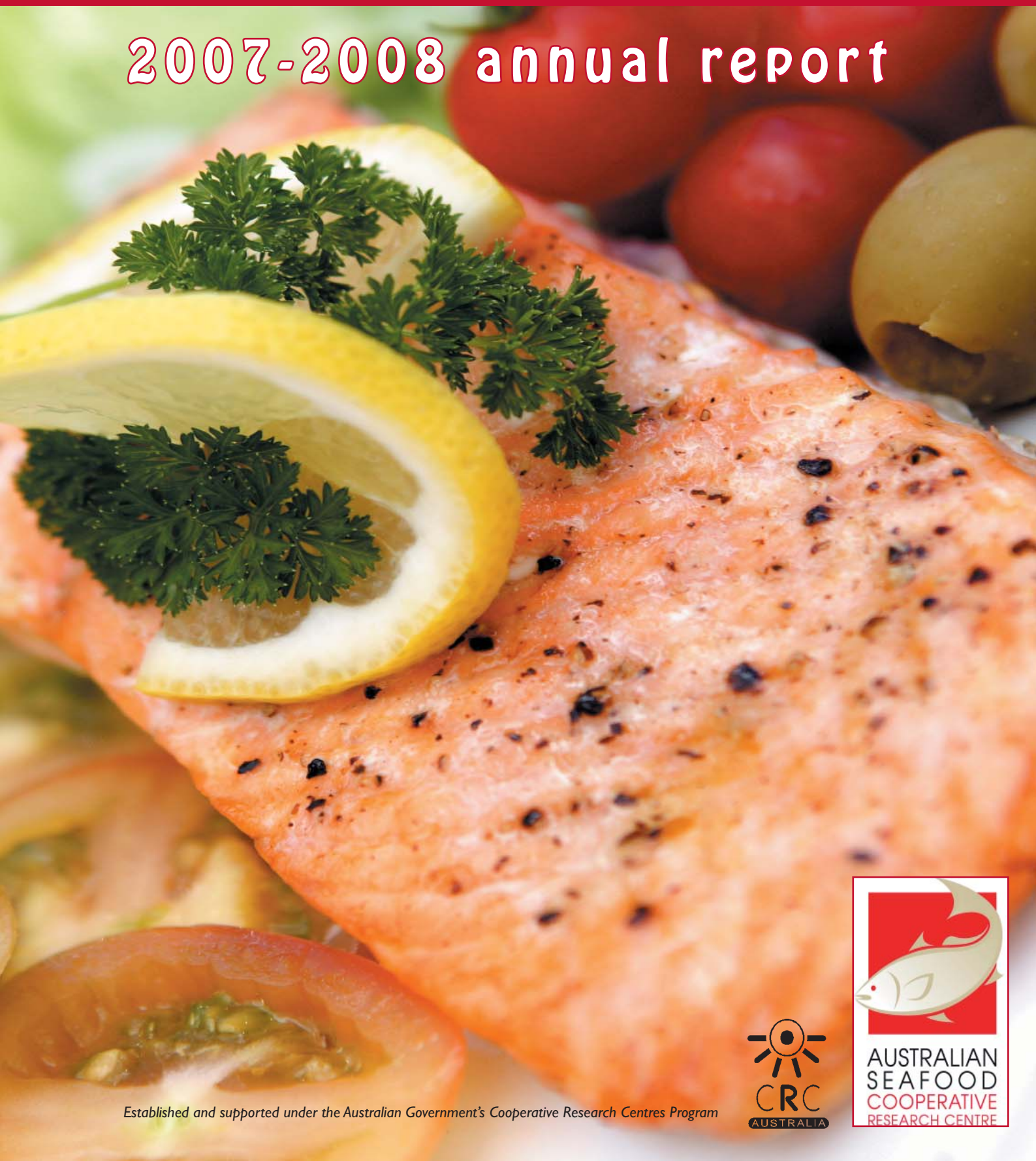
The Australian Seafood Cooperative Research Centre

2007-2008 annual report



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

CRC AUSTRALIA

AUSTRALIAN SEAFOOD COOPERATIVE RESEARCH CENTRE

contents

executive summary

Achievements and activities of the CRC in relation to research, commercialisation / utilisation and education outcomes for the reporting period.

The Board of the Seafood CRC Company Limited was appointed in early 2007 and the company was incorporated in July 2007. Research activities commenced in July 2007 with a full complement of staff and program leaders. The newly refurbished office supplied by Flinders University became operational in August 2007. Financial services and project administration systems were supplied under contract by the Fisheries R&D Corporation during 2007-2008 and will be transferred to the CRC during early 2008-2009.

A Research and Adoption Committee (RAC) composed of industry and research participants was established at the start of the year and has provided guidance on the implementation of all projects. Five technical reviews were also commissioned to assist with planning. It is very pleasing to note that at the end of the first year, activities are underway in 70 projects.

Ten projects that had been initiated by CRC participants prior to commencement of the CRC were adopted and provided with a boost in resources. Two significant outputs have already resulted from these projects. The first output, a technical breakthrough occurred on the 4th March 2008, Australian aquaculture pioneer Clean Seas Tuna Ltd announced it had become the first organisation in the world to close the lifecycle of Southern Bluefin Tuna. The successful collection of significant quantitites of Southern Bluefin Tuna sperm and eggs spawned by captive tuna in Clean Seas' purpose-built land-based breeding facility at Arno Bay, South Australia will allow the realisation of the company's plans to close the lifecycle of this species and potentially establish a valuable Southern Bluefin Tuna sperm bank and secure sustainable production of this premium endangered species.

The second significant output was the commercial release by Sydney Fish Market of a new range of value added seafood products under the Market Pride brand. New products in the range include Mediterranean Morwong fish cakes, Sea Mullet Chermoula fish cakes, Silver Warehou and Atlantic Salmon fish cakes, szechuan salt and pepper Squid, Australian seafood medley, Prawn bisque and seafood chowder (New England style).

Significant results have been achieved by the South Australian Research and Development Institute in the study of the seafood supply chain with the use of temperature data loggers during transport. Seafood products requiring transport range from live oysters and crustaceans, fresh fish and frozen products. Each has differing temperature tolerances and the use of data loggers to study weak points in the chain has highlighted numerous areas for study in coming years.

A report detailing production variables across prawn farms has identified the areas that will result in the largest returns from future Seafood CRC training and research projects.

The Seafood Market Access Forum was formed during the year with the assistance of the Seafood CRC. This forum of industry leaders and government officials will establish priorities for CRC research into technical and policy issues surrounding international market access for Australian seafood.

The CRC's research into methods of communicating the health benefits of seafood consumption received a major boost by the creation of a Seafood Centre of Excellence at Curtin University. A proposed contribution from Curtin University of $500,000 over three years will be directed towards consumer attitudinal research and intervention studies in specific community sectors.

The academic training program is fully operational with twelve PhD scholarships awarded to date. A condition of all PhD's is the involvement of an industry participant. Industry training included travel bursaries, technical workshops, leadership training and training needs analysis. Seven Post Doctoral Research Scientist appointments have been made during the year, with four appointees having taken up their position during the year.

The Seafood CRC has a very active communication program. The target audiences in order of current priority are the CRC participants, contractors and suppliers, other stakeholders, the media and the community.

The primary means of communication are electronic magazines an interactive website (with a member-only area), workshops, visiting scientists, media releases, project final reports and project summary reports.

Risks, opportunities and responses to the above

One of the Seafood CRC's largest projects, involving an attempt to produce commercial quantities of seafood using saline ground water, may not proceed. This is primarily due to the lack of water in the Murray-Darling Basin. Attempts are underway to identify an equivalent project as an alternative, with the decision to be made before December 2008.

The first stage of a study of global market development and direct supply chain opportunities for live southern rocklobster was reviewed and a decision made to accelerate commercial input to the project and to focus on the USA only during 2008/09. The Seafood CRC is working with Southern Rocklobster Ltd to ensure that the project meets the needs of fishers by reviewing progress.

Impediments to achievement of the CRC's objectives experienced during the year and strategies adopted to address these.

Some of the proposed post harvest projects have been slow to develop, resulting in missed milestones. This is due to:

- Lack of seafood processing R&D capacity in CRC participants and in Australia generally.
- Time required for some industry participants to decide on their priorities in this area.
- The need to engage the seafood processors, many of whom are not CRC participants even though the fishers supplying them are CRC participants.

To help build capacity in this area two post doctoral researchers have been appointed by the South Australian Research and Development Institute and one is to be appointed by the University of South Australia. A research leader in this area is also about to be recruited. A collaborative arrangement has also been established with the Grimsby Seafood Institute in the United Kingdom to help facilitate training and exchange visits.

Awards, special commendations, CRC highlights.

The Seafood CRC also congratulates industry participant, Sydney Fish Market who were awarded the Seafood Industry Promotion Award at the Seafood Directions 2007 Industry Awards

Photo: (L to R) - Gus Dannoun, Grahame Turk and Bryan Skepper from the Sydney Fish Market accept their Seafood Industry Promotion Award at the 2007 Seafood Directions Industry Awards ceremony

context and major developments during the year

A brief outline of the industry context in which the CRC operates (e.g. has there been a change in market conditions; have these changes impacted on the ability of the CRC to meet its objectives?).

As with many primary industries in Australia the ongoing drought has reduced business opportunities. Attempts to establish aquaculture on land have been significantly impacted.

The high value of the Australian dollar has also reduced export profits in some sectors. Difficulty in obtaining labour for fishing and processing operations, in common with other industries, is also a significant problem.

A unique feature of the Australian seafood industry is that seventy percent of the value of harvested seafood is exported as high value products. However, seventy percent of the seafood consumed in Australia is imported. This creates conflict in some industries, notably prawns, where the significant domestic market has come under pressure from imported product. There are opportunities within the CRC to work with our industry participants to improve processing efficiency and to research new market strategies to help alleviate some of these issues

Photo: FRDC

An explanation of any major developments or initiatives: Actions undertaken in relation to internal and/or external reviews, recommendations resulting from these reviews, strategies for implementing these recommendations and any resulting difficulties for the CRC anticipated by the Board

The Seafood CRC Company Ltd got off to a quick start on the 1st July 2007 as the Board had previously ratified the principal decisions and recommendations of the Australian Seafood CRC Startup Consortium and had approved policies and procedures essential to commence operations. During this reporting period the Seafood CRC was successful in establishing 70 projects, 12 PhD projects and the Seafood Centre of Excellence at Curtin University.

The first year DIISR visit (held on the 20th May 2008) resulted in positive feedback especially regarding the Company's operations to date and the CRC's ability to clarify the programs at the review following the extensive work conducted to bring together disparate sectors in the seafood industry.

The application to the Commonwealth Government CRC Program for the Seafood CRC included a proposal for research into seafood health benefits (Program 3). This part of the application was not approved. A workshop was held in October 2007 to determine whether the CRC participants could attract additional industry funding to continue the program. This was not successful and in May 2008 the Board decided to restructure Program 3. Research into communication of the health benefits of seafood, which was funded and which has been boosted by the contribution from Curtin University described above, was included as a new theme in Program 2. These changes are all included in a Request for Approval of Substantial Changes lodged with the Department of Innovation, Industry, Science and Research.

The Program Managers have each developed Research Theme Business Plans to guide the direction of research activity in their programs. Six Theme Business Plans have been produced and provided to Seafood CRC Participants for their input. The Board has approved five of these plans for implementation.

The Research and Adoption Committee advises the CRC staff and Board on the contents of the plans and reviews each project prior to implementation.

An explanation of any major developments or initiatives: Key events and changes of a substantial nature including key staff appointments and/or changes and purchases of major equipment

Following the change in program structure, the Board reviewed management arrangements and procedures. This has resulted in replacing each of the nine part-time Program Leaders with three full-time Program Managers who can take responsibility and accountability for their programs outcomes. Program Managers are supported by Theme Leaders who will help them to plan and review projects.

Photo: Clean Seas Tuna

national research priorities

National Research Priority Goal Highlights

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 outputs correspond to the national research priorities. Examples of CRC activities that align with national research priorties are explained below:

• The proposed Seafood CRC inland saline aquaculture initiative aims to develop a commercial scale supply of fresh seafood produced in water from saline water interception schemes in the Murray Darling Basin.

• The research into methods of communicating the benefits of seafood consumption is aimed at specific community sectors, in particular young families and women of child bearing age. This research aims to enhance efforts by a range of agencies to ensure an adequate intake of omega3 fatty acids, thus contributing to improved brain and cardiovascular health.

• A well recognised area of seafood frontier research is the world-wide attempt to complete the life cycle of many tuna species in captivity to enable sustained aquaculture production. Clean Seas Tuna Pty Ltd is working in partnership with the CRC to achieve this goal for Southern Bluefin Tuna. If successful this will be a world first and the basis of a multimillion dollar industry.

