3rd International Rock Lobster Congress

Mr R Edwards

FISHERIES
RESEARCH &
DEVELOPMENT
CORPORATION

FINAL REPORT

Project No. 98/341

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NON TECHNICAL SUMMARY

98/341	3rd International Rock Lobster Congress

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NON TECHNICAL SUMMARY:

The 3rd International Lobster Congress was hosted by the South Australian Rock Lobster Advisory Council, in conjunction with Primary Industries and Resources South Australia. The Congress received its funding from the major sponsor, the Fisheries Research and Development Corporation, registrations and sponsorship. It was held over 3 days, Wednesday, September 22 to Friday, September 24, 1999 (with a welcoming 'Icebreaker Reception' on Tuesday evening of September 21) in Adelaide, South Australia.

The purpose of the 3rd International Lobster Congress was to provide a forum for diverse interest groups to voice their opinions on the future direction for lobster industries. Fishers, scientists, environmentalists, managers, processors and politicians participated in discussions and comparisons of lobster fishing on a global level. Over the course of this 3 day Congress, more than 300 participants were in attendance to discuss some of the key issues affecting lobster fisheries around the world. Delegates were primarily from around Australia, but others travelled from New Zealand, the USA, South Africa, Norway and Canada.

The Congress theme was 'Manage Your Destiny' and the program mix was specifically designed to raise industry awareness levels about key issues that require managing both now and in the future. Thirty-five speakers from around the world presented information on a broad range of topics, from aquaculture and puerulus growout to indigenous issues, resource sharing, access security, marine protected areas and markets. The key areas that emerged for industry involvement in future management were in three broad areas: (1) environment, (2) resource sharing and (3) marketing.

Emerging issues/concepts raised in relation to the environment which industry need to address include: ecosystem interactions, ecological sustainable development and marine parks, with the overriding message being that industry must participate in the debate and also invest in the necessary research to effectively promote its position.

In the area of access security new information was presented about measuring the value of a fish for competing uses and provided direction for the initiatives to establish more defined and secure rights. Further effort in developing property rights was a key resolution from the Congress.

The Congress also encouraged upgraded effort in the area of marketing and profile. A concept floated towards an Australian/New Zealand cooperative effort and a commitment made to a national group to investigate the potential for cooperative action in the market place. The need to promote the value of the industry to the public and government was highlighted.

Along with the intense discussion, time was taken to enjoy South Australia's hospitality, with the 'Fishermen's Frenzy' on Wednesday evening, held at Fishing Industry House. The seafood was superb, the setting by the dock at Port Adelaide was ideallic, with a number of boats on display at the port. The mood was positive and alive.

The Congress resolutions reflect the commitment of the participants to working towards a common goal of sustainably, well managed fisheries world-wide, while building the value of the resource.

Background:
The International Lobster Congress, originally a US/Canadian conference, expanded to involve representatives from lobstering countries around the world. The purpose of the Congress is sharing information, exploring new technologies, discussing common problems and examining possible solutions to critical issues affecting the industry. Over 500 industry members attended the 2nd Congress in 1994, held in Portland, Maine. The South Australian rock lobster industry secured the rights to host the 3rd International Lobster Congress in 1999, after negotiations with the University of Maine Lobster Institute.

Given the size and value of the industry in Australia, information exchange is emerging as a key impediment to development and value adding. The geographical spread of the industry has meant communication between fisheries has been poor and the International Congress was seen as a potential launching pad for the upgrading of the Tri-State Lobster Conference to a regular national lobster industry conference.

Need:
The changing marketplace and production profile of rock lobster internationally dictates that the Australian rock lobster industry applies state of the art technology in management, research and development, if we are to maintain a competitive position and grow the value of the limited resource.

At present no vehicle exists to allow industry an effective interchange of ideas or to consider leading edge research and development from around the globe. Essentially the Australian lobster industries operate in isolation, disjointed by distance and State borders.

An outcome of the most recent Tri-State Conference was a call for a National Lobster Conference including all States and species not covered, to establish a forum for industry Australia-wide to make a start at building a national focus on management, marketing, development and problem solving.

Objectives:
The objectives of the project were to:
1. provide an international class lobster industry Congress, and
2. ensure a financially viable event.

Methods:
A Congress steering committee, comprising representatives of industry (SARLAC Directors) and Primary Industries & Resources SA (including SARDI) was established to oversee the planning and implementation of the Congress. A project work team comprising the event manager, industry project officer, marketing consultant and administrator were appointed to undertake the day to day operations to deliver the event.

A world-wide electronic network of contacts with interest in such a Congress was established as a first step, along with 6 key persons with responsibility for designing the program. The network was used as a vehicle for:-
- gathering ideas and assessing program areas and topics,
- building awareness,
- developing the program,
- securing international sponsorship,
- communications with participants,
- communications with potential speakers, and
- administering the registrations.

A detailed event delivery program and schedule was drawn up by the work team and approved by the Congress Steering Committee immediately upon formal commencement of the project. The plan detailed roles and responsibilities, time lines, financial targets and budget constraints.

Once the plan was established and agreed, the event manager co-ordinated the work team consultants and project personnel to deliver each segment of the event. The event manager and project officer reported regularly to the Steering Committee.

A preliminary Congress notice was produced and distributed globally, followed by the registration brochure, including preliminary Congress and social program (see Appendix 3). Sponsorship and trade display packages were developed and marketed to potential corporate supporters. Support from the SA lobster industry was committed well beyond expectations. Registrations were made by phone, post and the internet, and a database was established to track registrations.

The official program was produced and distributed to participants when they arrived (see Appendix 4).

Notification of the event generated widespread interest and unexpected requests from the scientific community to be involved. This interest converted into a number of workshops and meetings being convened in conjunction with the Congress. The Congress administration and event management resources were used to assist in delivering the following:

- International Lobster Health Symposium,
- Sampling Workshop,
- AGM of the SA Northern Zone Rock Lobster Fishermen's Association Inc, and
- Rock Lobster Aquaculture Seminar and Workshop.

The work plan was followed through to the conclusion of the event. The proceedings have been produced and distributed to key participation groups, and are available on the SARLAC web page http://www.rocklobster.org.au.

Results:

Participants

The hosting of the Congress attracted 320 full and part time participants, primarily from Australia and New Zealand, but with representatives from South Africa, Norway, USA, and Canada. Other workshops/meetings conducted as part of the week included:

- International Lobster Health Symposium – 80 participants,
- Sampling Workshop – 25 participants,
- AGM SA Northern Zone Rock Lobster Fishermen's Association Inc – 25 participants, and
- Rock Lobster Aquaculture Seminar and Workshop – 15 particpants.

Program

The program was broken into five key areas. They were:

- Water to Waiter – Processing and Lobster Culture,
- Resource Sharing,
- Industry Management,
- Marine Conservation, and
- Markets and Trade.

A range of national and international speakers participated and the feedback from participants was that the overwhelming majority of presentations were of a high standard, and provided useful information. Interestingly, all sessions were highly attended.

The program areas touched on key topics impacting on the lobster industry, nationally and globally, and provided specific guidance for future activity in each area. The program was specifically structured with short presentations and long discussion panels at the end of each session, with the program concluding at 3pm each day. Feedback from industry leading up to the Congress indicated that full day programs are not appropriate. It appears that the structure of the program was successful.

Venue

The venue was the Stamford Grand Hotel, Glenelg, and all feedback received was that the venue and their staff were outstanding, and provided top class support for the event. Amazingly, there was not a problem with the audio visual equipment over the 3 days.

Social Program

Apart from the official Dinner and Icebreaker Reception, the main social event was tagged the 'Fishermen's Frenzy', which incorporated the lobster season launch. This was launched the Deputy Premier. We continue to receive feedback from participants about the success of this event.

Industry Participation
A key feature of the event was the level of input by the lobster industry. Support in developing the program was provided from Western Australia, New Zealand and Tasmanian industries in particular. An industry team put together the program which was believed to be appropriate for the lobster industry. Lobster fishermen were active throughout the delivery of the event in partnering all international guests and speakers. Each guest/speaker was allocated an individual fisherman to show them around and introduce them to industry members and ensure that, at all times, they were actively involved in the event.

Industry members also participated in chairing sessions as well as assisting with panel sessions. In particular, Lionel and Elaine Carrison managed a full audio taping of the conference throughout, as well as undertaking photography duties. Overall, it was a great team effort.

Trade Displays
Fifteen exhibitors participated in the trade displays, which provided a blend of service provider information, latest technology and industry information. This was complemented with aquaria, holding 5 species of Australian lobsters, live. These lobster were the subject of a Species Taste-Off, held as a precursor to the Congress Dinner on the final evening. The live lobster provided tremendous interest to participants.

Public Relations
The event generated considerable media coverage, both written and primarily radio, with a range of interviews throughout the week of keynote speakers and industry personnel.

Resolutions
The following were the Congress Resolutions:

1. The Congress reaffirms the commitment to sustainability of the world's lobster resources and their environment.
   - The sustained utilisation of lobster resources.
   - The goal of a secure rights-based framework that incorporates all extractive and non-extractive stakeholders.
   - The goal of genuine co-management of fisheries.
2. The Congress encourages the free exchange of information and ideas to achieve these aims.
3. The Congress is committed to promoting the social and economic value of lobster fisheries:
   - By encouraging sustainability.
   - By advocating the removal of barriers to trade.
   - By promoting the social and economic benefits derived from lobster resources to nations, regions and local communities.
4. The Congress confirms lobster as the premium seafood choice of a discerning world market.

Benefit:
The direct benefits of the Congress are not measurable, but can be described. The nature of the program saw delivery and consideration of information from around the globe in a number of key areas. These included:

- harvesting and post-harvest handling,
- lobster culture,
- markets and marketing,
- resource sharing, and
- lobster fishery management.

The trade area saw direct exposure to new technology and services from a range of commercial and government service providers.

The second area of benefits has come in the form of two initiatives from the Congress. The first is the agreement to host a regular national lobster industry conference, probably in line with the national fishing industry conference. The second outcome was a commitment to consider the appropriateness of a co-ordinated activity on marketing and trade issues. Follow up from the Congress has occurred in this area.

Finally, the other area of direct benefit in hosting the Congress has been a clear demonstration by the industry that, when well resourced, it is mature enough to manage major projects on the national and international stage, in a professional manner.

The Congress has provided a leadership example for the industry.

Further Development:
Industry leaders met during the Congress to discuss future activities. It was agreed that a national conference should be held probably biennially, and in conjunction with the national fishing industry conference. It was recommended that this initiative be supported.

Conclusion:
The key desired outcomes of the project were a world-class and financially viable event. Defining a world-class event is difficult, but some judgements can be made against a number of criteria, relevant to the hosting of such events.

The event is assessed as follows:
- **number of participants** – adequate, and should have been more,
- **relevance of program** – feedback positive,
- **participation in social program** – high and feedback very positive,
- **venue suitability** – extremely professional and ideal setting,
- **event management team** – feedback very professional and no problems during the event,
- **meals** – all food well received and no negative feedback, and
- **quality of written material** – high and was an area where the budget was blown out – feedback positive.

With regard to the financial viability of the event, the budgeted income was $198,825. Actual income received, including standing pledges was $179,535. Budgeted expenditure was $198,825. Actual expenditure was $182,438, including an allowance of $1000 for production and distribution of proceedings. A shortfall of $2903 has been incurred by SARLAC.

The areas where large variations from budget occurred were as follows:
- registration fees were down on budget,
- sponsorship was up on budget,
- printing and design was 3 times budget, and
- event project management fee – reduced to meet budget.

APPENDIX 1

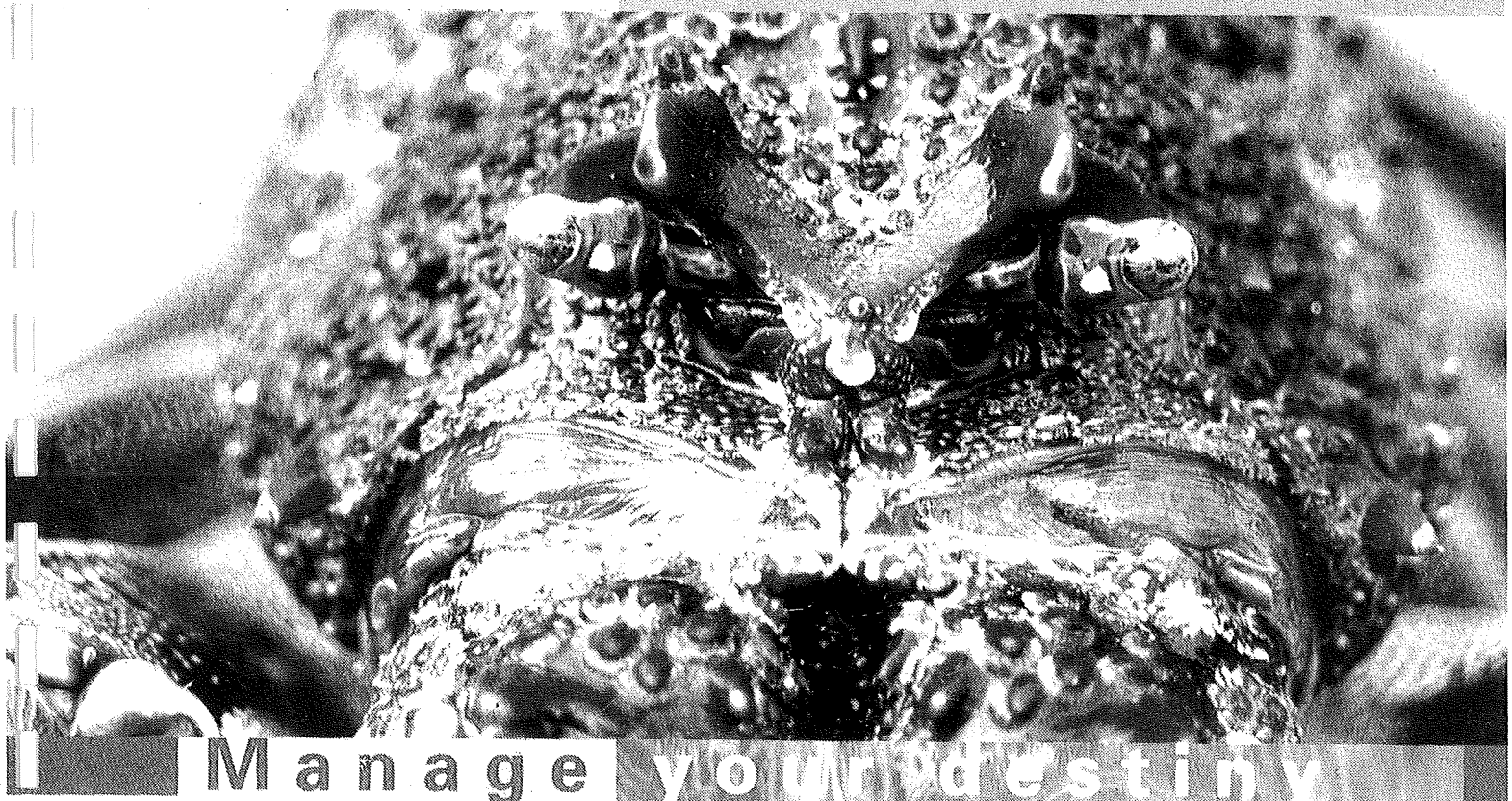
Congress Proceedings

3rd INTERNATIONAL LOBSTER CONGRESS

SEPTEMBER 21-24, 1999

ADELAIDE, SOUTH AUSTRALIA

CONGRESS PROCEEDINGS



Manage your destiny

Stamford Grand Hotel

Adelaide

South Australia

3rd International Lobster Congress

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INTERNATIONAL
LOBSTER
CONGRESS

SEPTEMBER 21-24, 1999
ADELAIDE, SOUTH AUSTRALIA

3rd International Lobster Congress

Hosted by the South Australian Rock Lobster Advisory Council in conjunction with Primary Industries and Resources South Australia.

Tuesday to Friday, September 21-24, 1999
Stamford Grand Hotel, Adelaide, South Australia

CONGRESS PROCEEDINGS

Editors:
Roger Edwards, Karen Raymond

This report was produced by the **South Australian Rock Lobster Advisory Council**.

The 3rd International Lobster Congress was a collaborative effort of the **South Australian Rock Lobster Advisory Council** and **Primary Industries and Resources South Australia**, with major funding from the **Fisheries Research and Development Corporation**, along with a host of sponsors and supporters.

SARLAC

PRIMARY INDUSTRIES AND RESOURCES SA

FISHERIES RESEARCH & DEVELOPMENT CORPORATION

Dear Reader

We, the Rock Lobster Industry of South Australia, and the State Government of South Australia (PIRSA) are pleased to present the proceedings from the 3rd International Lobster Congress.

The Congress was specifically pitched with a combination of practical yet key issues, which directly affect lobster fishers all over the world as a business. This was mixed with a blend of science, management and markets to come up with a program which we believe provided tremendous benefits whether you are a fisher, manager, scientist or marketer.

We are pleased to have followed on from the lead set by the Americans, who hosted the 1st and 2nd International Lobster Congresses in the early 90s. We hope we have achieved a similar standard with the 3rd International Lobster Congress.

Yours sincerely

Daryl Spencer
Director
South Australian Rock
Lobster Advisory Council
(SARLAC)

Gary Morgan
Director of Fisheries
Primary Industries and
Resources South Australia
(PIRSA)

The organisers of the 3rd International Lobster Congress would like to thank the following individuals, without whom this Congress would not have been possible.

Kristina Altschwager
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Daryl Spencer
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Howel Williams
Lucia Wyatt

South Australian Southern and Northern Zone Rock Lobster Fisheries Management Committees.
Smoked Fish donated by Lake George Seafood.

The patisserie items presented on the dessert table at the Fishermen's Frenzy were prepared by the Year 12 Food and Hospitality students of Seymour College.

For further information
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Congress Sponsors

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The University of Adelaide

K&S Diesel Power

New Zealand Rock Lobster Industry Council

National Institute of Water and Atmosphere

Ansett Australia Cargo

Western Australian Fishing Industry Council

Bickford's

Yalumba

Seafood Council (SA) Ltd

Taylor Marine

The Lobster Institute, University of Maine

Mountadam

Quin Marine

Coopers

Layzell Crash Repairs

Geraldton Boat Builders

Horwath Accountants

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RESOLUTIONS OF THE CONGRESS

1. The Congress reaffirms the commitment to sustainability of the world's lobster resources and their environment.

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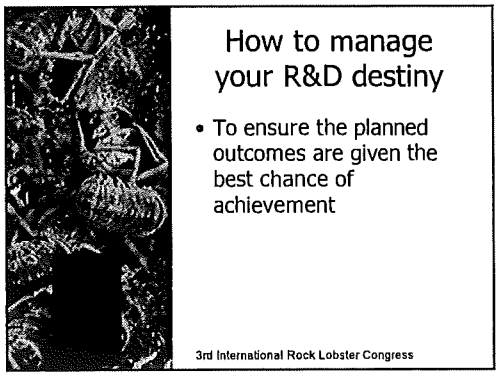
Major Sponsor Address

Mr Peter Dundas-Smith
Executive Director, Fisheries Research & Development Corporation (FRDC)

The Honourable Rob Kerin, ladies and gentlemen.

The agenda for this Congress is as impressive as it is broad in the topics that it covers. So, as no doubt you would expect, in my opening address to you this morning I will focus on research and development.



And specifically I will also give you an insight into how I think the Australian Rock Lobster sectors should manage their R&D destinies.

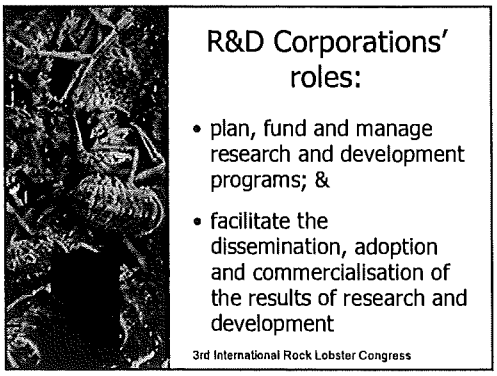
That is, what they need to do **to ensure that the outcomes they want from R&D are given the best chance of achievement**.

In Australia we have by all accounts a unique and highly regarded system for planning, funding and managing rural R&D.

The system comprises a number of rural R&D corporations, which are financially supported by their respective industries and the Federal Government.

Their role is to:

- **plan, fund and manage research and development programs;**
- **facilitate the dissemination, adoption and commercialisation of the results of research and development**



Over its seven years of existence the FRDC has found that the best way to fulfil its role is to involve its stakeholders - industry, government and the community in all phases of the project from planning to adoption of results.

This is not as easy as it should be!

The FRDC has made made substantial investment in Rock Lobster R&D over the last few years. The research and development projects funded by the FRDC include:

1971/018	Preliminary investigation of the south-east coast of WA to determine the possibility for the development of a fishery on southern rock lobster
1972/014	Establishment of juvenile rock lobster sampling sites for prediction of catch fluctuations
1972/022	Monitoring and evaluation of management measures in the WA rock lobster fishery; study of rock lobster predation by octopus
1972/029	Studies of the western population of the southern rock lobster in the south-east region of South Australia
1973/014	Study of octopus predation on rock lobsters
1974/015	Separating meat from rock lobster and fish
1975/007	A study of the amateur fishery for the western rock lobster (Panulirus cygnus)
1975/022	Determination of population parameters for yield calculations in the Tasmanian southern rock lobster fishery
1976/020	Ecology of coastal reefs: the nurseries of juvenile western rock lobsters
1977/021	A study of fishery-induced mortality of under-sized rock lobsters
1977/037	Research on technology of processing rock lobster in relation to drowning before tailing

1978/003	An investigation of the trace elements present in bronze whaler sharks and rock lobsters
1979/020	Socio-economic study of the rock lobster industry in the south-east of South Australia
1979/021	Alternative management strategies for the western rock lobster
1983/047	Measuring the feeding range of western rock lobster and the effective fishing area of a baited pot
1984/084	The potential of Danish seining as an alternative fishery for lobster boats
1985/057	Studies on the breeding stock of the western rock lobster (Panulurus cygnus), in relation to stock and recruitment
1986/064	A preliminary assessment of the rock lobster fishery in New South Wales
1986/083	An investigation of the habitat requirements of post-puerulus stocks of western rock lobster (Panulirus Cygnus)
1986/100	Investigations of the effect of water temperature on the growth, recruitment and breeding cycle of the western rock lobster
1988/041	Pilot study of larval recruitment and genetic variation of southern rock lobster populations
1990/006	Behavioural and physiological studies on phyllosoma larvae of the Western Rock Lobster
1990/007	Assessment of spatial and temporal variation in puerulus settlement of the southern rock lobster
1991/078	An economic evaluation of the 1987 Buy-back scheme in the southern zone rock lobster fishery
1992/014	The abundance of the eastern rock lobster Jasus Verreauxi along the coast of NSW
1992/104	Assessment of the Victorian rock lobster fishery
1992/124	Ex ante economic evaluation of rock lobster fishery management arrangements
1992/125.09	Airfreight of live seafood: An improved packaging system for live western rock lobster
1992/125.27	Reducing post-capture mortality when storing tropical rock lobsters for live export
1992/148	Preliminary feasibility study on the use of new age-pigment-based methods for age determination of western rock lobster (Panulirus cygnus)
1992/149	Utilisation of excess rock lobster settlement
1993/085	Test of method for telling moult stage of spiny lobsters
1993/086	Population dynamics of southern rock lobster in SA waters

Projects 1993/085 and 086 were significant in that for the first time we had formed a strong partnership between industry and researchers. Having two projects addressing the same objectives perhaps wasn't the most efficient way to do things, but it was a start to developing collaboration.

