

NSW Aquaculture Research Advisory Committee

Annual Report July 2008 to June 2009

Professor Ian White (Chairperson)
Ms Jo Pickles (Executive Officer)

NSW Department of Primary Industries
Port Stephens Fisheries Institute
Taylors Beach NSW 2316



**NSW DEPARTMENT OF
PRIMARY INDUSTRIES**

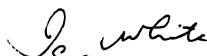
CHAIRPERSON'S REPORT

The world-wide economic crisis, the continuing impacts of drought in some parts of the state and major floods in the northern coastal region have impacted significantly on NSW's aquaculture industry and increased difficulties for producers. In such times, it is sometimes useful to consider the industry in a broader historic context. The NSW aquaculture industry is Australia's oldest aquaculture enterprise. Over the past 130 years it has weathered major droughts, massive floods, the Great Depression, two world wars, outbreaks of marine diseases, and major social changes. There is much to learn on how the industry adapted to these changing conditions.

One key observation is the role technological advances have played in increasing the resilience of the industry. These advances have been developed by innovative and observant growers aided by dedicated and committed researchers often working under difficult and uncertain conditions. It is often not easy to predict the full future impacts of research, and for that reason, it is sometimes difficult to obtain the necessary support. The history of the NSW aquaculture industry demonstrates the necessity of research and innovation. A recent example is the rapid recovery of oyster production in the Hawkesbury following the disastrous QX disease outbreak. This recovery was only possible because of long-term investment in research in a broad range of technologies. It was also the result of the continuing support of the NSW Government, the NSW Department of Primary and the Fisheries Research and Development Corporation. It is fundamentally important for the future of the industry in NSW that support for research and innovation to improve resilience and facilitate adaptation.

I want to specifically thank the efforts of ARAC members. The farmer members have been outstanding representatives of their industries despite the many pressures they face. The time they have committed to ARAC business and the strategic interests of their industries has been exemplary and it has come at considerable personal costs to them. Their insights and advice have been invaluable. I am extremely grateful to DPI staff who have assisted and contributed to ARAC. Their professionalism, dedication, energy, commitment and organisational skills have been outstanding. I also want to thank the FRDC for its continued support for the NSW aquaculture industry, which has been invaluable. The support of the peak industry associations is essential to the operation of ARAC and is greatly appreciated. Finally I am extremely grateful to the Minister and the Department of Primary Industries for their strategic initiatives in aquaculture.

ARAC is committed to increasing the profitability and growth of the aquacultural sector in NSW through applicable research. This is demonstrated in this report which I have pleasure in presenting.



Professor Ian White FTSE
CHAIR ARAC

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The NSW ARAC is operated from the Port Stephens Fisheries Institute
Taylors Beach Road, Taylors Beach, NSW, 2316
(Locked Bag 1, Nelson Bay, NSW, 2315)
Telephone: (02) 4982 1232 • Facsimile: (02) 4982 1107
Email: jo.pickles@dpi.nsw.gov.au

This report was compiled in July/August 2009

Preamble

This is the third Annual Report for the NSW Aquaculture Research and Advisory Committee (ARAC). The Minister for Primary Industries approved the formation of the Aquaculture Research Advisory committee in October 2005 to provide advice on industry contributions and R&D expenditure for all aquaculture industries in NSW. Confirmation for ARAC's establishment was confirmed in 2006 after the completion of a NSW Government review of Boards and Committees. ARAC has replaced the Oyster Research Advisory Committee (ORAC) and the former Advisory Council on Aquaculture (ACoA).

ORAC was formally disbanded after its meeting in December 2005.

The Committee

The Aquaculture Research Advisory Committee (ARAC) was established in October 2006 and held its inaugural meeting on 31 January 2007.

ARAC is a statutory committee that advises the Minister on the amount of contributions payable by the NSW aquaculture industries into trust accounts for aquaculture research and development and the expenditure of those trust funds. The NSW prawn aquaculture industry is not included as it pays research levies directly to the Commonwealth.

ARAC is established under Section 157 of the *Fisheries Management Act 1994*.

Terms of Reference

- 1 Investigate and evaluate the requirement for aquaculture research and development in NSW, after consultation with NSW aquaculture industries and with reference to NSW, Australian and overseas experience, and whether funded by the Fisheries Research and Development Corporation or otherwise;
- 2 Revise as appropriate research and development plans for NSW aquaculture research and development and promote it to the wider research community;
- 3 Advise the appropriate NSW Fisheries Research Advisory bodies and the Fisheries Research and Development Corporation on NSW aquaculture research and development matters and priorities;
- 4 Advise the NSW Minister for Fisheries on the level of funding from industry required for aquaculture research and development in NSW and on its expenditure.
- 5 Oversee the management of annual contributions for aquaculture research collected under Section 156 of the *Fisheries Management Act 1994*, and placed in separate trust accounts under Section 157 of the *Fisheries Management Act 1994*.
- 6 Report on a regular basis, including an Annual Report based on a financial year, to the NSW aquaculture industry, the NSW Minister for Primary Industries and NSW researchers on aquaculture research and development initiatives;
- 7 Facilitate the dissemination, adoption and commercialisation of the results of aquaculture research and development; and
- 8 Promote aquaculture research and development in NSW.

Membership and Selection Process

The *Fisheries Management (Aquaculture) Regulations 1995*, schedule 2 provisions relating to members and procedure of committee, section 2, states:

- 1 The Minister may convene a selection committee (including representatives of the aquaculture industry) for the purpose of recommending persons for appointment as members of a committee.
- 2 The Chairperson of a committee is to be the member of the committee at the time of being appointed by the Minister as Chairperson.
- 3 Section 157 (7) of the Act requires the Minister to ensure that a majority of the members of the committee are representatives of the aquaculture industry.

Industry members of ARAC are appointed by the Minister through a competitive selection process from Aquaculture Permit holders who have submitted expressions of interest to join the committee. A selection committee is appointed, comprised of two representatives from the NSW Farmers Association and the NSW DPI Director, Production Research. Industry members are selected on merit.

The Chairperson is appointed to the committee by the Minister.

To aid the committee with their function, NSW DPI personnel attend meetings and undertake the role of facilitator and secretariat.