National Research Priorities and Australian Seafood CRC Research

National Research Priority	Seafood CRC Research (%)
AN ENVIRONMENTALLY SUSTAINABLE AUSTRALIA - Transforming the way we use our land, water, mineral and energy resources through a better understanding of environmental systems and using new technologies	
Transforming exisiting industries	20%
Overcoming soil loss, salinity and acidity	10%
Sustainable use of Australia's biodiversity	10%
PROMOTING AND MAINTAINING GOOD HEALTH - Promoting good health and preventing disease, particularly among young and older Australians	
Preventative healthcare	10%
FRONTIER TECHNOLOGIES FOR BUILDING AND TRANSFORMING AUSTRALIAN INDUSTRIES - Stimulating the growth of world-class Australian industries using innovative technologies developed from cutting-edge research	
Breakthrough science	10%
Smart information use	5%
Promoting an innovation culture and economy	10%
SAFEGUARDING AUSTRALIA - Safeguarding Australia from terrorism, crime, invasive diseases and pests, and securing our infrastructure, particularly with respect to our digital systems	
Understanding our region and the world	15%
Protecting Australia from invasive diseases and pests	10%

governance and management

The Australian Seafood CRC Company Ltd's management structure comprises the Governing Board and the Research and Adoption Committee (RAC). The CRC has five full-time staff employed who are supported by specialist Theme Leaders. Financial management and project monitoring and reporting is conducted by the Fisheries R&D Corporation.

The Seafood CRC Board

The Board has eight members including the Managing Director. There is a Board committee for Finance, Audit and Risk Management and a committee for Remuneration and Appointments. 60% of the Board's directors are employed by commercial industry. A summary of the Board's skills are:

Name	Key Experiences	Organisation	Board Role
Prof Colin Buxton	• Director of Aquafin CRC (2001 - 2008) • Director of the faculty of Fisheries and Marine Environment, AMC (1996 - 1998) • Deputy of Department of Icthyology and Fisheries Science, Rhodes University • Over 20 years experience in the higher Education Sector (South Africa and Australia) in research and research management • Expertise in science, R&D management and strategic planning • MSc (cum laude), PhD • Graduate of Australian Institute of Company Directors • Frequent consultant to State and Federal Governments	Tasmanian Aquaculture and Fisheries Institute, University of Tasmania (Director)	Research Provider
Mr Roger Cotton	• Chairman of Southern Rocklobster Limited. • Longstanding experience in consulting • Corporate business development, brand stewardship and market positioning	National Institute of Accountants (Chief Executive Officer)	Industry
Mr Bob Cox	• Chartered accountant • Director of the seafood promotional body, Seafood Experience Australia	Marine Culture and Australian Seafood Industries Pty Ltd (Director) Tasmanian Oyster Research Council Ltd (Secretary)	Industry
Mr Callum Elder	• Food technologist • Executive General Manager, Quality and Innovation for Simplot Australia	Simplot Australia (Board of Management)	Industry
Mr Peter Dundas-Smith	• Experience of large-scale project management, logistics, human resources and strategic planning: • Senior manager with Telecom Australia • Wing Commander, RAAF • Director of Seafood Services Australia (2001-2005) and FRDC • Director of Aquafin CRC (2001 - 2008) • Director of OceanWatch (2007 - 2008) • Graduate of Advanced Command and Staff Course, RAAF • Grad. Diploma in Management Studies and Diploma of Company Directorship	Independent	Corporate Governance and R&D
Dr Patrick Hone	• Director of Aquafin CRC (2001 - 2008) • Member of the Federal Coordinating Committee on Science and Technology • Member of the Oceans Policy Science Advisory Group • PhD in marine science physiology	Fisheries R&D Corporation (Executive Director)	Corporate Governance and R&D
Mr Nick Moore	• General Manager of Seafarm Pty Ltd for nineteen years • Past President of the Australian Prawn Farmers Association.	Gold Coast Marine Aquaculture (General Manager)	Industry
Ms Erica Starling	• Actively involved in seafood processing and marketing since 1994 • 2003 RIRDC Rural Women's Award.	Indian Ocean Seafoods (Managing Director)	Industry
Dr Len Stephens	• BVSc, MSc and PhD from the University of Guelph, Canada • Chief Executive Officer of Australian Wool Innovation Limited (2003 - 2006) • General Manager of Livestock Innovation with Meat and Livestock Australia (2000 - 2005) • Senior Executive with Agriculture Victoria • Founding Director of the Victorian Insitute of Animal Science. • Director of the Dairy Australia Ltd	Seafood CRC (Managing Director)	Corporate Governance and R&D

The Board has approved a range of policies concerning project funding, conflict of interest, travel, intellectual property risk, etc. The board has had meetings at various locations around Australia and has always held a participants' meeting at each location. These meetings have been well attended and have performed a very useful function in keeping company members in touch with Directors. The Seafood CRC Board met 5 times face-to-face (Adelaide, Perth and Hobart) and held three teleconference during this reporting period. During the Board meetings Directors receive reports of the Centre's progress and finances, determine investment in significant projects, approve the theme business plans and budgets and approve policies and procedures.

The Seafood CRC Staff

During this reporting year the Seafood CRC had three full time staff with seven part-time Project Leaders. A management re-structure has now resulted in the following:

Name	Organisation	CRC Position/Role	New Role After Restructure
Dr Len Stephens	Seafood CRC	Managing Director	Managing Director and Program Manager for Commercialisation and Utilisation
Ms Emily Downes	Seafood CRC	Communications Manager	Program Manager - Communications and Education
Ms Rebecca Wilson	Seafood CRC	Officer Manager	Officer Manager
Dr Graham Mair	Flinders University (now Seafood CRC)	Program Leader 1 - Value Chain Profitability and Production Innovation	Program Manager - Production Innovation
Dr John Carragher	South Aust R&D Institute	Program Leader 1B - Value Chain Technologies and Processing	–
Ms Jayne Gallagher	Seafood Services Australia (now Seafood CRC)	Program Leader 2 - Product Quality and Integrity	Program Manager - Product and Market Development
Prof Robert Gibson	University of Adelaide	Program Leader 3 - Health Benefits of Seafood	–
Prof Chris Carter	University of Tasmania	Program Leader 4A - Education and Training (Higher Education)	The position of Theme Leader (Higher Education) is currently being advertised
Mr Roy Palmer	Tigrey Pty Ltd	Program Leader 4B - Education and Training (Industry Training)	Theme Leader - Industry Training
Dr Martin Miller	MIller Consultants Pty Ltd	Program Leader 5 - Commercialisation and Utilisation	–

** Please note a number of Theme Leader positions are to be filled in specialist areas in Programs 1 and 2 as identified by the relevant Program Managers which will be reported on in the 2008-2009 annual report.*

The Research and Adoption Committee

Since the management restructure the RAC now consists of Seafood CRC staff, Program Managers, a FRDC representative and industry representatives. It originally included all the above Program Leaders.

The RAC provides advice to the Board through the Managing Director on matters relating to implementation of research and adoption and to assist in the development of high quality projects. It is not an approval or governance committee.

The committee also provides recommendations to the Managing Director on how projects and programs can be improved to better meet the Centre's outcomes and end-user

L to R - Dr Len Stephens, Dr Graham Mair and Ms Jayne Gallagher

needs. The Committee is also used to monitor program performance nd provide feedback to Program Leaders on the performance of their programs.

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

The additional members of the RAC (not including the CRC's staff and Program Managers) are:

Name	Organisation	RAC Position/Role
Dr Geoff Allan	News South Wales Department of Primary Industries	Chair and scientific input
Mr Crispian Ashby	Fisheries Research and Development Corporation	Technical input
Mr Pheroze Jungalwalla	Tasmanian Salmonid Growers Association	Industry
Mr Richard Stevens	Western Australia Fishing Industry Council	Industry

At an output level, the Omnifish system is used to report progress against milestones for all projects. In addition an annual project outputs report is used to monitor specific outputs from projects and to hold project leaders accountable.

Evaluation of the CRC at an outcome level is still under development. Consultant economists have been briefed to identify appropriate measurement parameters and baseline data required to measure against CRC program outcomes

Changes to Participants

Tasea Enterprises Ltd has voluntarily appointed an administrator. The company will be wound up and will therefore no longer be a participant in the CRC. Tasea's contribution was to be $10,000 per year.

O'Donohue Filter Sand and Gravel Pty Ltd has advised that they do not have funds to contribute to the CRC in 2007-2008 or 2008-2009. It is unlikely they will continue to participate in the CRC. A final decision will be made in early 2009. O'Donohue's contribution was to be $40,000 per year.

L to R - Rebecca Wilson and Emily Downes

research programs

Research Activities and Achievements

During this reporting period the Seafood CRC has established 41 research projects. 21 of these fall within Program 1 (Production Innovation) and 20 fall within Program 2 (Product and Market Development).

The CRC received a grant from the Western Australia Centre of Excellence during 2007-2008.

The CRC's research direction remains unchanged.

Completed Projects

During this reporting period, seven projects have been completed. Two of these projects were by consultants who brought in expertise related to technical market access and functional foods. The completed projects are:

Project	Program	Aims and Objectives
2003/209 - Sydney Rock Oysters: Overcoming constraints to commercial scale hatchery and nursery production (New South Wales Dept. of Primary Industries)	1	The primary aim of this project was to develop the technology and establish the conditions under which reliable, commercial, industry based, supply of selectively bred spat was possible. This has been achieved and commercial production has begun.
2007/708 - Review of predictive tools and rapid diagnostics technology (Western Australia Chemistry Centre)	2	Predictive technologies are becoming well established in the food industry to deal with issues of safety, spoilage and shelf-life. This review resulted in 27 recommendations being made in realtion to further CRC investment.
2007/709 - Review of seafood market issues (South Australia Research & Development Institute)	2	This critical review of technical market access was used in the in development of the CRC's market security theme. The information gathered from this project provided a basis for determining where to invest in research and development and how to achieve the best and most effective return on investment. In particular, the project identified current key markets for Australian seafood and the current technical requirements for market entry and detailed research and development work being undertaken in key markets in relation to food safety and product integrity that may impact on Australian seafood exporters. The project also identfied work being done, or being proposed, internationally by industry or governments in relation to seafood safety and product integrity. as well as investigating current Codex and other international activities that may influence the technical requirements of Australia's key markets. Lastly the project identified trends in rejections of Australian shipments and reasons for them, determined what research and development capabilities exist and the opportunities for collaboration within Australia and internationally.

Associate Professor Alexandra McManus from Curtin University undertook the successful completion of project 2007/711. Photo: Curtin University

2007/710 - Review of traceability and freshness indicator technology (University of Tasmania)	2	This project consisted of a desk top study to critically evaluate the traceability and freshness indicator technologies that are relevant to the Australian seafood industry. The report provides the foundation for future studies within the Seafood CRC that will integrate relevant technologies, foster innovation and result in high quality and safe Australian seafood products. The study involved identification of currently available traceability and freshness indicator technologies relevant to the seafood industry and newly emerging traceability and freshness indicator technologies. It also explained how such systems may be integrated into seafood businesses and identified key organisations involved in developing these technologies. A description of potential directions that these technologies may go over the next 10 years and a number of recommendations describing how the CRC can trial and adapt traceability and freshness indicator technologies. were also included
2007/711 - Review of health benefit research and development (Curtin University)	2	This project conducted a critical review to investigate the capacity needs, health benefits research and development issues and opportunities for collaboration and co-funding. Evidence relating to health conditions and seafood consumption, the health risks associated with eating fish and seafood, consumer behaviour in relation to fish and seafood consumption and marketing and advertising about the health benefits of seafood from a variety of publications were documented.
2007/712 - Technical market access review of the product quality and integrity research program technical market access support program (Consultant - Vision Rural Services)	2	This project conducted an examination of seafood industry technical market access and support arrangements in order to identify current infrastructure and support services relevant to the provision of technical market access support within the Australian seafood industry and the detail of infrastructure and support services relevant to the provision of technical market access support within the Australian meat, dairy, horticulture and wine industries. It also compared and contrasted the approaches adopted by these industries for an assessment of the strengths and weaknesses of these approaches and the report detailed current Australian seafood industry product integrity testing capacities and identify any capability gaps. Lastly the project identified the current technical support priorities and needs of AQIS, Biosecurity Australia, FSANZ and state food regulators and the current technical market access issues and priorities of the CRC end user participants. The report provided a number of recommendations relevant to planning for future CRC research and development activity.
2007/713 - Potential for a functional foods strategy within the Health Benefits of Seafood program (Consultant - University of Wollongong)	2	This project examines seafood related global activity in the functional foods area with the aim of contributing to conceptual frameworks for the Australian seafood industry. It provides a scope of nutrition research providers (reflecting capability), an identification of trends in research (reflecting opportunity), and a description of funding models for establishing clusters of functional food research. Knowledge from this analysis may contribute to the establishment of a functional food research cluster for the Australian Seafood industry.