1993/087	Population dynamics of southern rock lobster in SA waters
1993/090	Trial of the use of new age-pigment-based methods for age determination of western rock lobster (Panulirus cygnus)
1993/090.02	Testing age pigment on western rock lobster of known age
1993/091	Fishery independent study of the spawning stock of the western rock lobster
1993/201	Development of a USA market strategy for western rock lobster tails
1994/032	Effects of seasonal and interannual variability of the ocean environment on recruitment to the fisheries of Western Australia
1994/134.02	Develop a code of practice for handling live rock lobster
1994/134.03	Physiological investigation into methods of improving the post-capture survival of rock lobsters (Panulirus cygnus and Jasus edwardsii)
1994/134.05	The bio-economic development of long term holding systems and aquaculture of southern rock lobster
1994/134.06	Development of improved onshore storage and transportation protocols for the Western rock lobster Panulirus cygnus.
1994/134.07	Rock lobster autopsy study
1995/017	Condition and its assessment in the southern rock lobster (Jasus edwardsii). Assessment of condition indices and moult staging techniques
1995/018	Southern rock lobster recruitment study
1995/020	Mortality, growth and movements of the western rock lobster, Panulirus cygnus
1995/115	Economic study of Victorian rock lobster fishery

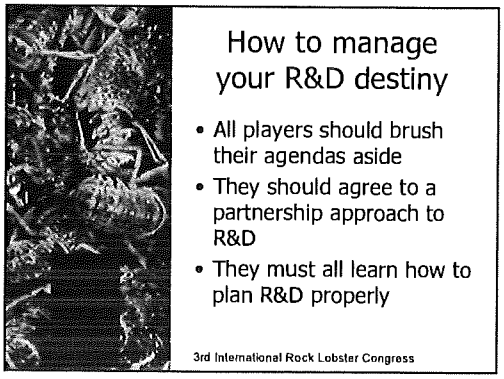
1995/137	Feasibility assessment of an adaptive management experiment in the SA lobster fishery
1995/138	Survey sampling design and length-frequency data analysis for on-going monitoring and model parameter evaluation in the South Australian rock lobster fishery
1996/107	Synthesis of existing data on larval rock lobster distribution in southern Australia
1996/108	Fishery-independent survey of the breeding stock and migration of the western rock lobster (Panulirus cygnus)
1996/116	Spawning and larval recruitment processes of commercially important species in coastal waters off Victoria
1996/154	Transfer of lipofuscin technology to the Central Ageing Facility
1996/160	Condition and its assessment in the southern rock lobster. Field application of the techniques for condition assessment developed in the laboratory
1996/337	Development of a dry, pathogen-free, water-stable lobster bait
1996/337.01	Development of a dry, pathogen-free, water-stable lobster bait
1996/344	Rock Lobster Post-harvest Subprogram: physiological studies of stress and morbidity during post-harvest handling and storage of western rock lobster (Panulirus cygnus)
1996/345	Rock lobster post-harvest subprogram: physiological studies of stress and morbidity during post-harvest handling and storage of western rock lobster (Panulirus cygnus)
1997/101	Assessment of broad-scale exploitation rates and biomass estimates for the Tasmanian southern rock lobster fishery
1997/104	Modelling to explore management strategies to optimise the value of the rock lobster fishery of Western Australia
1998/150	Development and assessment of methods to reduce the predation of pot-caught southern rock lobster (Jasus edwardsii) by maori octopus (Octopus maorum)
1998/300	Rock lobster enhancement and aquaculture subprogram , propagation of rock lobster - development of a collaborative national project with international partners
1998/301	Rock lobster enhancement and aquaculture subprogram Project 1: facilitation, administration and promotion
1998/302	Rock lobster enhancement and aquaculture subprogram Project 2: towards establishing techniques for large-scale harvesting of pueruli and obtaining a better understanding of mortality rates
1998/303	Rock lobster enhancement and aquaculture subprogram Project 3: feed development for rock lobster aquaculture
1998/304	Rock lobster enhancement and aquaculture subprogram Project 4: pilot study of disease conditions in all potential rock lobster aquaculture species at different growth stages
1998/305	Rock lobster enhancement and aquaculture subprogram Project 5: determination of the optimum environmental and system requirements for juvenile and adult rock lobster holding and grow-out
1998/338	The prevention of occupationally-related infections in western rock lobster fishermen
1998/341	3rd International Rock Lobster Congress
1998/362	Workshop on post settlement processes affecting the southern rock lobster , Jasus edwardsii in southern Australia
1999/140	Impact of management change to an Individual Transferable Quota system in the Tasmanian rock lobster fishery.
1999/202	Rock lobster autopsy manual
1999/314	Rock lobster enhancement and aquaculture subprogram: preliminary investigation towards ongrowing puerulus to enhance rock lobster stocks while providing animals for commercial culture

I believe we are now at a cross roads. Scientists, and particularly biologists, are probably feeling that they are losing control of the R&D agenda and that because of the community ownership of the natural resource, such a move is inappropriate.

Fisheries managers are probably feeling, with justification, that they are doing a good job of managing rock lobster fisheries in Australia but any devolvement of management responsibility to industry would be risky and in conflict with the spirit of their enabling legislations.

They, like scientists, would probably like to see the emphasis on biological R&D maintained because it underpins their management role. However, they, unlike the biologists, are increasingly becoming aware of the need for socio-economic R&D as this R&D also underpins their management roles.

The third player in all of this is industry. Industry is probably feeling that, regardless of all of the above, under cost recovery arrangements for R&D, it is entitled to a greater say in what R&D is undertaken.



So how do we move beyond the crossroads?
First, **all players should brush their agendas**, political or otherwise **aside**. Second, **they should agree to a partnership approach to R&D** whereby no one partner has control over another.Third, and this is most important, **they must all learn how to plan R&D properly.**

Seven years ago, when the FRDC was established, we inherited an R&D application driven approach to R&D funding. Since that time, largely due to the push by the FRDC, R&D plans have been developed for industry sectors and states.

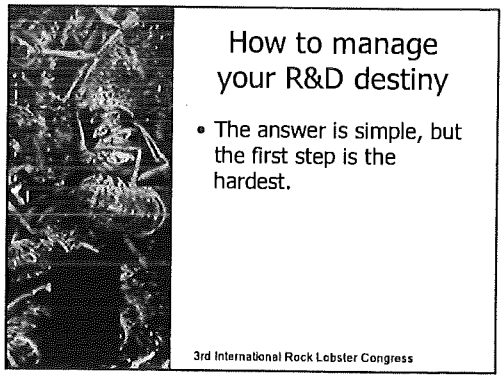
Despite this however, industry involvement in the development of R&D funding applications is not as apparent as it should be.

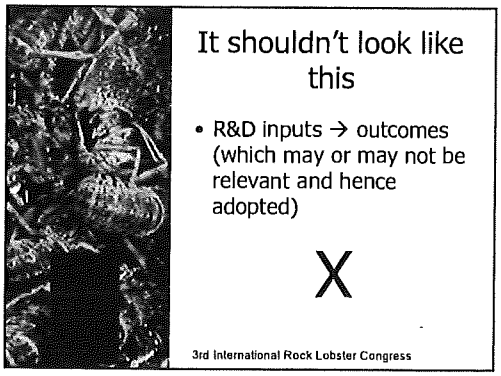
Whose fault is this? Scientists for not developing their applications with industry? But what if the industry was unavailable for discussion or didn't really know what its priority was or didn't have in place a rigorous united structure to identify its priorities?

Or was it the fault of industry, who finds it easier to identify what research shouldn't be undertaken? There is undoubtedly fault on both sides and this, unfortunately, sets the scene for suboptimal research and reduces its chance for adoption.

To me **the answer is simple, but the first step is the hardest**. You, researcher managers, and we, need to establish a proper planning structure and a rigorous process.

The process needs to start with identifying planned outcomes, it needs to develop strategies for achieving those outcomes and then to identify the R&D inputs (key result areas if you like) that will address these strategies.





What the process currently looks like is this:

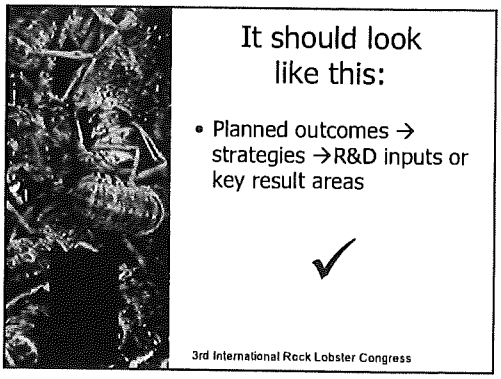
R&D inputs → outcomes (which may or may not be relevant and hence adopted)

X

The model should look like this:

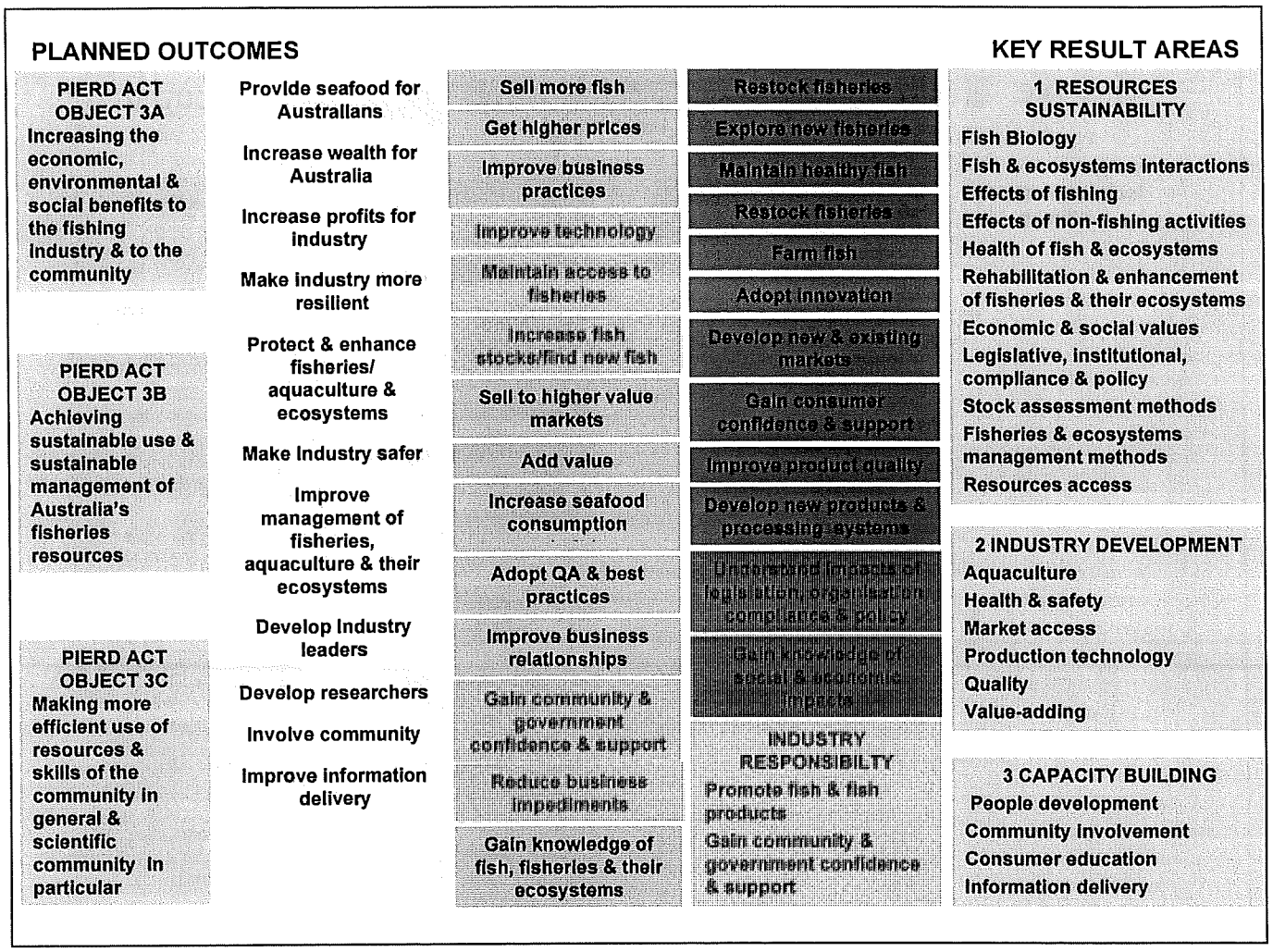
Planned outcomes → strategies →R&D inputs

✓

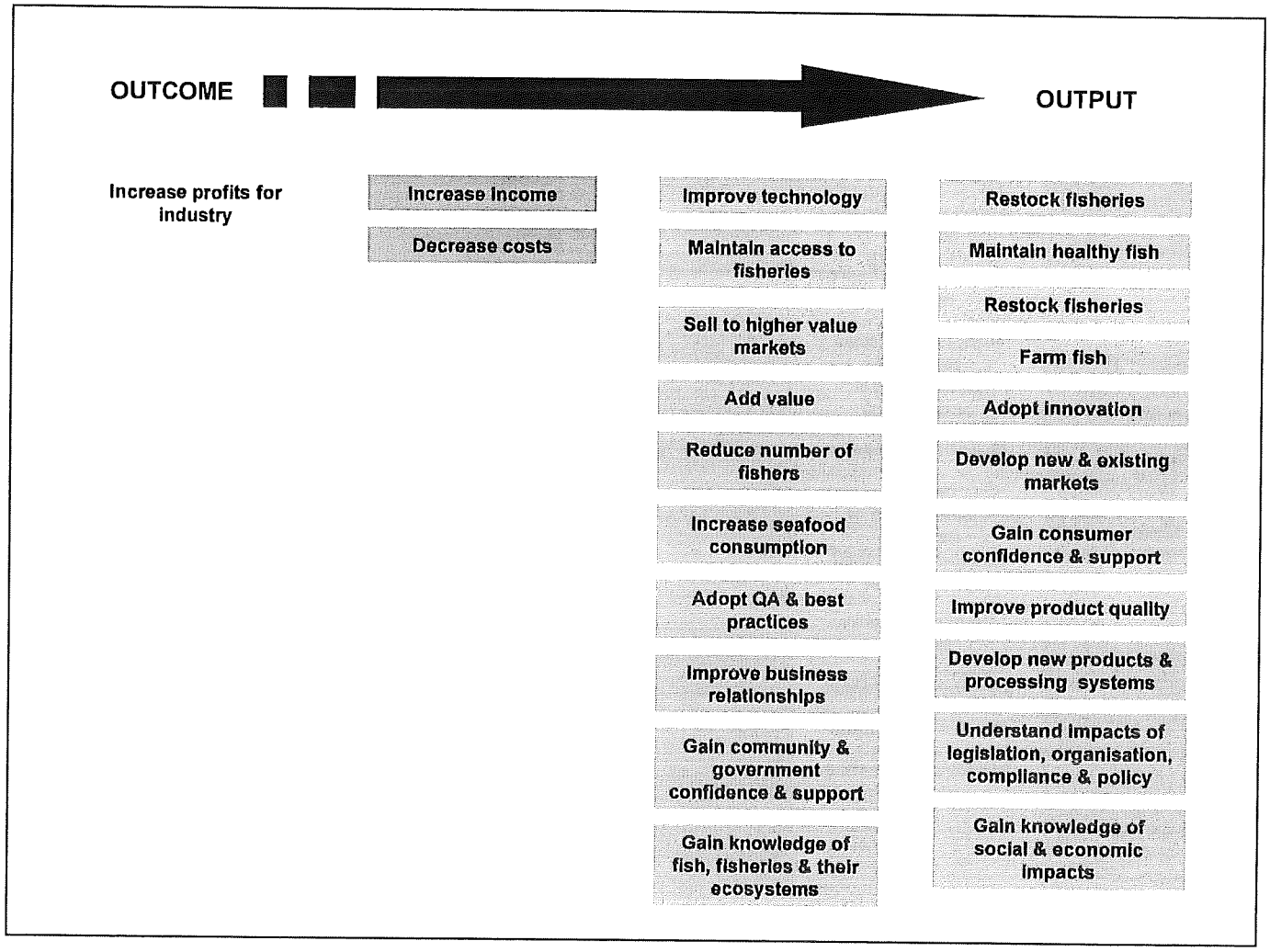


As I said, however, identifying the planned outcomes appears to be the difficult step.

The planning model I suggest you adopt looks like this.

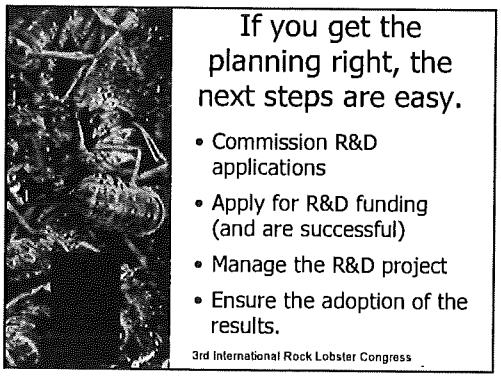


If I was to focus on one outcome say "Increased profits for industry" it would look like this:



Note that knowing more about fish stocks is not an outcome, it's an output of research.

An outcome would be increased profits or increased fish consumption.



If you get the planning right, the next steps are easy.

You **commission R&D applications**

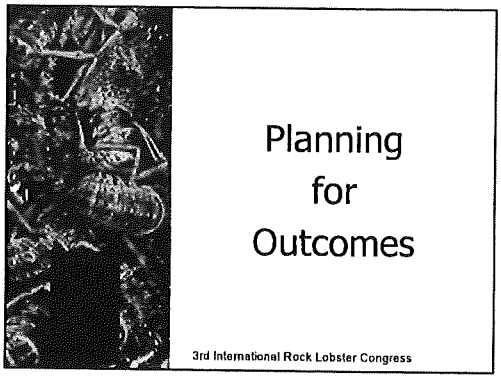
You **apply for R&D funding (and are successful)**

You **manage the R&D project**

You **ensure the adoption of the results**

Ladies and gentlemen, I am pleased that the FRDC is part of this Congress and on behalf of the FRDC I thank those who have put in many months of hard work into **planning** this Congress and I wish you all successful **outcomes**.

Thank you



Leading the Way – Lessons from the Australian Wine Industry

Ms Jane Ferrari
Yalumba

Thanks Paul, I might just take this opportunity to mention that I was the youngest in my class, and I went straight from high school, turned 18 in my first year at Roseworthy College, which was a bit of a culture shock. I wasn't old enough to drink when I arrived at college and those were the days when we didn't have a bar on campus, and it was a lotto to see if you actually got home from the pub, which was actually about 2 miles away – most of them ended up in the paddocks. So I'm not as old as I look.

My job today is actually an excellent one. I am going to tell you right from the outset that I don't know much about your world. I've had the lobster industry introduced to me quite recently. Earlier this year we had a phone call from Steve Hinge and Roger Edwards, who said, 'What do you think about the lobster industry and the wine industry getting together?'

It never really occurred to me that we've been running in parallel lines in this State, a very strong fishing industry, a very strong wine industry, and there never seemed to be any formal or informal crossover. So we've just embarked, this year, on an excellent association with the South Australian Rock Lobster Association. Please forgive me in my presentation if I don't know all the super-dooper facts about your industry. I'm going to try and show you parallels that I think exist and, hopefully, some things that you will be able to use when you define your own strategy.

I've been asked to give you an outline of the Australian Wine Industry, and the way that we've gone about improving our profile and overall industry value, both domestically and internationally and, to a degree, how we're planning our own destiny.

This plan has been documented by the industry and is called Vision, or Strategy 2025. It's a 30 year plan, that was put together and documented in 1995, released in 1996, and that's the basis for my presentation.

I believe there exists a natural synergy between the seafood and wine industries and, essentially, we're both farmers of sorts. We have harvesting of seasonal crops. Mind you, I have noticed, since I've got involved in your industry that your harvest has got a particularly different flavour and aroma profile to ours, which is a fortunate thing.

Due to this synergy, I think there are aspects of this Vision 2025 that may be adapted to the rock lobster industry, and contribute to similar increases in profile, industry value and market share, both domestically and internationally. Firstly, I would like to give you an overview of our industry, and its current situation, which is 4 years into its plan, Vision 2025.

In 1966, Australian table wine consumption amounted to a little more than 2 bottles per head of population per annum. 78% of this wine consumption consisted of fortified ports and sherries, and premium varietal table wines barely made the grade. These statistics clearly show the enormous change in our industry over the last 30 years, and we are now consuming about 24 bottles of wine per head per year. I have to admit that, in the Barossa Valley, our consumption is slightly higher, but we think that we should support our own industry first, and we're doing our very level best.

If you are ever drinking a bottle of wine, just think of us as your favourite charity and we need your support.

What has created this revolution?
Innovation in viticulture and wine processing technology, allied with changing consumer preferences toward a mediterranean diet, stimulated by a lot of European immigration, an increased incidence of dining out, and a growing concern about health and responsibility for activities, particularly driving, a serious of complex sociological and demographic factors that I am not going to list and bore you with, but basically the changing role of women, particularly with their role in the work force and their buying power and the aging of the Australian population have all contributed.

The winner has been the wine industry.

The late 20th Century lifestyle beverage of moderation, that's us. It is more than a beverage, it has become a lifestyle product. It's very complimentary with food, hospitality, entertainment, the arts and tourism, and I think there's a definite place for rock lobster here, that it's not just a meal and not just another menu option. In fact, we've come a very, very long way with our cuisine and restaurant culture in this country. It's in living memory that Roy Reen, the famous Mo McCacky comedian did that legendary skit that reflected restaurant culture of the day, where the waiter comes up and says, 'What are you going to have?' and he's thoughtfully picking his nose at the same time. Roy just shoots straight back, 'Well I'll have 2 boiled eggs, you bastard, because you can't put your fingers in those.'

We've come a long, long way.

Despite this increase in domestic consumption of Australian wine, and a massive growth in exports, the industry's successful development should not be seen as something that can't be repeated. Vines were introduced by Captain Arthur Phillip in 1788 and wine production was carried out by the English gentry in most states for the first half of the century of settlement.

The influx of European immigrants to the gold rushes in the 1860s and the accompanying waves of cultural migrations by settlers, such as the Silesians of the Barossa Valley, have provided the necessary skills required to grow better quality grapes and make good wines.

It has also left Australia with a legacy of 100 year old vines, historic buildings, and a vast accumulation of expertise, in which we sit quite nicely. The Australian Wine Industry, with acknowledged leadership and a proud heritage of innovation, has come of age in the 1990s.It is now a mature industry with a global focus, a significant presence in world markets and international product successes ranging from Grange to Jacob's Creek.

I don't want to dwell too long on our success, but I think it's really important because they have charged us with leading the way, so I just want to give you a complete picture of where we are at. Although Australia is one of the world's smaller wine producers at 2% of world production, and we have a relatively low domestic consumption of that, 24 bottles per head, it's exports are more than 27% of it's production, 10% more than the key world wine producing nations of France and Italy. This achievement has come without government subsidy or trade protection measures, thankfully Rob's gone.

Australia has also developed an industry structure with considerable economy of scale, despite a large number of wineries, we've got nearly a thousand; and a new producer's licence issued every 38 hours in this country. Just 10 of those dominate the industry with an 84% share of the national crush. In fact 6% of our labels account for more than 75% of our sales. Nevertheless the contribution of small producers to the industry's success has been out of all proportion to their size, which links back to the word that you've been groping for before, not charisma, I think it's personality. I think industries need personality, people like to see people and we've certainly got those and the small and larger producers contribute to this tapestry of what the industry really is.

Growth for Australia's wineries has been rapid in the last five years, with the then 7 publicly listed wine companies recording a net increase of profits from $55,000,000 in 1992-93 to $87,000,000 in 1994-95. A large part of this success was due to a twenty-fold growth in exports in the last ten years, but domestic consumption has also grown slowly, defying the national trend towards declining alcohol sales. Increased vineyard plantings of premium grape varieties have helped to accommodate this growth and a substantial rise in production is already underway as new plantings start to bear. When we stated Vision 2025 we stipulated, as has been mentioned earlier, about your sustainable size of your crop, we actually devised a plan for how much vineyard we would need to sustain our growth and, four years into our plan, we've already achieved the vineyard planting that we thought would take thirty years. So it's a very interesting place to be for us.