Deputy Members

The *Fisheries Management (Aquaculture) Regulations 1995*, schedule 2 provisions relating to members and procedure of committee, section 3, states:

- 1 The Minister may, from time to time, appoint a person to be the deputy of a member, and at any time revoke any such appointment.

Committee Members in 2008/09

Member	Representing	Date of Appointment	Expiry Date
Prof. Ian White	Independent Chair	Oct 2006	Oct 2009
Mr Dominic Boyton	Industry	Oct 2006	April 2009
Mr Tony Troup	Industry	Oct 2006	April 2009
Mr Geoff Diemar	Industry	Oct 2006	April 2009
Ms Audrey Thors	Industry	Oct 2006	April 2009
Mr Rob McCormack	Industry	Oct 2006	April 2009
Mr Nick Arena	Industry	June 2008	June 2011

There are six members on ARAC, four lease-based (oyster) representatives and two land-based (non-oyster) representatives, which reflects the relative sizes of the industry sectors in NSW. All members of ARAC, including the independent Chairperson, are appointed for a term of three years.

Mr Nick Arena's appointment was approved by the Minister for NSW Primary Industries in July 2008. In April 2009, NSW DPI mailed expressions of interest to all aquaculture permit holders in NSW, seeking to fill vacancies as five terms of appointment were due to expire. Only a limited number of applications were received and the panel agreed to re-advertise for more applicants. Applications close in July 2009 and the panel will re-convene to consider the applications and recommend suitable candidates to the Minister for NSW Primary Industries.

Dr Trevor Gibson (Director, Food Security and Productivity), Dr Geoff Allan (Research Leader, Aquaculture), Dr Wayne O'Connor (Senior Research Scientist), Mr Ian Lyall (Manager, Aquaculture) and Mr Steve McOrrie (Extension Officer, Aquaculture) from NSW DPI sit as observers on the Committee. Ms Jo Pickles (NSW DPI) is the Executive Officer.

Meetings

Three meetings were held during the financial year 2008/09:

Member	2 Oct 2008	26 Feb 2009	28 May 2009
Prof. Ian White	✓	✓	✓
Mr Tony Troup	✓	✓	✓
Mr Geoff Diemar	✓	✓	✓
Ms Audrey Thors	x	x	✓
Mr Dominic Boyton	✓	✓	✓
Mr Rob McCormack	✓	✓	✓
Mr Nick Arena	✓	x	✓
NSW DPI			
Dr Trevor Gibson	✓	✓	✓
Dr Geoff Allan	✓	x	✓
Mr Ian Lyall	✓	x	✓
Dr Wayne O'Connor	✓	x	✓
Mr Steve McOrrie	✓	✓	✓
Ms Jo Pickles	✓	✓	✓

Declaration of Pecuniary Interests

Schedule 2 of the *Fisheries Management (Aquaculture) Regulations 1995* sets out provisions relating to members and committee procedure. Clause 9, sub clause 1 of the state:

- a a member of a committee is required to disclose any direct or indirect pecuniary interest in a matter being considered or about to be considered at a meeting of the committee, and

- b a member whose interest appear to raise a conflict with the proper performance of the member's duties in relation to the consideration of the matter must as soon as possible after the relevant facts have come to member's knowledge, disclose the nature of the interest at a meeting of the committee.

No pecuniary interests were declared in this financial year.

Trust Accounts for the 2008/09 Financial Year

Advice on Level of Contribution

Section 156 of the *Fisheries Management Act 1994* states a permit holder is required to contribute to the cost of administration or research or to other industry costs. Under section 157(4) of the *Fisheries Management Act 1994* the Minister is to appoint a committee of persons to advise the Minister on the amount of contributions payable into any trust account. Research contributions made by the aquaculture community (excluding the prawn industry) are reported to the Minister by ARAC.

Research contributions from the oyster industry have been set at \$35.00/ha/year. The amount of research contributions billed for 2008/09 was \$104,587.42.

Research contributions from the non-oyster aquaculture industry have been set at \$26/ha/year or \$127 for a minimum of 5 ha/year. The amount of research contributions billed for 2008/09 was \$24,296.99.

The required annual contribution to the Fisheries Research Development Corporation is calculated at 0.25% average gross value of production (AGVP), based on three year rolling calculations. The contribution from the oyster industry for 2008/09 was \$85,085.02 (\$90,932.05 less the fee waiver of \$5,847.03). The contribution from the non-oyster aquaculture industry for 2008/09 was \$15,346.00 (\$21,406.31 less the fee waiver of \$6,060.31).

Advice on Level of Expenditure

Section 156 of the *Fisheries Management Act 1994* states a permit holder is required to contribute to the cost of administration or research or to other industry costs. Under section 157(4) of the same Act the Minister is to appoint a committee of persons to advise the Minister on the expenditure of money in the trust account.

As at April 2009 there were 345 oyster permit holders and 164 non-oyster permit holders.

Expenditure Purpose and Level

The allocated expenditures for the 2008/09 financial year are outlined below:

ARAC REVENUE AND EXPENSES – 1 July 2008 to 30 June 2009		
*Note: this is an accrual accounting report for WBS 116-1 (Oyster Research Levy)		
Revenue:	Credit	Debit
Balance carried forward 30.06.2008	\$3,918.74	
Research Contributions billed 01.07.2008 to 30.06.2009	\$104,587.42	
Total Revenue	\$108,506.16	
Expenses:		
Internal Transfer to Committee Account		\$9,336.00
Bad Debts		\$837.00
FRDC Contribution (reduced by fee waivers for research)		\$85,085.02
Total Expenses		\$95,258.02
Balance of Cost Centre as at 30.06.2009	\$13,248.14	

ARAC Committee expenses – 1 July 2008 to 30 June 2009		
*Note: this is an accrual accounting report for WBS 2492-1		
Revenue:	Credit	Debit
Balance carried forward 30.06.2008	\$2,838.36	
Transferred from NSW DPI funds	\$14,002.00	
Total Revenue	\$16,840.36	
Operating Expenses:		
Travel		\$6,648.74
Committee Fees		\$4,808.11
Consumables		\$978.47
Total Expenditure		\$12,435.32
Balance of Cost Centre as at 30.06.2009	\$4,405.04	

