493	11,606
(a) Aggregate employee benefits liability		47,681	36,230
(b) Number of employees at year end		6	4

	Note	2010 $	2009 $

NOTE 13: LEASING AND PROJECT COMMITMENTS

(a) Operating lease commitments

Non-cancellable operating leases contracted for but not capitalised in the financial statements:

Payable		
- not later than one year	17,167	11,000
- later than one year and not later than five years	53,553	68,183
- later than five years	-	22,406
	70,720	101,589

General description of leasing arrangement

Lease for office accommodation on premises at Mark Oliphant Building (North Wing 3B), Science Park Adelaide, Laffer Drive, Bedford Park SA, which expires 12 August 2014. Lease payments are not subject to an annual increase in accordance with upwards movements in the Consumer Price Index. The initial period of office accommodation lease is seven years, with an expiry of 12 August 2014. Further office accommodation has been acquired adjacent to current premises effective 1 February 2009, also expiring 12 August 2014.

(b) Project commitments comprise:

Payable		
- not later than one year	8,665,504	10,610,476
- later than one year and not later than five years	8,838,464	6,074,318
	17,503,968	16,684,794

NOTE 14: CONTINGENT LIABILITIES

The company has no contingent liability.

	Note	2010 $	2009 $
NOTE 15: CASH FLOW INFORMATION			
(a) Reconciliation of cash			
Cash at the end of the financial year as shown in the statement of cash flows is reconciled to the related items in the statement of financial position is as follows:			
Cash on hand		300	300
Cash at bank		4,819,429	4,742,538
		4,819,729	4,742,838
(b) Reconciliation of cash flow from operations with profit after income tax			
Profit from ordinary activities after income tax		-	-
Non-cash items			
Depreciation		15,063	12,525
Changes in assets and liabilities			
(Increase) / decrease in receivables		(308,406)	(1,678,720)
(Increase) / decrease in other assets		(967)	(830)
Increase / (decrease) in payables		1,046,985	3,130,320
Increase / (decrease) in provisions		11,451	10,046
Increase/(decrease) in project payables		(534,167)	726,856
Increase/(decrease) in supplier payables		(134,562)	148,774
Cash flows from operating activities		95,397	2,348,971

	Note	2010 $	2009 $

NOTE 16: RELATED PARTY TRANSACTIONS

(a) Transactions with director-related parties during the 2010 financial year were transactions conducted under normal terms and conditions and include GST. They were in relation to the Research projects or work undertaken by the organisation and all were as follows:

(i) Prof C Buxton - University of Tasmania Director		
Income received from entity	137,500	137,500
Expenditure paid to entity	1,008,964	978,299
(ii) Mr R Cotton - Southern Rock Lobster Chair		
Expenditure paid to entity	640,052	831,135
(iii) Mr R Cox - Australian Seafood Industries Pty Ltd Company Secretary		
Expenditure paid to entity	248,571	102,808
(iv) Mr R Cox - Pierce Edward Cox Service Pty Ltd - Principal		
Expenditure paid to entity	20,971	21,487
(v) Dr Craig Foster - Shanelsa Pty Ltd Director		
Expenditure paid to entity	13,360	-
(vi) Mr C Elder - Simplot Australia Pty Ltd - Board of Management		
Income received from entity	110,000	110,000
Expenditure paid to entity	12,182	44,518
(vii) Dr Craig Foster - National Aquaculture Council Chairman		
Expenditure paid to entity	6,420	-
(viii) Prof P Mooney South Australian Research Development Institute Executive Director		
Expenditure paid to entity	1,263,203	-
(ix) Dr P Hone - Fisheries Research and Development Corporation Executive Director		
Income received from entity	4,663,050	4,104,126
Expenditure paid to entity	86,109	120,081
(x) Mr N Moore - President Australian Prawn Farmers Association		
Expenditure paid to entity	28,069	88,612

NOTE 16: RELATED PARTY TRANSACTIONS (CONTINUED)

(b) Contributions received in-kind from members during the 2010 financial year are not recognised in the accounts of the entity, but have been disclosed below: (PA: Participants Agreements)