Consumers in Australia and overseas are trading up the quality alcohol consumption rather than quantity. This is reflected in declining sales of bulk or cask wines and an increase in semi-premium, premium bottled wines. This stronger demand, aligned with a tightness in supply have increased prices and improved margins. The wine industry has achieved this success by following a classic value adding

model. It transforms an agricultural commodity into a quality, branded image product which is securing a growing share of the oversupplied and very competitive global wine market. We went about creating Brand Australia for the Australian Wine Industry, and then there's a tier of brands below that, but if Brand Australia is our prime goal, then there's brand Barossa, then there's brand Yalumba and we can all sit comfortably in that.

Much of our industry adds an estimated $910million to purchase inputs or seven times our farm gate value. Much of the industry's success can be attributed to a series of human and natural competitive advantages. We're a world leader in innovative technology, which ensures cost competitive, high quality grape and wine production. We have a product with intense flavour, we're flexible in our production structures, because we don't have the old world, or the French, Italian limits of appellation on our vineyard areas and we've managed to achieve a value for money reputation across all price points, particularly overseas.

Other advantages which I think we share with you are a clean, green physical environment, our engaging personality of our wine makers, who have featured strongly in the promotion, the geographical and the technical diversity of our viticulturalists and our nation's long viticultural and wine making heritage, which is 150 years out of 200. So that's not too bad. As a result of this commitment to value adding and its world competitiveness, the wine industry is one of the few genuine national industries concentrated outside the metropolitan areas. Again, we share this with you. It plays a major role in regional development, contributing to employment, business growth, tourism and corporate investment. Currently we contribute to 40 different regional communities, which I think is a great effort. Sixty percent of Australia's wine is bottled in the Barossa Valley, even if it's not made there. So it's a very, very strong community economy.

The healthy image of wine supported by recent research on its effect in reducing cardio-vascular disease has distanced it from other alcohol beverages. The industry is also strongly committed to environmentally friendly production, so already I think there are some very, very strong parallels between your industry and ours.

The Australian wine industry has undertaken a strategic planning process resulting in Vision 2025, a statement of the aspirations and goals of the industry for the next 30 years. Our vision is that by the year 2025 the Australian wine industry will achieve $4.5billion in annual sales by being the world's most influential and profitable supplier of branded wines, pioneering wine as a universal first choice lifestyle beverage, which is a big mouthful, but basically means there is no replacement for quality and we really have to commit as an industry, together. This vision is both achievable and worth achieving. It outlines the scope of industry opportunity, which is $4.5billion, the industry's position in the world market, not the biggest, but the most influential and the most profitable, the key product - branded wines, the existing competitive advantage of innovation and Australia's leadership in securing the image of wine as a preferred choice of beverage. Most importantly the vision provides a focus for the future, but does not preclude a wide scope of opportunity, as I said we are already at the vineyard plantings that we are required to sustain our industry in 30 years' time. It gives you a skeleton to work to, but it must be flexible to accommodate all these shift and changes.

The industry's future lies primarily in branded wine products, which reflect the distinctiveness of variety, region and producers, and aims to maximise the advantages of wine in capturing complementary business growth in tourism, food and lifestyle areas. The vision will emphasise the development of new markets, both domestically and overseas, with the optimum penetration being in Europe and North America. Asia is a very curly one for us, we've gone very gently into Japan last March and had excellent results, but it took us a long time to find a business partner that understood the Asian mentality and was well established in Asia. But from Japan, from a very, very gentle entry to their market we're now looking at some considerable expansion, that's on a personal company note, not as a major industry. I believe Japan is one of your major markets also.

The intention is to develop global leadership in specific branded market segments and a first preference status in food and accompaniment and lifestyle associated markets. Branded Australian wine products will lead the world in flavour and in particular, flavour per dollar, but will also offer a diversity of style and an extensive range. So no matter at what point you drink Australian wine, whether it be in the 2 litre cask, which we consider in our production 2½ bottles in a bag or whether you're at the Grange end or the Octavious end, we aim to make sure that it's excellent value for money as an industry and

as a company within that industry. The underlying values which will drive people in the industry will be integrity, which will ensure a community acceptance, a pioneering and innovative spirit, a culture of collaborative competition, a strong and demonstrated customer focus, an emphasis on quality and a commitment to financial success which, at the end of the day, is the reason why we're here.

The industry will achieve its vision by adopting the mission statement, total commitment to innovation and style from vine to pallet, which could easily transform to the seabed to the plate. As I see that some of you have got from the water to the waiter, I think is one of your topics. Our objectives in relation to fulfilling this vision are to enhance the image and reputation of Australian wine, which is critical for us. I don't know very much about rock lobster, but I do know that the best rock lobster I've ever heard about comes from Maine and they have a huge festival there, the Maine Rock Lobster Festival. Now I don't know why I know that, I just do. So I guess the image and reputation of Australian rock lobster and its constant improvement is obviously of critical importance, as it is to us, to the development of your industry.

However, if the recent response to the let out of those recreational pots is any indication, you've got a huge amount of demand there, so I really think, 1 million phone calls jamming the local exchange, it's pretty amazing. You need to entrench innovation as the driver of industry competitive advantage, enhance wine styling quality, purity, uniqueness and diversity. I just think there's so may parallel lines here, you have excellent opportunities with respect to regionality, I'm not really sure, but does rock lobster change from the regions that you draw it from? We have a huge differential with us where the grapes come from, even within a region, and I just think there's a huge amount of opportunity for you.

Capitalise on market growth opportunities by expanding our industry capacity, our grapevine area has raced ahead of its time and now we, as an industry will be catching up with facilities to actually process that fruit and store it. If you're into investment opportunities, I'm not so sure about Telstra 2, I'd buy stainless steel, it's $1 a litre to store wine. To make a tank, if you've got a hundred thousand litre tank it's a hundred thousand dollars to buy. I personally think I'll buy shares in Barossa's tanks up at Nuri, there's a lot of money to be made in stainless steel.

Extend the scope of your industry participation in complementary business sectors and I think rock lobster's presence as a branded entity at the year round calendar of excellent food and wine events that exist not only in Australia but around the world is an obvious end for you. The circuit exists and it's just a matter of tapping in, and of course at the end of the day to improve our profitability, with the image and influence of the wine industry, the way we've gone about it is that we wanted to progress and sustain the community acceptance positioning of wine.

We do a lot of work with our local communities. We support everything from the motorcycle clubs through to the bingo clubs through to the sporting bodies, and we're just everywhere, everywhere where the community is, we're there supporting them in every raffle, every dinner, every church fate, in everything. That's on a very local level and we also make sure that we hit every calendar event with the food and wine circuit that exists both domestically and internationally. We've adopted a targeted public strategy, public city strategy to communicate the uniqueness and capabilities of the Australian wine industry, which I think is working very well, we have folks coming in from overseas that know everything there is to know about Jacob's Creek, they just don't know where it is in Australia, so something is going quite well out there.

We like to extend the influence of Australia in world wine forums and institutions and this has been particularly borne out by the success of the Barossa as one region, one small region of Australia going to England and to the United States on its own and getting a regional profile, it's not out of the realms of possibility to do this.

Everybody knows that in a family there's always the aunts and uncles you don't like, you still have to kiss them at Christmas because you know that they're going to give you a present. So, it's always better to get along and present a united front. We need to accelerate the adoption of environmentally sustainable policies and practices in all aspects of our industry, in which we're well underway. We're well aware of the green power and the green strength, and it's in our best interests to do that anyway, because we have something unique here and we need to maintain it and to promote that it's maintained. So we need to maintain the existing minimal regulation to ensure market responsiveness and production flexibility which, so far this industry has enjoyed and we hope it continues to enjoy.

Australia had the potential to make more rapid progress than its key competitor, traditional Europe, due to possible advances in quality, cost competitiveness, branding, an important investment requirement and government support. These advances will come about from the implementation of the strategy, as we've already seen, four years in. Our market opportunities are very sound, we cannot ignore our domestic market because we're being attacked on all sides with our traditional markets both home and abroad, by South America, particularly Chile, by South Africa now, once they actually hit their straps and with apartheid being a thing of the past, hopefully, they now emerge from an industry which has had severe constraints and where they've had varieties that we've never had planted in this country, and once they change over to conventional varieties we've got another very strong competitor for our own markets and our international markets.

So we need to be very aware of our opportunities to hold what we have and to also improve what we have. We need to broaden the appeal of wine so it is more accessible and attractive to the occasional and prospective consumer segments. We need to gain, via market research, a better understanding of consumer behaviour and attitudes relating to wine and we need to enhance and expand our market distribution and channels for wine. We need to develop new products, we need to create new market opportunities and one of the things I think is very strong for us is our regional opportunities. We have a magnificent circuit of regional food and wine cultures, particularly in this state, in this country and I think it is, itself something we can promote and become world famous for, it's there, it's lurking, but I think it really just needs to be polished and pushed out into the spotlight. I think, I've not been on your tour of ports, but I think the possibilities exist for you as well, particularly in wine tourism, we're seeing huge growth.

The Australian Tourism Commission thinks that in the next five years the increases in tourism in this country will be phenomenal and they'll be in wine tourism, Aboriginal tourism and the discovery of the outback by the rest of the world. I think that this is something they've overlooked, this tour of ports that you have and I think it is something that you can develop without actually losing the unique charm and the personality. There's also a track record for regionally branded produce; Alabo lamb, Woodside's goat cheese, Flinders Ranges' quandongs, Buderin ginger, and I just think that there's a real opportunity for branded regional lobster. Now I'm not sure if you've got the differences and I'm hoping to find that out by long, long taste tests and comparisons, but I think there may be something there, I'm not sure.

We need to develop promotional initiatives to increase the loyalty of our existing wine drinkers to extend the occasionality of consumption in the marginal segments, those horrible beer drinkers and spirits drinkers, and we need to develop consumption in the prospective segment. A lot of this is via the constant profile of tastings and educational exercises and promotional exercises that we undertake and we've just started a red or white wine with fish tasting that we've tacked on to the end of the Fisheries Academy filleting course. We're in our infancy there, but we're learning very quickly and doing quite well, thanks very much. I think there are opportunities everywhere. We need to utilise our wine regions, as defined by geographic indications, as a brand marketing and I ask again, is there regional variation in lobster? We need to improve our access to export markets by small and medium wine companies because this is what gives that excellent personality to the industry as a whole.

I think our big opportunities lie in wine tourism for us. We're really only just scratching the surface and we look at some of the very, very interesting things happening for us over the next two years, particularly with the Olympics next year. We're already seeing a huge amount of interest, people are setting up tours, they're already coming through at a rate of knots. We're working consecutive days from now until the first of December at the winery on our events side and we're just busier than we've ever been. It is phenomenal interest. I'm not sure if you're seeing the same thing, but you will definitely get the spin-off, because that's what they'll want to eat while they're here is seafood.

We need to capitalise on our wine tourism opportunities by stimulating wine tourism and improving the profitability for wineries, so they are going to go into it with much more depth than they are currently. The wine industry and tourism industry have a common objective of capturing and presenting a unique sense of place to consumers, whether they be wine drinkers or tourists, and the wine and food crossover here is the strongest tool that we have, it really is.

As an anticipated growth in self-discovery tourism in the next century, prompted by maturity of income and time rich baby boomers and the increasing affluence of Asian consumers, means that a number of opportunities exist. Wine tourism in Australia is currently estimated to be worth around $400million with potential to grow substantially to $1.1billion. Now that's figures on paper, but we're seeing it happening on the ground right now. The strategies to increase the wine tourism market and capture a greater share of the tourist dollar include increased collaboration between wineries and tourism operators, enhanced tourism services at wineries and joint promotion with state tourism authorities. I think there's opportunities here for you with the tourism operators and educational facilities, the lobster centre, lifestyle of a lobster in tanks, cooking master classes with high profile chefs. It's all there, the circuit really does exist, it's just a matter of coming along with us and tapping in.

For the Australian wine industry to achieve the vision of 6.5% of the value of the world wine production by 2025, grape production will need to rise from the existing peak of around 850,000 tonnes to 1.5billion tonnes. There also needs to be significant investment in storage capacity. As I said, stainless steel, that's my tip for the share market, expanded processing facilities, transport and the skills of our wine making workforce. I think profitability is something that we don't need to discuss, we all know that's the bottom line, but as farmers, of sorts, we know that we've already had five booms and four busts in our industry, we've had a vine pull. So there's also that element that we can never anticipate, which is basically mother nature and in our industry, as with yours I gather that we stand there with one eye on the markets, with our fingers crossed behind our backs, and one eye on the weather. So we really are at the mercy there sometimes with the profitability and the weather.

Government Partnerships

The Australian wine industry seeks to forge a strong partnership with government to implement its Vision 2025. We are actually a very active part of the Premier's Food for the Future council and we see strategies such as that as a very, very good way of taking us both on to greater and better things. Achieving our target, which is $4.5billion in annual sales is not something the wine industry can do by itself. It needs the support of the Australian community through its selected governments, it needs the support of the food industry and we all need to go on together.

Wine has become a model for value adding and it has achieved success through the genuine competitive advantage of Australia and its people. Providing a positive investment climate and facilitation infra-structure are the key contributions that government can make. We need to continue in partnership with the government, alcohol and health programs to reduce alcohol abuse and we need to shift alcohol away from beer and spirits, because when was the last time you were in the front bar of a pub and saw someone knocking back a schooner of claret? That's been a long, long time - I've never seen it. So I think we need to shift that and make wine the accompaniment for food and as wine and food industries we can go on, we could really go on.

We need to ensure that the state and local government land use planning policy's infra-structure provision and regional development strategies are supportive of our industry and at the same time I reiterate that 60% of the wine made in Australia is actually bottled in the Barossa. We need roads and we need a lot of things up there with B-doubles on the road and things like that. Governments, local governments in particular, and state governments are becoming incredibly important and we are really trying hard now to link up with our government departments and our councils and get on side because we now, more than ever, need each other, quite strongly.

With industry institutions we need to review our wine industry bodies' structures to ensure that they enhance a whole industry strategic focus, so that we're all working together to amplify our market influence and to clarify roles and ensure resource efficiency. We need to make sure that all those industry bodies that do exist are actually working for us and working in the right direction. From what I've seen this morning and what's around the room I think you're, sort of, well on a par with where we're at. We need to redesign our Australian wine industry internal communication processes, our forums and media, which is basically, we need to reinforce the fact that we're all holding hands and going in the same direction. We need to contribute to a cohesive and co-operative environment because that is the way a strong industry will go on.

So what are we going to do for the next five years? The thrust of five years 1997 to 2001 will be to accelerate the penetration of our export markets, which is happening on a daily basis, to initiate domestic market development and to increase Australia's relative competitiveness through an upgrade

of grape supply, quality, a reduction in cost and an improvement in government's policy support. Industry aspects of the plan include that our exports will capture 8.3% of the UK wine market and will more than double their share of the US market to 2%. We're actually already there in England, we're actually 12% of the UK market so we're working well ahead of our strategy, although we do see the storm clouds on the horizon. As I said we're an agricultural entity and anything can happen. Our competitors for our traditional markets and our new markets are looming ever larger and even though things are good the farmer in us tells us that they may not always be so. We're all about getting ready, just in case. Our growth in domestic wine sales we would like to improve with an anticipated per capita consumption of another 18.9 litres per head by 2001, which would be a substantial help for our industry.

To make the 2025 Vision a reality will require the commitment of the wine industry to implementing all the strategies that I've already discussed. The scenario specified the scale and scope of growth opportunity which is feasible and also desirable. It will be up to the individual commercial entities in the wine grape, wine and supplier industries to determine how they can use the framework of opportunity identified by the vision to create their own business future. The wine makers federation of Australia, on behalf of the Australian Wine Foundation will take responsibility in consultation with the Wine Grape Growers Council and other wine industry bodies for implementing, monitoring and revising Vision 2025.

The final supporting documentation of the Vision 2025 strategy and a detailed plan of action will be derived during a discussion process within the Australian wine industry, which is ongoing. This will culminate in the Australian wine industry outlook conference which happened this year, so whilst we've put our strategic plan together we haven't put it to bed and that has been revised already this month. It's just finished, we're the 21st today and they just finished those consultations. So we'll be a new and improved streamline version of our strategic plan, out hopefully by the end of this year. So, like I said, it's not enough to let sleeping dogs lie. We keep going as an industry, refining, honing, shifting, changing according to what the markets require.

In conclusion, I hope that this overview of the Australian wine industry and its Vision 2025 has been of some benefit in illustrating what can be achieved by a strong spirit of collaboration and a clear sighted approach to the future. It's no accident that we are an overnight success that's been ten years coming, or in the case of Yalumba, 150 years coming, November 17th this year. It's definitely a case of, if the Australian wine industry does well, everyone in the Australian wine industry does well and that goes down the tiers. If the Barossa Valley does well, everyone in the Barossa does well. It's entrenched in our mindset that that's the way we go about doing business.

Equally important is the individual winery focusing every effort to maintain quality and value for money at every opportunity. As Rob Hill-Smith, our managing director and owner, says, "There's an awful lot of wine produced in the world, and a lot of it is awful." So we're very mindful of that fact, we're out there to make the wine, make a good wine at whatever level, because not every grapevine's going to give you Grange and you have to, you know it's horses for courses, you have to do the best with what you've got. So we make sure that, at whatever end of the consumer scale we're working at, it's value for money. Our industries, yours and ours, really do exist hand in hand, food and wine arguably the greatest partnership, probably after gin and tonic, and I can only wish you every good fortune for this coming season, every season to come and this Congress in particular.

I would like to particularly thank Roger Edwards and Steve Hinge for introducing us, and when I say we, that's Yalumba, to the South Australia Rock Lobster Association and we look forward to a long and mutually successful association. I hope you enjoy the wines at tonight's Frenzy and Friday night's dinner. I personally selected them, if you've got a problem come and see me. If you're in the Barossa Valley please drop by, we'll be more than happy to show you our world and I'm equally interested in seeing yours. I wish you every success and I hope that this Congress is just another stepping stone on the road to success for your industry as part of the great food and wine industry that exists in this country. It's something unique and it's something I believe we can all be proud of and has got so much potential, so I wish you all very well.

Thank you very much.

Quality & Markets: Water to Waiter

Mr Tony Gibson
Chairman – Western Rock Lobster Development Association (Inc)

The Australian Lobster Industry – An Overview

- Australia produces approx 16,000 tonnes of lobster annually
- Lobsters are caught in New South Wales, Vistoria, Queensland, Western Australia, South Australia, Tasmania, Northern Territory, Commonwealth (Torres Straits)
- Annual value of production is + A$400,000,000.00
- All fisheries are seasonal
- There are a number of different species caught
- In excess of 90% of annual production is exported

Production (MT)

State	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	Total
NSW	98	100	143	84	103	104	107	739
Victoria	460	439	524	509	483	458	508	3,381
Queensland	488	585	546	607	723	582	661	4,192
WA	12,194	12,366	11,045	10,886	9,902	9,979	10,485	76,857
SA	3,162	2,818	2,629	2,611	2,587	2,528	2,622	18,957
Tasmania	1,898	1,907	1,907	1,387	1,786	1,819	1,485	12,189
NT	1	-	-	-	-	-	-	1
C'wealth*	173	174	185	182	201	233	219	1367
Total	**18,474**	**18,389**	**16,979**	**16,266**	**15,785**	**15,703**	**16,087**	**117,683**

**Commonwealth production is from the Torres Straits Islands. (The rock lobster fishery is under Commonwealth, not State (Qld) jurisdiction.) NSW=New South Wales, WA=Western Australia, SA=South Australia, NT=Northern Territory*

The Global Scene

Lobsters have become a valuable international seafood commodity which generate healthy returns for producing nations including Australia.

Clearly from this table we can see that:

- World annual production is in the order of 65,000 metric tonnes.
- Australia is the largest producer with 23.7% of total production.
- Brazil + Cuba rank 2nd & 3rd with 14% each.
- New Zealand produce 4.6% placing it at the number 5 position.
- The remaining 15 producing nations collectively represent 32% of global production.

RANK	COUNTRY	1992	1993	1994	1995	AVERAGE	TOTAL	%
1	Australia	17,959	17,804	13,514	13,226	15,626	62,503	23.7%
2	Brazil	9,127	9,100	9,120	9,440	9,197	36,787	14.0%
3	Cuba	9,340	8,501	9,694	9,405	9,235	36,940	14.0%
4	Bahamas	8,156	7,848	7,589	7,750	7,836	31,343	11.9%
5	New Zealand	2,770	3,047	2,735	3,616	3,042	12,168	4.6%
6	USA	2,210	2,756	3,676	3,231	2,968	11,873	4.5%
7	South Africa	3,117	2,489	2,198	2,967	2,693	10,771	4.1%
8	Indonesia	2,398	1,208	2,021	2,500	2,032	8,127	3.1%
9	Mexico	2,029	2,017	2,239	2,317	2,151	8,602	3.3%
10	Nicaragua	2,387	2,200	2,822	2,274	2,421	9,683	3.7%
11	Honduras	1,356	1,046	1,081	1,522	1,251	5,005	1.9%
12	Nigeria	1,233	1,049	1,751	1,496	1,382	5,529	2.1%
13	Japan	1,194	1,238	1,118	1,136	1,172	4,686	1.8%
14	Haiti	750	830	780	900	815	3,260	1.2%
15	Malaysia	993	1,118	1,203	702	1,004	4,016	1.5%
16	Venezuela	371	940	763	629	676	2,703	1.0%
17	Dominican Republic	532	537	967	619	664	2,655	1.0%
18	Pakistan	502	507	669	615	573	2,293	0.9%
19	Belize	513	442	541	608	526	2,104	0.8%
20	Oman	546	701	623	608	620	2,478	0.9%
	Total	***69,475***	***67,371***	***67,098***	***67,556***	***67,875***	***263,526***	***100.0%***

Major Lobster Importing Nations (Tonnes)

Country	Imports: Fresh/Chilled			Imports: Frozen			Imports: Total		
Year	1993	1994	1995	1993	1994	1995	1993	1994	1995
USA	13,245	14,566	14,240	13,577	14,165	15,645	26,822	28,731	29,885
France	8,166	6,618	8,256	6,915	7,705	7,790	15,081	16,323	16,046
Hong Kong/China	4,176	5,254	7,380	412	2,234	3,593	4,588	7,488	10,973
Spain	3,385	3,404	4,090	4,768	4,928	5,582	8,153	8,330	9,672
Canada	2,770	7,459	8,203	711	749	749	3,481	8,208	8,952
Belgium	1,427	1,765	1,921	703	857	1,020	2,130	2,622	2,941
Italy	3,134	2,914	2,781	-	-	-	3,134	2,914	2,761
UK	1,304	1,302	1,102	574	926	1,030	1,878	2,228	2,132
Netherlands	1,005	941	1,200	-	-	-	1,005	941	1,200
Denmark	627	520	397	549	415	398	1,176	935	795

Source: FAO (1997)

Quality

One definition of quality is:

"a degree of excellence"

Quality is possibly one of the most abused words in the seafood industry world wide. I suggest that every fish crustacea or mollusc that has ever been caught could be described as being of excellent quality however in saying this I believe this is directly related to the fishers expectations of how much he or she will require from the buyer hence the excellent tag. If we set this aside, I am confident that in particular over say the last 10-15 years as an Industry Australia's fisher folk have improved their on board handling and practices to such an extend that every kilogram of lobster which is caught is conveyed to the processor or packer in the best possible manner to maximise the potential dollar return from that lobster. Fisher folk have certainly lifted their game.

In the past the use of hessian bags for consigning catch was acceptable. Today thankfully this is not the case. On board recirculating/ holding tanks are now the rule to ensure as far as possible that every lobster caught is fit for live export. Whether the lobster eventually is exported as live or presents itself in some other pack style is really irrelevant. The fact that it has been delivered as fit for live is evidence of the fishers acknowledgement that supply of premium quality product is the key objective of funding today.