The Abalone industry with CRC Program Leaders

2007/714 - Review of health benefit research and development relevant to the Australian seafood industry and members of the Australian Seafood CRC (Flinders University)	2	This project documented FSANZ's requirements for health benefit claims in plain English and detailed the gaps in justification for product health benefit claims. It also established the CRC's end-user priorities for R&D needed for justifying product health benefit claims as well as identifying emerging gaps in research, potential opportunities for collaboration with a range of partners and potential alternative and collaborative funding.
2008/704 - Review of available software tools that can be used to support selective breeding programs in the Seafood CRC (SARDI)	1	This project assisted the CRC in the development of the genetics theme business plan by reviewing available software tools that can be used to support selective breeding programs in the Seafood CRC. The recommendations made were to utilise existing expertise and software that can be adapted to the task. and for quantitative geneticists to utilise and add to the database initiated for this review to generate a shortlist of software needed. It was also recommended further detailed information of recommended software be performed at a later stage once the size and scope of the breeding programs or national breeding company running the programs is known.
2008/721 - Develop, conduct and analyse a small survey of seafood buyers at ESE 2008 to help assess the relative importance of key attributes of Australian seafood in influencing purchasing decisions (Seafood Services Australia)	2	The main purpose of this project was to survey perception that seafood traders / professionals of this industry have about six seafood producing countries, including Australia. Results showed that overall, A ustralia is perceived closely to New Zealand and is seen as being a 'trustworthy' 'natural' product from 'pristine' waters with 'good food safety' and a 'premium quality'. On the other hand, results how that Australia suffers from lacking the perceptions to do with good supply, such as 'consistent supply' and 'easy to get'. Quality is the word that comes first to mind for 29% of the respondents.
2008/730 - Codex Alimentarius working group on pathogenic marine *Vibrio* spp. (SARDI)	2	The Codex Alimentarius Commission is a joint body of the Food and Agriculture Organization of the United Nations (FAO) and World Health Organization (WHO). It develops food standards, guidelines and related texts such as codes of practice under the Joint FAO/WHO Food Standards Program. The main purposes of Codex are protecting the health of consumers, ensuring fair trade practices in food trade and promoting coordination of all food standards work undertaken by international governmental and non-governmental organisations. The Codex Working Group on the Code of Hygienic Practice for *Vibrio* spp. in Seafood was held in Kyoto, Japan on the 3rd to the 6th June, 2008 to develop the early draft of the Code. Australia was represented at this Working Group by the Seafood CRC because of the potential impact on industry . The report resulted in a number of recommendations for Australia.
2008/735 - Current international trade issues affecting the Australian seafood industry (The University of Adelaide)	2	This project briefly examines the major international trade negotiations in which Australia has participated or is participating and gives an overview of the implications of those negotiations for the seafood industry in this country. The report addresses both the multilateral trade negotiations now underway at the World Trade Organization in Geneva and Australia's bilateral and regional trade negotiating efforts in the Asia-Pacific area.

Photo: Southern Rocklobster Ltd

Projects in Progress

Program 1 - Production Innovation

A list of projects in progress from Program 1 follows::

Project in Progress	Project Objectives	Key Research Achivements
2005/029 - Factors limiting the resilience and recovery of fishing Abalone populations (University of Tasmania)	This project will identify key ecological processes that limit standard recovery and will quantify the scale of spillover benefit from translocated Abalone populations. Lastly a cost benefit analysis of rehabilitated habitat will be undertaken.	The population genetics component is ahead of schedule, while processing of the larval collector samples is slightly behind schedule. There is little evidence at this stage to conclude that the reduction in abalone density at the southern sites is due to mortality or a seasonal response in cryptic behaviour. The scheduled survey should enable the determination of the drop in density. This project has also re-developed expertise in anchoring equipment in wave exposed subtidal rocky reef habitats. The concept of drilling holes underwater is not new, and has been used widely in coral reef systems. However, the current solution with SS expansion plugs is quick, cheap and extremely robust, and will be used for a wide variety of experiments in benthic ecology. Progress on the larval tagging experiments has halted. This is firstly due to biosecurity issues related to transfer of biological material from hatcheries to natural reef systems and also because the chemical tag used, while strong during the development stage to settlement competency appears to diminish rapidly after metamorphosis. An alternative chemical tag will be trialled later this year.
2006/220 - Spatial management of Southern Rocklobster fisheries to improve yield, value and sustainability (University of Tasmania)	This project will conduct field experiments and sampling to provide additional data required for alternative harvest strategy evaluation as well as on translocation to undertake economic evaluation. It will also determine the extent of ecological community change in deep water reef habitats in response to increased harvest rates of lobsters and will enable assessment reporting of trends in biomass and egg production by depth (model fitting).. A large part of this project will also evaluate alternative spatial management options in respect to yield and egg production and alternative spatial management options by economic analysis. This project will ultimately develop functional management and monitoring recommendations to apply the research outcomes.	Research in progress

2006/226 - Protecting and enhancing the Sydney Rock Oyster selective breeding program (New South Wales Department of Primary Industries)	Project 2006/226 will establish par mating protocols necessary for the development of selectively bred oyster lines as well as confirming the association between PO and QX resistance using par matings to determine the performance of PO-selected family lines in QX- prone estuaries. It will also identify and characterise additional genetic markers of disease resistance and assess the value of cyropreservation to secure family lines for later use and will use non-chemical means for the induction of triploidy in Sydney Rock Oysters. Ultimately, this project will result in the production of family lines made available to Select Oyster Company for incorporation in future breeding plans.	The pair mating of Sydney Rock Oysters (SROs) has achieved 30 family lines which have reached a mean size of 35 mm. These lines were deployed to the Georges River for QX disease resistance evaluation. A breeding plan for the next round of pair matings has been developed and is expected to increase the total number of oyster families available for incorporation in to the Select Oyster Company breeding plan to 60. The necessary research to complete an assessment of cryopreservation techniques for the protection of SRO breeding lines has been achieved. A standard operating procedure has been completed and the Select Oyster Company breeding manual has been appended.
2006/227 - Enhancement of the Pacific Oyster selective breeding program (Australian Seafood Industries)	Project 2006/227 will upgrade and refine the Australian Seafood Industries 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 industry. A spreadsheet to calculate the economic values of traits for Pacific Oysters enabling regular updates and customisation to individual regions. will be produced along with a breeding strategy that delivers the best genetic gains for the Pacific Oyster industry and fits within the resources available to Australian Seafood Industries. Genetic gains will also be documented where possible with different oyster selective breeding strategies and the relative economic benefits of these different strategies will be determined. Specifications for a facility to produce the required number of families will also be developed along with specifications for a computer system to support the breeding program (i.e. best mate allocation and genetic evaluation). The Australian Seafood Industries database will also be updated. The development of a model for data capture and processing for further development by Australian Seafood Industries and consideration by other aquaculture sectors will also be produced.	Twenty four 9th generation family lines were successfully produced and have now been distributed to progeny testing sites in South Australia and Tasmania. The breeding strategy simulation study has been completed and has demonstrated the need to move to a minimum of 40, but preferably 50 lines. Stage 1 of the veconomic weights model has been completed, knowledge gaps have been identified and work has started on filling these gaps.

2007/224 - Increasing the profitability of *Penaeus monodon* farms via the use of low water exchange microbial floc production	This project will evaluate the effectiveness of different carbon sources for microbial floc formation in commercial ponds and determine the nutritional benefits of microbial flocs to *P. monodon* reared in ponds and the reduction in feed costs will also be quantified. Finally the effects of low water exchange, microbial floc production systems on the reduction in farm nutrient discharge and overall effects on farm profitability will be quantified.	Research in progress
2007/707 - Resolving laval rearing, juvenile development and productivity constraints for propagated Southern Bluefin Tuna and improvements to the production of Yellowtail Kingfish and Mulloway (Clean Seas Tuna)	Project 2007/707 will produce quality fertilised Southern Bluefin Tuna eggs for use in larval rearing, weaning trials and for commercial production of juveniles. Part of this project will be to establish protocols and methods for the commercial production of juveniles to support a propagated tuna aquaculture industry and to develop cost effective feed and sources for growing Southern Bluefin Tuna hatchery reared fingerlings to get them ready for transfer and grow out in sea cages. A cost effective feed pellet for grow out of wild caught and hatchery produced SBT that achieves an FCR of 4.5:1 or better without compromising flesh quality will also be developed and/or evaluated. This project will also condict research to reduce deformity rates in Yellowtail Kingfish to less than 10% before hatchery grading and to improve average growth rates compared to established current models, by better feeds and feed management of Yellowtail Kingfish. An important aim will be to reduce costs of Yellowtail Kingfish production through refining of feeds and feed management that lower FCR from 2:1 to 1.7:1. Another important component will be to improve grow out processes to decrease the time from hatchery to market from 3.5years to achieve 3kg size to 2.5years in Mulloway.and to reduce production costs through improved fish health management and disease control in Yellowtail Kingfish. Project 2007/707 will develop a range of options for genetic improvement of cultured stocks and implement cost effective strategies that will achieve efficiency, productivity and market gains in Southern Bluefin Tuna, Yellowtail Kingfish and Mulloway. A post harvest capability will also be established to take advantage of market driven cost effective value adding opportunities to increase profitability of these propagated finfish.	Research in progress

Yellowtail Kingfish. Photo: Clean Seas Tuna

2007/717 - Southern Bluefin Tuna maturation and sexing: Develop and apply new technologies (Clean Seas Tuna)	This project will develop sedation, handling and sampling techniques for Southern Bluefin Tuna and apply tools for the characterisation of reproductive development and sex determination of captive Southern Bluefin Tuna. The project will also manipulate reproductive development of Southern Bluefin Tuna using environmental and hormonal interventions.	Research in progress
2007/718 - Yellowtail Kingfish juvenile quality: Identify timing and nature of jaw deformities in Yellowtail Kingfish and scope the likely causes of this condition (University of Tasmania)	Project 2007/718 will evaluate the variation in the quality of Yellowtail Kingfish eggs and assess the use of ozone disinfection of Yellowtail Kingfish embryos and the quality of live feeds used in the production of Yellowtail Kingfish. It will also determine the onset and severity of malformations in cultured Yellowtail Kingfish and identify potential factors influencing the malformation to develop a plan for future research. Hatchery staff will also be trained in the identification of larval malformations and in ozone disinfection.	The project has quickly contributed to improvements made in commercial hatchery operations with demonstrated economic benefits associated with improved swim bladder inflation rates, higher survival and reduced jaw malformations, accompanied by a reduced requirement for labour intensive sorting and improved quality of juveniles stocked into sea cages.
2007/720 - Inland saline aquaculture commercialisation (News South Wales Department of Primary Industries)	The inland saline aquaculture project aims to develop and operate a commercial-scale, demonstration farm for Rainbow Trout using saline groundwater from the Wakool-Tullakool Subsurface Drainage Scheme. It will also develop production methods that optimise production from farms constructed in association with groundwater interception and evaporation schemes and that optimise management of saline groundwater using those schemes. The project aims to extend commercial inland saline aquaculture of trout and coordinate national research and development on inland saline aquaculture. A training and extension program for inland saline aquaculture. will also be developed.	This project is currently on hold for reasons described on page 2

Post Doctoral Research Scientist for Project 2008/709 - Dr Bennan Chen

2008/705 - Quantitative genetics (post doctoral research scientist) (SARDI and Flinders University)	This Post Doctoral Research Scientist engages with select CRC Participants seeking to design and implement long term generic improvement programs in their industry sectors. These industries include Abalone, Barramundi, marine finfish, oysters and other industry sectors relevant to South Australia. The primary R&D activities will be in the design and implementation of breeding programmes and to provide support to genetic related research in other sectors. The project will comprise a range of research activities focused on the estimation of genetic parameters, the management of selection programs and the estimation of genetic gains. There will also be a range of complementary research activities addressing key constraints to optimisation of breeding programs.	Research in progress
2008/709 - Larval and early juvenile marine finfish rearing (post doctoral research scientist) (SARDI and Flinders University)	This Post Doctoral Research Scientist engages with CRC participants seeking to address key production and marketing "bottlenecks" that can be addressed by targeted research on larval rearing issues. In particular, work is being conducted with Clean Seas Tuna Pty Ltd to address their identified and/or potential Yellowtail Kingfish and propagated Southern Bluefin Tuna larval rearing issues, through research, education and training, and technology transfer. The focus is on larval developmental biology, early nutrition and feeding protocols, and system characteristics.	Research in progress

Photo: Clean Seas Tuna

2008/711 - Addressing the key aquatic animal health issues limiting production of Australian Yellowtail Kingfish and hatchery reared Southern Bluefin Tuna industries (SARDI)	Project 2008/711 will firsty review literature to establish the best candidate in-feed medications and the dosages for the treatment of flukes. It will then test the efficacy of selected in-feed medications in reducing the burden of gill and skin flukes on Yellowtail Kingfish in tank trials and in pilot scale field trials. This objective will also determine the rate that residues of the most promising medication are cleared from fish in accordance with APVMA requirements. This project will also determine whether netting treated with antifoulants reduces the number of larval flukes settling on Yellowtail Kingfish and determine whether the fish absorb and retain residues of the most promising antifouling compounds. A 12 month program of routine monitoring of gill and gut pathology of Yellowtail Kingfish will also be established to determine any impact of a special diet on winter gut syndrome. Another important component of this project is over the range of salinities, experiment in the Spencer Gulf and quantify the effects on performance (growth rates and apparent food conversion efficiency) and blood osmolality of Yellowtail Kingfish. Finally the research will result in the development of a health protocol for hatchery reared larval Southern Bluefin Tuna and will preserve samples for future archival diagnostic anaysis.	Research in progress
2008/712 - Second generation tuna feeds (Clean Seas Tuna)	The availability of a viable manufactured feed supply in Australia to support the propagated tuna industry and the Southern Bluefin Tuna wild caught farming industry. is considered a research priority and this project will determine the suitability of two available feeds for fattening Southern Bluefin Tuna. Indictaive growth, feed conversion, weaning mortality and degree of fatness will be determined for each product from Skretting and Ridley Aquafeeds	Research in progress