	Staff Full Time Equivalents		Non-Staff In-kind ($)	
	PA	Actual	PA	Actual
Industry Participants				
Abalone Council Australia Ltd	0.10	-	-	-
Australian Abalone Growers Association	0.10	0.10	20,000	-
Australian Barramundi Farmers Assn	2.30	2.80	250,000	40,000
Australian Council of Prawn Fisheries	0.10	-	-	-
Australian Prawn Farmers Association	0.20	0.30	-	-
Clean Seas Tuna Ltd	3.00	-	1,050,000	-
Fisheries R&D Corporation	0.10	1.80	200,000	574,382
Mures Fishing Pty Ltd	0.10	-	32,000	-
Oyster Consortium	1.10	2.80	196,000	174,332
Ridley AgriProducts Pty Ltd	0.10	-	-	-
Seafood Services Australia Ltd	0.60	2.20	-	2,000
Simplot Australia Pty Ltd	0.90	0.70	-	4,538
South Australian Marine Scale Sardine Industry Association	0.10	-	50,000	-
Southern Adelaide Health Service	0.10	-	-	-
Southern Rocklobster Ltd	0.10	0.10	100,000	100,000
Southland Fish Supplies	0.10	-	-	-
Sydney Fish Market Pty Ltd	0.20	2.20	60,000	46,000
Tasmanian Salmonid Growers Assn Ltd	0.10	1.10	74,000	52,930
Tasmanian Seafoods Pty Ltd	0.10	0.10	-	-
West Australian Fishing Industry Council Inc	0.40	1.10	-	43,000
Research Providers				
Chemistry Centre of WA	0.90	-	59,900	-
CSIRO	4.50	4.40	150,000	169,764
Curtin University of Technology	0.70	1.70	90,000	-
Department of Fisheries, WA	0.60	0.50	10,000	-
DEEDI QLD	2.80	4.20	-	-
Flinders University	4.10	-	152,800	-
NSW Industry & Investment	4.10	2.80	528,000	267,000
South Australian Research and Development Institute	2.20	7.20	243,900	243,044
University of Adelaide	1.00	0.10	300,000	8,000
University of South Australia	3.20	-	140,000	-
University of Tasmania	3.40	3.00	372,300	394,001
University of Sunshine Coast	1.50	3.40	50,000	37,500
TOTAL	**38.90**	**42.40**	**4,128,900**	**2,156,491**

NOTE 17: FINANCIAL RISK MANAGEMENT

The company is exposed to a variety of financial risks comprising:

(a) Interest rate risk
(b) Credit risk
(c) Fair values

The board of directors have overall responsibility for identifying and managing operational and financial risks.

(a) Interest rate risk

Interest rate risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate as a result of changes in market interest rates.

The company's exposure to interest rate risk in relation to future cashflows and the effective weighted average interest rates on classes of financial assets and financial liabilities, is as follows:

2010

Financial instruments	**Interest bearing**	**Non-interest bearing**	**Total carrying amount**	**Weighted average effective interest rate**	
	$	**$**	**$**		
Financial assets					
Cash	4,819,728	-	4,819,728	4.48 %	Floating
Debtors	-	1,631,489	1,631,489	0.0 %	
Other receivables	-	516,565	516,565	0.0 %	
	4,819,728	2,148,054	6,967,782		
Financial liabilities					
Creditors	-	50,035	50,035	0.0 %	
Other payables	-	449,331	449,331	0.0 %	
Deferred income	-	6,629,735	6,629,735	0.0 %	
	-	7,129,101	7,129,101		

2009

Financial assets					
Cash	4,742,538	300	4,742,838	2.9 %	Floating
Debtors	-	1,898,743	1,898,743	0.0 %	
Other receivables	-	13,441	13,441	0.0 %	
	4,742,538	1,912,484	6,655,022		
Financial liabilities					
Creditors	-	181,356	181,356	0.0 %	
Other payables	-	986,739	986,739	0.0 %	
Deferred income	-	5,582,750	5,582,750	0.0 %	
	-	6,750,845	6,750,845		

NOTE 17: FINANCIAL RISK MANAGEMENT (CONTINUED)

(b) Credit risk

Credit risk is the risk that one party to a financial instrument will cause a financial loss for the other party by failing to discharge an obligation.

The maximum exposure to credit risk, excluding the value of any collateral or other security, at balance date of recognised financial assets is the carrying amount of those assets, net of any provisions for impairment of those assets, as disclosed in statement of financial position and notes to financial statements.