The production of the video "15 Minutes", as well as initiatives by various State Government Agencies have all helped to create an awareness of the need for quality. However I believe that the Fisheries Research & Development Corporation has and is playing a key role in co-ordinating all of the quality programs (and there are plenty of them) with a National perspective of ensuring that Australia is recognised globally as a nation which produces premium quality seafood of the highest standards from its pristine marine environment.

On a personal note I am extremely pleased that the Western Rock Lobster Fishery is shortly to be accredited as a sustainable marine fishery by the Marine Stewardship Council. This will be the first fishery in the world to wear the MSC eco label and in fact this will say to the world that the fishery – its management regime its catching practices and its production processes have been reviewed under the strictest principles and criteria and it can wear the logo with pride. I hope other Australian fisheries will follow on down this acreditation path.

Quality I suggest is best summed up as being akin to the Japanese philosophy of 'KAIZEN' which literally translated means – continuous improvement.

We must never lose sight of this in our quest for "a degree of excellence"!

Roles of the Players in the Lobster Game

Who Are the Players?

- Researchers & government agencies
- Fisherfolk
- Processors (receivers & packers)
- Exporters (freight forwarders/ airlines)
- Wholesalers
- Retailers (restaurants/ chefs)
- End users (consumers)

What Roles Do They Play?

- Researchers – provision of robust biological information.
- Fishers – delivery of premium quality product.
- Processors – handling to ensure premium quality retained.
- Exporters – maximise the value of the catch.
- Wholesalers – provide delivery/ service retailers.
- Retailers – handle/ prepare/ present to enhance.
- Consumers – simply enjoy the product

GENERIC PROMOTION

The Concept Of Generic Promotion

In order to maximise the return from generic promotion, it is important to firstly consider how lobster is recognised, ordered and consumed in each of the markets. The various decision making processes tend to identify the best opportunities that exist to promote Rock Lobster in a manner that best maximises exposure and subsequent returns.

For generic promotion to be effective, we need to consider how and where the lobster is consumed, who makes the decision to consume lobster, what significance does lobster play and how is lobster recognised and ordered? In this regard, the decision making behaviour exhibited by consumers in each market is different and needs to be considered prior to implementing generic promotion alternatives.

It appears that the concept of the generic promotion of commodity based items is becoming more prevalent in Asia. Examples provided indicate that agricultural products, such as oranges, apples, grapes and beef, are beginning to be generically promoted – usually with a focus on the geographical origins and related features of such products.

While the generic promotion of lobster is still in its infancy stage (with the Atlantic producers leading the way), an opportunity certainly exists to create a generic promotion campaign aimed at developing a higher awareness and subsequent demand, for Australian Lobster in major markets.

Generic Promotion In Asia

Aussie Beef

Most end-users and agents have identified 'Aussie Beef' as an example of generic promotion. Most identified that this campaign used television and magazine advertising as a means of promoting the awareness of Australian beef. They perceived that this promotion was effective only in creating brand awareness and trial, but failed to create a consistent demand for the brand.

The failure of this example of generic promotion was attributed to the quality of the product (Japanese consumers prefer beef which is 'marbled' with fat while Australian beef was considered to be too lean and dry) ill-directed promotional messages and inappropriate media selection. As a result, most perceived this campaign as being a waste of money as it promoted a product that is not highly regarded among consumers in Japan.

Sunkist Oranges and Washington Apples

Some fruit and vegetable brands were also noted as being generic brands. In three markets, both agents and end-users were aware of Washington Apples and Sunkist Oranges as examples of generic promotion. The examples were viewed as being similar in that they:

- Originate from a geographical region.
- Are considered to be high quality and premium grade products; and,
- Their promotion is aimed at end consumers who predominantly purchase these items at retail level.

However it has been identified that while consumers demand these generic brands, some retailers hold preferences for the products of particular suppliers because of the perceptions they hold on quality, price and consistency of supply. For this reason, the packaging of the product incorporated the generic identity of the product, as well as the identity of the product, as well as the identity of the individual producer.

The Canadian Atlantic Lobster Producers' Association
In a survey conducted in 1997 the respondents were unaware of any major examples of generic promotion which involved seafood products. However, the US and Canadian (in particular), lobster industries were noted as being active in the promotion of its lobster in all markets.

The Canadian producers were noted as having unified presence where their product was promoted through:

- Trade shows involving chefs and food and beverage managers from major hotels and restaurants.
- Newspaper exposure through editorials in food and entertainment sections.
- Hotel promotions (some of which involved Air Canada, other Canadian food suppliers and the Canadian Ministry of Tourism.

The Canadians were seen to be active and consistent in their generic promotion and were believed to have invested considerably. As a result, most respondents felt that the endusers (and to a degree the consumers) in each of the markets have become more aware and more open to using this species -- which is considered to be of a lower quality and culturally inappropriate.
While none of the respondents were able to identify who was responsible for this promotion (apart from indicating 'the Canadians'), it can be assumed that it has been co-ordinated through the Canadian Atlantic Lobster Producers' Association (CALPA) – a body responsible for the development of key market opportunities, particularly in Japan.

Generic Promotion
- Who pays?
- Who benefits?
- Who does it?

Who Pays?
I suggest that any promotional activity of the Australian lobster industry should be seen as a self-help exercise. The days of seeking Government hand-outs is long gone hence Industry should pay for its own promotional activities.

I have often heard the argument that the only place money is generated from its is out of the pot. If this is correct then logically the first call on promotional funds should come from the fishers themselves.

If there are any Government hollow logs then obviously these should be also tapped into.

Who Benefits?
I suggest that the beneficiaries are the Industry and all those associated with it. I include here government agencies; researchers; banks and suppliers all of whom have some degree of dependence on the continued inability of the fisheries.

Who Does It?
I suggest that all lobster industry organisations representing all segments of the total industry should pool their ideas via an Industry Forum to determine:
- Is there support for the concept?
- If so what structure fits?
- Is there a financial commitment?
- How do the funds get collected?
- Establish time frames & responsibilities

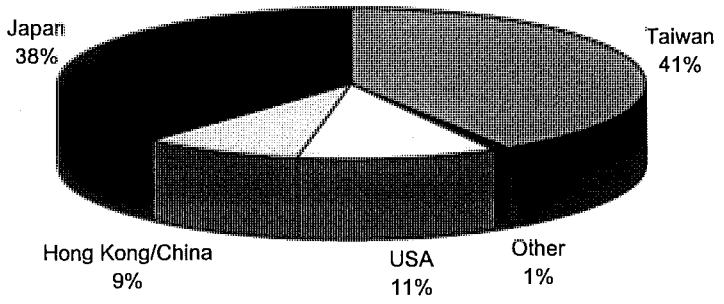
Markets

- The Australian Lobster Industry is the largest export segment of the Australian Fishing Industry.
- In excess of 90% of annual production is destined for export markets.
- The main markets are:- Taiwan (Live/ Raw/ Boiled)
  Japan (Live/ Raw/ Boiled)
  Hong Kong/ China (Live)
  USA (Tails)
- The European Union can best be described as an emerging marked for fresh chilled and boiled lobster.
- Local (Australian) consumption accounts for approximately 10% of annual production.
- Export values approximate A$425,000,000:00 annually.

Australian Exports of Rock Lobster by Destination

	MT	1995-96 $'000	MT	1996-97 $'000	MT	1997-98 $'000
WHOLE						
Live fresh or chilled						
China	228	8612	806	30741	1896	75223
Chinese Taipei	2105	69323	2163	78144	1410	41668
Hong Kong	2791	102987	2637	101536	2158	81351
Japan	1572	55453	1377	51319	1655	51202
Singapore	64	2475	75	2923	62	2402
United States	14	550	20	710	14	523
Other	62	1914	52	1925	45	1504
Total	6837	241324	7130	267298	7240	253873
Frozen Raw						
China	2	67	21	819	23	639
Chinese Taipei	1860	52194	1898	58470	2140	58436
Hong Kong	52	1647	143	4359	101	3115
Japan	1780	58206	1912	62067	1286	35362
Singapore	44	1251	31	844	41	1224
United States	76	3041	39	1955	7	308
Other	17	374	27	563	21	377
Total	3831	116780	4071	129078	3619	99461
Frozen Cooked						
China	1	30	1	34	0	3
Chinese Taipei	57	1509	65	1789	115	3084
Japan	80	2505	144	4748	92	2471
Singapore	3	103	0	3	0	0
Other	19	576	12	342	9	251
Total	160	4723	221	6917	215	5810
TAILS						
Fresh, Chilled, Frozen						
China	1	36	0	6	1	26
Chinese Taipei	215	5719	84	2375	30	902
Hong Kong	34	1263	31	1358	25	1229
Japan	492	17898	173	7409	49	3248
Singapore	13	397	6	235	1	58
United States	539	24139	668	37647	964	59026
Other	29	965	10	593	3	69
Total	1324	50418	973	49623	1073	84558

Lobster Product Shipments By Destination



Industry Opportunities

Rather than undertake a detailed SWOT analysis I have chosen rather to isolate the 'opportunities' portion to demonstrate what I perceive to be the future positioning of the Lobster Industry in Australia and more importantly Globally.

In summary I suggest the key opportunities for the Industry are:

- Continue to maximise our clean green image.
- Adopt a co-operative (across boarders) approach.
- Explore fully an 'Aussie' approach to promotion.
- Examine the concept of a Lobster Council of Australia.
- Promote sustainability.
- Promote good management practices.

Summary and Conclusions

- Australia's rock lobster industry is primarily export related.
- It supplies premium quality lobster to discerning markets.
- It recognises its success is due to its quality.
- The partnership between industry & government is strong.
- All fisheries are biologically in "good shape".
- To maintain its world position the industry must continue to improve.
- The industry must be united.
- Aussie lobsters should be promoted generically.
- The industry must improve its internal communications network.
- Consider the creation of the Australian Lobster Council.
- Keep pressure on governments to assist in achieving a level playing field in international trade.
- Regularly participate in international trade displays.
- Never lose sight of the fact that it must not rest on its laurels.
- "kaizen to koujo o mezashite"

The goal is to improve & continue to improve.

Thank you for attention and patience.

Survival & Condition

Dr Brian Paterson
Senior Physiologist, Centre for Food Technology

Abstract

Requirements for the survival and condition of lobsters during post-harvest handling can be spelled out by regulations or sought by the market. Firstly, some of the lobsters that are caught turn out to be undersized and must be returned alive to the sea. Secondly, keeping legal-sized lobsters alive to the point of processing ensures that their quality is optimal when cooked and/or tailed. Finally, the practice of storage and marketing of live lobsters maintains quality through the handling and distribution chain to the final customer. The handling, transport and storage of live lobsters after harvest, and associated issues, can be considered against this background. Obviously, the treatment of undersized lobsters could have consequences for the 'survival' of the fishery, and for example fishing regulations aim to reduce unnecessary capture and handling. Regarding the handling of the legal-sized catch, survival is clearly a definitive issue in live marketing, though live lobsters can also lose weight or be rejected because of injury and damage (eg. loss of legs). But in addition to physical losses, lobsters that are more 'alive' than others at the factory may differ in weight recovery, and in appearance, texture and flavour of the processed product. If this is the case, then this is an argument for ensuring that handling keeps the catch as vigorous and as intact as possible. Once packaged properly, lobsters handle live transport well, subject of course to mishaps in transit. However, opening up newer markets can still involve going back to basics to ensure the packaging is suited to the journey.

Introduction

Why are we interested in the survival and condition of lobsters? Clearly, wholesalers and buyers may be concerned with these issues, particularly in the context of live marketing of lobsters. Yet, the issue is actually bigger than this. We acknowledge what the market wants in its lobsters, yet at the same time the regulation of a lobster fishery can often have a lot to say about the way lobsters are handled after harvest, and again, with survival and condition in mind.

The word 'survival' is something that we associate particularly with the live market- for obvious reasons- but survival becomes an issue the moment a pot is lifted from the ocean. 'Condition' on the other hand is one of those words that means a lot of things, so I'll take a broad reading of it, to arrive essentially at the fitness of the product for its intended purpose. This definition encompasses a host of different kinds of condition, for example, the overall appearance, the vigour or liveliness and other more technical characteristics such as meat recovery or flavour.

If we begin to think of survival as a challenge that begins the moment the pot leaves the ocean, then it is clear that the survival of lobsters during post-harvest handling is not a new concern at all. To account for some of this history, I will discuss different perspectives on post-harvest handling of lobsters where survival and condition are important. Firstly, some of the lobsters coming up in the pot turn out to be undersized and must be returned alive to the sea. Secondly, keeping lobsters alive ensures that their quality is optimal when cooked and processed, for example regulations and codes or practice often require that shellfish like lobsters and crabs be 'alive' at the time of cooking. Finally, the relatively more recent trend (for some species) toward live marketing of lobsters is essentially an extension of this principle to the very customer. The feeling is that the product cannot get much fresher than if it is alive until immediately before it is served.

In this paper I'll discuss each aspect and raise the associated issues and challenges and review some of the research underpinning these areas before considering how we go about ensuring the survival and condition of the lobsters, including areas where some work remains to be done. I'll draw mainly upon the Australian experience with spiny lobsters, though I think these issues apply to varying degrees to the broad range of lobsters fished throughout the world. No doubt that the particulars differ for each species.

In Australia, the lobster industry is dominated by harvest of spiny lobsters. These pot fisheries are based on two species, the western rock lobster *Panulirus cygnus*, and the southern rock lobster *Jasus edwardsii,* (the latter species also dominating the fishery in nearby New Zealand). The western rock lobsters are caught along the south-western coast of Western Australia, where the annual catch is on average around 10-11 thousand tonnes. Regarding production of the southern rock lobster, southern states such as South Australia and Tasmania predominate with a combined annual catch of just under half that of the western species (eg. in 1997/98 just over 4 thousand tonnes) (ABARE 1998). There is also a minor dive fishery for tropical rock lobsters (eg. *P. ornatus*) in northern Australian waters. All of these fisheries export significant quantities of live lobsters, but processing for sale of whole cooked and tailed lobsters also occurs.

Release of undersized lobsters

Returning undersized lobsters to the fishery only works if it gives the lobsters a chance to grow up. Somebody certainly gets to know about it if a legal-sized lobster dies after capture during subsequent handling or storage. But how do you establish if that lobster vanishing toward the sea floor actually returns one day as a legal-sized lobster?

Tagging studies conducted sometime ago with undersized western rock lobsters showed that the handling the lobsters received on the fishing boat had a significant impact upon either their immediate survival or their subsequent growth (Brown and Caputi 1983; Brown and Caputi 1985). Clear problems emerged the longer the lobsters spent in air. While it was recommended that the period in air was kept to a minimum, the more practical regulatory approach was to put 'escape gaps' into the traps to make them more efficient, making it less likely that the small lobsters would be retained unnecessarily.

This possibility that regular handling of undersized lobsters would have a cumulative impact on the wider fishery, is essentially a lobster husbandry issue. Lobsters can of course, be returned to the sea in other ways. In recent years, we've seen an allied issue developing overseas with re-stocking programs for clawed lobster juveniles. Stress during the transport of the juveniles can impact upon their survivability in the wild (van der Meeren 1991).

Live for processing

The basic rationale for requiring lobsters to be unambiguously 'alive' at the point of processing is a question of quality. Living lobsters look after their own flesh quality. Of particular concern with shellfish such as lobsters and crabs is the condition of the digestive gland. This organ, typically occupying a large part of the 'head' could break down in a dead animal, liberating enzymes and materials into the body which stain and soften the flesh. The simplest way to avoid this is to keep the animal alive right up until the point it is killed and processed. For lobsters, treatments like tailing and freezing in 'green' product or cooking and freezing whole lobsters are used to stabilise the product quality.

An obvious question that arises. Exactly how alive does the lobster need to be? Sensory work with *Jasus edwardsii* has found that a noticeable deterioration in quality of the processed product occurs when cooking lobsters that are on the verge of death but still technically 'alive,' (Boyd and Sumner 1973). Keeping lobsters as lively and vigorous as possible, even if they are bound for the pot, will pay off by ensuring consistency of quality in the product being handled.

Factors associated with the biology of the product can have an impact on the quality of processed lobsters. Yield or meat recovery may suffer if the lobster has shed its shell recently. In addition, the development of the new shell makes the lobster especially prone to an unsightly condition called 'black-spot' (Ali *et al.* 1994). Here, a black pigment, melanin, accumulates either in the shell or inside the body. Fortunately, the causes of this discolouration are well understood (it's essentially the same process that makes apples go brown), as are the means of inhibiting or preventing it during processing (Iyengar and McEvily 1992).

Live lobsters

Live marketing of spiny lobster has expanded over the past decade or so. For live marketing, lobsters may be held at the factory for longer than generally required for processing. Lately of course, long-term holding has emerged as one strategy for lengthening the delay between capture and marketing, perhaps to take better advantage of price fluctuations.

Survival of lobsters to established markets is generally good. So its not first up issues of survival during airfreighting which dictate volumes exported live, but rather market conditions. Some exporters prefer to concentrate upon the live trade, and overall, the bulk of the southern rock lobsters harvested are probably traded live. In contrast, only a third or so of a large fishery like the western rock lobster may be exported live. Most of the latter catch is good enough quality to sell live, instead its a question of whether the live market could absorb that many lobsters during periods of peak catches as well as the fact that alternative product forms can still be attractive to the processor.

While little mortality occurs in shipment, mishaps still occur. Some of this may be unavoidable accidents. However, considering the other things that get transported in aircraft holds (eg. dry ice, chilled meat, domestic pets) there is scope for conflicts between the lobster's requirements and these other cargoes. It may be possible to better protect consignments from some problems in transit, and this may become an increasing priority as new markets open up, and lobsters are flown further afield.

Ensuring survival and condition

Survival and condition of lobsters is an imperative from the moment they leave the water, but the fisher won't always know the ultimate fate of the product. For this reason, every lobster is best handled as if it is going to be transported alive all the way to the final customer. Survival and condition of lobsters can best be bolstered by promoting wherever possible the existing codes of practice. The point is to ensure that the lobster's requirements are met at each stage of the process. Handling codes may need to be updated if they lack information that is available elsewhere. However, in the case of areas where clear recommendations cannot be made, then further research may be needed to improve or add detail to the handling codes.

Lifting the pot onto the boat and removing the lobsters for sizing is one point where damage can occur. Some injury could perhaps be reduced by refinements to the pot design to stop legs from protruding, but further approaches may have to be sought. Lobsters should be handled in air as little as possible when sizing and grading them on the fishing boat. The legal-sized catch should be deposited in baskets in flowing seawater in a storage tank on the boat. Care must be taken to ensure that the flow rate is adequate and that the seawater flows amongst the lobsters rather than between the baskets. At this stage, the lobsters are disturbed by capture and handling, and have recently fed on a bait. All of this gives them a high demand for oxygen in the water around them, making it crucial to maintain water flow (Crear and Forteath 1997a; Crear and Forteath 1997b).

The catch can be landed on shore under a range of circumstances. The best case applies when lobsters are delivered directly to the jetty of a dock-side factory and can be submerged in storage tanks soon after arrival. However some fisheries are so geographically dispersed (that of the western rock lobster is an example of this) that lobsters must often be stored temporarily at sea in floating boxes or small on-shore storage facilities before being transferred to a central factory perhaps by carrier boat or road transport. As with other instances of storage, lobsters are best transported submerged, in well circulated and aerated seawater. This may be straightforward when moving lobsters by sea, however it may not be a practical method of road transport. On the road, lobsters are usually transported without seawater, usually cold, in insulated trucks. The lobsters must be cooled several degrees below ambient temperature to alleviate the stress of keeping them in air- though actual specifications for how to do this are sometimes lacking for particular species. Chilled sprays, using recirculating seawater, are sometimes used as an alternative. These sprays may be effective at cooling the product but the water becomes progressively dirtier during the journey and ongoing maintenance is more of an issue. Further, it is not clear that the spray helps lobsters to breathe any better out of water. A case probably exists for research that better defines the conditions under which lobsters can be transported out of water.

Lobsters should be stored in tanks that allow them to recover or 'purge' after capture before any further live handling or transport such as to an overseas market. If a reliable supply of seawater is available, then seawater can be continually pumped into the storage tanks at a rate matched to the loading of lobsters present and allowed to drain back into the sea. Alternatively, a seawater recirculation system can be employed, particularly in locations remote from the ocean and/or when it is intended to cool the water down to reduce the metabolic rate of the lobsters.

Seawater recirculation systems are widely used in the seafood industry, and usually rely upon some form of 'bio-filtration' to handle the wastes produced by the confined product (Bunter 1993). This topic itself is beyond the scope of this paper. Part of the ammonia waste excreted by the lobsters doesn't dissolve entirely in the water but remains in the water as the gas, the toxic form. Fortunately, bacteria in a 'bio-filter' convert ammonia via nitrite (another toxic molecule) to an end product, nitrate, which is relatively harmless by comparison. A common mistake occurs when unconditioned systems are 'shock loaded' with large loads of product and levels of wastes in the water rise to levels dangerous to the lobsters until the system adjusts (or the lobsters die, which ever comes sooner). Another mistake is to load more lobsters into the tank than the system can cope with. Given the popularity of these systems, it certainly pays to investigate what exists in terms of 'best practice' for this technology as well as to recognise that any given recirculation system has its limitations.

Lobsters are generally stored for only a few days before being packed and exported. However, it is becoming increasingly common in some situations to hold product for even longer periods, for example to market lobsters at particularly favourable times. There are added risks of course. Holding lobsters for long periods may lack the extreme problems seen when handling lobsters shortly after harvest, though the combination of lack of feed and less obvious kinds of stress may lead with time to loss of condition and reduced meat recovery.

For air-freight, lobsters are packed in a support medium (usually wood shavings or similar) inside polystyrene foam boxes (with air holes). A frozen 'coolant' (a bottle of ice or a bag of gel-ice, wrapped in paper) is added before sealing and securing the box with packaging tape. The lobsters survive in transit for more than a day, easily sufficient to get them from Australia to markets in Asia. The few losses that occur seem to arise from mishaps in transit (temperature extremes at airports, damage to boxes). Where there is any doubt about the cause of mortality, particularly for new entrants to the trade, it pays to hold 'control' boxes aside from each pack-out to rule out prior causes. One strategy to deal with the potentially hostile environments that the packaging must cope with is to make the consignments as independent as possible of their surroundings. Because temperature is a major factor in the survival of lobsters in transit, disposable or returnable temperature loggers are a useful addition to the packaging, particularly when proving new flights and new markets. This of course requires some groundwork at the destination, in arranging for buyers to collect and return the information.

Conclusion

Survival and condition is not only something associated with the live trade in lobsters. In this paper I've explained that interest in the survival and condition of lobsters has a long history, beginning for example in concerns for the fate of undersized lobsters returned to the fishery. With the legal-sized catch, survival and condition also had an imperative for tailing and other forms of processing. While the live trade is significant, not all lobsters will be traded live. Rather than assuming that there be two classes of lobsters, it is helpful to think instead in the following terms; that lobsters that are 'fit for live export' are fit for everything a processor may wish to do with them.

Survival is maintained by correct handling, storage and transport methods after harvest. In some areas work remains to be done to refine the on-board and onshore handling of the product. Refine is probably the operative word. Beyond the simple fact of survival, lobster condition and product quality is clearly influenced by physical damage and leg-loss as well as biological factors such as how recently the lobster shed its shell. Lobsters in general are quite robust during shipment to market, showing negligible levels of unexplained mortality. Of course, at this stage it is all relative. Sending product longer distances into new markets may require going back to basics with packaging and air-freight.

A degree of "best practice" often already exists for post-harvest handling of lobsters. But this doesn't mean that it applies in all cases. While some fisheries, areas or companies are further along the path than others, this is not to encourage complacency about ones position in the scheme of things. The ranking can of course change. Information may already exist on how to handle lobsters properly, so it becomes a question of extension and training rather than solely of research.