ARAC REVENUE AND EXPENSES – 1 July 2008 to 30 June 2009		
*Note: this is an accrual accounting report for WBS 119-1 (Aquaculture [non-oyster] Research Levy)		
Revenue:	Credit	Debit
Balance carried forward 30.06.2008:	\$28,489.70	
Research Contributions billed 01.07.2008 to 30.06.2009	\$24,296.99	
Total Revenue	\$52,786.69	
Expenses:		
Internal Transfer to Committee Account		\$4,666.00
Bad Debts		\$171.20
FRDC Contribution (reduced by fee waivers for research)		\$15,346.00
Total Expenses		\$20,183.20
Balance of Cost Centre as at 30.06.2009	\$32,603.49	

Levy Collection

Billing is conducted on the financial year and permit holders have the option of paying in full by 30 September or by quarterly instalments at 30 September, 31 December, 31 March and 30 June of that year.

Money held in the NSW DPI Crown Trust Account does not receive interest.

Forward Budget

ARAC REVENUE AND EXPENSES – 1 July 2009 to 30 June 2010 (Oyster Research Levy)		
Revenue:	Credit	Debit
Balance carried forward 30.06.2009	\$13,248.14	
Research Contributions billed 01.07.2009 to 30.06.2010	\$111,600.00	
Total Estimated Revenue	\$124,848.14	
Expenses:		
FRDC Contribution (estimate)		\$91,000.00
ARAC Committee Expenses (Internal transfer)		\$8,000.00
Total Estimated Expenses		\$99,000.00
Estimated Balance as at 30.06.2010	\$25,848.14	

ARAC REVENUE AND EXPENSES – 1 July 2009 to 30 June 2010 (Aquaculture [non-oyster] Research levy)		
Revenue:	Credit	Debit
Balance carried forward 30.06.2009:	\$32,603.49	
Research Contributions billed 01.07.2009 to 30.06.2010	\$24,649.00	
Total Estimated Revenue	\$57,252.49	
Expenses:		
FRDC Contribution (estimate)		\$22,000.00
ARAC Committee Expenses (Internal transfer)		\$4,000.00
Minor research activities		\$20,000.00
Total Estimated Expenses		\$46,000.00
Estimated Balance as at 30.06.2010	\$11,252.49	

COMMITTEE REVENUE AND EXPENSES – 1 July 2009 to 30 June 2010		
Revenue:	Credit	Debit
Balance carried forward 30.06.2009	\$4,405.04	
Internal transfers	\$12,000.00	
Total Estimated Revenue	\$16,405.04	
Expenses:		
Consumables		\$2,000.00
Travel		\$7,500.00
Committee fees		\$4,500.00
Total Estimated Expenses		\$14,000.00
Estimated Balance as at 30.06.2010	\$2,405.04	

Recommendation on Level of Contribution

On 31 January 2007, the Committee agreed the oyster research levy should increase to \$35.00/ha/yr from \$29.00 as this amount was insufficient to maintain the contribution to FRDC at 0.25% of AGVP and operate ARAC. Letters were then written to lease-based farmers explaining the reasons for the increase. An amendment in the Regulation Review has also been prepared seeking approval to raise the levy to be in effect 2008/09. The Committee has agreed that levies be reviewed on an annual basis at the first meeting in the calendar year.

List of Activities

- In October 2008, ARAC welcomed our new member; Mr Nick Arena, who will be representing land-based aquaculture. Nick started his business; Tailor Made Fish Farms 10 years ago and farms Barramundi in Port Stephens. This land-based position was advertised via expression of interest after the previous occupant resigned.
- NSW DPI forwarded a brief to the Minister for Department of Primary Industries to support the permanency of the Extension Officer position. This position was established by NSW DPI to assist the transfer of available and emerging technology to the NSW aquaculture industry. The position was created on a temporary basis for two years (in 2007) and focuses primarily on the needs of the NSW oyster industry, while providing point of contact assistance to the land based aquaculture industry. The current term of this position is due to finish at the end of June 2009. ARAC prepared a letter of support that went with the brief. Unfortunately, NSW DPI does not have the funding to continue the role of the Extension Officer position and ARAC were advised the role will finish at the end of June 2009.
- ARAC discussed scope in the current budget for a small land-based research project up to \$20,000. The project should have direct results to existing farmers or perhaps building flexibility into their business. The Committee agreed to streamline the process for identifying R&D priorities, evaluating those of highest priority to industry, and helping assess the likely cost benefit of developing and conducting research. A new form 'Submission to ARAC for a Research Initiative' will be sent to all Aquaculture permit holders on an annual basis calling for research priorities. This will give farmers an opportunity to submit their ideas and advise of the issues that may be constraining the growth of their business. These responses will be collated and discussed at the next ARAC meeting (2 October 2009) to determine priorities.
- The history of the NSW Oyster Industry has a lot of archival material that lies with oyster farmers and it is hoped to create an oral history and photographic archive so this information it is not lost. Several committee members have made contact with various libraries and museums and information on sponsorship or funds from historical societies or heritage funds to finance the project. Professor Ian White drafted a proposal for this project and after committee consultation, forwarded it to the Social Sciences Research Development Program (within FRDC) for comment. Dr Geoff Allan will follow-up on the proposal. Some photographs have already been received and we will also seek farming history and how it happened direct from the farmers – and if you would have information you would like to contribute – please contact Jo Pickles at NSW DPI, Port Stephens (tel: 4916 3901).
- Oceanwatch sponsored and arranged an Oyster Field Day held on 23 September 2008 that focused on the environmental credentials of the oyster industry. They organised buses from the north and south coasts to transport farmers to the event on the Hawkesbury River. The day was very successful and included the NSW Oyster Industry 2008 Environmental Champion of the Year Awards as well as the People's Choice Awards for most Beautiful Oyster.