Canned abalone. Photo: Australian Abalone Council

2008/718 - Southern Bluefin Tuna larval and juvenile rearing (Flinders University)	This project will ultimately produce a small batch of healthy Southern Bluefin Tuna juveniles ready for transfer to sea cages. As part of the process research will compare best practice marine larval and nursery rearing techniques across a range of leading Australian marine finfish hatcheries with propagated Southern Bluefin Tuna eggs and larvae and will define a successful set of larval rearing protocols, weaning strategies and nursery rearing techniques for Southern Bluefin Tuna in a commercial hatchery situation.	Research in progress
2008/722 - Scope and economic analysis of options for a nationally unified breeding program that provides significant economic benefit to the Australian abalone aquaculture industry (SARDI)	Project 2008/722 will model the Tasmanian GSW program(s) and alternative mainland strategies to determine the optimal strategy for a unified coordinated program. It will identify the areas of collaboration for adding value to each program and the standardisation of procedures needed to ensure collaboration is achieved. and will identify key researchable constraints to the implementation of the breeding program, proritise the research objectives and indentify funding options. The cooperative breeding program that develops will aim to achieve the objectives of the Australian Abalone Growers Association.	Modelling of the Tasmanian/GSW program(s) and alternative mainland strategies is underway with the project's principal investigator havingcollected economic and genetic data from the industry and adapting a bioeconomic simulation model that was developed for Atlantic Salmon. The model has been run and used to provide information that will help to optimise all the selective breeding programs. The core focus of the simulation modelling is to optimise the development of a centralised mainland selective breeding program. Some key researchable constraints have also been identified (e.g. early induction of reproduction).
2008/723 - Development of a genetic management and improvement strategy for temperate marine finfish (Flinders University)	This project will develop a range of options for genetic improvement of cultured stocks and implement cost effective strategies that will achieve efficiency, productivity and market gains.	Research in progress

2008/725 - Aquatic animal health (post doctoral research scientist) (SARDI)	The project aims to develop a novel strategy to treat fluke-infested Yellowtail Kingfish using one or more in-feed medications and improving the current practice of bathing in hydrogen peroxide. The project also aims to determine whether treating Kingfish cage nets with antifoulants reduces the rate at which infective fluke larvae settle on gills and skin. The Post Doctoral Research Scientist will also determine whether there is an existing difference in farmed Yellowtail Kingfish performance and whether it can be attributed to salinity differences between key farming areas in Spencer Gulf and whether potential increases of salinity can exacerbate the situation. Lastly, the project will increase preparedness of industry staff and aquatic animal health scientists involved in hatchery-propagation of Southern Bluefin Tuna to rapidly respond to potential health issues affecting larval tuna, according to a developed protocol, and the storage of archival samples for future diagnostic research.	Research in progress
2008/733 - Population genetic structure of Sea Cucumber in Northern Australia (Flinders University)	This project will characterise the genetic population structure of Sea Cucumbers, *Holothuria scabra*, within the range fished by Tasmanian Seafoods. It will characterise the genetic diversity of the hatchery broodstock and progeny arrays relative to their original natural populations and will refine and/or recommend polices and strategies for sustainable management and enhancement, through ranching, of Sand Fish fisheries.	Research in progress
2008/750 - Amoebic gill disease vaccine phase III: Sea-based trials, vaccine refinement and commercialisation (CSIRO)	Project 2008/750 will determine whether vaccination success of Atlantic Salmon against amoebic gill disease in a controlled small-scale laboratory environment can be translated to the commercial environment. It aims to refine the experimental vaccine and produce the most effective commercial vaccine formulation and review the pertinent legislative requirements for the commercialisation of the vaccine and undertake the research to adequately address any concerns. Lastly it will identify a suitable partner and develop an agreement for the delivery of an efficient and effective commercial vaccine against amoebic gill disease.	Research in progress

Program 2 - Product and Market Development

A list of projects in progress from Program 2 follows:

Project in Progress	Project Objectives	Key Research Achivements
2004/401 - A market access guide for seafood exporters: International residues standards (SARDI)	This project aims to produce a web-based database on seafood contaminant standards in major export trading partner nations for Australian aquaculture and wild capture fisheries. A listing of veterinary medicines registered for aquaculture usage in Australia will also be produced and peak industry bodies and Australian Commonwealth agencies on importing country-specific residue standards will be informed of the project results.	Key data has been collected ready for inclusion in the still to be created, secure, web based portal. Once completed, it will be made accessible to all CRC end participants. There have been some issues with making the information in the project available to the public or others. Drawing overseas countries' regulators attention to specific MRLs that Australia does not wish to progress in international forums e.g. CODEX. This may lead competitors to start to examine the food regulatory structures of their trading partners. Secondly, releasing information may prematurely assist developing countries or competitor countries in the development of their national food regulatory systems to take advantage of commercial opportunities such as the new Japanese Positive List System.
2007/700 - A critical evaluation of supply-chain temperature profiles to optimise food safety and quality of Australian Oysters (SARDI)	Project 2007/700 will evaluate Australian oyster cool chain processes to underpin food safety and optimise commercial quality. In addition it will identify future research, investment, education and training priorities to implement best practice time temperature regimes for the Australian Oyster industry. Lastly the project will provide input to the development of an Australian Oyster Refrigeration Index to assist industry and regulators to optimise time temperature regimes that assure food safety.	This project is linked to project 2007/719 A targeted survey of Australian oyster growers was developed to profile current Australian storage and transport practices. There was an excellent response to the survey. A baseline microbiological study has also been undertaken to develop a spoilage profile of Australian oysters. The project to date has shown that there is little information known regarding spoilage of oysters worldwide.

Project 2007/703 contributed to the new "Market Pride" products using under utilised species. Photo: Sydney Fish Market

2007/703 - Intervention strategies to maintain the safety and quality in a range of value-added products made with under utilised southern and eastern scalefish and shark fishery species (Sydney Fish Market)	This project will ultimately lead to new value-added products for Sydney Fish Market. The first steps involve an assessment of the food safety risks associated and identification and resolution of the critical quality issues associated with the primary processing of the target species. The next step is to assess the food safety risks aand identification and resolution of the critical quality issues ssociated with the secondary processing of the proposed products. Ultimately the project will contribute to the capacity building within Sydney Fish Market and Southlands Fish Supplies regarding the development of value-added seafood product lines.	A risk profile of microbial pathogens in minced seafood products was produced which undertook a risk identification and characterisation of the major microbiological and parasitic organisms and then described a microbiological risk characterisation for the proposed products and the main control factors to be taken into account during production. A report on microbial spoilage and other quality issues was also produced. This document outlined what existing fish handling and spoilage information was available for the proposed target species covering Australian Salmon, Silver Warehou, Gould's Squid and Royal Red Prawns. It also covered microbiological issues related to the MAP packing of seafood and issues related to the stability of minced seafood products. A report outlining the key biochemical issues to be aware of with regard to seafood spoilage and the impacts of the various stages of production including; capture, chilled storage, processing, frozen storage and MAP packing was also produced. Finally, the range of new products under the "Market Pride" label was launched in July 2008.

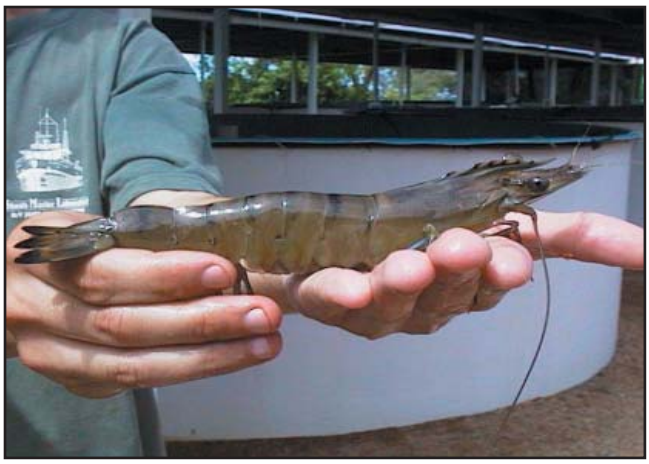
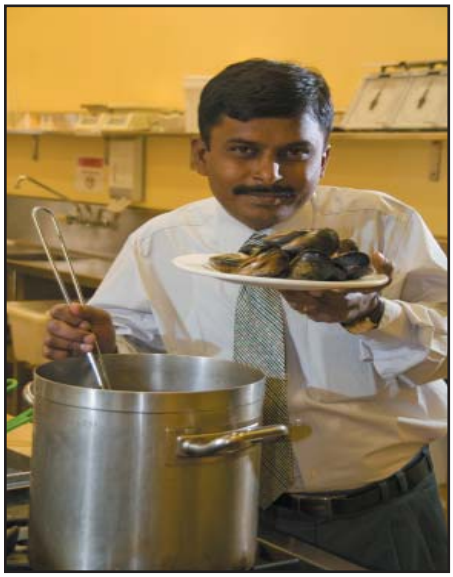


Photo: NSW Department of Primary Industries

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 (Southern Rocklobster Ltd)	This project will develop a new supply chain system which guarantees consistent supply and quality of Australian Southern Rocklobster to the super premium, fine-dining sector specifications in the USA. It will develop a nice distribution and the most effective communication systems for Australian Southern Rocklobster to service and support the super premium, fine dining sector in the USA.	Research in progress
2007/706 - Establish the technical and market data to assess the feasibility of live bivalve mollusc (Australian Oysters) access in the USA: Stage 1 (Corvel Management)	This project will determine the commercial feasibility for Australian Oyster growers to access, develop and maintain a market in the USA	This project demonstrated that there are no major technical barriers to gain entry in to the USA and a commercially feasible opportunity exists to enter the market provided investment is made to build and or develop the market. This is likely to be best achieved via in-market resourcing and under favourable external influences (e.g. exchange rate).
2007/716 - "Passion for prawns": Benchmarking performance (CDI Pinnacle)	Project 2007/716 will identify the key business performance indicators to enable measured evaluation of returns on investment in the industires development, measure the Australian prawn farmers varying performance and identify the key drivers of variation in performance against those key business performance indicators. Lastly the project will establish recommeded actions to overcome the variability and improve performance against the businees performance indicators identified and it will extend the actions to the next generation of industry leaders.	Quantitative and qualitative benchmarks have been established for aquaculture prawn production, processing, transportation and marketing. Benchmarks were identified following direct consultation with growers and how they analyse their business activities. These are then compared between and across one or many farms. The Australian Prawn Farmers Association are in the process of establishing a reference group of growers involved in prawn production. This reference group will work actively with the recommendations found from this research.



Mr Mohan Raj is the Post Doctoral Research Scientist for project 2008/708. Photo: SARDI

2007/719 - Protecting the safety and quality of Australian oysters with integrated predictive tools (University of Tasmania)	This project will produce a validated and robust *Vibrio parahaemolyticus* model that is approved by Australian and international regulatory bodies to manage the live oyster cold chain, control the risk of *Vibrio* diseases and provide greater access to national and international markets.	This project is linked to project 2007/700 Research in progress
2008/703 - Improving the erythrocyte omega-3 fatty acid profiles and health status in adults through increased consumption of canned tuna (University of South Australia)	Project 2008/703 aims to demonstrate that regular consumption of canned fish leads to long-term increases in incorporation of long chain omega-3 fatty acids into erythrocytes.	Research in progress
2008/708 - Seafood processing (post doctoral research scientist) (SARDI)	This Post Doctoral Research Scientist will engage with CRC participants to help develop a strategic research and development plan for the "Smart Processing" theme. The project will conduct a number of key result areas such as establishing alliances with other relevant research groups (e.g. New Zealand Crop and Food, FoodScience Australia) working in this discipline to integrate their activities with existing research projects requiring seafood processing expertise.	Research in progress
2008/710 - Benchmarking consumers physical and mental availability for seafood products and brands in different buying situations (post doctoral research scientist) (University of South Australia)	For seafood, mental and physical availability of the whole category of seafood remains an issue. With few specific seafood brands, there is considerable opportunity for CRC participants to benefit from even the most fundamental information in relation to how seafood competes for both mental and physical space with both other proteins (i.e. beef, lamb, chicken) and other forms of seafood (i.e. prawns, oysters, abalone). Making seafood products and brands physically available may be considered relatively 'easily' achievable, but the question remains as to whether current distribution systems are the form that buyers want, are the most effective and profitable options for producers and are in a form that will gain the most attention from buyers. There are many distribution options available to seafood producers - this research will aim to determine which options are likely to be most effective for producers.	Research in progress