We don't know everything about post-harvest handling of every lobster. Still, while the obvious shortcomings can be sorted out using and extending existing knowledge, (eg. storage systems), the task is, having begun that, to see what areas of *research* remain to be addressed?

Acknowledgements

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Lobster Processing and Product Utilization

Alfred A. Bushway, Robert Bayer, Mary Ellen Camire, Terry M. Work, Russel A. Hazen, Kathy Dentici and Beth Bussell

Introduction

The history of lobster processing dates back several decades. Early product forms included canned lobster meat, frozen Rock Lobster tails and small whole *Homarus americanus* (generally under 452 grams) frozen in brine and referred to as "Popsicle" packs. As worldwide lobster production increased (Table 1) and new freezing technologies were developed, the interest in value added frozen lobster products has expanded. An additional factor, which has driven the interest in frozen products, has been the removal of live holding tanks for lobster from supermarkets and restaurants. This has lead to the development of several new frozen product forms for the foodservice and retail markets. This paper will summarize the state of current research on lobster processing and product utilization.

AREA	YEAR	PRODUCTION Metric tons	VALUE K $USD
World	1997	230,573*	1,900,000
U.S.	1997	41,350*	300,597
Maine	1998	20,682**	132,000

Freezing Technologies

Early freezing of lobster relied on the use of still freezers where freezing rates were extremely slow and the volume of product that could be frozen was limited. As blast freezing became available, this technology was adapted to the freezing of lobster and other crustaceans. Temperatures of - 30 C is reached during blast freezing, which results in a more rapid freezing rate. The major problems encountered with these early freezing technologies included tail and claw meat sticking to the shell, toughening of the meat and the development of off flavors (Getchell and Highlands, 1957; Zacharia, 1986; Gall and Learson, 1992). Getchell and Highlands in 1957 were the first to report that lobsters heat treated to 91 C for 70 seconds in a 2% salt brine could be easily shucked from their shells before and after freezing. Sensory analysis determined that meat remained acceptable for 3-6 months at -29 C. They concluded that lobsters blanched for 70 seconds at 91 C allowed meat to "release" easily from the shell, kept meat in as raw a state as possible and resulted in minimal change in shell color. These results proved to be invaluable as newer freezing technologies were introduced to the lobster processing industry.

In the 1980s, new and improved freezing technologies were introduced into the meat processing industry. The last ten years has seen these technologies adapted to the freezing of seafood to include lobsters. Cryogenic freezing with either liquid N_2 (boiling point -196 C) or liquid CO_2 (boiling point -79 C) has revolutionized the freezing of seafood. In addition immersion and flash freezing in glycerol or alcohols (-50 to -22 C) has been examined. The limitations of the later methods are that the products must be packaged prior to freezing in order to prevent contact with the freezant. Advantages of these new freezing technologies include rapid freezing with less tissue damage and improved texture when the products are prepared for consumption.

Cryogenic Freezing Research

Over the past five years research has been conducted examining the feasibility of using cryogenic freezing to produce high quality frozen lobster products. Preliminary experiments (Work et al., 1997) compared the quality of frozen blanched hard and new shell lobster and examined the quality attributes of blanched frozen new shell lobster. These experiments were performed to determine if new shell lobsters would produce a high quality frozen product with a reasonable shelf life. Hard and new shell lobsters were processed according to the scheme outlined in Figure 1 using liquid CO_2 and a batch cryogenic freezing unit.

LOBSTER PROCESSING SCHEMATIC

Blanch 60 secs. at 190 ^{0} F

Cool 5 min. cold water

CO_2 freezer –80 ^{0} F

Package in plastic lined cardboard box

Chest freezer storage at –18 ^{0} F

Sensory, physical and chemical analysis at 3 month intervals

Results from these preliminary experiments demonstrated the following:

1. Cryogenic freezing of new shell lobsters can maintain good quality attributes during frozen storage for up to 9 months.
2. No fishy flavor was detected in any of the samples over the length of the study
3. Claw internal cartilage did remain attached to the meat
4. Salt soluble protein decreased and shear force increased over storage time, but differences were not significant.

As a result of this preliminary research, two large and several small lobster freezing plants were established in Northeastern states in the United States.

Research has continued on maintaining the quality of frozen lobster products over extended storage. Recent experiments have examined the effect of preprocessing treatment on the quality of whole fully cooked lobster over 15 months of commercial frozen storage. A natural antioxidant and a sweetener (at three different concentrations) were introduced into the lobster prior to cooking and freezing. Results have demonstrated that antioxidant with the lowest concentration of sweetener produced a significantly better frozen product than the control or other treatments. These lobsters were preferred for overall quality, flavor and should the least change in texture over the 15 months of frozen storage.

New Product Forms

The successfully adaptation of cryogenic freezing to the lobster processing industry has provided processors with a number of opportunities to develop value added products for the foodservice and retail markets. Frozen product forms that are currently available include whole blanched and fully cooked lobster, blanched and fully cooked tails, cooked claws with the shell scored (referred to as Cocktail Claws), whole cooked lobster meat removed from the shell and vacuum packaged, and cooked claw and knuckle meat removed from the shell. The later two products are used in foodservice to prepare sautéed lobster and lobster salad and rolls. The advantages of these product forms include:

1. Not having to have live holding tanks
2. Not having to deal with groups involved with the ethical treatment of animals
3. Reduction in the amount of lost product
4. Waste stream reduction with regard to disposal of carapaces and shells

By-Product Utilization

As with any new processing technologies, there are issues that must be addressed in terms of by-product utilization. As the volume of frozen lobster tails and picked meat increase, the disposal of the carapaces and shells has to be handled in an economic manner. The development of value added products from these materials would assist in off setting the higher cost of cryogenic freezing. Possible products to be produced from these materials would include organic compost, chitosan, soup bases, flavor enhancers (glaces), minced lobster for use in fermented sausages, and extruded snack products. Research is currently in progress to develop extruded snack products, which would include ground carapaces and shells in the formulation.

Future of Lobster Processing

The freezing of lobster does have a future, but there are several factors, which may impact the volume of product that will be processed. These include but are not limited to:

1. Maintenance of the current harvest volumes of live lobster
2. Stable boat prices for live lobster
3. Providing a high quality product for the market

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Food Safety and Training

Mr Hagen Stehr, AO
Australian Fisheries Academy

Ladies and Gentlemen,

Thank you first of all, for inviting me to speak and share my thoughts about training in a fishing-sector. My companies have quite heavily invested in over the last couple of years, so my interest is more than just general. Training and education is the single most important issue we have to solve so that we can look with confidence into the future, but training and education is also without doubt the most dry and boring subject, and in many instances quite plainly a pain in the backside - and yet so important. So please give me your attention for the next few minutes and I hope I will not send you to sleep and will make sense in what I am saying.

When my company contacted me by satellite phone, asking if I would talk at this forum I was camped half way up Mount Tutoko Glacier, in the South Island of New Zealand with some climbing friends, debating the merits of training and mountaineering, as over the previous couple of years six people had lost their lives in this particular area due to mainly one thing - not enough knowledge and training in this area, not enough understanding of weather patterns in the high mountains and a gung-ho belief that "it can't happen to us". It struck me then how similar our business of fishing is, but even more so because if you don't have enough training you can lose your life and in the future your businesses as well. You only have to look at the monument in front of Fishing Industry House listing 176 names of people lost at sea in South Australia alone. Many of them Rock Lobster fishermen. Not a good record.

When my company bought into the Rock Lobster fisheries I felt indeed lucky, as I believe it is a magnificent industry and being attracted to the Quality Management System, the Southern Zone was for me - the place to go - but various experts told me that the almost as magnificent Northern Zone, Input-control Fisheries is far exceeding the technical and economic performance. Well, it's all good news.

We hear how so many fisheries around the country are going extremely well, fishermen working hard, reaping substantial rewards and so they should. Fish prices inevitably going up, assuring us a secure future. But does it? I beg to question. In my 22 years involvement with various training organisations around Australia and comparing us with various overseas countries, it has never ceased to amaze me just how much training in our industry is an unappreciated field of endeavour. The Rock Lobster industry is no exception, in fact, given that this industry is one of Australia's highest value fisheries it is disturbing just how little emphasis this industry has placed in the past, on something which will be without doubt our saviour in the next millenium.

I hope you are aware and if not you certainly should be, that there are continuous outside forces at play, who want a piece of our industry, bring us under their control, burdening us with unnecessary laws and regulations, cut our industry down in size, or at worst, shut us down completely. Government departments, Marine Safety and environmental organisations, cruelty against Lobsters movements, Back to Earth fundamentalists, Mabo style claims, scientists and fisheries management forums, Occupational Health and Union issues, export regulations and standards Some of those issues, no doubt justified, will be matters we will have to deal with logically and rationally in the future and on top of all that there is, as many of you well know, a distorted idea in urban Australia, driven by some seemingly intelligent people, who can't grasp the concept of sustainable management of our fisheries resources. Through their ignorance and arrogance, to appease their own misguided environmental consciences, have become dangerous and are against our industry.

In the future we will need fishermen and leaders who will have to be able to deal with those issues on a day to day basis.

Some of you, no doubt will say I am an alarmist. I don't think I am. Might I remind those people of my columns in Professional Fisherman Magazine, re: The Great Australian Bight Marine Park, some five years ago. The SAFIC Board at the time, thought I was grossly exaggerating. Well - you all know now that I wasn't. The proof is there for all to see, because in the end we only have ourselves to blame because we didn't have the people with the right training and understanding to put the right arguments.

Moving towards the year 2000 and beyond no-one in our industry can afford to deny the importance of having properly skilled, competent and assured people, who know their rightful place in society and that is not on the bottom of the pack, like in years gone by. Education in the new millenium goes much further than just ensuring that the skippers of our vessels have the correct qualifications and tickets, or our deckhands have done the appropriate sea safety training.

In order to survive in an increasingly competitive consumer dominated and environmentally conscious world, our industry has to start to take stock and take notice of how it can improve itself and become palatable to the general community. The old gung-ho days of the past and the ratbag tag of hard drinking, environmentally destroying, resource raping image and "she'll be right mate" attitude, should go into the dustbin of history. Training and education must go beyond the traditional compulsory qualification and must move with the times. Industry needs to start embracing in a very serious fashion, aspects such as food safety, business management, environmental and resource management and also most importantly political awareness - just to name a few.

We have to understand that we will not survive and I mean NOT survive in our fast moving, ever changing world of technology and under the ever critical eye of the consumer and general public unless we become socially, environmentally and politically aware of what is going on in the outside world, beyond the boundaries of our fishing grounds. The challenge for us should be to create a new way of thinking in a much broader sense than has ever occurred previously. It is of paramount importance to create a new breed of leaders and fishermen who will be able to help us face the challenges of the 21st century, and guide us through the no doubt stormy waters ahead of us.

If history has taught us anything, it is that nothing ever stays the same, and that we won't be able to go on like we have in the past. Our challenges in the future will be more complex, tougher and more sustained if we haven't a skilled, trained workforce - alert and society conscious fisherman, knowledgeable and assured leaders - we won't have an industry in 10-15 years from now. Think about what I am saying, because it will come to pass if we are not careful. The other challenge of course is for industry to understand the famous adage "user pays, user says". We must end the days of believing that Government will continue to pay for education and training. We have to get over this hand out mentality, acting like a bunch of scapegoats and shoemakers. Only if we become totally self-sufficient paying our own way will we become Masters of our own destiny.

An excellent example was told to me by the Australian Fisheries Academy, CEO, Grant Carnie about a fisherman (in fact he was a lobster fisherman) enrolling in the Academy and complaining about a $600.00 cost for a 6 week Skippers course. Those of you who know me can imagine what I would have said to this gentleman, fortunately Grant Carnie was more diplomatic. He explained that a student these days attending University must pay anything in order of $5,000.00 to $15,000.00 for a degree, study at least 3 years and not even having the guarantee of a job in the end, let alone a salary far in excess of what people with degrees will ever earn. The young man very soon realised his investment in his future was well justified and in financial terms, peanuts really. But it is not only the simple understanding we need, that training comes at a cost, but have to understand that we need other types of training which is important for us, so we can face all challenges.

I am sick and tired of the fact that some sectors of our society still think of us as second class citizens. Always easily manipulated, regardless how many millions of dollars we contribute into the economy, and therefore one of the most important needs we have is leadership training. We have to start grooming today, the leaders of tomorrow. Martin Smallridge, Executive Officer of the South Australian Prawn Boat Owners Association is just one who feels such training is of utmost importance.

Numbers of fisherman are declining. The amounts of information and issues that need to be addressed are increasing. Fishermen can readily acquire skills of seamanship, how to catch fish and how to sell the produce, but they are not equipped with the skills and techniques to deal with issues such as:

- Slippery bureaucrats and scientists
- Political situations, Party politics and Politicians
- The Media
- Meeting procedures, Policy development
- Resource management principles
- Economics, Technical research and
- Industry development

How many times have you seen meetings fall to pieces with politicians and bureaucrats because we couldn't bring our point across. Industry members become intimidated, tongue tied, nervous and can't speak. Training in political awareness is just another one. Our industry is naïve. If we don't learn how to work in the political arena, don't complain when the Politicians don't listen. Learn from other industries like Mining and Farming (they have it down to a fine art and have run appropriate leadership and public education courses for many years).

Food safety is another item looming on the horizon. We need extensive education and become fully aware of the significance for our industry. Over the next two years a major push from Australian and New Zealand Government's is underway to address food safety standards. The fishing industry will come under close scrutiny. The damage that can be done by contaminated seafood to our industry is immense. Look at the Garibaldi incident here in Adelaide. To make a point, not only Garibaldi went against the wall, but another perfectly safety conscious local company went bankrupt, only because they were in the same business. The oyster poisoning scares on the east coast of Australia is still having a detrimental financial effect years later. I have seen it in my own industry, the Tuna Industry. A small scare in Australia can affect our markets in Japan. A complete lack of understanding of food hygiene and safety was seen recently on local television. What a disgraceful scene - it showed a dog dancing around a lobster, out of water, on the deck of a boat and doing what dogs do! It will only take one incident like that to wipe out any positive marketing image you guys have tried to create.

In the past we have been able to overcome some problems by employing "Hot Shots" like Brian Jeffriess, Brett McCallum, Roger Edwards and Ted Loveday, but those people will quickly tell you that they are only as good as the committees and fishing operators around them.

In the end we are our own Masters of our Destiny. We have got our own balls on the line and we need leaders that understand the practical side, and at the same time, have an overview of the broader industry. Where is this batch of future leaders, I ask you ?

No doubt you have covered most big issues for the lobster industry this week, but not one single industry trainee is here. Some of you might say I'm scare mongering, but isn't that preferable to not having a business in a few years, and make no mistake we will be challenged in the future in one way or the other. We need to train and educate our own with proper planning and foresight. If we don't others will force their own agendas on us and then - God help us.

Industry training should encompass four levels:

1. Catching and Safety
2. Transport and Handling
3. Processing and Export
4. Practical Know-How (interaction with consumers and the needs of the general society).

Training plans for the future should encompass all, to ensure that fishermen have an adequate knowledge and insight in what happens around them. From the deck of a fishing boat, to the legislative chambers of Parliament, how political party's work, what our political masters expect from us and what we should give in return. Fact is, in political terms, we are few in numbers but with the right knowledge and know-how, focussing on our objectives, we can bring our industry up to standard and hold substantial political and economic punch we must learn how to use our power and that in the end, is what will sustain us into the next century.

On the other hand we risk ongoing negative assessment by the general public,

- of being branded political light weights
- of wishy-washy approaches in the political area
- division in or own ranks and
- a "She'll be right mate" mentality will in the end destroy us.

Improving our industry by education and training, beyond everybody's expectations should be our challenge for the next Millenium. The Australian Fisheries Academy is ready to give a hand to the Lobster industry of Australia. All of us had to work bloody hard to achieve what we have established so far. Don't let anybody take it away from us by being ignorant and dumb. Thank-you.

Re-seeding and Stock Enhancement

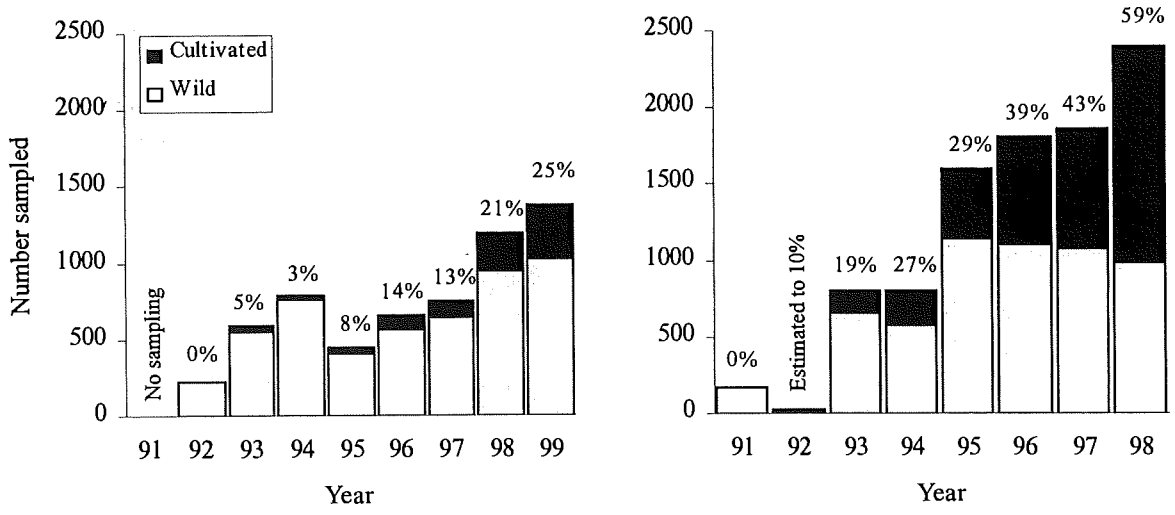
"Large Scale Lobster (Homarus gammarus) Enhancement in Norway"

Knut E. Jørstad and Ann Lisbeth Agnalt

Lobsters resources in the south and western coastal areas of Norway have long traditions and have supported local fisheries for several centuries in spite of large fluctuations in the harvest. The annual catch in Norway was around 1000t in the 1930s, and was the largest lobster fishery in Europe contributing to 30-40% of total harvest in this region. The annual catches was later reduced to about 600-700t in the post-war period followed by a collapse in the lobster stocks between 1960-1970. At present, the total lobster harvest in Norway is only 3-5% of earlier catches. This situation initiated research on developing aquaculture approaches aiming on rebuilding lobster stocks.

Lobster stock enhancement was included in the national Norwegian Sea Ranching Programme (PUSH) initiated in 1990. The lobster enhancement program focused on increasing an almost depleted local stock at the islands of Kvitsøy in southwestern Norway. From 1990 to 1994 about 127,000-lobster juveniles were released. The juveniles were raised to about 1 year of age at the Kyrksæterøra Lobster Hatchery and micro-tagged before they were transported to Kvitsøy and the released into the natural environment at Kvitsøy.

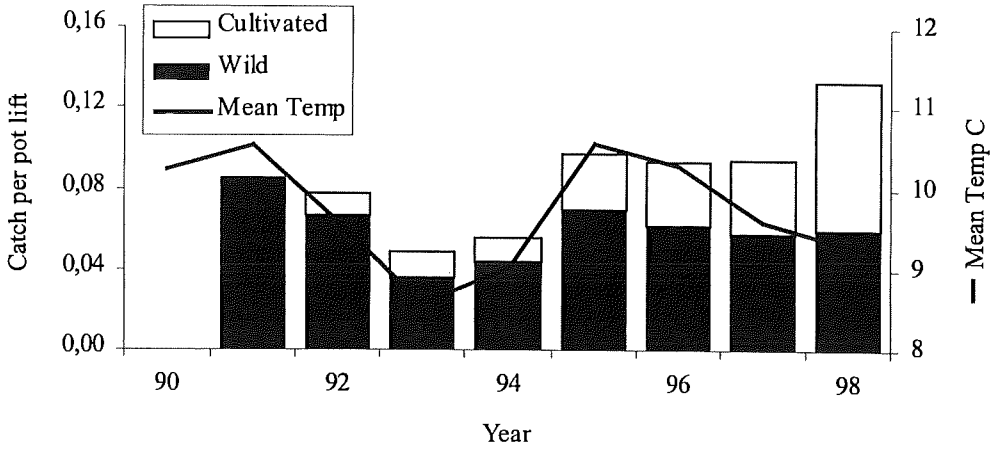
Since 1991, the commercial lobster fishery at Kvitsøy has been carefully monitored through a close co-operation between local fishermen, local management authorities and scientific personnel, and more than 95% of all lobsters harvested were investigated for microtag and thus cultured lobsters identified. A clear increase in the lobster landings due to the released/cultured lobster was observed, both for commercial sizes as well as for lobster below the legal size (recruiting). The proportion of cultured lobsters in the fisheries was nearly 60% in 1998, and in samples of sub legal sizes the frequencies of cultivated lobsters were between 60 and 70%.



Sampling of commercial landings of European lobster (Homarus gammarus) above legal size at Kvitsøy during a) spring and b) autumn. The proportion of cultivated lobster is given above the column.

There has been an increase in the fishing effort during the observed period from 1991 to 1998, probably as a result of the enhancement program. The observed high frequencies of cultured lobsters in the landings could therefore also be explained by displacement of the wild lobsters in the area. For this reason, some reliable fishermen have been contracted to keep a log-book during the commercial fishing season. Information of the catches of lobster above and below the legal size, and number of lobster pots used were noted on a daily basis for the entire fishing season.

The data on catch per unit effort demonstrate a significant increase in the total harvest. Most of the increase seemed to be associated with recruitment of cultured lobsters to commercial sizes. The catches of wild lobster seemed to have remained at more or less a stable level with some variation possibly due to variation in temperature.



Catch per pot lift of lobster above legal size caught at Kvitsøy each autumn season. The catches were separated into wild lobster and those of cultivated origin. Solid line is mean surface temperature in October and November at Kvitsøy.

Information about catch per unit effort in nearby lobster areas were no releases have been conducted, was provided by Dr Stein Tveite (Institute of Marine Research, Flødevigen). With this additional information, the data indicates that the cultured lobsters represent a true enhancement, an additional harvest for the fishery and not a replacement of the wild lobster animals in the area. From 1991 genetic analyses were also incorporated in the overall investigation. Samples of wild lobsters, broodstock used for juvenile production were analyzed and compared for several allozyme loci present in white muscle. Now samples are also collected from recaptured cultured and wild lobsters in the ongoing fishery in order to evaluate potential genetic changes in the local population. Selected samples are now analyzed DNA techniques.

In a depleted local lobster stock as the one at Kvitsøy, heavy fishing pressure on cultivated lobsters when they reach legal size, will only result in a short term increase the harvest. To keep the present harvest, this implies that annual releases have to be conducted. Establishment of a local lobster hatchery in the Kvitsøy County as well as the new plans for building a large-scale lobster hatchery for production of juveniles for releases, constitute new approaches for rehabilitation of Norwegian lobster stocks. In amore sustainable strategy, culture approaches should be supplemented new management approaches. In that respect, the need for culture activities is considered more as temporary activities and can be reduced when the stock size and natural recruitment is on acceptable levels.

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Holding Systems

"Live-Holding of Southern Rock Lobster in South Australia"

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Live-Holding

This paper is concerned with live-holding of legal-sized adult southern rock lobster (*Jasus edwardsii*) that are captured from the wild commercial fishery in South Australia. These lobsters are live-held for the sole purpose of value-adding to the catch. Value-adding can occur in three ways: live marketing, strategic marketing, and product enhancment. Live-marketing has arisen because of the higher prices paid for live rather than frozen product, and 95% of the catch in South Australia is now sent live to overseas markets in order to gain maximum prices. Strategic marketing relates to price fluctuations in overseas markets during the fishing season and to market opportunities outside the fishing season. This practice involves stock-piling product during times of low prices and selling at times of higher prices such as the Chinese New Year. Product enhancement is still in the research stage and relates to weight gains and improvement in the condition of lobsters. This is the focus of our present research and development project.