- The Committee made some minor changes to its priorities in the document ‘Planning Strategic Research for Fisheries, Aquaculture and Aquatic Conservation in NSW, 2004-2009’ and also updated (with minor changes) the ‘ARAC R&D Strategic Plan 2007-2012’ ([www.dpi.nsw.gov.au/fisheries/aquaculture/publications/industry-development/arac-r_and_d-strategic-plan-2007-2012](http://www.dpi.nsw.gov.au/fisheries/aquaculture/publications/industry-development/ arac-r_and_d-strategic-plan-2007-2012)).
- In recent years, NSW DPI, the NSW Silver Perch Growers Association and the National Aquaculture Council (NAC) have worked cooperatively to progress the approval of Minor Use Permits with the Australian Pesticides and Veterinary Medicines Authority (APVMA) for a number of chemicals used in aquaculture in Australia. These chemicals included salt, formalin, potassium permanganate, oxytetracycline, trichlorfon and copper sulphate. In addition, an application was lodged by NSW DPI for the use of clove oil as an anaesthetic at the request of the NSW aquaculture industry. ARAC will write to the NAC asking if they will take over the application for clove oil, considering a national approach, on behalf of the Australian aquaculture industry.
- The Committee discussed a request from the National Aquaculture Council (NAC) asking to attend ARAC meetings as an ‘observer’. ARAC agreed the NAC can provide a valuable contribution to our meetings and have invited Justin Fromm (the new Chief Executive Officer) to attend future meetings.
- ARAC membership for one land-based and four lease-based positions are due to expire in 2009 (membership terms are for three years). A selection panel convened on 16 June 2009 to discuss applications received for membership on ARAC (advertised via expressions of interest). Only a limited number of applications were received and the panel agreed to re-advertise for more applicants. The second call for applications closes on 31 July 2009 after which time the selection panel will re-convene to discuss and recommend applicants to the Minister for NSW Department of Primary Industries.
- ARAC discussed the research levies that had been calculated for oysters and non-oyster aquaculture NSW that are due to the Fisheries Research and Development Corporation (FRDC). The money collected from these levies goes primarily to the FRDC to support aquaculture research in NSW (primarily through the Seafood CRC). A small portion of the levy contributes to the running of the NSW Aquaculture Research Advisory Committee (ARAC) and to fund other small research activities. The contribution to FRDC is calculated at 0.25% average gross value of production (AGVP), based on three year rolling calculations. The money contributed to the FRDC is matched by the Commonwealth Government. In recent years, for every dollar the oyster industry has contributed, four have been returned.
- Continue to update the ARAC homepage on the Department’s website including the summary of discussions from previous meeting and contributing to the Aquaculture Update newsletter.

- Kept informed of the Seafood CRC. The Seafood Cooperative Research Centre (CRC) is Australia's first entity to stimulate and provide comprehensive seafood-related R&D and industry leadership on a national basis. The Seafood CRC formed the Oyster Consortium to ensure the national oyster industry became a core participant in the Australian Seafood CRC. The Oyster Consortium consists of 6 representatives from NSW, 6 from SA and 6 from Tas. The Consortium will determine a national approach to R&D on edible oysters. Together the Consortium and the Seafood CRC will determine what research and development proceeds. From here the Seafood CRC will develop the program and decide the best institution/agency and project leader to conduct the research.

Aquaculture Research and Development currently being undertaken by NSW DPI

For the most up-to-date information on oyster research and development currently being undertaken by NSW DPI, please refer to its web site: www.dpi.nsw.gov.au/research/areas/production-research/aquaculture. The NSW DPI website contains non-technical summaries of all research projects, scientific outputs and final reports.

Oyster Research and Development currently being undertaken in Australia

- 1 Project Title Industry management and commercialisation plan for the Sydney rock oyster breeding program

Principal Investigator Mr Ray Tynan

Time Frame 2005 – 2007

Funding Sources Select Oyster Company Pty Ltd, NSW DPI, FRDC and Seafood CRC (2005/209)

- 2 Project Title Oyster Consortium Strategic Plan (2007-2014)

Principal Investigator Rachel King

Time Frame 2007 - 2014

Funding Sources FRDC and Seafood CRC

- 3 Project Title Review for the Australian Oyster Consortium on their strategic market direction

Principal Investigator Ewan Colquhoun

Time Frame 2008

Funding Sources Seafood CRC

- 4 Project Title Quality, shelflife and value adding of Australian Oysters

Principal Investigator Tom Madigan

Time Frame 2009 - 2012

Funding Sources Uni SA and Seafood CRC

- 5 Project Title Australian Oyster Industry Benchmarking Program Development

Principal Investigator Shane Comisky

Time Frame 2009

Funding Sources Seafood CRC

- 6 Project Title Australian Edible Oyster Industry Business Plan

Principal Investigator Shane Comisky

Time Frame 2009

Funding Sources Seafood CRC

- 7 Project Title Securing and enhancing the Sydney rock oyster breeding program

Principal Investigator Dr Wayne O'Connor

Time Frame 2006 – 2009

Funding Sources NSW DPI, FRDC and Seafood CRC (2006/226)

8	Project Title	Enhancement of the Pacific oyster selective breeding program
	Principal Investigator	Mr Scott Parkinson
	Time Frame	2006 – 2009
	Funding Sources	ASI, FRDC and Seafood CRC (2006/227)
10	Project Title	Paralytic shellfish poisoning – A molecular genetic probe for fast, accurate detection
	Principal Investigator	Dr Shauna Murray
	Time Frame	2009 – 2010
	Funding Sources	UNSW, USYD, UTAS, NSW DPI
11	Project Title	Ecological impacts of QX Oyster disease and its management strategy in the Hawkesbury River Estuary
	Principal Investigator	Dr Brendan Kelaher
	Time Frame	2007 – 2010
	Funding Sources	UTS, NSW DPI, ARC, Hornsby Shire Council
12	Project Title	Building Bivalve Production Capacity in Vietnam and Australia
	Principal Investigator	Dr Wayne O'Connor
	Time Frame	2007 – 2012
	Funding Sources	ACIAR
13	Project Title	A critical evaluation of supply-chain temperature profiles to optimise food safety and quality of Australian oysters
	Principal Investigator	Tom Madigan
	Time Frame	2007 – 2008
	Funding Sources	SARDI and Seafood CRC
14	Project Title	Establish the technical and market data to assess the feasibility of live bivalve mollusc (Australian oysters) access in USA – Stage 1
	Principal Investigator	Steve Bowley
	Time Frame	2007 - 2008
	Funding Sources	Seafood CRC
15	Project Title	CRC Oyster Consortium – communication, extension and management of R&D results
	Principal Investigator	Rachel King
	Time Frame	2007 - 2011
	Funding Sources	Seafood CRC
16	Project Title	Develop the non-maxima pearl industry at the Abrolhos Islands (<i>Pinctada imbricate/fucata</i>)
	Principal Investigator	Derek Cropp
	Time Frame	2007 – 2011
	Funding Sources	FRDC