Research Activities and Achievements Outputs and Milestones

Research Program 1: Production Innovation

Output/ Milestone No.	Description	Contracted Date	Achieved (Y/N)	Reasons why not achieved (if applicable)	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	N	Not yet due	–
MS 1.1.2	Key researchable constraints identified and characterised in at least two new production systems	June 2010	N	Not yet due	–
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	N	Not yet due	–
MS 1.2.3	Annual production characterised and interventions optimised in at least one fishery	December 2010, December 2011 and December 2012	N	Not yet due	–
Output 1.3	Removal or reduction of key production constraints in selected 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	December 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	N	Not yet due	–

MS 1.3.3	Strategic disease management approaches and technologies developed for at least two aquaculture species	December 2009	N	Not yet due	_
MS 1.3.4	New low-cost aquaculture diets targeting improved feed conversion developed and evaluated	December 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	N	Not yet due	_
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	June 2010	N	Not yet due	_
MS 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 No.	Description	Contracted Date	Achieved (Y/N)	Reasons why not achieved (if applicable)	Strategies to achieve unmet milestones
Output 1.6	Removal or reduction of barriers to seafood consumption	June 2010, then ongoing	N	Not yet due	_
MS 1.6.1	Barriers to and drivers of seafood consumption identified in at least two new domestic or overseas consumer groups annually	June 2008 and annually thereafter	N	Work in progress	Several projects being contracted to meet milestone
MS 1.6.2	Individually tailored approaches to overcoming barriers trialled and evaluated in at least two new domestic or overseas consumer groups annually	June 2009 and annually thereafter	N	Not yet due	_
Output 1.7	Smart processing technologies and practices	June 2008 and ongoing	Y	_	_
MS 1.7.1	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	Y	_	_
MS 1.7.2	Innovative technologies for controlling spoilage to enhance shelf-life and amrketability developed and evaluated for each of three types of seafood per annum	June 2009 and annually thereafter to June 2014	N	Not yet due	_
MS 1.7.3	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	June 2009 and annually thereafter to June 2014	N	Not yet due	_
MS 1.7.4	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	N	Not yet due	_

MS 1.7.5	Innovative technologies and practices to reduce the weight loss of seafood product, from harvest to market, developed and trialled in at least one value chain every two years	Every two years: June 2009. June 2011 and June 2013	N	Not yet due	_
MS 1.7.6	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	N	Not yet due	_
MS 1.7.7	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	N	Not yet due	_
MS 1.7.8	Technology and capability to support innovation of new seafood products developed	June 2009	N	Not yet due	_
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	N	Not yet due	_
MS 2.1.2	Technology and capability to support implementation of ongoing traceability systems developed	June 2010	N	Not yet due	_
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	N	Not yet due	_
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	N	Not yet due	_
MS 2.2.3	Novel rapid diagnostic systems developed for at least one seafood spoilage process to ensure product quality	June 2010, June 2012 and June 2013	N	Not yet due	_
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	Not yet due	_
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 fpr 50 commercially important Australian species developed	June 2010	N	Not yet due	_
MS 2.3.2	Refridgeration index developed, validated and implemented to enable cost-effective, efficient temperature management in Australian seafood cool chain	June 2011	N	Not yet due	_
MS 2.3.3	Predictive tools developed, trialled and available to industry to better manage foos safety risks associated with microbiological hazards in the Australian seafood cool chain	June 2014	N	Not yet due	_

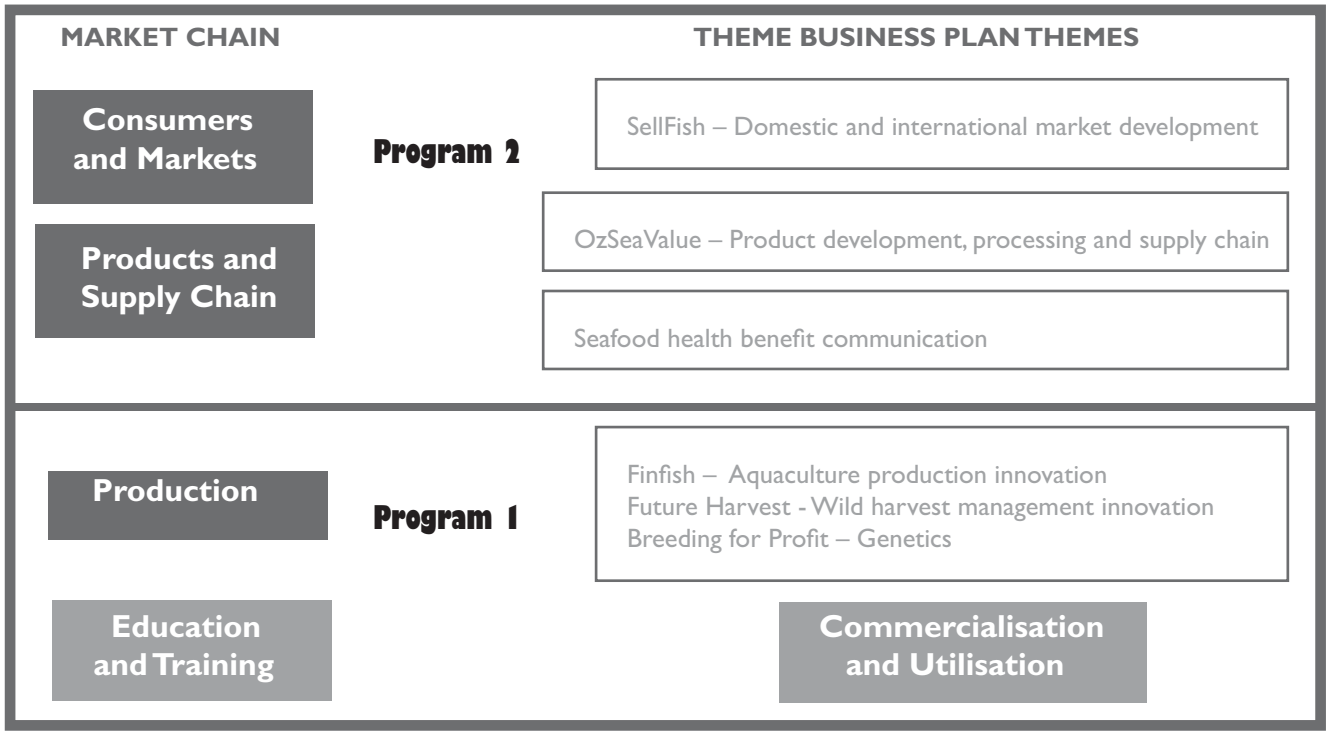
Output 2.4	Optimised technical market access	June 2014	N	Not yet due	–
MS 2.4.1	Technical market access panel established and intial work plan set	December 2007	N	Agreement in principle for a seafood trade panel	Project 2007/712 commissioned to identify infrastructure needds including role and responsibilities of market access panel
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	N	Not yet due	–
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	N	Not yet due	–
MS 2.4.4	Additional completed, internationally reviewed, integrated health benefit and risk assessments available for market access negotiations and for comsumer risk advisories	June 2012 and June 2014	N	Not yet due	–
Output 2.5	Communication of consumer health benefits and risks	June 2010	N	Not yet due	–
MS 2.5.1	Key factors influencing consumers' behavioural responses to seafood health benefit and risk communication identified	June 2008	N	Work in progress	Three reviews undertaken to review the CRC role to identify partnerships for collaboration
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	N	Not yet due	–

MS 2.5.3	Health benefit and risk communication strategies trialled for four sectors, consumer responses analysed and guidelines refined	June 2010	N	Not yet due	_
Output 2.6	Market access database	June 2009	N	Not yet due	_
MS 2.6.1	Market access database established and maintenance program agreed	June 2008	Y	_	_
MS 2.6.2	Market access database expanded to cover additional elements relevant to market access and available on secure website	June 2009	N	Not yet due	_

research collaborations

Collaborative Activies in the Seafood CRC

The preparation of 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 industry and get approval of the business plans' concepts and research direction. The following diagram explains the theme business plan concept:



Program 1 (Production Innovation) Collaborative Activities

Research Projects Within a "Finfish" Theme

The current plan for stakeholder engagement in the series of research projects that fall under the 'Finfish" theme is to:

- Promote and support a Seafood CRC Marine Finfish Aquaculture Indsutry Committee which incorporates all enterprises investing in marine finfish aquaculture to promote the open exchange of common research strategies and approaches and the adoption of research outputs.

- Organise an annual workshop for all Seafood CRC participants involved in aquaculture production research. This meeting will be 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. The meeting will allow Seafood CRC management to provide an update of key overarching issues.

- The Finfish theme business plan will be annually circulated to relevant participants. Each year, an Annual Operat-

Photo: WAFIC

ing Plan will be prepared to document all approved and proposed projects, update expected and achieved outputs and detail the budget. The Annual Operating Plan will also detail the links between this Theme, and all other CRC themes

• An annual review and update of the Plan will be undertaken which will include management of two industry sector networks, the Finfish Hatchery Network and the Shellfish Hatchery Network. Those networks will include both CRC and non-CRC participants and involve workshops, training, technical exchanges and communication activities to accelerate development of aquaculture hatcheries within Australia.

Research Projects Within a "Future Harvest" Theme

The current plan for stakeholder engagement in the series of research projects that fall under the 'Future Harvest" theme is to:

• Organise an annual workshop for all Seafood CRC participants involved in wild harvest fisheries production research. This meeting will be used to identify key opportunities to enhance the efficiency and profitability of fisheries, build collaborative research and training approaches and review progress with projects and facilitate collaboration. The workshops will allow Seafood CRC management to provide an update of key overarching issues affecting wild fisheries CRC participants.

• The Theme Business Plan will be circulated annually to all wild harvest industry participants and research providers. Each year, an Annual Operating Plan will be prepared to document all approved and proposed projects, update expected and achieved outputs and detail the budget. The Annual Operating Plan will also detail the links between this Theme, and other themes including the AB Sea Theme and the Communication Strategy.

Research Projects Within a "Breeding for Profit" Theme

The eight industry partners and six research providers with stakes in this theme will participate in a number of collaborative activities. The Seafood CRC catalyse collaborative research and training in a number of areas including development and implementation of breeding programs for aquaculture leading to the formation of a national organisation supporting the commercialisation of breeding programs. other specific mechanisms to support collaboration include:

• Annual workshops and training programs linked to the hatchery networks formed as part of the Finfish theme focused on issues related to the implementation of breeding programs linked to commercial hatchery systems.

• The development of national services to support breeding programs such as national cryopreserved sperm gene banks and cost-effective genetic marker analyses.

• The development of a strategic partnership with Nofima/Akvaforsk in Norway, the world leaders in aquaculture genetic programs, with stakeholders in this theme including an active exchange program.

• An annual review and update of the plan will be undertaken. This will include management of two industry sector networks, the Finfish Hatchery Network and the Shellfish Hatchery Network. Those networks will include both CRC and non-CRC participants and involve workshops, training, technical exchanges and communication activities to accelerate development of aquaculture hatcheries within Australia.

Program 2 (Product and Market Development) Collaborative Activities

Research Projects Within a "Sell Fish" Theme

The reviews undertaken as a part of developing the "Sell Fish" theme have identified a number of potential opportunities for collaboration. Collaboration with these organisations will help the Seafood CRC by:

- Enabling all CRC participants the opportunity to benefit from improved trade and market access negotiation infrastructure and support services.

- Providing opportunities to co-invest with other seafood industry sectors (not members of the CRC) and with other sectors.

- Building research and development capacity and capability to enable rapid response to trade issues (to avoid costly disruption to trade) and to support the development of scientifically sound, timely analyses of current and potential trade and market access issues.

Some capacity already exists within the CRC (e.g. Seafood Services Australia, University of Tasmania, South Australian Research and Development Insitute, the University of South Australia, the University of Adelaide and Flinders University). The focus of the collaborations will be to help build the capacity of these CRC research and development providers by investing in and undertaking projects in partnership with organisations not involved in the CRC. These organisations include:

- The Commonwealth Government (Department of Agriculture, Foresty and Fisheries, Department of Foreign Affairs and Trade and the Department of the Environment, Water, Heritage and the Arts) .
- State Governments (State Development Departments, Food Strategies etc.)
- Individuals and companies with particular expertise (to be determined as needed)
- The University of Adelaide: international trade school and new global food business school.

Research Projects Within a "Oz Sea Value" Theme

The reviews undertaken as a part of developing the "OzSeaValue" theme have identified a number of potential opportunities for collaboration. Collaboration with these organisations will help the Seafood CRC by:

- Networking existing product development, processing and supply chain performance improvement expertise and identifying gaps that need to be filled.

- 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.

- Create a pathway for identifying and assessing emerging technology that could benefit seafood CRC members.

There are some notable centres of expertise internationally (Grimsby Institute, Danish Fisheries Institute, University of Florida, Crop and Food NZ to name a few) which the Seafood CRC intends to build collaborative and strategic relationships focused on building capacity in Australia to support commercially based seafood product and processing development.