Holding Systems and Practices

Live-holding of adult southern rock lobsters in South Australia is possible on three time scales: short-, medium-, and long-term. Short-term holding of several days is the usual practice for lobster processors prior to local sale or export and is conducted in land-based facilities with recirculating water. Medium-term holding of more than a few days to several weeks can be practised by processors but is increasingly being conducted by commercial fishers prior to sale of their catch as it enables strategic marketing against the fluctuating export price of lobster. To better facilitate medium-term holding by commercial fishers, two, large, purpose-built, sea-based floating pontoons have been constructed in South Australia. These facilities enable not only medium-term holding but also the possibility for long-term holding of several weeks to many months. Similar long-term holding could also be performed in flow-through raceways such as those developed for the abalone aquaculture industry in South Australia. The opportunities offered by long-term holding lie in the possibilities for value-adding to the existing catch through weight gains and for improving the physiological and external condition of lower-priced "white" and "damaged" lobsters. Long-term holding may also enable new markets to be created during the closed season of the commercial fishery.

Research

The environmental and system requirements of lobsters held short-term in land-based recirculation systems are reasonably well understood and factors such as temperature, oxygen, ammonia, and animal wastes can be controlled. However, the environmental and system requirements of lobsters held long-term in pontoons and raceways have not been investigated and we know little of key responses to factors such as temperature and water quality that cannot be controlled. The need for feeding and the nutritional requirements and modes of food delivery also need to be considered, as does the density and holding conditions. In order to investigate the environmental and system requirements of lobsters in long-term holding facilities, a research study is presently underway. This research constitutes one component of Project 5 (98/305) of the Fisheries Research and Development Corporation's "Rock Lobster Enhancement and Aquaculture Sub-Program." As part of the study, experiments are being conducted to investigate the effects of different prepared and natural feeds on the survival, growth, and condition of live-held adult southern rock lobsters. The feeds being tested are live mussels (*Mytilus edulis*), octopus (*Octopus maorum*), and two types of prepared pellet (dry, and moist). Mussels are the food most commonly used in spiny lobster aquaculture experimentation, and octopus is a by-catch from the local commercial lobster fishery. Both feeds are readily available and relatively inexpensive in South Australia. The two prepared pellet feeds were developed through Project 3 (98/303) of the Rock Lobster Enhancement and Aquaculture Sub-Program.

Results from the study have so far shown that lobsters can be held for at least four months over summer in the pontoon and raceway systems. After four months holding, survival rates were as high as 95% in some treatments and individual weight gains of up to 23% were recorded. In the mussel treatment from the summer pontoon experiment, there was 95% survival, with 68% of these lobsters moulting and gaining, on average, 8% of their initial body weight through the moult. Lobsters were also shown to have maintained or improved their physiological condition after four months of holding, and colour change was induced in some "white/speckled" lobsters.

While the results to date have been very promising, several problems have also been encountered. These include tail fan damage, over-feeding, cage fouling, and lobster shell fouling. Future research is therefore required to address these factors and to improve weight gains at moult in long-term live-held southern rock lobster.

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Puerulus and Sub Legal Growout – An Industry View

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Australia's wild lobster fisheries should welcome the research underway in lobster aquaculture. And before those of you who are in the wild lobster fisheries throw me out, I'll give you three reasons why:

The first reason is simple – you can't prevent progress. Trying to stop aquaculture in R&D would be like trying to stop the sun setting tomorrow.

The second reason is – the work is being done here in Australia, and that means that we, Australia's wild fisheries, can influence it, provide the necessary input and attempt to position ourselves in light of the likely economic outcomes. In other words, make sure we're the beneficiaries.

Let's be clear about this, research is already under way in New Zealand and Japan. There we have no influence, no opportunity for direct benefit, and I think both countries are ahead of Australia in research at this time.

The third reason is the biological R&D is being undertaken and managed nationally, it's a professional, structured sub program of the FRDC Corporation. Big Research with a capital B and a capital R it may be, and big research is usually bad news for wild fisheries, because it forces other peoples' self-serving research agendas down our necks. However, this is probably the best kind of Big Research, because it's structured and accountable and, I believe, competently managed. Let's remember that representatives from the wild fishery sit on the steering committee, that oversees the whole project, and sub project leader Rob van Barneveld has made it clear he's prepared to front up to industry meetings of wild fisheries associations, Australia-wide, to keep us in the picture.

So what are our concerns? They fall into 2 main areas. Firstly, the potential biological impacts on the wild stock, and I don't think that can be underestimated. Secondly, the likely economic impact on the wild fishery. If we start with the biological impacts, as some of you may recall, the foundations for the development of rock lobster aquaculture were established at a national science and industry workshop, organised by FRDC, and held in Hobart in July, 1997. As FRDC reported in its newsletter, R&D News, Volume 5, Number 4, the first of the foundations, the underlying ethic, if you like, was to be the maintenance of biological neutrality.

One of the scientists involved, Dr Bruce Phillips, of Curtin University in Western Australia, said if puerulus were to be collected from the wild, the catch of adult fish should be reduced proportionately. The best estimate put forward at the time was to reduce the wild catch by 1 tonne for every 40,000 puerulus taken. In the case of quota-managed fisheries, this means the retirement of 1 tonne of quota, as per the case in New Zealand.

A later analysis, undertaken by the Tasmanian Aquaculture and Fisheries Institute, has recommended that, in the Tasmanian case at least, the conversion rate of 1 tonne of quota to 40,000 puerulus was not conservative enough to protect the wild fishery. The paper suggested the conversion rate should be halved to 20,000 puerulus for every 1 tonne of quota retired. That's a big difference, and certainly highlights the uncertainty that is involved at this stage of the process.

This is where we've got to draw a line in the sand. I think we should be absolute in this. There are no guarantees for the wild fisheries, anywhere in this process. So the promise of this vague concept of 'biological neutrality', on which the whole R&D effort was founded, must be delivered. The individual and collectively we must insist that no extra pressure be placed on the wild fisheries. I think that is absolutely paramount.

Rock lobster fisheries are Australia's most valuable. They're the most valuable in terms of investment, employment and they're most valuable in terms of export earnings. It is up to us, in the wild fishery, to ensure that it is not jeopardised, particularly by people who are not involved and who have no present commitment to our industry. Believe me, we cannot rely on fisheries managers, scientists or corporate investors in aquaculture to deliver on the promise of biological neutrality.

The evidence, in my State, in Tasmania, is that they're already cutting corners. Tasmania's wild fisheries managers no longer support the option of trading quota for the rights to harvest puerulus, neither do the scientists. Nor do potential investors. The current proposal is to take the puerulus from the wild, without reducing the catch of adult fish to compensate.

But let's stop using this word 'puerulus'. In wild fisheries terms, what we are really talking about are juvenile rock lobsters. The Tasmanian plan is to take these juveniles which, in the wild, suffer very high mortality, and rear them in culture, with near zero mortality. Then the trade-off comes. A proportion of these hand-fed juveniles would be taken from their predator-free, temperature-controlled, 3 meals a day, 5 star accommodation, and dumped in the wild to compete with their brothers and sisters and cousins, already there, for available habitat and food. We are told that the process just outlined is the best way to ensure the principle of biological neutrality. This is from biologists and managers, who place their hands on their hearts, and swear they are devoted to the precautionary principle when dealing with biological unknowns.

However, in fairness to the scientists and also to the managers, they are being directed by a political agenda. I don't think there's much doubt, especially in our case, of that. We have a lot of unknowns, I will list just a few. Quoting from FRDC's R&D news again, Bruce Phillips stated at the initial workshop in 1997 that a US study estimated that the mortality rate in the first year after settlement was in the region of 75%. Again, another best guess, one would imagine. Bruce went on to say that it would be years before it was known, whether this doomed percentage could be harvested without having an adverse effect on the wild fishery. It would be years, and we don't know whether this doomed percentage have a built-in propensity to fail and are they life's losers anyway? Some of them are going to die. If they do, we don't know that, returning such juveniles to the wild, to grow to sexual maturity, would introduce a failure gene in the stock. We don't know that. And if we did, we don't know how severe its impact would be on future recruitment.

We must remember that, in the wild fishery, your future is your recruitment of those animals. That is your future, somewhere down the track.

We really don't know enough about the habitat requirements of early, juvenile lobsters and we don't know what effect the introduction of tank-reared, artificially fed juveniles would have on the natural survivors. If those fish are being cultivated in high densities, before being returned to the wild, how good would the hygiene be? What are the chances of introducing diseases to the wild stock? Would we only be getting the runts of the litter, with the best ones being graded for on-growing for culture? What do you reckon? Which ones do you reckon they'd throw back? I don't think there'd be much argument about that. How will we ascertain their mortality rates when they're reintroduced to the wild? It may be years, again, before we gain any accurate information on survival rate. Would their release cause additional mortality amongst juveniles already in the wild? We don't know. What impact would they have on habitat, competition and growth rates? We don't know.

These are just some of the questions, you could probably think of some more, that will have to be addressed. Until questions, such as these, are answered, shouldn't we, as a national industry, take a national stand on biological neutrality? Because if we don't, this matter is going to be decided on a state by state basis, as it already is in Tasmania. By the way, I've yet to have a biologist to point out, someone might put their hand up, where in any wild fishery the concept of biological neutrality has been successfully applied. Imagine the difficulties with some of the lobster species that potentially have a very long life span.

My firm belief is that we should act nationally, to ensure that every step that can impact on the wild resource or wild fishery, is based on research. It's got to be based on research. We must not allow our individual fisheries to be jeopardised one by one, to save corporate investors a few bucks. They are champing at the bit, and are very inclined to play down the huge gaps in knowledge or behaviour, and other processes in the wild, that can impact on the continued sustainability of wild stocks.

In Tasmania, in the case of southern rock lobster, scientists can't tell us if the recruitment comes from our own breeding stock, South Australia, New Zealand or from the middle of the Pacific, and we don't know. This applies elsewhere, of course as you are well aware.

When and if it's proven to be safe and successful... when... by all means, let's have some form of enhancement. But, until that time, there should be no abandonment of the precautionary principle, and no watering down on the principle of biological neutrality in taking stock from the wild for grow-out.

In the most basic of terms, if we can't be assured of this biological neutrality, we cannot be assured that our wild resource is safe.

Another reality check, like any other commercial venture, rock lobster aquaculture is going to be about return on capital. In the foreseeable future, the fastest return on capital will not be from closing the lifecycle because, despite the promise, this may still take years to achieve commercially. The quickest return will be taking juveniles from the wild and on-growing them. So the pressure from corporate interests, already lining up for a piece of the action, will not only be from on-growing wild stock, but naturally on-growing at the lowest possible cost. So expect previous commitments to retire quota to be abandoned, in favour of tossing a few juveniles back into the sea and calling it enhancement. It is likely to be a lot cheaper than retiring quota. Make no mistake, the corporate investors would not even do that, if they could get away with it.

For the wild fisheries, the biological issues very quickly become economic ones of course. And, in economic terms, the big question is, 'Where does the wild fishery fit into the rock lobster aquaculture picture?' Again, let's return to the principles laid down at that initial workshop, and the words of South Australian fisheries manager, Will Zacharin, as reported by FRDC. Will said, 'Let's recognise the pre-eminent position of the wild fishers. The aim should be a high degree of co-operation, with flow-on benefits to the wild fishery.' He warned then that any jurisdictions without a policy on rock lobster aquaculture had better get one or face a fight. I think they were very wise words.

The Tasmanian experience is that his advice has been largely ignored. Once again, it's been politically driven, and although wild fisheries in the individual states will have some differing objectives, I think we should start work immediately on a cohesive, national policy, covering the things that we do agree on. The national bottom line, as I see, should be that we, the wild fishers, should be fundamentally involved in the decision making process, at all levels, perhaps as investors.

The decision making process should involve 4 groups:

1. The wild fishery, because of the huge investment in and its pre-eminent claim on the wild resource, and its position as Australia's most important seafood provider.
2. Investors in rock lobster aquaculture.
3. Government, as the legislator and resource protector.
4. Researchers, who provide the answers sought by the other 3 groups.

So what about investment? For the wild fisher, I believe the choice is clear. We either invest or become part of it, or we get done over. Even from the position of the corporate investors in aquaculture, perhaps it is better to have wild fisheries inside the tent, pissing out, than outside the tent pissing in.

That aside, could we become co-investors in aquaculture, on the basis of our existing access rights. Maybe. It is not legally defined, but every cent invested in a wild fishery relies on continuing stock improvement. Our future recruits are our real property, and access to potential recruits is also essential at this stage for our culture growout.

As I see it, we do have prior rights here and the question is how can we exercise them for aquaculture? Possibly the establishment of the Tasmanian salmon industry could provide a guide, as it too was established on an exclusive breeding stock, with access to that stock totally controlled. In that case a company was established with the exclusive rights to provide atlantic salmon fingerlings for aquaculture for a specified number of years.

The company comprised A-, B- and C-class shareholders. 51% was owned by the government, which owned 100% of the breeding stock from day 1, thus all the A-class shares. The B- and C-class shareholders are the growers, whose annual rights to the fresh growout stock are based on the class and number of shares that they held. That's just something that could be considered.

It is important to stress, at this time, that our Minister sees the on-growing of juveniles as only a stepping stone, to allow the aquaculturists to gain experience in growout techniques, pending the closing of the lifecycle. He is unwilling the guarantee an indefinite supply of rock lobster puerulus as being the cornerstone of a rock lobster industry. Therefore it is envisaged that the structure outlined a minute ago would only have a limited lifespan. However, it is important that, whatever structure is contemplated, includes the wild fisheries as being an integral part of the process. Economic involvement will also give the wild fisheries a very necessary say on some of the other key issues.

Juvenile collection from depleted areas must be a no-no. Collectors must meet strict criteria and permit conditions. In fact, it may be prudent to restrict collection to people or corporate entities that own the appropriate wild fisheries licences. In other words, why would you allow another group of people to come in to where you already own the resource, or a share of the resource, and you pay very handsomely for that. The enhancement ratios are decided, instead of retirement of quota, wild receding is the preferred option, the ratio of returned juveniles should be decided using the precautionary principle. In Tasmania our position is 25+5. When proven, 25% of collected juveniles, plus a 5% buffer must be returned to the wild. This is regardless of mortalities in tanks, and with the releases to be in the areas from which the puerulus were originally collected, or from other areas approved by industry after consultation with wild fishery scientists.

Enhancement release side, commercial growers, as I said before, obviously they want to get rid of the fish, as quick as they can get them, because it's only going to cost them money to keep them there, so they'll be giving those the flick, that 30%, as quick as they can do it, so we said that we should have a required size there that they must reach before they can get rid of them. The legal position sizes all want to keep a distinct gap between the minimum legal size of wild harvest animals and the maximum legal size of cultured fish. The current legal definitions of lobsters must not be changed. The wild fishery must not allow a separate class of the same species to be defined by legislation or regulation. In Tasmania, we fought long and hard to gain recognition in our fisheries legislation that a lobster is a lobster, from the cradle to the grave, with no exception.

Roger Edwards had a bit to say at one of the R&D meetings. The meeting that he chaired was that the risk assessment should be made to protect the wild fishery, and that corporate enthusiasm should not allow aquaculture development to become totally production driven. It would not be in Australia's best interests to develop a cultured product that destabilises markets for the wild fishery harvest, worth more than $400m annually. That means market research and development first, then targeting the product accordingly, not what appears to be happening at the moment.

This, in turn, requires marketing expertise to be introduced into the program now – not next month or next year. There is an unfortunate tendency in most seafood and research funding to think that R&D begins and ends with biological science – it doesn't. After the assurance that lobster aquaculture is based on biological neutrality, the most fundamental outcome from this R&D initiative is that it will not wreck our markets.

Currently the R&D program can't deliver on this and is totally focussed on capturing, rearing and feeding little lobsters, although some effort is being put into closing the lifecycle. That's how success or failure will be measured, whether or not their efforts will contribute to sending you to the wall financially will not weigh on their conscience, one iota. They see that as someone else's responsibility. So let's make it ours. Let's insist that some genuine free-enterprise market development is co-opted right now into this R&D program and that biological science follows it, not vice versa. More importantly, let's resolve to send a clear message, via the industry representatives on the sub-program steering committee, what our industry expectations are of the program and its priorities. If this fails, we should set up our own working party to establish our national objectives and to negotiate them at a national level.

Finally, what we have at the moment is an unstoppable R&D process that is dancing to the beat of someone else's drum, somebody out here in right field, or left field, is pulling some of these strings. We can continue to stand on the sidelines, criticising, while others reap all the benefits, and possible endanger our industry, if we choose to do that. Or we can combine our muscle as Australia's most important seafood sector, to become part of the process and share the outcome. That's not really a choice, I don't think, is it?

Lobster Health

"Health Management of the American Lobster from Harvest to Market"

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Note - Much of this text is available with illustration in the "Lobster Health Manual, " published by the Lobster Institute and the Maine, New Hampshire Sea Grant Program.

The American lobster, *Homarus americanus*, is subject to several health problems that appear during post-harvest storage and transport. Major sources of post-harvest losses include gaffkemia or 'red tail', ciliated protozoan disease, shell disease, and vibriosis and other types of Gram-negative bacterial infections.

Catastrophic losses of lobsters have been most consistently associated with gaffkemia. Infection results when the bacterium *Aerococcus viridans* breaches the integument through wounds. A fatal sepsis is the ultimate outcome of infection, with the onset of mortality dictated by temperature. Gaffkemia is presently monitored by individuals in the lobster industry, with a simple hemolymph culture technique that uses syringes pre-loaded with a selective medium. Lobsters in storage can be treated for gaffkemia with a feed that contains oxytetracyline. Industry use of this feed has greatly reduced associated mortalities. Residue of the antibiotic is easily measured using a modification of a test used to detect antibiotics in cows' milk. This test is routinely used and takes only 2.5 hours

Ciliated protozoan disease is also associated with some lobster mortality in storage. The causative organism is *Anophryoides haemophila*, which invades lobster tissues and hemal spaces through perforations of the integument. Acute infections are typically characterized by the presence of large numbers of ciliates freely swimming in the hemolymph, and are readily detected by microscopy. Mortality may be due to tissue destruction and loss of hemocytes produced by invading ciliates, or may be due to secondary invaders.

Shell disease also contributes to some market losses in long-term storage facilities. Erosion and necrosis of the exoskeleton not only make lobsters unattractive to the consumer, but also prone to weakness and mortality. Causative factors of shell disease are not conclusively established, but bacteriological examinations indicate that shell lesions are principally associated with bacteria of the genera *Vibrio, Pseudomonas,* and *Aeromonas*. There is also a strong relationship between shell disease and lobster source, and a possible link to lobster nutrition.

Lobster health problems related to *Vibrio spp.* and other Gram-negative bacterial pathogens are apparently increasing in significance. Recent, high mortalities in some Maine lobster pounds have been associated with a strain of Gram-negative bacteria identified as *Vibrio fluvialis*. A simple hemolymph culture test may be useful in screening for infections of this type. Environmental or other etiological factors may also be important in this type of infection.Lobsters with this syndrome are weak, and lethargic. We have trained fishermen and lobster dealers to diagnose, treat, or make market decisions based on their own observations.

Red Tail (Gaffkemia)

Red tail (gaffkemia) is a fatal bacterial disease of the lobster (*Homarus americanus*) caused by the bacterium *Aerococcus viridans*. A lobster will contract this disease only if there is a wound or break in its shell through which the bacteria can pass. Even chewed antennae, the wound from a claw plug, or rough handling can provide an opening for the bacteria to enter. Gaffkemia often causes high mortalities among lobsters held in pounds or cars in Maine and the Maritime provinces, resulting in severe economic losses.

The bacteria are always present in lobster populations, with an average of 5% to 7% reported in freshly caught lobsters (Stewart et al. 1966 and Vachon et al. 1981). Problems with this disease are magnified in the crowded living conditions of a "live car" or pound, since the lobsters are aggressive and chew on each other, opening wounds where the disease-causing bacteria can enter. The large amount of handling that occurs in the pound also greatly increase the lobster's susceptibility to red tail.

In a car, the spread of red tail is a function of how many of the infectious bacteria are in the water and the number and size of wounds on the lobster. When a lobster dies of red tail and is torn apart by other lobsters, millions of bacteria are released into the water in the car. To prevent massive numbers of bacteria from being released, check the car frequently, at least daily, and if possible, remove weak and dead lobsters before they can be cannibalized.

How to Control Gaffkemia in Lobster Pounds and Storage Cars

Importance of Water Circulation on Aeration

Good water circulation within the car is important. Fresh seawater coming into the car provides highly oxygenated water to the lobsters and can help flush out recently shed red tail-causing bacteria from newly cannibalized, infected lobsters. Any fouling that could limit water circulation within the cars should be removed.

In a pound, mechanical aerators increase lobster survival time by raising oxygen levels. Oxygen concentration tends to stratify, with the lowest level occurring in the bottom few inches of the pound. This is especially true towards the end of low tide. Warm water aggravates the situation because the water holds less oxygen and lobsters use more oxygen under these conditions.

By mixing and oxygenating water, surface aerators will uniformly distribute oxygen to the entire population, helping to reduce mortality and enhance lobster food consumption and weight gain. Approximately 3 horsepower of aeration is required per acre at peak demand (Hagopian et al. 1989).

The Effect of Temperature on the Spread of Gaffkemia

The later in the fall you place lobsters in the car, the fewer problems with gaffkemia you will encounter. Water temperature is a critical factor determining the duration of the lobster's life after it is infected with red tail (Stewart et al. 1969) (See graph). At a water temperature of 59 F (15 C), lobsters will have an average time to death of 12 days while at 50 F (10 C) average survival is 28 days. As water temperature drops, the average life span of an infected lobster increases (65 days at 45 F (7 C) and 172 days at 37 F (3 C). As water temperature approaches 32 F (0 C), lobsters will live many months.

Even at low temperatures, when lobsters live for long periods of time, they still have the disease. If the lobsters are placed in an environment where the temperature is elevated (i.e. in shipping or in a recirculating tank), their time to death is shortened.

Precautions to Control the Disease

Handle every lobster. Remove culls that are weak or have broken shells. Use a diver to remove weak and dead lobsters from pounds on a regular basis. Once a lobster is infected, the bacterium will grow in the lobster's blood and tissues, eventually killing the lobster. However, the disease will not spread by a healthy lobster eating an infected one. The infective bacteria are killed by lobster stomach acid.

Monitor your lobsters for disease by taking blood samples and culturing them to determine the relative incidence of the disease before it is apparent in weak or dying lobsters. It may or may not be practical to do this yourself. This service is available for a fee from an independent business. Samples may be done repeatedly at the owner's discretion or as medication is administered. This sampling procedure does not harm the lobster in any way.

Terramycin in pelleted form may be given to lobsters to control the spread of the disease. This medication must be used carefully to avoid residue.

Vaccination is another method that can be used to control gaffkemia. This method offers the advantage of no residue. However, each lobster must be individually injected with the vaccine.

How to Control Gaffkemia in Weak or Dead Lobsters

Equipment needed:

Microscope with oil immersion lens
Microscope immersion oil
Sharp object to obtain blood (syringe and needle if returning lobster to pound)
Glass microscope slides
Sedi-stain (bacterial stain)

Procedure:

Obtain a drop of blood from the lobster. A syringe and needle is least harmful to the lobster, and the sample is best taken from the claw joint. If a syringe and needle is not available, any sharp object will do.
Deposit the drop of blood (lobster blood is clear) in the center of a clean, dry slide.
Take a second slide and draw the edge across the blood to make a thin layer of fluid. This is called a "smear." Allow the slide to dry thoroughly.
Put three drops of sedi-stain on the smear, wait 5 seconds, and rinse thoroughly with running fresh water. (If you wait too long before rinsing, the stain will be too dark; try again.) Let the slide dry.
Place slide in microscope with stain side up.
Place a drop of immersion oil on stained slide, then turn microscope lens so it rests in the oil. Focus the microscope.