17	Project Title	Protecting the safety and quality of Australian oysters with integrated predictive tools
	Principal Investigator	Mark Tamplin
	Time Frame	2008 - 2009
	Funding Sources	UTAS and Seafood CRC
18	Project Title	Protecting the safety and quality of Australian oysters using predictive models integrated with 'intelligent' cold chain technologies
	Principal Investigator	Mark Tamplin
	Time Frame	2008 - 2011
	Funding Sources	UTAS and Seafood CRC
19	Project Title	Australian visit from Pierre and Helen Boudry
	Principal Investigator	Scott Parkinson
	Time Frame	2008
	Funding Sources	Shellfish Culture and Seafood CRC
20	Project Title	Methodologies for the implementation of Micro Mobile Information Systems in the Cold Chain and the resulting implications of Time Temperatures
	Principal Investigator	Paul Turner
	Time Frame	2007 - 2010
	Funding Sources	UTAS and Seafood CRC
21	Project Title	Human enteric viruses in Australian bivalve molluscan shellfish
	Principal Investigator	Tom Ross
	Time Frame	2008 - 2011
	Funding Sources	CSIRO, SARDI and Seafood CRC
22	Project Title	Proactive control of oyster spat production by controlling microbiological contamination
	Principal Investigator	Mark Tamplin
	Time Frame	2008 - 2011
	Funding Sources	UTAS and Seafood CRC
23	Project Title	A one day workshop to define oyster 'condition' and to review the techniques available for it's assessment
	Principal Investigator	Barry Ryan
	Time Frame	2008
	Funding Sources	ASI and Seafood CRC
24	Project Title	Australian Oyster Industry supply chain analysis and improvement strategy
	Principal Investigator	Tony Troup
	Time Frame	2008 - 2009
	Funding Sources	SOCo and Seafood CRC

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|----|------------------------|--|
| 25 | Project Title | Using genomic information to understand and improve the quality of the Australian South Sea Pearl |
| | Principal Investigator | Degnan, B. |
| | Time Frame | 2009-2014 |
| | Funding Sources | UQ, ARC, Autore Pearling Pty Ltd, Pearl Oyster Propagators |
| 26 | Project Title | Linking genes with the phenotype – creation of a genetic linkage map for the silver-lipped pearl oyster <i>Pinctada maxima</i> |
| | Principal Investigator | Jerry, D. |
| | Time Frame | 2008-2010 |
| | Funding Sources | ARC, James Cook University, Atlas South Sea Pearl |
| 27 | Project Title | Heterotrophically grown microalgae as a feed source for the Australian aquaculture industry |
| | Principal Investigator | Lewis, D. |
| | Time Frame | 2007-2009 |
| | Funding Sources | ARC, The University of Adelaide, South Australian Oyster Hatchery |
| 28 | Project Title | Molluscan biomonitor for quantification and impact assessment of endocrine disrupting chemicals in marine ecosystems |
| | Principal Investigator | MacFarlane, G. |
| | Time Frame | 2008-2011 |
| | Funding Sources | ARC, The University of Newcastle, NSW DPI, Port Stephens Council, Hunter Water Corporation |

Aquaculture Research and Development currently being undertaken in Australia



Australian Centre for International Agriculture Research (ACIAR)

Active and Pipeline ACIAR Aquaculture Projects. NB. All ACIAR-funded Projects have an Australian component with the Commissioned Organisation [responsible for administering the funds] being an Australian University or State or Commonwealth Government Department. *More information visit www.ACIAR.gov.au*

Active Sustainable production of aquaculture and culture based fisheries projects	
FIS/2005/114	Building bivalve hatchery production capacity in Vietnam and Australia
FIS/2005/108	Freshwater prawn aquaculture in the Pacific: improving culture stock quality and nutrition in Fiji
FIS/2005/009	Technical capacity building and research support for the reconstruction of tsunami-affected, brackishwater aquaculture
FIS/2006/138	Developing aquaculture based livelihoods in the Pacific Islands region and tropical Australia
FIS/2006/002	Aceh aquaculture rehabilitation project
FIS/2005/169	Improving productivity and profitability of smallholder shrimp aquaculture and related agribusiness in Indonesia
FIS/2004/065	Culture of promising indigenous fish species and bioremediation for barramundi aquaculture in northern Australia and PNG
FIS/2002/077	Improved hatchery and growout technology for marine finfish in the Asia-Pacific region
FIS/2002/076	Land capability assessment and classification for sustainable pond-based aquaculture systems
FIS/2002/001	Developing aquaculture in degraded inland areas in India and Australia
FIS/2001/058	Sustainable tropical spiny lobster aquaculture in Vietnam and Australia
FIS/2006/172	Winged oyster pearl industry development in Tonga
FIS/2006/140	Achieving consistent spawning of captive yellowfin tuna (<i>Thunnus albacares</i>) broodstock
FIS/2002/075	Application of PCR for improved shrimp health management in the Asian region
FIS/2005/137	Control of nodaviral disease in tropical marine finfish hatcheries: enhanced biosecurity through the application of contemporary biotechnology, epidemiology and pathobiology
FIS/2006/144	Strengthening regional mechanisms to maximise benefits to small-holder shrimp farmer groups adopting better management practices (BMPs)
Recently concluded Sustainable production of aquaculture and culture based fisheries projects	
FIS/2007/094	Policy, institutional and economic constraints to aquaculture research adoption in Vietnam
FIS/2007/045	Evaluation of production technology, product quality and market potential for the development of bivalve mollusc aquaculture in the Philippines
FIS/2005/115	Improving capability for shrimp virus PCR testing laboratories in Vietnam
FIS/2007/117	Review of sandfish pond-culture progress in Vietnam
FIS/2003/027	Planning tools for environmentally sustainable tropical finfish cage culture in