Collaborations will also be focused on coinvestment opportunities with organisations not part of the CRC. These organisations include:

- The Commonwealth Government.
- State Governments (State Development Departments, Food Strategies etc.)
- Individuals and companies with particular expertise

Photo: Gold Coast Marine Aquaculture

Other Collaborative Linkages within the CRC Across Research Activities

During this reporting period a number of collaborative actvities took place within each research project. For example, the Fisheries Research and Development Corporation and the Seafood CRC worked on 3 linakge/technology transfer projects. These were development of a quality index for Australian seafoods, the effect of temperature on reproductive development of maiden and repeat spawning Atlantic Salmon (for understanding the basis for improved egg survival and quality) and extension work for the development of an amoebic gill disease vaccine.

In addition, Seafood Services Australia have provided a number of adminsitrative and communication support activities for the CRC as well as developing and taking responsibility for the Seafood Market Access Form.

Other details of specific collaborative acitvites that were undertaken in research projects are:

Program 1 (Production Innovation) Project Collaborative Activities

2005/029 - Factors Limiting the Resilience and Recovery of Fishing Abalone Populations

An update on the project's progress was provided to the Abalone Fishery Advisory Committee in August and November 2007 and information is continually provided to this group and the Tasmanian Abalone Council Executive.

The Project Leaders have also been in regular contact with the Department of Primary Industries and Water's staff in order to obtain relevant permits, and to co-ordinate activities.

2006/226 - Protecting and Enhancing the Sydney Rock Oyster Breeding Program

The development of techniques for cryopreservation of Sydney Rock Oyster eggs and the development of current protocols were discussed with and assistance sought from staff from the Cawthron Institute in New Zeland.

2008/723 - Development of a Genetic Management and Improvement Strategy for Temperate Marine Finfish

NIWA National Institute of Water and Atmospheric Research in New Zeland were involved with the CRC's strategic planning workshops for genetics in Yellowtail Kingfish.

Program 2 (Product and Market Development) Project Collaborative Activities

2004/401 - A Market Access Guide for Seafood Exporters: International Residues Standards

Qingdao Qingdao Municipal Science and Technology Bureau met with the South Australian Research and Development Food Safety Research and Aquatic Sciences group. The visit was to seek information on potential collaboration in a number of areas including seafood safety and testing.

On the 21st August 2007, South Australian Research and Development Food Safety Research and Aquatic Sciences group met with a Vietnamese delegation from the Vietnamese Department of Science and Technology Department, the Vietnamese Ministry of Fisheries, the Vietnamese Research Institutes for Aquaculture No 1, 2, and 3, the Vietnamese Department of International Co-operation Department, the Vietnamese Science and Technology for Economic and Technical Sectors – Vietnamese Ministry of Science and Technology, the Truong Sa Marine Fisheries Company and 128 Company. The purpose of the visit was to seek potential collaboration on seafood research projects. The Vietnamese visit was funded by the Danish Government.

The Vietnam National Fisheries Quality Assurance and Veterinary Directorate and the Ministry of Agriculture and Regional Development also visited the South Australian Research and Development Food Safety Research and Aquatic Sciences group on the 28th February 2008 in Adelaide.

A delegation from the University of Bari, Italy visited the South Australian Research and Development Food Safety Research and Aquatic Sciences group on 12th February 2008 as part of a South Australian Government invitation issued to the Puglia region in Italy.

2007/700 - A critical evaluation of supply-chain temperature profiles to optimise food safety and quality of Australian oysters

To evaluate current oyster cool chain processes, the Principal Investigator has visited several growing regions in both New South Wales, South Australia and Tasmania. This has allowed the understanding of the differences between the sectors, such as the types and locations of growing environments and also any differences in harvest practices.

2007/703 - Intervention Strategies to Maintain the Safety and Quality in a Range of Value-Added Products Made with Under Utilised Southern and Eastern Scalefish and Shark Fishery Species

Montserrat Hernandez Iturriaga visited Australia in March 2008 and provided useful and insightful advice. During his visit to Australia, Mr Hernandez visited the "Market Pride" product production facilities in Eden, Sydney and Newcastle.

2007/713 - Potential for a Functional Food Strategy within the Health Benefits Program of the Seafood CRC

This work was undertaken by the University of Wollongong, National Centre of Excellence for Functional Foods. The Centre was established to support the Australian food industry in the development of a functional foods market by integrating knowledge from a range of sources. The Centre itself is based on intersectoral collaboration, a joint venture between the Commonwealth Scientific and Industrial Organisation (CSIRO) - Division of Health Sciences and Nutrition, the Department of Primary Industries, Victoria, Food Science Australian and the Australian Research Council Key Centre of Smart Foods at the University of Wollongong.

The Seafood CRC collaborated with the Centre due to the organisation's leadership in the functional foods area and as such were able to draw upon the combined capability of the partner organisation (e.g. expertise in food technology, nutrition and consumer science [basic science through to human trials], public health, food regulation, marketing and innovation management) to determine whether there was merit to submit an application for supplementary funding to DIISR for a Health Benefits of Seafood research program.

2007/716 - "Passion for Prawns" - Benchmarking Performance

As part of the data collection process for this project, CDIPM consulted with prawn farmers with respect to the provision of information for inclusion in the benchmarking process. Other supply chain members (post farm gate) were consulted to develop an understanding of the prawn supply chain and in particular issues associated with aquaculture prawns. CDIPM consults regularly with the Australian Prawn Farmers Association to provide project updates and progress reports.

Seafood Access Forum

A major collaborative achievement has been the formation of the Seafood Market Access Forum (SAF). This forum initiated by Seafood Services Australia, the National Aquaculture Council, Seafood Experience Australia was supported by the Seafood CRC and FRDC in the initial stages through a review of infrastructure needs and priority issues for seafood trade and market access.

The SAF will be the ongoing mechanism for determining priorities for Seafood CRC investment in trade and market access research and development.

commercialisation and utilisation

Commercialisation and Utilisation Strategies and Activities

During this first year of operation of the CRC one new product was released to the market. A new line of retail ready, fresh, chilled, value-added seafoods, called "Market Pride" was launched by Sydney Fish Market.

The other "commercialisation" activities during the year involved working with industry partners to plan the path to market for products as they are developed. Examples include the Atlantic Salmon amoebic gill disease vaccine and brood stock genetic evaluation systems for aquaculture.

One of the features of the Seafood CRC is the work being conducted within the retail market with CRC partners. In these cases the alternative commercialisation strategies are clear from the start and the research is evaluating alternatives. An example is research into the market for Southern Rocklobster research in the USA.

Much of the written material resulting from research conducted by the CRC, such as final reports, is made available to the industry and general public through Seafood Services Australia Pty Ltd (SSA). One of the key functions of SSA, a Seafood CRC participant, is to provide information to industry in a usable and timely manner. For example, a study by the CRC on the way in which the industry could improve its input to international tariff and quota negotiations resulted in SSA forming the Australian Seafood Market Access forum. This forum is now the national coordinating body to liaise with government on matters such as tariffs, technical trade barriers and proposed bilateral trade agreements.

At this early stage in the Seafood CRC, there are no patents and spin off companies.

Commercialisation and Utilisation Projects

The Seafood CRC has funded a number of projects that will ensure participants work collaboratively to implement research and development results from the CRC.

2005/209 - Industry management and commercialisation plan for the Sydney Rock Oyster Breeding Program

The New South Wales Department of Primary Industries established a breeding program in 1990 in Port Stephens and the Georges River with the aim of selecting Sydney Rock Oysters for faster growth. The program was later expanded to include selection for resistance to the new major diseases, winter mortality and QX.

As a result, oysters breeding lines have been produced that are capable of reaching harvest size eleven months earlier, with others that are resistant to winter mortality or QX. Following these achievements and a Fisheries R&D Corporation funded hatchery production development program, the New South Wales oyster industry has actively sought the development of a commercial vehicle to take on the responsibility of breeding line management and distribution of resultant improved stock.

2007/715 - Oyster Consortium - Communications, extension and management of research and development results

This project will provide the resources to ensure that the outcomes of the research and development are adopted and commercialised quickly and extensively throughout the Australian oyster industry. Without this coordination it would be very difficult to achieve the change at the extent and rate necessary to achieve the growth targets for the industry.

2008/715 - Australian abalone industry research and development planning, implementation and extension

This project will enable the abalone industry to better be able to work collaboratively and improve the quality of products supplied to the market and to maintain market share in major exports.

Commercialisation and Utilisation Milestones

Output/ Milestone No.	Description	Contracted Date	Achieved (Y/N)	Reasons why not achieved (if applicable)	Strategies to achieve unmet milestones
Output 5.1	Technology transfer leading to successful commercialisation and utilisation of CRC outputs	2013	N	Not yet due	–
MS 5.1.1	Commercial potential of all research projects evaluated; commercialisation and utilisation plans prepared for projects	December 2007 and ongoing	Y	–	–
MS 5.1.2	Research outputs evaluated by the Commercialisation, Utilisation and Communication Committee and large-scale commercialisation trials initiated for projects meeting commercial selection criteria	June 2010	N	Not yet due	–
MS 5.1.3	Large, commercial-scale trials demonstrating technical and economic viability of selected research outputs completed	June 2012	N	Not yet due	–
MS 5.1.4	Implementation plan to ensure rapid industry adoption completed for the selected research outputs	June 2013	N	Not yet due	–
Output 5.2	Intellectual property protected for the benefit of the Australian seafood industry and research community	September 2007	N	No protectable IP developed to date	n/a

Photo: WAFIC

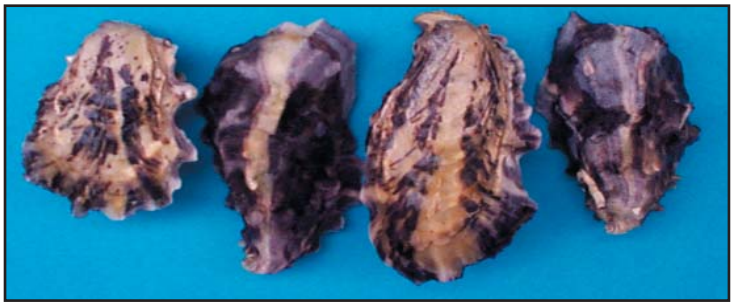


Photo: SARDI

MS 5.2.1	Intellectual property strategy approved by the CRC Board	September 2007	Y	–	–
MS 5.2.2	A patent attorney contracted to work on behalf of the CRC	September 2007	N	Not yet needed	n/a
MS 5.2.3	Intellectual property register established	September 2007	Y	–	–
MS 5.2.4	Intellectual property and staus of existing intellectual property reviewed annually	June 2008 and annually thereafter	N	Audit of IP scheduled	Review to be conducted in August 2008
Output 5.3	Communication tools developed and delivered	June 2008	Y	–	–
MS 5.3.1	Communication strategy developed; CRC logo and brand launched	June 2008	Y	–	–
MS 5.3.2	CRC conference and trade show conducted	December 2008 and every two years thereafter	N	Not yet due	–
MS 5.3.3	Communication tools, including media products, developed	December 2008 and annually, thereafter	N	Not yet due	–
Output 5.4	Technology transfer leading to successful commercialisation and utilisation of CRC outputs	2013	N	Not yet due	–
MS 5.4.1	Commercial potential of all research projects evaluated; commercialisation and utilisation plans prepared for projects	December 2007 and ongoing	Y	–	–
MS 5.4.2	Research outputs evaluated by the Commercialisation, Utilisation and Communication Committee and large-scale commercialisation trials initiated for projects meeting commercial selection criteria	June 2010	N	Not yet due	–
MS 5.4.3	Large, commercial-scale trials demonstrating technical and economic viability of selected research outputs completed	June 2012	N	Not yet due	–

MS 5.4.4	Implementation plan to ensure rapid industry adoption completed for the selected research outputs	June 2013	N	Not yet due	–
Output 5.5	Intellectual property protected for the benefit of the Australian seafood industry and research community	September 2007	N	No protectable IP developed to date	n/a
MS 5.5.1	Intellectual property strategy approved by the CRC Board	September 2007	Y	–	–
MS 5.5.2	A patent attorney contracted to work on behalf of the CRC	September 2007	N	Not yet needed	n/a
MS 5.5.3	Intellectual property register established	September 2007	Y	–	–
MS 5.5.4	Intellectual property strategy and status of existing intellectual property reviewed annually	June 2008 and annually thereafter	N	To be conduced after IP audit	IP audit scheduled for August 2008
Output 5.6	Communication tools developed and delivered	June 2008	Y	–	–
MS 5.6.1	Communication strategy developed; CRC logo and brand launched	December 2007, strategy reviewed annually	Y	–	–
MS 5.6.2	CRC conference and trade show conducted	December 2008 and every two years thereafter	N	Not yet due	–
MS 5.6.3	Communication tools, including media products developed	December 2008 and annually thereafter	Y	–	–

Photo: TSGA

The Seafood CRC's magazine "Seafood Stories" - a publication designed to keep participants in the loop regarding CRC activities.

Intellectual Property Management

Soon after the Seafood CRC Company Ltd was incorporated, the Board approved changes to the IP policy, so that all new IP generated during Seafood CRC funded projects is owned by the Seafood CRC Company Ltd. Participants have a non-exclusive, royalty-free rights to use the IP 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 companies formed to commercialise R&D results.