If the lobster has gaffkemia, you will see the following:
Clumps of round, dark blue or black bacteria, often in groups of four.

If you can see the above in the blood smear, this lobster has red tail.

Using Medicated Feed to Treat Gaffkemia

In 1967, Stewart and Cornick established in vitro sensitivities of *Aerococcus viridans*, the bacteria causing red tail, to various antibiotics. Stewart and Arie (1974) administered several of these antibiotics, including oxytetracycline, by injection. These antibiotics proved effective against *A. viridans* but also appeared to be toxic to lobsters.

Experiments conducted by the University of Maine showed that lobsters eating a diet fortified with Terramycin could survive a direct gaffkemia infection. Also, during early stages of infection, if a lobster has the strength to eat the diet, its life will be prolonged or it may be cleared of the disease.

Recommended Procedure and General Guidelines for Terramycin Use in Tidal Lobster Pounds

Fall Pounding for the Winter Market

Do not feed lobsters any other feed on the days medication is being given. Be sure there is no uneaten feed left over before the medication is fed.
As a gaffkemia control, or what is called a preventative maintenance diet, feed 3 to 6 pounds of medicated pellets daily per thousand pounds of lobsters for 5 to 6 consecutive days. For best efficiency, feed as late in the day as possible because lobsters, being nocturnal, tend to feed best at night.
Medicated pellets should be fed when the first 5,000 to 10,000 pounds of lobsters have accumulated, or no longer than 10 days after the first lobsters were caught. Repeat this medication procedure when the next lobsters are about 10 days from the time they are caught, or after a large shipment of 10,000 pounds or more are purchased. If water temperatures are high, it may be desirable to feed when fewer lobsters are present. Feed greater amounts when the lobster density is low to assure that the lobsters will find the feed.
As the water temperature lowers in the fall, taper off on the amount of feed per thousand pounds of lobsters. The last feeding in November should be only 3 or 4 pounds per thousand.
Be aware that your lobsters may be more hungry than normal for a day or two after periods of feeding medication, similar to other animals which are fed Terramycin.
To medicate efficiently in the fall pounding period, there should be no less than 3 or more than 4 feeding periods of 5 to 6 days each if you begin storing lobsters around the first week of September and finish stocking in late November.
When there is an obvious severe infection, medication should not be used. These lobsters should be marketed.

Spring Pounding
Old shell lobsters in May and June usually eat about half the amount of feed daily as soft shells. Four (4) pounds per thousand pounds of lobsters for one 5- to 6-day period should be enough because of the short pounding period. Be sure to medicate the lobsters early enough so as to allow a 30-day period of time before you plan to market the lobsters.

Summer Pounding Soft Shells to Harden for Late Summer Market
Feed lobsters at least 6 pounds of medicated feed per thousand pounds of lobsters for 5 to 6 days and be sure to allow the 30 days before marketing them. These are general guidelines for most lobster pound operations. If your operation varies from the norm, or if you suspect a disease problem with your lobsters, consult your feed supplier or contact the Animal, Veterinary, and Aquatic Sciences Department at the University of Maine at Orono.

How to Feed Lobsters in Cars
First, some area of solid bottom will be needed in the car to retain the feed. Lobsters can be fed as follows: lobsters from the first day's catch will be placed in pen A and fed; the second day's catch in pen B; third day's in C; fourth day's in D. When pen A has been fed for 4 days, those lobsters will be sent to the lower decks and the fifth day's catch placed in pen A, and the cycle continues so that each lobster gets 4 days on medication. If the car has more than four pens, a 5 to 6 day feeding cycle is more desirable. As water temperature drops to the mid-forties Fahrenheit or below, less medication will probably be effective.

What the Medication Will Do
Those lobsters that have the disease in the early stages and eat the medication will clear themselves of the disease. Lobsters that are exposed to the disease and consume the medication will not develop the disease. However, any lobster that has gaffkemia and is at a stage where it is too weak to consume the feed will still die.

Preventing Antibiotic Residues in Lobsters
January 1986 marked approval of Terramycin (oxytetracycline) for use in lobsters. This compound must be used carefully to avoid antibiotic residue in lobsters going to market. Animal food products are routinely analyzed by the Food Safety and Inspection Service (FSIS) in the U.S. for many different compounds including drugs, industrial contaminants, and pesticides. The experience of the animal agricultural industries has demonstrated that prevention is the most effective way to deal with residues.

Use Medicated Feed Wisely!
The first safeguard against drug residue is to use medicated feed conservatively, monitoring the level of disease in the pound or car.

Follow Feeding Instructions
Feed only the recommended level of Terramycin for the periods specified. Prolonged feeding periods or feeding greater quantities or higher concentrations of the antibiotic will increase the time it takes to clear the drug from the lobster.

Abide by the Withdrawal Time
The U.S. Food and Drug Administration has set a withdrawal period of 30 days minimum for medicated lobsters to go to market. A recommendation for farm animals is to allow extra time for drug withdrawal. The same should be followed for lobsters. If lobsters are to be sold at Christmas, mid-November should be the target date to stop feeding medication.

Be Sure to Use Residue-Free Feeds During the Withdrawal Period
Lobster should consume only residue-free feed during the withdrawal period. Be sure your feed is adequately labelled so no mix-up occurs.

Summary of Residue Prevention Program
Use medicated feeds wisely
Follow feeding instructions
Abide by withdrawal times
Use residue-free feeds during withdrawal period.

A Rapid Method to Determine Antibiotic (Oxytetracycline) Levels in Lobster
Before lobsters can be marketed, their tissues must be free of all antibiotic residues. The hemolymph is the last tissue in the lobster to become free of antibiotic residue. Delvotest P, a commercially available product for detecting antibiotic residues in milk samples, is a simple, sensitive test for determining antibiotic residues in lobster hemolymph. This is important for lobsters that go to market and for dealers who want to know if their lobsters have consumed a medicated feed.

How to Perform the Delvotest P
Follow the directions provided with the Delvotest P kit for testing milk. The test involves taking a blood sample with a syringe and needle and incubating the sample. A color chart is provided to determine the presence or level of residue.

Ciliated Protozoa
Until recently, the only major pathogenic organism affecting lobsters in storage was a bacterium that causes "red tail" or gaffkemia. In spring of 1990, 1991, and 1992, pounds in Maine and Canada experienced high shrinkage when the lobsters were taken out. Lobsters from these pounds were examined at laboratories of the University of Maine in Orono or the Department of Marine Resources in Boothbay Harbor, Maine, and were found to have an infection of ciliated protozoans in their hemolymph or blood. This disease has been documented in crabs of various species and lobsters.

Shell Disease
Shell disease (also called rust disease, black spot, or brown spot) is a common syndrome in both marine and freshwater decapod crustaceans. The disease is an external infection caused by a variety of opportunistic microorganisms which attack the chitin component of the exoskeleton. Environmental stress and the presence of wounds are important factors in the onset of this disease.

Shell disease in the American lobster was first documented by Hess in 1937 in individuals removed from a tidal storage pound in Nova Scotia. Since that time, similar lobster holding facilities throughout Nova Scotia, New Brunswick, and Maine have dealt with recurring outbreaks of this disease. In addition to increased mortality, the disease produces a weak, aesthetically unappealing product which is unsuitable for sale. Lobster pound owners have experienced market losses up to 35% in some cases.

Other bacterial infections
During the last five years mortalities have been associated with the presence of a motile rod type of bacteria that can be observed by taking a drop of blood and placing it under a glass cover slip then viewing it under oil immersion with a microscope. These bacteria have most often been typed as vibrio fluvialis, although occasionaly other vibrio species and some aeromonas species have been identified. Shrinkage from these bacteria have been observed averaging approximately, 12% although mortlity as great as 30% has been observed. Treatment with antibiotics are in the experimental stages although none are currently approved by USFDA. Lobsters with this syndrome are weak, lethargic, and have slow or ineffectual responses to sensory stimuli.Vibrio fluvialis was isolated and identified as the etiological agent responsible for disease. The V. fluvialis isolates were highly susceptible to a variety of antibiotics tested. However, resistance to erythromycin was observed in 31% of the strains. The organism's could grow at temperature between 19-23°C, but not at 30°C. The addition of NaCl to the growth medium was necessary for optimal growth; minimal concentration was 1%. These results suggest that these organisms have a strict temperature growth requirement and that sodium ions may be required for optimal growth. Additional biochemical analyses, have determined that these isolates may represent a third putative biovar of V. fluvialis. Other animal studies aimed at fulfilling Koch's postulates showed that a dose of 10 6 CFU/ml injected into the hemocoel of lobsters caused the lobsters to become lethargic, and it killed 75% of the lobsters within 120 hours. No deaths were observed in control lobsters. In contrast, a dose of 3 X10 8 CFU/ml killed all of the lobsters within 18 hours. The organisms were rapidly killed (D value of 5.7 min) at 37°C, suggesting that these organisms would probably not survive long enough to establish an infection in homeothermic animals, such as humans.

In summary, this Disease is probably caused by a cohort of highly related, strictly halophilic, heat-liable V. fluvialis strains. Although the emergence of this pathogen poses a significant economic threat that merits additional studies, the causative strains are probably not pathogenic for humans. Understanding how this organism is able to overcome species barriers and adapt to new hosts is crucial in producing disease-free seafoods.

South African Management Decision Rules

"Operational Management Procedures in the new South African Marine Living Resources Bill"

Mr Amos Barkai & Mr Mike Bergh

Problems with the Traditional Management of Fish Resources

It is clear to all involved in the management of fish resources that the relevant scientific knowledge will always be limited. Although some of these knowledge deficits can be addressed, others have to be accepted, since they are either the result of limited data about the past, or a consequence of inherent limits to knowledge about ecological and biological systems. Nevertheless, for resources managed by an annual global allocation (TAC), a precise quantitative decision has to be made each year, regardless of the imprecision of scientific knowledge.

In addition to scientific uncertainty, there is considerable scope for political interference in the decision making process. Different users have conflicting interests, control and enforcement is less than perfect, there may be unrecorded fishing, and there is a high degree of climatic and environmental variability. Some argue that there is also a need to reduce the amount of scientific time and effort spent on annual TAC deliberations in order to make research resources available for "more important" issues.

The Utopian Solution

It is not surprising that fisheries resource managers around the world are looking for a management approach that will be safe, workable and acceptable, even under such diverse and troubled circumstances. What should such a fisheries management program consist of? In the case of an overexploited, depleted resource where rebuilding the biomass is a primary concern the following components are required:

1. It should have a specific target, for example, a biomass level 30% larger than at present, or alternatively, a biomass that is 20% larger than the biomass which produces maximum sustainable yield.
2. It should have a timespan over which the target biomass should be achieved, for example 10 years.
3. It should include a TAC setting mechanism that allows this target to be reached in the specified timespan.
4. The TAC setting mechanism should include a self-correcting component. If incoming resource abundance indices perform in an unexpected way, indicating that previous assumptions about resource productivity and/or size were incorrect, the TAC should adjust to keep the resource biomass on track towards its eventual target.
5. Interannual changes in TAC should not be too large. Relative stability in annual allocations ensures the efficient utilisation of existing fishing and processing resources, and prevents over-capitalisation.

The above five points are together termed **operational management procedures** or **OMPs.** The new South African Marine Living Resources Bill, Chapter 2 6c, states that *" The forum* (the Consultative Advisory Forum - CAF) *shall advise the Minster on any matter referred to it by him or her, and in particular...(c) The establishment and amendment of* ***operational management procedures*** *including management plan."*

How OMPs Work

An important impetus behind the development of the OMP concept is the uncertainty inherent in biological systems. Uncertainty means that any trend in the data has to be dealt with carefully, because it could be misleading. Errors could be made if one either over-reacts or under-reacts to incoming data. Coping with uncertainties involves intelligent hedging and in the development of OMPs one has to be mathematically explicit about exactly how this hedging is done.

The OMP itself is a relatively simple formula or model which self-corrects by adjusting the annual TAC in response to changes in resource indices in a way that keeps the resource biomass on its desired path. Examples of such indices are: the commercial catch rate, survey biomass estimates, catch age or size structure, tagging data and catch sex ratios. Although the OMP is often represented by a relatively simple formula, the rational behind its development is complex, both in concept and in numerical sophistication.

There is a close relationship between the OMP and it's underlying development and rationale. Ideally, the development of an OMP should follow the process used by the International Whaling Commission. The basic steps are:

1. Obtain an estimate of resource dynamics and current size from the best interpretation of the available data. This will be chosen as "**a reality**" for the purpose of evaluating different OMPs.
2. Obtain estimates of uncertainty in the available data (i.e. extent of fluctuations around true values and trends).
3. Identify promising candidate OMP formulae.
4. Adopt the model in (1) as a description of reality, and use this model to project into the future. Use the 'uncertainty' information in (2) to generate typical data on resource performance used in management. This is like throwing a dice.
5. Run the model ahead for a large number of 'throws of the dice', and summarise the performance of different candidate OMP formulae with respect to measures like average catch, percentage change in the "true" biomass and variability in the TAC.
6. Explore the implications of certain radical future events, e.g. a recruitment collapse, using different OMPs.
7. Explore the implications of different "realities" using different OMPs.
8. Choose the OMP that performs "best". The term "robust" is applied to a formula that achieves goals in the face of the range of uncertainty that one has to deal with.
9. Use the "best" OMP to calculate the TAC over the next 3 to 5 years. Hereafter, a new OMP will be developed and implemented.

"Traditional" Management Practice Versus OMPS

The OMP concept arose partly out of frustration with the traditional management approach where, frequently, no new scientific insights are placed on the table each year, but the same issues are debated over and over again. In the end, a quantitative decision has to be made, and this must normally be based on the same limited set of data, with only one year of additional new data. The OMP cuts out these annual debates, which are regarded as unproductive by proponents of the OMP approach. This is beneficial if one accepts the deeper philosophical argument that fisheries science does not really advance meaningfully on an annual time scale, but only on a decadal scale.

An important benefit claimed for OMPs is that the short, medium and long term risks of a particular management approach are quantified. This is clearly impossible in a situation in which there is room for intervention involving human judgement, and the OMP philosophy consequently requires strict and exclusive adherence to management by a mathematical formula. In this sense it represents a radical departure from traditional management practice. To appreciate this, we take as a point of departure the definition of an OMP (as recorded in South African policy documents preceding the adoption of the new bill):

> *"a scientifically evaluated process defining the manner in which the available data on a resource is used to determine the level of control measures to be detailed in fisheries regulations to manage such resource in terms of sustainable harvesting, rebuilding strategies, etc. The procedure must therefore set the rules which specifies the data to be collected, the analysis of such data, the management actions to be taken as a result of such analysis, and the means of analysing the results of such actions"*

A superficial reading of the above does not suggest anything very different from previous 'traditional' management practice. This is not the case, and indeed it appears that few people, whether they be scientists, industry personnel, politicians or lay people, really understand the OMP concept and its full implications. We note the following departures from the traditional management approach implied by OMPs:

- The traditional approach to fisheries management is not a "scientifically evaluated process", even though it does indeed involve scientific deliberations and evaluations. This is because it involves the exercise of human judgement, which cannot be codified and quantified. It is therefore impossible to "scientifically evaluate" a process which itself involves scientific evaluations.
- The traditional approach **does not** define "the manner in which the available data on a resource is used to determine the level of control measures to be detailed in fisheries regulations to manage such resource in terms of sustainable harvesting, rebuilding strategies, etc." Rather in the traditional approach, the data that should be used, and the manner of use, is a subject of much debate amongst scientists.

- The traditional approach does not "set the rules which specifies the data to be collected, the analysis of such data, the management actions to be taken as a result of such analysis, and the means of analysing the results of such actions". Again these matters are dependent on the outcome of scientific debates, whose outcome cannot be predicted or codified as a set of rules.

OMPs therefore actually imply a substantially different TAC decision making process. Practically, the differences include:

- No annual scientific debates about resource status and appropriate management action.
- No new information about the resource allowed to influence the determination of the TAC.
- In effect, to set the forthcoming fishing season's TAC, new resource performance information (e.g. commercial catch rate, catch age structure, survey data) is simply inputted to a computer program, which then produces the TAC.
- Advisory committees have no role in the determination of the annual TAC (since such intervention implies a process which cannot be scientifically evaluated), but rather its input is limited to directing the development of OMPs. This means that other people scientific input, marketing considerations and socio-economic arguments cannot be allowed to influence the TAC during the OMP implementation period.

Potential Problems with the OMP Philosophy

Should the South African fishing industry be used as a guinea pig for OMPs?

One should bear in mind that OMPs, interpreted in the strict sense of the definition given here, where a mathematical formula replaces human judgement and intervention for a period of three years or longer, is a relatively new concept in fisheries management. To date, South Africa is the only country in the world where this approach is already written into its fisheries policy. In international terms it is largely untested, which is not surprising given the large commitment it implies from political, social, scientific and economic interested and affected parties. As a result, its effectiveness has not been proven elsewhere in the world.

What if the development of OMPs requires greater human resource costs than anticipated?

The drive for the adoption of OMPs in South Africa may have a political as well as a scientific rationale. Examples of the former could include a desire to:

- Reduce the amount of time, effort and debate required for the determination of the TAC.
- Impose conservative management regimes.
- Minimise the options for meddling by politicians and/or industry members in the determination of the annual TAC.

One should ask whether these factors have been decisive in the approach taken with OMPs, or whether the maxim of optimal resource utilisation was the primary factor. It goes without saying that it is not acceptable to compromise optimal resource utilisation and the contribution of the fishing industry to the economy for the sake of saving time, money and headaches for scientists, fisheries managers and politicians.

In reality, the OMP may not save time because the high risk of the requisite long term commitments puts much greater pressure on technical deliberations. In such circumstances, any attempt to short-circuit the OMP development process is very risky, since during the OMP implementation period, there is a lower degree of scientific vigilance, and little pressure to remain scientifically critical. In certain circumstances, this may be an obstacle to the development of innovative solutions to new situations.

Is fisheries management just about TAC determination?

OMPs only deal with the TAC, but many other critical management issues have to be addressed. For example, it seems likely that if, at the time of the crises in the South African West Coast rock lobster fishery in the early 1990's, the management of this fishery was governed by an OMP, it is unlikely that the large reduction in the minimum size would have been possible. It is generally accepted that the South African lobster industry would have been closed down had the 89 mm minimum size remained unchanged. The present OMP for this fishery contemplates only TAC manipulation as a management measure, and makes no allowance for possible gear innovations, changes in the minimum size, or the possibility of a male-only fishery. This means that under certain circumstances, the industry may have to accept a reduced TAC or even a complete moratorium on fishing, even though other management options might prevent the need for such radical steps.

What about common sense?
Under the OMP management format, even if TAC produced by the OMP runs counter to basic human judgement, experience and intuition, no intervention is permitted. This is a risky approach. Experience in South Africa, Namibia and other countries around the world has demonstrated that, under certain circumstances, a flawed scientific paradigm together with an uncompromising management regime can cause much damage to fish stocks or to the industry they sustain.

In addition to all the above, in the new South African Act, the minister has the power to ignore the OMP produced TAC and to set a different TAC. These ministerial powers, if used, nullify the entire OMP philosophy, since they lie beyond the reach of "scientific evaluation".

Which "reality" should be used to set an OMP?
The complexity of the OMP concept can be abused to bypass important scientific debates with substantial implications for the industry. Consider the situation where there are two unresolved views on resource dynamics:

View 1: The pessimistic view, which assumes that resource biomass is small and resource production is low and there is little or no potential for resource biomass or TAC growth under the TAC.

View 2: The optimistic view, which assumes larger and more productive resources with more potential for growth in resource biomass or TAC.

Assume a situation in which the management objective is to increase resource biomass by 50% over ten years. The advocate of the pessimistic view argues for an OMP that, on average, achieves 50% growth in resource biomass, when **View 1 (the pessimistic one)** is chosen as **"reality"**. The same OMP would however achieve 80% growth over 10 years if the **View 2 (the optimistic one)** is to be believe. The argument of the pessimists will be that their OMP is fairly robust to the uncertainty about **View 1** or **View 2,** and will stick with a TAC based on the OMP launched under the pessimistic view.

What the pessimists often do not present are the economic implications of choosing **View 2** as **"reality"**. In fact this is an additional TAC of roughly 1.5% of the initial resource biomass [~(80%-50%)/(10 years)]. In circumstances where industrial harvests are typically 10% of resource biomass, the difference in TAC is 30%, a very substantial amount. The lesson here is that OMP robustness looks very different when expressed in economic as compared to biological terms, and both types of robustness should really be considered.

In South Africa, the government management agency is more often than not the advocate of the more conservative view. Although this is probably a good thing, it is not necessarily the role adopted by governments in other countries, where, for example, conservation groups fulfil this role. This situation usually leads to greater political weight being given to **View 1**, even though the basic argument is that the proposed OMP is robust to any of the views on reality. One could argue that if the OMP is truly robust, then all parties would be indifferent to which view of reality is used as the launching point for OMPs.

Arguments about the merits of different views of reality and its implications often get lost in the complexity of the OMP deliberations, and in the claim of OMP robustness. Common sense input by industry in the development of OMPs seems of little import or impact faced by the high level language and philosophy of OMPs. There is a perception that the industry is effectively excluded from meaningful involvement in management, both during the development of the OMP, and then in the annual determination of the TAC, for the entire period over which the OMP is implemented.

IWC Examples Regarding the OMP Development Process

It is relevant to this article to review the process followed by the International Whaling Commission (IWC) in the development of the Revised Management Procedure (RMP), which is where the OMP concept originated.

a) **Time scale**

In 1979, serious doubts were expressed about the efficiency and reliability of the management program at the time, viz. the New Management Procedure (NMP).

At a meeting in 1982 the IWC agreed to stop commercial whaling for a period of 10 years with effect from 1986. As part of this agreement, the IWC undertook to make a "comprehensive assessment of the effects of this decision (the moratorium on whaling) on whale stocks and to consider modification of this provision and the establishment of other catch limits".

This led to a process in which the scientific committee considered alternative management procedures for whaling, culminating eventually in the RMP.

The RMP was finally adopted by the IWC in 1994, some 12 years later, or 8 years after 1986, when the management procedure idea was first put forward.

The RMP has not been implemented because of strong political disagreements and it is not clear if it will ever be implemented. No field results from the implementation of the RMP are available and its workability is still untested in the real world.

b) **Development process**

The following points about the development of the RMP were extracted from an article by G P Donovan in 1995, the scientific editor of the IWC.

"At the start of the development process five procedures were proposed and subjected to thousands of trials to 'test their robustness'.

Of course, initially the testing was relatively simple – to see if they worked when they had the information they thought they would have at the levels of accuracy they expected. However, the procedures had also to work when knowledge was not perfect and data were limited i.e. the procedures had to be realistic in terms of likely scientific knowledge and take into account scientific uncertainty.

The various suggested procedures had to 'pass' a series of trials of increasing difficulty.... The competition among the alternative procedures led to dramatic improvements in their ability to cope with the trials and some procedures were improved by incorporating elements from other procedures.....**In the end, after several years of work** .....matters were narrowed down to just two essential parameters....

However, we have not yet discussed one very important aspect of any management procedure - by what criteria do you judge if it 'works' and given that it works, how do you select among alternatives? In other words we must define the objectives of the procedure. To some extent it is relatively easy to arrive at 'extreme' objectives for any natural resource:

that the resource is not driven to extinction;
that the maximum sustainable harvest is achieved.....

The setting of objectives and the relative weight given to those objectives (the trade-offs) require political rather than scientific decisions, although the scientist clearly has an obligation to explain the implications of any decisions that might be taken to the politicians, for example by providing them with a range of specific options." (end quote from Donovan's article).

c) **Conclusions drawn from the above**

It seems that 12 years passed between the time that the management procedure concept was first proposed and its adoption by the IWC.