	Indonesia and northern Australia
FIS/2002/068	Improving feeds and feeding for small scale aquaculture in Vietnam and Cambodia
FIS/2001/083	Inland aquaculture in PNG: improving fingerling supply and fish nutrition for smallholder farms
Fisheries and aquatic resource management projects	
FIS/2002/111	Culture, capture conflicts: sustaining fish production and livelihoods in Indonesian reservoirs
FIS/2002/074	Capacity development to monitor, analyse and report on Indonesian tuna fisheries
FIS/2003/033	Integrated fisheries resource management (Rinconada Lakes, Philippines and NSW Australia)
FIS/2003/059	Sea ranching and restocking sandfish (<i>Holothura scabra</i>) in Asia-Pacific
FIS/2005/078	Culture-based fisheries development in Lao PDR
FIS/2005/096	Assessment of the impact of the PNG purse seine fishery on tuna stocks, with special focus on the impact of FADs
FIS/2006/137	Analyses of three databases of fisheries data from Mekong River
FIS/2006/142	Developing new assessment and policy frameworks for Indonesia's marine fisheries, including the control and management of IUU fishing
FIS/2006/183	Development of fish passage criteria for floodplain species of central Laos
FIS/2007/076	Thai Department of Fisheries assistance with Lao Fish Passage Development Program
FIS/2007/116	Improving resilience and adaptive capacity of fisheries-dependent communities in Solomon Islands
FIS/2008/043	Training in soil assessment and scientific writing for aquaculture officers in PNG
Recently concluded Fisheries and aquatic resource management projects	
FIS/1997/031	Pearl oyster resource development in the western Pacific
FIS/2003/051	Improving sustainability and profitability of village sea cucumber fisheries in Solomon Islands

Australian Research Council (ARC)

New and ongoing projects and fellowships of the Australian Research Council. *For more information visit www.arc.gov.au*

Project ID	Project Title
DP0772271	Omega-3 fatty acids, appetite and growth in farmed fish
DP0878499	Omega-3 fats in vegetable oils: Improving their benefits
DP0880358	Production of structured designer particles with high encapsulation capacities and efficiencies
DP0985995	The essence of being an animal: sponge allorecognition and the evolution of individuality
FF0456170	Integrative behaviour: a new synthesis
LP0775100	Heterotrophically grown microalgae as a feed source for the Australian aquaculture industry
LP0775480	Hatchery production of rock lobster seedstock for aquaculture and enhancement with emphasis on ozonation of culture water to reduce disease
LP0776273	Establishing an ecological basis for stocking density of Australian bass in freshwaters: Experimental field tests of a general numerical model
LP0776759	Uncovering the genetic basis for saxitoxin production in Australian marine and freshwater systems: novel molecular tools for management
LP0776985	Alternate diets for a sustainable aquaculture industry: neuroethology of feeding in barramundi
LP0882042	Reducing skeletal malformations in cultured marine fish using gene expression, improved nutrition and advanced system operation
LP0882235	Linking genes with the phenotype - creation of a genetic linkage map for the silver-lipped pearl oyster <i>Pinctada maxima</i>
LP0883806	An investigation of the underlying mechanisms that control gender and fertility in the Moreton Bay Bug, <i>Thenus orientalis</i>
LP0883880	Improving vaccine performance through understanding host-pathogen interaction in yersiniosis
LP0883918	Molluscan Biomonitor for Quantification and Impact Assessment of Endocrine Disrupting Chemicals in Marine Ecosystems
LP0989830	Regulation of saxitoxin production in bacteria and algae
LP0990606	Optimising barramundi production through early prediction of thermal tolerance and growth
LP0990664	Towards closing the life cycle of marine sponges: benefits for public aquarium display and coral reef conservation

Fisheries Research and Development Corporation (FRDC)

The Fisheries Research and Development Corporation plans, invests in and manages fisheries research and development throughout Australia. It is a federal statutory authority jointly funded by the Australian Government and the fishing industry. *For more information visit: www.frdc.com.au*

Project ID	Project Title
2009/214	Sector Overview: National Fisheries and Aquaculture RD&E Framework
2009/213	Emerging and Developing Aquaculture Program
2008/234	ASBTIA: Investigation of causes of mortalities in farmed SBT - variation to project 2008/228
2008/228	ASBTIA: Maintaining SBT High Health Status - understanding SBT parasites and investigating ways to mitigate their influence on SBT production
2008/227	ASBTIA: SBT Research Program - Coordination, facilitation and administration
2008/224	Australian Mussel Association - formation and levy setup
2008/222	Rickettsia-like organism vaccine development for the salmonid aquaculture industry
2008/221	Atlantic Salmon Aquaculture Subprogram: whole genome selection to improve selection efficiency for AGD resistance
2008/218	Extension funding application- AGD Vaccine phase III
2008/217	Atlantic Salmon Sub Program: Effect of temperature on reproductive development of maiden and repeat spawning Atlantic salmon: understanding the basis for improved egg survival and quality
2008/202	Towards reliable hatchery-produced quality blue mussels: an integrated approach to optimising supply
2007/249	Market investigation of the impact of rock lobster aquaculture
2007/234	Seafood CRC: AGD vaccine phase III; Sea-based trials, vaccine refinement and commercialisation
2007/232	FRDC initiative - a national hatchery network
2007/230	Aquaculture Nutrition Subprogram: Technical review, project management and development services.
2007/229	Aquafin CRC - Salmon Aquaculture Subprogram: Facilitation and administration
2007/228	Rock Lobster Propagation Subprogram: Facilitated development and coordination of research towards the commercial propagation of rock lobsters in Australia
2007/226	Aquatic Animal Health Subprogram: rapid strain identification of the bacterial fish pathogen <i>Streptococcus iniae</i> and development of an effective polyvalent vaccine for Australian barramundi
2007/225	Aquatic Animal Health Subprogram: Metazoan parasite survey of selected macro-inshore fish of southeastern Australia, including species of commercial importance