Communication Strategy

Communication is a major component of a successful centre. 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 of industry, commercial and economic growth. Without effective communication, our CRC participants may not receive vital information, which will ultimately affect awareness and adoption.

The initial twelve month communication plan for the Seafood CRC allowed the CRC to set preliminary goals to establish effective two-way communication, to establish a strong corporate culture and reputation, to build a meaningful repore 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.

Some of the activities conducted have been the establishment of a quarterly magazine, regular Participant meetings (that are held in conjunction with the CRC Board meeting) and involvement in the Seafood Services Australia's national networking meetings.

The plan also provided a clear framework for communication activities by guiding decision making, ensuring effective resource use and encouraging the participation of participants and staff. Lastly, the plan provided the framework to deliver and aid the adoption of key messages and results of the Seafood CRC.

For the first year of the CRC's operation, it was identified that establishing effective communications with stakeholders, particularly its participants was the number one priority. The Seafood CRC brings together the interests of a range of stakeholder groups both external and internal. These include staff, contractors, consultants, government, industry, research providers, industry participants and media. To ensure the differing nature and requirements of each group are achieved, four key target audiences were identified. These groups, in order of importance for 2007-2008 were:

1) *Industry and Research Provider Participants* - The CRC provided regular and ongoing updates about the Seafood CRC and its actvities to increase the profile and create recognition. This acted as a catalyst for regular information exchange and progress updates with the aim of developing strong internal repore and relationships.

2) *Other Stakeholders* - Other stakeholders in the CRC covers many sectors including the producers, processors, transporters, marketers, associations, lobby groups, trainers and educators, DIISR, Federal Minister for DIISR and other relevant politicians and potential R&D providers). The plan enabled is to create external awareness of the Seafood CRC and its activities. Information was customised for specific sectors/stakeholders to increase the understanding of CRC research and outcomes while simultaneously increasing and gathering support. This ultimately will achieve successful adoption of research and findings and potential collaborative research and technology transfer arrangements.

3) *CRC Staff, Contractors and Consultants* - The 2007-2008 communications plan identified the need to keep all staff, contractors and consultants aware of activities happening in the CRC and to inform them of project and program progress. It was also important to recognise this target audience's significant achievements that led to the Centre's success.

4) Media - The plan also aimed to create and increase awareness of the CRC and aid in the delivery of key messages to the general public. Communication with the media will increase targeted understanding of the research benefits to the CRC Participants in the Australian seafood industry.

5) Community - The plan aimed to create and increase awareness of the CRC. Communication with the community about the benefit of Seafood CRC research will come from related extension and media activities.

End-User Involvement and CRC Impact on End-Users

There are nine end user companies involved in the CRC in their own right. Also there are nine industry associations each with numerous member companies that are active participants and provide funds through their association. Each of these eighteen industry participants are directly engaged in the design and delivery of our R&D programs. During this first year there was a range of readiness of the industry participants to begin R&D projects. Most were ready to begin projects at the start of the year. However some required further strategic planning and consultation to determine priorities. A theme business planning approach has been used during the year to coordinate the needs of each participant and develop projects with a common theme. This has been done through a series of workshops and extensive consultation across Australia by the CRC program managers.

End-User Name	Relationship with CRC	Activity and End-User Location	Nature/Scale of Benefits to End-User	Actual or Expected Benefit to End-User ($ terms)
Southern Rock-Lobster Ltd	Industry Participant	Commercialisation (South Australia)	Market development activity in the USA	Sales to USA of Rocklobster to the value of $1 million
Marine Scale Sardine Industry Association	Industry Participant	Pilot Trial (South Australia)	Evaluation of flow ice machine for preservation of Sardines for human consumption	Sales of Sardines for human consumption doubled from 100 tonnes to 200 tonnes per year
Oyster Consortium	Industry Participant	Commercialisation (National)	Sales of gentically improved Oyster spat	Progessively increasing share of market obtained by genetically improved stock
Tasmanian Salmonid Growers' Association	Industry Participant	Pilot Trial (Tasmania)	Sea-trial of vaccine to prevent amoebic gill disease	Potential saving to industry of $17 million
Simplot	Industry Participant and R&D Provider	Product Evaluation (National)	New product development with enhanced nutritional benefits	New commercial food product released nationally
Sydney Fish Market	Industry Participant	Commercialisation (New South Wales)	Research contributed to new seafood product development	Increased profit from adding value to under-utilised species targetting specific market segments
Seafood Services Australia (Seafood Access Forum)	Industry Participant and R&D Provider	Utilisation (National)	Assisted the establishment of a seafood market access forum (SAFF) to facilitate industry seafood to trade and gain market access	Mechanism enabled focused collaborative effort to maintain existing and establish new markets domestically and internationally for CRC participants

education and training

Progress of Higher Education Theme

The CRC now has a total of 12 PhD projects that have been approved. Of the 12 PhD projects, 4 scholarships have been filled by candidates. The rest are currently undegoing an advertising process to appoint students ready to begin in the 2009 academic year. PhD students can become part of the Seafood CRC Higher Education program by one of two methods of entry - by a full CRC scholarship or become "top-ups" via students obtaining an Australian Postgraduate Award and the Seafood CRC "tops up" the sipend to the Australian Postgraduate Award Industry Award rate, adds an operational budget and funds towards supporting the student's relationship with their mentor.

The third round for PhD projects was called during June 2008, with a due date for submissions during August 2008 for specific projects to fit within gaps currently in CRC themes (Finfish, Breeding for profit, Future Harvest, Sell Fish and Oz Sea Chain). It is expected the projects will be approved and students appointed in time to start at the beginning of the 2009 academic year.

The Higher Education theme also has provisions for a substantial Masters and Honours program but to date, no projects have been approved and no students have been appointed.

As students are appointed, they each receive an individually prepared CRC student pack which outlines about the CRC research area they fit in to, programs they can attend and ways the CRC will support their personal development throughout their candidature.,

Both full PhD scholarships, top up PhD students, Masters students and Post Doctoral Research Scientists participate in the Higher Education personal development activities. These are:

Industry Mentor Program

The industry mentor program will ensure our graduates and young scientists obtain essential and pertinant knowledge about the seafood industry and specific seafood sectors. It will also ensure students and Post Doctoral Research Scientists are able to communicate with industry about R&D enabling industry to value benefit. They will also gain confidence and communication skills promoting industry ready graduates and ensure the retention of graduated students remaining in the Australian seafood industry. Additionally, industry mentors will have the opportunity to gain new skills

Each PhD, Masters and Post Doctoral Research Scientist must have at least one industry mentor. Funding is available within the PhD scholarship and Post Doctoral Research Scientist operating costs to facilitate the relationship ($1,000 per year each). Formal mentoring activitites include the student or young scientists to spend up to one working week during their candidature working from the industry mentor's business to facilitate communications, information sharing and learning. Field trips for students, Post Doctoral Research Scientists and mentors enabling them to visit businesses that represent a number of industry sectors within the CRC and throughout the supply chain. Industry mentors will expand their knowledge by visiting their student or Post Doctoral Research Scientist in their labs and work in the lab or out in the field, sampling and recording and being an assistant. An employment networking facility will be developed on the members only area of the website and linked to other relevant seafood sites.

The mentor program will be in full swing during the 2008-2009 reporting period. as a larger number fo students come on board.

Young Scientist Workshop Series

The Young Scientist Workshop Series will ensure PhDs, Masters and Post Doctoral Research Scientists are trained in a variety of useful skills such as working with the media, giving presentations at conferences, having a contextual understanding of the commercialisation and patent process and opprtunities to gain experience or improve their interview techniques.

Seafood CRC PhD, Masters and Honours Students

Name	University of Enrollment	Theis Title	Project No.	Supervisors	Industry Mentor (subject to agreement)
PhD Full Scholarship					
Judith Fernandez	University of Tasmania	Protecting the safety and quality of Australian Oysters using predictive models integrated with "intelligent" cold chain technologies	2008/700	Mark Tamplin (UTAS) Tom Ross (UTAS)	Scott Parkinson (Shellfish Culture Ltd)
Not yet appointed	University of Tasmania	Understanding quality in abalone	2008/701	Malcolm Brown (CSIRO) Louise Ward (UTAS)	Ron Tume (CSIRO Food Science)
Not yet appointed	Flinders University	Understanding penaeid prawn sex determination and developing monosex induction strategies for commercial application	2008/713	Graham Mair (Flinders) Melony Sellars (CSIRO)	To be advised
Not yet appointed	Flinders University	Nutritional factors influencing the performance of Yellowtail Kingfish cultured at low temperatures	2008/736	David Stone (SARDI) Jian Qin (Flinders)	Mike Thomson (Clean Seas Tuna Ltd)
Rachel Tonkin	Curtin University	An investigation of the micorbiology and biotechnical properties leading to the extended shelf-life in Goldband Snapper	2008/737	Hannah Williams Thomas Riley (Curtin University) Steven Munyard (PathWest)	Richard Stevens (WA fishing Industry Council) and Janet Howieson (Dept of Fisheries, WA)
Not yet appointed	Flinders University	Characterisation of selected fish processing co-products and development of novel integrated bioprocesses for value-added food and non-food products	2008/738	Wei Zhang (Flinders) Chris Franco (Flinders)	Mario Klingler and Franca Curulli (Simplot Australia)
Not yet appointed	Flinders University	Antiviral activity and resistance to Abalone virus ganglioneuritis	2008/739	Kirsten Beckendorff Peter Speck (Flinders)	Mehdi Doroudi (SARDI)
Vipul Pare	University of South Australia	Understanding and forecasting seafood suppliers and buyers behaviour trading at Sydney Fish Market	2008/740	John Dawes Carl Driesener Herve Remaud (University of South Australia)	Gus Dannoun (Sydney Fish Market)
Not yet appointed	University of Tasmania	Human enteric viruses in Australian bivalve molluscan shellfish	2008/741	Mark Tamplin (University of Tasmania)	To be advised
Not yet appointed	Flinders Univesity	Processing Sea Cucumber viscera for bioactive compunds	2008/742	Chris Franco Wei Zhang (Flinders University)	Grant Leeworthy (Tasmanian Seafoods)

Not yet appointed	University of Tasmania	Using the mucosal antibody response to recombinant *Neoparamoeba perurans* attachment proteins to design an experimental vaccine for amoebic gill disease	2008/749	Barbara Nowak Phil Crosbie (University of Tasmania) Mathew Cook (CSIRO)	David Mitchell (Huon Aquaculture Company)
PhD Top Up Scholarships					
Steven Cambridge	University of Tasmania	Methodologies for implementation of micro-mobile systems in the cold chain	2008/734	Paul Turner (UTAS) Tom Ross (UTAS)	Mark Tamplin (Uni of Tasmania)
Masters and Honours - No projects or students to date					

Post Doctoral Research Scientist Positions

Name	Participant	Project	Project No.	Co-Investigators	Industry Mentor (subject to agreement)
To be appointed	Finders University and the South Australian R&D Institute	Quantitative Genetics	2008/705	Graham Mair (Flinders University) Xiaoxu Li (SA R&D Institute)	Craig Foster (Clean Seas Tuna) and Mark Gervis (Australian Abalone Growers Association).
Mohan Raj	South Australian R&D Institute	Seafood Processing	2008/708	John Carragher (SA R&D Institute) Steve Slattery (Qld DPI) Allan Bremner (Seafood Services Australia)	Mark Boulter (Sydney Fish Market)
Bennan Chen	South Australian R&D Institute and Finders University	Larval and early juvenile marine finfish rearing	2008/709	Wayne Hutchinson Steven Clarke (SA R&D Institute) Jian Qin (Flinders University)	Morten Deichman, (Clean Seas Tuna)
Nick Danenberg	University of South Australia and Flinders University	Bechmarking consumer physical and mental availability for seafood products and brands in different buying situations	2008/710	Byron Sharp Rachel Kennedy Hervé Remaud (University of South Australia)	To be appointed
Craig Hayward	South Australian R&D Institute	Aquatic animal health	2008/725	Steven Clarke Mehdi Doroudi (SA R&D Institute)	Craig Foster, (Clean Seas Tuna)

Research Travel Grants

A formal system will be established to support CRC R&D providers and students to attend educational and personal development opportunities during the next reporting period. The aim of this scheme is to enhance R&D providers to seek solutions and options for industry to improve production and reduce costs.

The travel grants will not be for travel to conferences etc (this is to come from project budgets) but rather for exchanges and academic travel in association with projects. 10 bursaries per year will be offered per year..

During this reporting period, Mr Tom Madigan from the South Australian Research and Development Institute was supported to attend The Codex Working Group on the Code of Hygienic Practice for *Vibrio* spp. in Seafood in Kyoto, Japan from the 3rd to the 6th June, 2008. The purpose of Mr Madigan's visit was to represent Australia at this Working Group because of the potential impact on CRC industry participants. Mr Madigan's participation resulted in a number of reccomendations for Australian CODEX negotiations.