The company does not have any material credit risk exposure to any single debtor or group of debtors under financial instruments entered into by the company.

The company minimises concentrations of credit risk in relation to trade receivables by undertaking transactions with a large number of customers.

(c) Fair values

The fair value of financial assets and financial liabilities approximates their carrying amounts as disclosed in the statement of financial position and notes to the financial statements.

NOTE 18: SEGMENT REPORTING

The Company operates in the research and development field within the seafood industry and all company activities are performed within Australia.

NOTE 19: MEMBERS' GUARANTEE

The company is incorporated under the *Corporations Act 2001* and is a company limited by guarantee. If the company is wound up, the Constitution states that every member while they are a member or within one year after ceasing to be a member is required to contribute to a maximum of $10 each towards meeting any outstandings and obligations of the company. At 30 June 2010 the number of members was 25.

NOTE 20: COMPANY DETAILS

The registered office of the company is:

Seafood CRC Company Ltd
Mark Oliphant Building (North Wing 3B)
Science Park Adelaide, Laffer Drive, Bedford Park
Adelaide SA 5042

SEAFOOD CRC COMPANY LTD
ABN 51 126 074 048

DIRECTORS' DECLARATION

The directors of the company declare that:

1. The financial statements and notes, as set out on pages 9 - 32, are in accordance with the *Corporations Act 2001*:
   (a) comply with Accounting Standards in Australia and the *Corporations Regulations 2001*; and
   (b) give a true and fair view of the financial position as at 30 June 2010 and performance for the year ended on that date of the company.
2. In the directors' opinion there are reasonable grounds to believe that the company will be able to pay its debts as and when they become due and payable.

This declaration is made in accordance with a resolution of the Board of Directors.

Director: _____
Mr P Dundas-Smith

Director: _____
Mr R Cox

Director: _____
Dr L Stephens

Dated this 21st day of September, 2010

RSM Bird Cameron Partners
Chartered Accountants

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INDEPENDENT AUDITOR'S REPORT

TO THE MEMBERS OF

SEAFOOD CRC COMPANY LIMITED

We have audited the accompanying financial report of Seafood CRC Company Limited ("the company"), which comprises the balance sheet as at 30 June 2010, and the statement of comprehensive income, statement of changes in equity and cash flow statement for the year ended on that date, a summary of significant accounting policies, other explanatory notes and the directors' declaration.

Directors' Responsibility for the Financial Report

The directors of the company are responsible for the preparation and fair presentation of the financial report in accordance with Australian Accounting Standards (including the Australian Accounting Interpretations) and the *Corporations Act 2001*. This responsibility includes establishing and maintaining internal control relevant to the preparation and fair presentation of the financial report that is free from material misstatement, whether due to fraud or error; selecting and applying appropriate accounting policies; and making accounting estimates that are reasonable in the circumstances.

Auditor's Responsibility

Our responsibility is to express an opinion on the financial report based on our audit. We conducted our audit in accordance with Australian Auditing Standards. These Auditing Standards require that we comply with relevant ethical requirements relating to audit engagements and plan and perform the audit to obtain reasonable assurance whether the financial report is free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial report. The procedures selected depend on the auditor's judgement, including the assessment of the risks of material misstatement of the financial report, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial report in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by the directors, as well as evaluating the overall presentation of the financial report.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Independence

In conducting our audit, we have complied with the independence requirements of the *Corporations Act 2001*.

RSM Bird Cameron Partners
Chartered Accountants

Auditor's Opinion

In our opinion:

The financial report of Seafood CRC Company Limited is in accordance with the *Corporations Act 2001*, including:

(i) Giving a true and fair view of the company's financial position as at 30 June 2010 and of its performance for the year ended on that date; and

(ii) Complying with Australian Accounting Standards (including the Australian Accounting Interpretations) and the Corporations Regulations 2001.

RSM Bird Cameron Partners

RSM Bird Cameron Partners
Chartered Accountants

G M STENHOUSE
Partner

Canberra, Australian Capital Territory
Dated: 21 September 2010

PARTICIPANT LOGOS






Australian Government

Fisheries Research and Development Corporation

THE AUSTRALIAN SEAFOOD COOPERATIVE RESEARCH CENTRE
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