2007/224	Seafood CRC: Increasing the profitability of <i>Penaeus monodon</i> farms via the use of low water exchange, microbial floc production systems at Australian Prawn Farms and at CSIRO
2007/221	Evaluating the Southern Bluefin Tuna cell lines as a platform for testing the effectiveness of antioxidants in preserving flesh quality
2007/216	Develop the non-maxima pearl industry at the Abrolhos Islands (<i>Pinctada Imbricata/fucata</i>)
2006/243	Aquatic Animal Health Subprogram: development of management strategies for herpes-like virus infection of abalone
2006/237	Consumer research to assist growth for Australian farmed prawns
2006/235	Rocklobster Propagation Subprogram: commercially viable production of temperate rocklobster (<i>Jasus spp.</i>) puerulus from eggs
2006/227	Seafood CRC: enhancement of the Pacific oyster selective breeding program
2006/226	Seafood CRC: securing and enhancing the Sydney rock oyster breeding program
2006/225	Aquafin CRC - SBT Aquaculture Subprogram: improving fish husbandry and performance through better understanding of the relationship of fish stress and health
2006/217	Repositioning the Australian prawn farming industry for growth
2006/215	Seafood CRC: southern rocklobster industry research and development planning, implementation and extension
2006/205	Genetic improvement of <i>P. monodon</i> - establishing commercial readiness
2005/209	Seafood CRC: industry management and commercialisation plan for the Sydney rock oyster breeding program
2005/201	Aquafin CRC - Atlantic Salmon Aquaculture Subprogram: environmental control of growth and early maturation in salmonids
2004/404	Identification of demand drivers, distribution requirements and supply chain efficiencies to assist development of the Hiramasa Kingfish (<i>Seriola lalandi</i>) and Suzuki Mulloway (<i>Argyrosomus hololepidotus</i>) brands in Melbourne
2004/258	Aquaculture Nutrition Subprogram: further development towards commercialisation of marine fish larvae feeds – Microdiet
2004/239	Rock Lobster Enhancement and Aquaculture Subprogram: strategic planning, project management and adoption
2004/238	Aquaculture Nutrition Subprogram: Further development towards commercialisation of marine fish larvae feeds - artemia
2004/236	Aquaculture Nutrition Subprogram: evaluation of value-added grain protein products for Atlantic salmon and black tiger prawns
2004/233	Abalone Aquaculture Subprogram: investigating the immunology of stressed abalone (<i>Haliotis</i> species)
2004/221	Aquafin CRC - Enhanced hatchery production of striped trumpeter, <i>Latris lineata</i> , in Tasmania through system design, microbial control and early weaning
2004/220	Aquafin CRC: feed technology for temperate fish species
2004/216	Aquafin CRC - SBT Aquaculture Subprogram: strategic planning, project management and adoption

2004/209	Aquafin CRC - SBT Aquaculture Subprogram: application of the use of dietary supplements for improving flesh quality attributes of farmed SBT
2004/205	Aquafin CRC - SBT Aquaculture Subprogram: provision of research platforms for projects requiring Port Lincoln based R&D support
2003/649	Aquatic Animal Health Subprogram: industry's emergency preparedness and response to mass mortality of yellowtail kingfish <i>Seriola lalandi</i> : development of plans and protocols
2003/242	Rock Lobster Post Harvest Subprogram: value-adding the southern rock lobster fishery - optimising flesh quality of under-valued large lobsters for the sashimi market
2003/226	Aquafin CRC - Southern Bluefin Tuna Aquaculture Subprogram: net fouling management to enhance water quality and southern bluefin tuna (<i>Thunnus maccoyii</i>) performance
2003/221	Innovative Solutions for Aquaculture: assessment of novel monitoring and modelling techniques for monogenean skin and gill parasites
2003/220	Innovative Solutions for Aquaculture: potential for parasite interactions between wild and farmed kingfish, discrimination of farmed and wild fish and assessment of migratory behaviour
2003/211	Rock Lobster Enhancement and Aquaculture Subprogram: advancing hatchery propagation of tropical rock lobsters (<i>Panulirus ornatus</i>)
2003/209	Seafood CRC: Sydney rock oysters: overcoming constraints to commercial scale hatchery and nursery production
2001/249	Aquafin CRC - SBT Aquaculture Subprogram: optimisation of farmed Southern Bluefin Tuna (<i>Thunnus maccoyii</i>) nutrition to improve feed conversion efficiency and reduce production costs



Australian Seafood Cooperative Research Centre (Seafood CRC)

The Australian Seafood Cooperative Research Centre is Australia's first entity to stimulate and provide comprehensive seafood-related research and development and industry leadership on a national basis. *For more information visit: www.seafoodcrc.com.au*

The Seafood CRC programs and research
Program 1 Production innovation
Program 2 Product and market development
Program 3 Education and training
Program 4 Commercialisation and utilisation
Administration
Program 1 research projects
Sydney Rock Oysters: Overcoming constraints to commercial scale hatchery and nursery production
Factors limiting the resilience and recovery of fishing abalone populations
Industry management and commercialisation plan for the Sydney Rock Oyster breeding program
Spatial management of Southern Rock lobster fisheries to improve yield, value and sustainability
Securing and enhancing the Sydney Rock Oyster breeding program
Enhancement of the Pacific Oyster selective breeding program
Increasing the profitability of Penaeus monodon farms via the use of low water exchange, microbial floc production
Resolving the larval rearing, juvenile development and productivity constraints for propagates Tuna and improvements to the production of Kingfish and Mulloway
Southern Bluefin Tuna maturation and sexing - Develop and apply new technologies
Yellowtail Kingfish juvenile quality - Identify timing and nature of jaw deformities in Yellowtail Kingfish and scope the likely causes of condition
Review of available tools that can be used to support selective breeding programs in the Seafood CRC
Addressing the key aquatic animal health issues limiting the production of Yellowtail Kingfish and Southern Bluefin Tuna
Second generation tuna feeds
Southern Bluefin Tuna larval/juvenile rearing
Scope and economic analysis of options for a nationally unified breeding program for the Australian abalone aquaculture industry
Development of a genetic management and improvement strategy for temperate marine finfish
Population genetic structure of Sea Cucumber in Northern Australia
The advancement of reproductive development in Tuna using hormonal manipulations of kisspeptin, the gatekeeper of puberty