Visiting Research Scientist Scheme

This scheme will provide support for visiting specialists to assist the Seafood CRC participants with their problems and identifying potential solutions. The scheme will also enhance collaboration with international institutions and exchange information between industry and research and development providers. The Seafood CRC aims to have at least one visiting scientist per year.

During this reporting period, one visiting scientist attended activities with the CRC and another three were approved for visits during the 2008-2009 reporting period (Dr Pierre Boudry and Dr Helen McCombie [IFREMER, France] and Professor Mike Dillon [Grimsby Institue and the Humber Institue of Seafood, UK]).

In February 2008, Professor Michael Crawford, the Director of The Institute of Brain Chemistry & Human Nutrition at London Metropolitan University spent one week in Australia. Activities that the Seafood CRC were involved in organising were Professor Crawford's meeting with PIRSA and selected seafood industry people, an inaugural Visiting Fellow Dinner where Professor Crawford was the guest speaker and a public seminar at the Adelaide Art Gallery entitled "Seafood for a healthy body and mind". The seminar was followed by a networking session over a light lunch.

Progress of the Industry Training Theme

A number of education and training activities have been initiated and completed during this reporting period.

Analysis of Training Needs and Training Options for Industry Participants

This project will develop and test the processes for training needs analysis and/or learning environment analysis as part of the CRC education and training strategy.A template for a training needs analysis was developed and tested with two industry participants to identify and monitor KPI's for their businesses education and trianing. The two participants were able to identify education and trianing as a critical component of their overall continuous business improvement plan.

Now that the model has been developed and tested, the next step will be undertaken in the next reporting period which will be to role out the project to all industry participants.

L to R: Ted Loveday (Seafood Services Australia), Professor Michael Crawford (London Metropolitan University) and Seafood CRC Industry Training Theme Leader Roy Palmer

Advances in Marine Hatchery Technology in Australia Workshop

The Seafood CRC supported this workshop which involved the communication of recent advances in hatchery technology to industry, communication within and between industry and research hatchery operations and the clarification of research and development priorities and technology transfer and training needs of marine fish hatcheries.

Two international experts presented at the workshop - Assistant Professor Giorgos Koumoundouros of the University of Patras, Greece, who has extensive experience in investigating skeletal development and malformations in marine finfish and Professor Hiroshi Fushimi of Fukuyama University, Japan, who leads a team of active researchers working on innovation in larval rearing techniques and new species development, including Northern Bluefin Tuna.

Seafood CRC Industry Bursaries

The aim of the Seafood CRC industry bursaries is to develop the capabilities of our industry participants and strengthening the capacity for Seafood CRC industry to commercialise. It also develops targeted research capacity to meet key industry needs and our industry's human capacity to support industry participation in specific national and international events. 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.

Bursary applicants are required to undertake a selective application process and successful applicants are required to prepare a report outlining issues that need to be considered by any industry member prior to, during and after a CRC, their own learning from the experience, provide relevant information for the Seafood CRC and its members and a detailed list of people met and facilities visited during the trip.

During this reporting period, 4 bursaries were awarded for 2 activities. These were for Mr Judd Evans and MrTony Troup (Oyster farmers) to attend the WERA099 and the National Shellfish Conference in Providence, Rhode Island in 2008 and Mr Stephen McLeary (Western Rocklobster Fisherman) and Mr George Pitt (Oyster farmer) to attend the European Seafood Exposition in Brussels.

National Seafood Industry Leadership Program

The CRC is all about capacity building within the CRC participants and the FRDC Seafood Leadership Program enables the opportunity to invest in people who are keen to show their leadership potential. Investing in Leadership, and the associated networks and cross stakeholder understanding is seen as vitally important for all sectors to be able to contribute to debate, drive change and address challenges in order to enable the Seafood CRC and the industry to reach its potential. Three CRC industry participants - Che Spruyt (fisherman), Gail Spriggs (Clean Seas Tuna) and Raymond Pratt (Sydney Fish Market) were supported to participate in the 2008 program.

Other Seafood CRC Education and Training Projects

Seafood CRC Induction Project

Organisations, large or small, should have a well-considered induction programme. Generally the induction programme has to provide all the information that new employees and others need, and are able to assimilate, without being overwhelming or diverting them from the essential process of integration into a team.

In the case of the Seafood CRC it is more about giving all the people involved in the CRC (from the highest level of their organisation, to students through to those working at the 'coalface') a sense of understanding and ownership which in turn will ensure the CRC is maximising the wealth of knowledge and experience that there is within the groups. The need to ensure that all participants understand what a CRC is and does, learn about the Seafood CRC, its goals and people involved, what tools and opportunities are available to them (e.g. website, bursaries etc.), meet Program Managers and CRC staff and they can learn how they can engage effectively to maximise their involvement and experience during their time in the CRC.

An on-line, interactive induction proejct which is linked to the Seafood CRC website was completed.

ALife - Promoting the Australian Seafood Industry as a Career Path for Generation X and Y

The Alife project promises to revolutionise the manner in which school leavers get information about future careers. The CRC has seen this as an important initiative and has invested in a trial program based on Oyster farming. The ALife project aims to replace the Careers Guide - a heavy, cumbersome printed book that is given to all school leavers in Australia to assist them in choosing a potential career and deciding whether further study is required after high school to pursue a chosen career path.

Knowing there was a better way, Lifeworks Media developed A-Life, a cutting-edge, interactive multimedia vehicle using film and contemporary graphic imagery, similar in nature to FaceBook and YouTube, designed to engage Generation X and Y and allow them to make more informed career path choices. All the technology used in ALife can also be downloaded on to mobile phones and iPods allowing the information to reach the target audience in the most effective way. The project is also endorsed, hosted and promoted by Rove McManus (Australian TV celebrity) and Ada Nicademou (actress on Home and Away and other Australian television shows).

100 different profiles and diverse career options are presented in the ALife project ranging from accountancy to clock making to engineering (i.e. white collar to blue collar). The CRC decided to invest in one profile (the oyster consortium were eventually chosen after an audition process).

Expansive national distribution of the ALife project will ensure 3 million DVDs for the next three years will be going out to all schools, TAFES and universities in Australia, together with major newspapers as well as back up marketing through an interactive website and a call centre. A detailed evaluation processes will also occur and will be provided to the Seafood CRC 12 months after the launch of the project. If successful, the Seafood CRC may choose invest in further profiles expanding over all our industry participants (e.g. prawn farmer, wild catch fisherman, abalone diver etc.)

Other Education and Training Activities Conducted Within Projects

2004/401 - A market access guide for seafood exporters: International Residue Standards

The Italian University of Gastronomy, visited the South Australian Research and Development Institute Food Safety Research and Aquatic Sciences team in Adelaide on the 15th May 2008 and presented some lectures. The students were in Adelaide as part of their Stage Territoriale in Australia, a requirement of their university study.

2005/029 - Factors limiting the resilience and recovery of fishing abalone populations

Mr Mike Porteus attended AgFest in May 2007, to provide information and gain feedback from the project and the associated commercial and recreational closure, from the general community.

The ALife logo

Project members have continued to liaise with St Helens High School, and have identified a study area within which to conduct some experiments with the junior high students. While several of the students are qualified divers, OH&S issues associated with diving activities including the students has slowed progress. The University dive officer is keen to assist, and will most likely join future trips to work with St Helens High.

2007/706 - Estalish the technical and market data to assess the feasability of live bivalve mollusc (Australian Oyster) access in the USA

Mr Ray Brown from the Tasmanian Department of Primary Indsustries and Mr Ken Lee from the Primary Industries and Resources of South Autsralia visited the USA during August 2007 to attend the biennial ISSC workshop and conference in Albuquerque, New Mexico and liaise with USFDA officials and state shellfish program regulators. In addition, Mr Brown and Mr Lee also visited several US states to review the shellfish quality assurance programs in those states and to compare them with current Australian state programs. Lastly, during this US visit, Mr Brown and Mr Lee visited Stonybrook University on Long Island to meet with those involved in the regulatory unit of the New York state shellfish program.

2008/722 - Scope and economic analysis of options for a nationally unified breeding program that provides significant economic benefit to the Australian abalone aquaculture industry

Dr Xiaoxu Li, Dr Martin Millar, Dr Nick Elliot, Dr Nick Savva, Jonathon Lillie, Ann Flemming, Mark Gervis, Geoff Penfold, Justin Harman attended a course in selective breeding program design. on the 23rd May 2008. Two people were directly supported by the Seafood CRC to attend.

L to R - George Pitt, Stephen McLeary and Roy Palmer during the European Seafood Exhibition tours.

Education and Training Milestones and Outputs

Output/ Milestone No.	Description	Contracted Date	Achieved (Y/N)	Reasons why not achieved (if applicable)	Strategies to achieve unmet milestones
Output 4.1	Graduation of about 25 PhD students	20 by June2012; another 5 by June 2014	N	Not yet due	–
MS 4.1.1	Education and training committee established and work plan and operating processes developed	February 2008	Y	–	–
MS 4.1.2	Intial students recruited, inducted and paired with appropriate industry mentors	February 2008	Y	–	–
MS 4.1.3	Initial students gain PhD and selected students embark on career pathways in seafood	December 2011	N	Not yet due	–
Output 4.2	Research education and training through Research Program 1	June 2014	N	Not yet due	–
MS 4.2.1	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	Partially achieved	First stage of the training needs analysis completed. Stage 2 of the project developed and will be initiated during 2008/2009	Project developed and contract being drawn up so stage 2 of analysis can begin
MS 4.2.2	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	N	Not yet due	–
MS 4.2.3	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 4.2.4	CRC induction program for participants developed and implemented	December 2007	Y	–	–
Output 4.3	Postgraduate qualifications available	June 2010	N	Not yet due	–

Seafood CRC participant in the 2007 National Seafood Leadership Program - Emily Downes with Dr Patrick Hone from the Fisheries R&D Corporation with the previous Federal Minister for Agriculture, Forestry and Fisheries the Hon. Eric Abetz.

MS 4.3.1	Demand for postgraduate qualifications with seafood specialisations relevant to Research Program 1 identified and at least one postgraduate course developed and offered	February 2010	N	Not yet due	–
MS 4.3.2	Vocation and education training level skills set and new competencies relating to the outputs of Research Program1 identified and submitted for inclusion in the National Seafood Industry Training Package	June 2009	N	Not yet due	–
Output 4.4	Incorporation of external expertise into Research Program 1	June 2014	N	Not yet due	–
MS 4.4.1	Two international researcher exchanges completed	One by June 2010; the other by June 2013	Partially completed	For Program 1, 2 international researchers will be visiting Australia in the 2008/2009 reporting year	–
MS 4.4.2	Program of CRC training and education opportunities (national and international) developed and at least two bursaries or scholarship opportunities for Research Program 1 disbursed each year	June 2008	Y	–	–
MS 4.4.3	Annual program of professional development training seminars, workshops and forums relevant to Research Program 1 outputs completed	December 2008	Partially completed	The three theme business plans related to Program 1 and the education and training business plan are almost complete	–
Output 4.5	Establishment of recruitment pathways for the seafood industry and research providers	June 2014	N	Not yet due	–

Seafood CRC participant in the 2008 National Seafood Leadership Program - Gail Spriggs from Clean Seas Tuna Ltd

MS 4.5.1	Case studies on engagement in CRC activitities of young people involved in VET at two rural high schools documented and reviewed and expansion of activity evaluated	March 2008	N	Have Board approval to commence project at beginning of 2008/2009	Have engaged with the University of Adelaide to conduct the case studies
Output 4.6	Graduation of about 15 PhD students	10 by June 2012; another 5 by June 2014	N	Not yet due	–
MS 4.6.1	Initial students recruites, inducted and paired with appropriate industry mentors	February 2008	Y	–	–
MS 4.6.2	Initial students gain PhD and selected students embark on career pathways in seafood	December 2011	N	Not yet due	–
Output 4.7	Knowledge from Research Program 2 converted into educational and training tools	June 2014	N	Not yet due	–
MS 4.7.1	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	N	Not yet due	–
MS 4.8	Postgraduate qualifications available	June 2010	N	Not yet due	–
MS 4.8.1	Demand for postgraduate qualifications with seafood specialisations relevant to Research Program 3 identified and at least one postgraduate course developed and offered	February 2010	N	Not yet due	–

Seafood CRC participants in the 2008 National Seafood Leadership Program - Che Spruyt (Abalone diver with AbNormal Co,) and Ray Pratt (Sydney Fish Market)

MS 4.8.2	Vocation and education training level skills set and new competencies relating to the outputs of Research Program2 identified and submitted for inclusion in the National Seafood Industry Training Package	June 2009	N	Not yet due	–
Output 4.9	Successful incorporation of external expertise into Research Program 2 activities	June 2014	N	Not yet due	–
MS 4.9.1	Two international researcher exchanges completed	One by June 2010; the other by June 2013	Partially completed	For Program 2, 1 international researcher visited the Seafood CRC. 2 international researchers will be visiting Australia in the 2008/2009 reporting year	–
MS 4.9.2	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 4.9.3	Annual program of professional development training seminars, workshops and forums relevant to Research Program 1 outputs completed	December 2008	Y	The two theme business plans related to Program 2 and the education and training business plan are almost complete	–

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