Improvements in Yellowtail Kingfish larvae and juvenile survival and quality
Amoebic gill disease vaccine phase III: Sea-based trials, vaccine refinement and commercialisation
Increasing seedstock production of domesticated Giant Tiger Prawns through male fertility
Commercial production of all female reproductive sterile triploid Giant Tiger Prawns: Assessing their commercial performance in ponds
Development of a genetic management and improvement strategy for Australian cultured Barramundi
Defining oyster condition and reviewing techniques available for assessment
Improving profitability in the Western Rocklobster fishery using a Rocklobster trap
Product quality issues (maturation and harvest stress)
Program 2 research projects
Development of a quality index for Australian seafoods
A market access guide for seafood exporters: International residues
A critical evaluation of supply-chain temperature profiles to optimise food safety and quality of Australian oysters
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
Assessment of new market opportunities and development of effective market penetration strategies for Southern Rocklobster
Establish the technical and market data to assess the feasibility of live bivalve mollusc (Australian Oysters) access in the USA - Stage 1
A review of predictive and rapid diagnostic technologies relevant to the Australian seafood industry
A review of technical market access issues relevant to the Australian seafood industry members of the Australian Seafood CRC
A review of traceability and freshness indicators
A review of health benefit research and development
Technical market access review: Product quality and integrity and technical market access support
A review to identify capability in functional foods research
A functional foods strategy
Passion for prawns - Benchmarking performance
Protecting the safety and quality of Australian oysters with integrated predictive tools
Increased consumption of canned tuna by demonstrating erythrocyte omega-3 fatty acid profile in adult people
Improving post-harvest quality of Sardines through utilisation of flow ice technology
A community intervention approach to increasing seafood consumption
Develop, conduct and analyse a small survey of seafood buyers at ESE 2008
International trade negotiations impacting on seafood industry interests
Improving supply chain practices and processes to increase the value of Southern Rocklobster
South Australian marine finfish to Europe market development plan

Australian Oyster industry supply chain analysis and improvement strategy
Project development for retail transformation
Program 3 projects - students and post doctoral research scientists
PhD projects
Methodologies for the implementation of micro-mobile information systems in the cold-chain
Protecting the safety and quality of Australian oysters using predictive models integrated with 'intelligent' cold chain technologies
Understanding quality in abalone
Understanding the penaeid prawn sex determination and developing monosex induction strategies for commercial application
Nutritional factors influencing the performance of Yellowtail Kingfish cultured at low temperatures
An investigation of the microbiology and biotechnical properties leading to extended shelf-life in Goldband Snapper
Characterisation of selected fish processing co-products and development of novel integrated bioprocesses for value-added food and non-food bioproducts
Antiviral activity and resistance to Abalone virus ganglioneuritis
Understanding and forecasting seafood suppliers and buyers behaviour trading at the Sydney Fish Market
Human enteric viruses in Australian bivalve molluscan shellfish
Processing of Sea Cucumber viscera for bioactive compounds
Using the mucosal antibody response to recombinant Neoparamoeba perurans attachment proteins to design an experimental vaccine for amoebic gill disease
Proactive control of Oyster spat production by controlling microbiological contamination
The effect of temperature on reproductive development in maiden and repeat spawning farmed Atlantic Salmon
Quality, shelf-life and value adding of Australian Oysters
Determination and manipulation of reproductive status of the captive reared Southern Bluefin Tuna
Improvement of Yellowtail Kingfish production efficiency through food and feeding management
Honours Projects
Understanding the role of kiss/kissr1 system in controlling puberty in Yellowtail Kingfish and Southern Bluefin Tuna
Evaluation of a saline water caldoceran as new live food for fish larvae
Novel products from Blue Swimmer Crabs
Post Doctoral Research Scientist projects
Quantitative genetics scientist
Seafood processing scientist
Larval and early juvenile marine finfish rearing scientist
Benchmarking consumers physical and mental availability for seafood products and brands in different buying situations research scientist
Aquatic animal health scientist
Shellfish safety scientist

Seafood molecular biologist
Program 3 projects - education
Specialist education projects
Seafood CRC induction project
Training needs analysis/learning environment analysis - pilot project
ALife - Promoting the Australian seafood industry as a career path for generation X and Y
Implementation of company training needs analysis scoping survey to initiate CRC's prioritised workplace training
Developing networks and mechanisms to make more effective use of scientific and community knowledge and skills
Seafood CRC professional diploma (entrepreneurship)
Master classes
Advances in marine finfish hatchery technology in Australia
Latest trends in seafood packaging
Industry bursaries
WERA099 and National Shellfish Conference bursaries
European seafood exposition 2008 bursaries
Sponsorship of the 2008 national seafood industry leadership program
Study tour based at the National Institute of Water and Atmospheric Research
National shellfish conference, Whiskey creek hatchery, Taylors' Shellfish, Hatfield Marine Science Centre and Aqua Technics
Sponsorship of the 2009 national seafood industry leadership program
Research Travel Grants
Codex alimentarius working group on pathogenic marine vibrio species
European commission and Australian embassy, IFREMER and the 7th International Conference on Molluscan Shellfish Safety
Visiting Experts
Australian visit from Professor Michael Crawford - London Metropolitan University
Australian visit from Dr Pierre Boudry and Dr Helen McCombie - IFREMER
Australian visit from Dr Daniel Khan and Professor Mike Dillon, Grimbsy Institute and Humber Seafood Institute, Uk
Australian visit by Professor Clemens von Schacky auf Schofield, Ludwig-Maximilians Universtitat, Germany
Program 4 projects
Oyster consortium - Communication, extension and management of R&D results
Australian abalone industry R&D planning, implementation and extension
Australian farmed prawn industry R&D planning, implementation and extension
A business plan for the Australian Barramundi
Review of the Australian Oyster Consortium on their strategic market direction
Australian farmed prawn industry R&D planning, implementation and extension
Defining Oyster "condition" and review of techniques available for assessment
Australian Oyster industry business plan