It initially involved five different procedures that were subjected to thousands of robustness tests. There was also a clear understanding that the weight given to different trade-offs was political rather than scientific.

In addition, the final procedure was submitted for international peer review, by nine North American scientists who were not linked to the IWC or to the whaling debate.

It seems that in South Africa the OMP development process is a very abbreviated version of the development of an OMP for whales. Although a direct comparison may be unfair, since the IWC deals with many whale species spread over many oceans in extremely politically and emotionally loaded environments, it is interesting to note to what pains the committee went before selecting an OMP. The reason is that the IWC recognise the large risk involve in a management concept that prevents any possibility of revision for a considerable period of time. Indeed the IWC interpretation of an OMP is far less strict than the one proposed in South Africa, and it includes many mechanisms for in-period revisions if these are found to be necessary.

Some Thoughts, Conclusions and Recommendations

1. More often than not, complex problems require complex solutions. An attempt to provide a simple TAC setting mechanism in a complex and variable ecological and political environment, although attractive in concept, may carry many risks.
2. Nevertheless, there is clearly a need to remove some of the conflict involved in the determination of the annual TAC. It is also important that fishermen, individuals and companies appreciate and accept the need to manage fisheries on a medium to long term basis, and to move away from ad hoc annual TAC decisions often motivated by short term considerations. The authors of this article therefore support the principle of medium term management plans with an OMP as an important component.
3. However, the OMP process should be linked to a higher level of security of fishing rights. It seems inconceivable that fishing companies and fishermen will be required to assume a long term approach to fisheries management while they have very little (or none at all) long term security of their fishing rights.
4. Members of the fishing industry should be presented with explicit biological objectives for OMPs distinct from economic and political objectives. In cases where OMP objectives are economic (e.g. increase resource biomass in order to improve catch rate), members of the fishing industry should have the final say about the relevant quantitative trade-offs.
5. There are many very technical elements to the development of an OMP. As demonstrated above, the "reality" which forms the basis for the development of the OMP is often more critical than the OMP formula which is selected. The development of this "reality" should be done in close consultation with industry members. The industry's experience and knowledge can contribute significantly to the development of an appropriate paradigm which provides a context and framework for the mathematical models and computer simulations.
6. OMPs should not be linked to the elimination of the process of critically re-examining base data and stock assessment models on an annual basis, and accommodating new scientific findings where justified. We question the notion that the "burden of proof" for a change to the OMP lies with the fishing industry. The process of critical analysis and investigation is the duty of the people involved in the fishery management process, including government scientists, academics and industry representatives.
7. The OMP should not lead to 'push button' resource management over five to ten years, or even over three years. Such an approach will compromise scientific vigilance and ingenuity, and lead to the loss of valuable opportunities and alternatives.
8. Where views about the resource and proposed OMPs differ, an international peer review is very useful, introducing new ideas and insights untainted by local politics and interests.

South Australian Input Controls and Quota – 5 years down the track

"Economic Comparisons of an Input Control Fishery and a Quota Fishery within the Same Stock"

Julian Morison, EconSearch Pty Ltd **& Roger Edwards,** Fisheries Management Consultants

Abstract

The South Australian southern zone and northern zone rock lobster fisheries have distinctly different management regimes. The southern zone is a fishery that has had quota management for five years while the northern zone remains an input control fishery. Fishing the same species in the waters of the same state and in an almost identical socio-economic/cultural environment, these two fisheries provide a unique opportunity to assess differences between input control and output control management systems. Drawing on data available over the past five years this paper analyses differences between the fisheries in terms of management costs, operator costs, operator behaviour, operator profitability and economic efficiency.

Overview

Background

The South Australian Rock Lobster Fishery began in the early 1870s as locals caught lobsters with hoop nets for sale in Adelaide and Kingston in the state's South-East. The first commercial pots were used in 1889 and around the turn of the century small industries began to emerge in different parts of the state. In the late 1940s a cooperative opened a factory at Beachport to process lobster tails for export to America.

From here the industry developed rapidly with vessels becoming more sophisticated and catch increasing. The Rock Lobster industry is now a significant and expanding industry in South Australia generating a business turnover of more than $230 million and supporting of 2200 jobs (EconSearch 1999a, b).

About 95 per cent of the annual commercial catch of 2,600 tonnes is sold live through Asian markets, with a landed value of almost $80 million and which brings more than $100 million into the state. The catch has remained relatively stable in the past decade as both fishers and managers have taken steps to ensure the long-term sustainability of the resource.

Table 1 SA Rock Lobster Catch and Value of Catch, 1990/91 - 1998/99

Year	Southern Zone		Northern Zone		South Australia	
	(tonnes)	($m)	(tonnes)	($m)	(tonnes)	($m)
1990/91	1,562	26.7	1,104	18.2	2,666	44.9
1991/92	1,940	36.3	1,222	21.4	3,162	57.8
1992/93	1,754	34.8	1,064	20.5	2,818	55.3
1993/94	1,669	43.2	930	23.4	2,599	66.6
1994/95	1,720	48.6	891	25.5	2,611	74.0
1995/96	1,684	44.6	903	23.8	2,587	68.4
1996/97	1,635	47.0	893	24.4	2,528	71.4
1997/98	1,680	50.9	942	27.7	2,622	78.6
1998/99p	1,713	47.2	1,016	26.7	2,729	73.9

p provisional
Source: SARDI

The Rock Lobster Industry operates on a full cost recovery basis and finances its own management, research and resource protection.

Fishing is carried out in the waters of South Australia's entire coastline, with the exception of Marine Park exclusion zones. The fishery is divided into two zones, the Southern and Northern Zones. The Southern Zone reaches from the Victorian border to the Murray mouth, south of Adelaide and the Northern Zone covers the area from the Murray mouth to the Western Australian Border. While geographically smaller, the Southern Zone is the more significant in terms of commercial boats numbers. There are currently 183 boats operating in the Southern Zone, compared with 71 in the Northern Zone. The total annual catch in the Southern Zone averages around 1,700 tonnes, compared to around 900 tonnes in the Northern Zone (Table 1).

The Rock Lobster season runs from 1 October to 31 April in the Southern Zone and from 1 November to 30 May in the Northern Zone. All commercial fishers must be licensed and their activities are controlled through input controls and quotas in the South and management of fishing time and pot lifts in the North.

Fishers record the catch every day and participate in voluntary pot sampling. Economic performance of the fishery is monitored through surveys and independent economic analyses.

Management Arrangements

The Rock Lobster Fishery in South Australia has a long history of management, with the main activity occurring in the last 32 years after limited entry was introduced.

Over the years changes in the minimum legal length and season have occurred in various regions and zones within the fishery.

In the Southern Zone a 15 per cent pot reduction (1984) and a buy back, which removed 41 licences (1987), were implemented and on 1 October 1994 individual transferable quotas (ITQs) were introduced. The current management arrangements include:

- Total allowable catch of 1,720 tonnes allocated at 144kgs/pot
- Limited pots to a total of 11,900
- Limited entry
- Legal minimum size of 98.5mm
- Closed season from May 1 to September 30
- Minimum mesh diameter on pots of 50mm
- Maximum of 100 pots per licence with 80 allowed to be worked
- Prohibition on taking berried females

In the Northern Zone a 10 per cent pot reduction was implemented in 1985 and again in 1992. These measures were followed by a shortening of the season by one week in 1993, as a real time management system was trailed for the fist time. The season was shortened by additional weeks in 1993 and 1994. Current management arrangements include:

- Limited entry
- Legal minimum size of 102mm
- Closed season from June 1 to October 31
- 21 days time-closure within a 210 day season
- Minimum mesh diameter on pots of 50mm
- Maximum of 60 pots per licence
- No double pulling of pots within a 24 hour period
- Prohibition on taking berried females
- Restriction on boat size to 18 metres and engine capacity of 1200 Hp

Approach

The two zones have introduced vastly different management systems during the 1990s. The approach taken to analysing performance of the fisheries includes assessing mix of 'soft' and 'hard' data collected over the past five years since the introduction of quota in the Southern Zone (1994/95 to 1998/99). These include statistics about the fleet and catch. Data from an economic assessment of both zones from 1997/98 are assessed, as are management costs in recent years and regional economic impact.

Analysis

Structural Adjustment

Boat numbers over time are an indicator of structural adjustment in the fishery (Table 2). It should be noted for the first five years of quota management, transfers in the Southern Zone were only allowed within the fishery and this undoubtedly would have slowed the rate of adjustment.

Both zones also maintain upper pot limits, which are an artificial impediment to free market adjustment in the respective fleets. Set out in Table 2 are the licence numbers over the last 10 years and average pots/licence since 1992.

As shown in Table 2, licence numbers have declined by about 3.7 per cent and 13.4 per cent in the Southern and Northern Zones respectively over the past 10 years. Over the last five years the decline has been 2.1 per cent and 9 per cent, respectively.

With constant pot numbers in each fishery since 1992, the average pot holding per licence has increased as licence numbers have declined.

Table 2 Licence numbers and average pot holdings in SA Rock Lobster Fisheries

Year	Southern Zone		Northern Zone	
	Licence number	Av pots/licence	Licence number	Av pots/licence
1989	190		82	
1990	192		82	
1991	191		83	
1992	192	62.1	80	49.4
1993	189	63.1	79	50.0
1994	187	63.8	78	50.6
1995	186	64.1	77	51.3
1996	186	64.1	75	52.7
1997	183	65.2	73	54.1
1998	183	65.2	71	55.6

Cost of Management

The management of the lobster fisheries in South Australia is the responsibility of the Minister, Director of Fisheries and Fishery Management Committees (FMC) under Section 20 of the *Fisheries Act 1982*. The Fishery Management Committees were introduced in 1993 in both the lobster zones.

The fisheries have been operating under full cost recovery for five years. Costs of management include:

- annual reports on biological and economic indicators,
- policy and management services,
- regulatory/legislation and licensing services,
- compliance services,
- directorate services,
- extension services,
- research services (including the Fisheries Research and Development Corporation levy), and
- the services of various committees.

In the early years while the system was evolving, various anomalies existed in the charging procedures. In 1997 the cost recovery process was restructured to more accurately reflect the direct costs of managing fisheries in South Australia. For this reason data from the past two financial years and the current year budgets are assessed. It is believed that these costs provide a more accurate picture of the costs of management than would data from previous years. All costs, with the exception of compliance and FMC committee costs are apportioned between the Zones on a 70:30 (Southern Zone: Northern Zone) basis in line with past tonnage, licence numbers and values of production.

The costs attributed to both zones in 1997-98 and 1998-99 and the budgeted figures for 1999-2000 are presented in Table 3. Over the period, the total costs of managing the fishery for research, compliance, management and industry development have fallen. In the Southern Zone they have declined from $2,372,000 to $1,955,000 in aggregate or from $1,408 per tonne to $1,137 per tonne. In the Northern Zone the costs have declined from $988,000 to $706,000 or $1,049 per tonne to $784 per tonne.

Experience in the South Australian Rock Lobster Fishery has shown the costs of the lobster management under quota to be more expensive. Although the cost per tonne of management, compliance, research and development, does vary over the time, it is forecast to be $350 per tonne higher in the Southern Zone quota fishery for the 1999-2000 financial year.

Compliance

Compliance is the key component impacting on licence fees. In the Southern Zone, the cost of compliance has increased over the three-year period from $914,000 to $1,011,000 or from $542 per tonne up to $588 per tonne. This has happened in the face of declining total licence fees.

In the Northern Zone, the compliance cost has fallen from $278,000 to $236,000 or from $295 per tonne to $262 per tonne. According to the budgeted fees for 1999-2000, the difference in compliance costs accounts for $326 per tonne of the total difference of $353 per tonne between the two fisheries. It should be noted that the industry is currently considering restructured compliance costs in the Southern Zone.

The Southern Zone is characterised by a relatively short and straight coastline with a small number of landing points. By comparison, the Northern Zone fishery has an extensive coastline with numerous landing points. Despite these differences, in 1999/2000 the cost of compliance per tonne of lobster caught is likely to be more than twice as high in the Southern Zone than in the Northern Zone (Table 3).

Table 3 Cost of management in SA Rock Lobster Fisheries, 1997/98 – 1999/2000

	Actual 1997-98	Actual 1998-99	Budget 1999-2000
Total Licence Fees			
SZ Licence Fees	$2,372,000	$2,105,000	$1,955,565
SZ Catch (tonnes)	1,685	1,714	1720
SZ Licence Fee Cost/tonne	$1,408	$1,228	$1,137
NZ Licence Fees	$988,000	$807,000	$706,000
NZ Catch (tonnes)	942	1,016	900
NZ Licence Fee Cost/tonne	$1,049	$794	$784
Total fees difference: SZ – NZ ($/t)	$359	$434	$353
Compliance Costs			
SZ Compliance Costs	$914,000	$974,000	$1,011,000
SZ Compliance Cost/tonne	$542	$568	$588
NZ Compliance Costs	$278,000	$280,000	$236,000
NZ Compliance Cost/tonne	$295	$276	$262
Compliance cost difference: SZ – NZ ($/t)	$247	$293	$326

Meeting Times and Costs

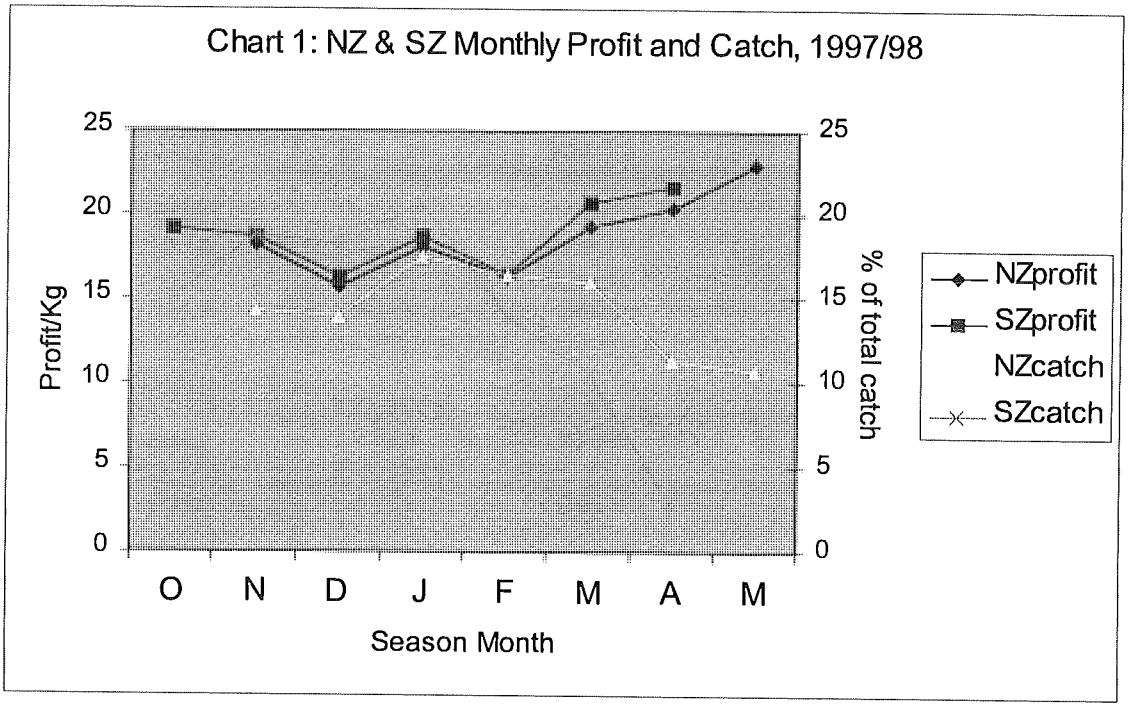
Since the time of the introduction and management of the quota system the Southern Zone Lobster Fishery has met on 53 occasions. The Northern Zone has met on 27 occasions. The budget for the Southern Zone for the current financial year 1999-2000 is $70,000 whereas the Northern Zone budget is $45,000.

Profitability

The economic indicators report (EconSearch 1999a,b) suggests that there is very little difference in return to capital invested between the two zones. A rate of return of 4.5 per cent was estimated in the Northern Zone and 4.4 per cent in Southern Zone in 1997/98.

One of the conceptual advantages of quota management is that effort can be shifted to the time of the year when returns are higher. "Profit" per kilogram, shown in Chart 1, has been calculated as the gross return per kilogram less costs per pot lift less labour costs. Fixed costs have not been deducted. Deducting fixed costs would change the position of the profit curves but would not change their shapes.

Chart 1 indicates that in both fisheries there are greater returns to be had late in the season. In the Southern Zone where there is an incentive to fish later, the proportion caught in the last month of the season is actually lower than in the Northern Zone.

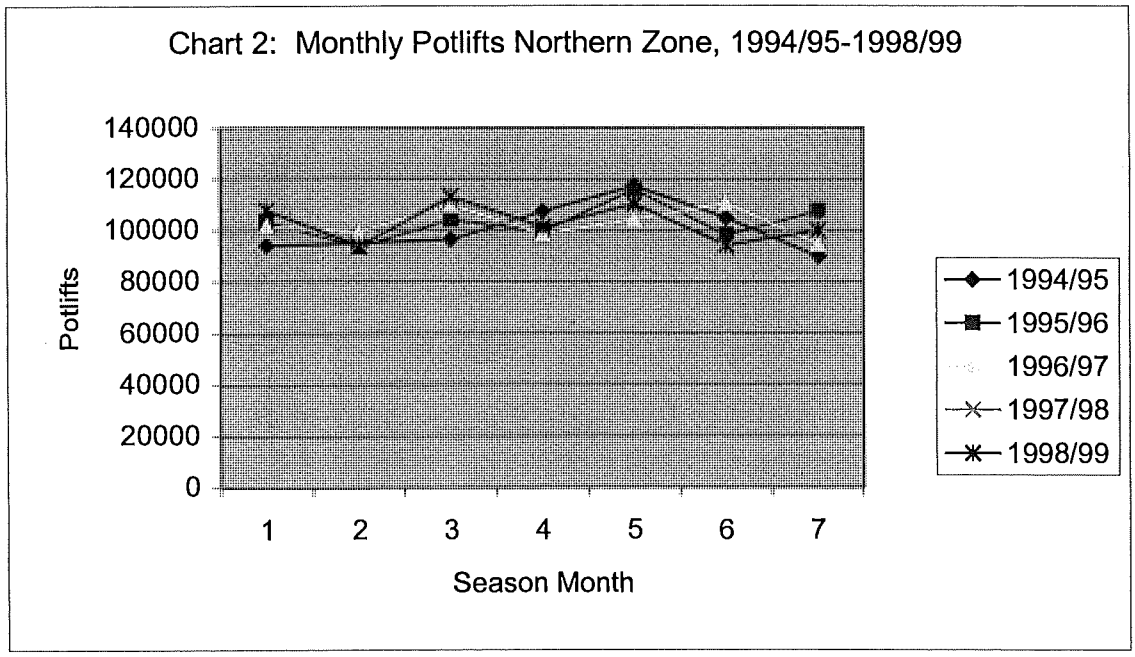


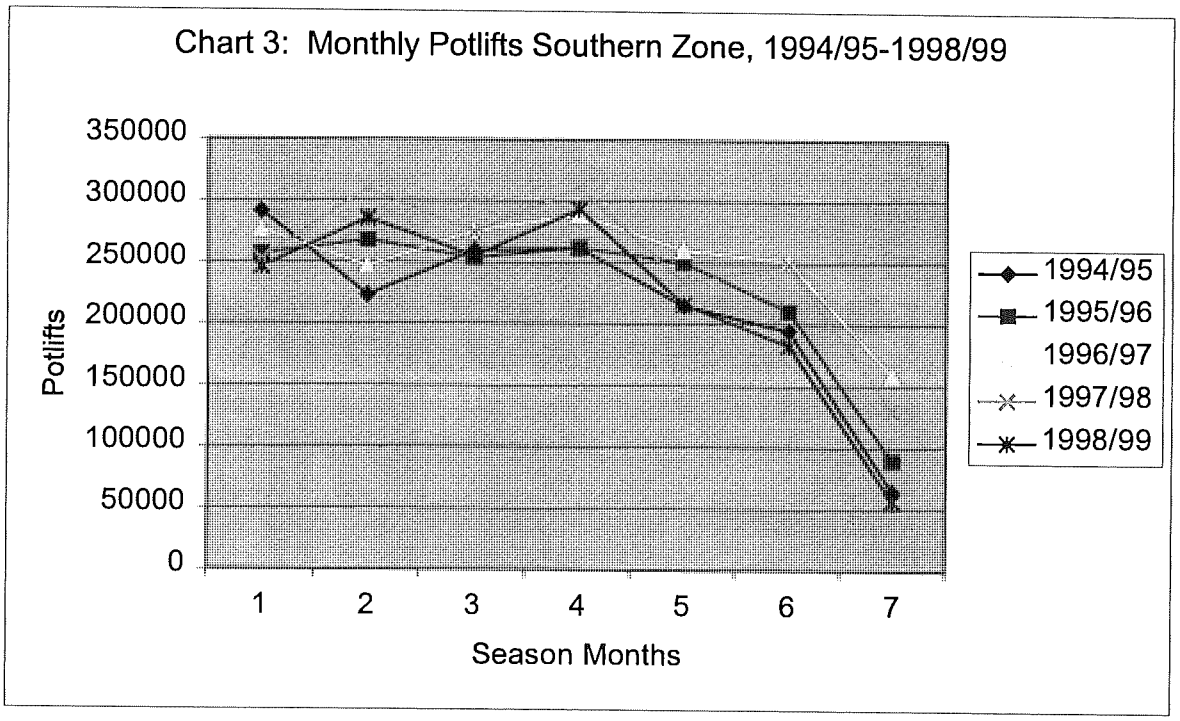
Time Management

The temporal distribution of effort for the two fisheries is illustrated in Charts 2 and 3. Chart 2, representing effort in the Northern Zone, does not show a strong trend on a month-by-month basis, with the distribution of effort quite even throughout the season. Also, there does not seem to any discernable trend over the five years since the introduction of quota management in the Southern Zone. It seems that fishing effort, as well as catch (Table 1), has been relatively steady in the Northern Zone in recent years.

Chart 3, representing effort in the Southern Zone, does illustrate one obvious difference from the temporal distribution of effort in the Northern Zone. In each of the past five years in the Southern there has been significantly lower effort in the last two months of the season. Consistent with the Northern Zone, however, the Southern Zone distribution of effort has been fairly consistent form one year to the next.

This is somewhat surprising. Given the profit incentive, illustrated in Chart 1, it would be expected that, at least over time, effort would shift into the higher profit months. After five years of quota management in the Southern Zone, this does not appear to be happening.





Regional Impacts

Another economic indicator that may vary with differences in management of the fishery is the economic impact that the fishery has on the regional economy in which it is located. The economic indicator reports (EconSearch 1999a,b) for the Northern and Southern Zone fisheries suggest, however, that there is very little difference between the two fisheries. The impacts, measured in terms of employment, household income, business turnover and value added, per tonne of lobster are generally greater in the Southern Zone but not significantly so (Table 4).

Table 4 Economic Impacts of South Australian Commercial Fisheries, 1997/98

	Southern Zone	Northern Zone
Turnover		
Fishing (direct) ($m)	50.9	27.7
All other sectors (indirect) ($m)	99.5	53.0
Total ($m)	**150.4**	**80.7**
Total/Direct	3.0	2.9
Total/Tonne ($)	90,000	86,000
Value Added		
Fishing (direct) ($m)	34.7	19.2
All other sectors (indirect) ($m)	50.1	26.6
Total ($m)	**84.8**	**45.7**
Total/Direct	2.4	2.4
Total/Tonne ($)	50,000	49,000
Employment		
Fishing (direct) (jobs)	710	312
All other sectors (indirect) (jobs)	780	418
Total (jobs)	**1,490**	**730**
Total/Direct	2.1	2.3
Total/Tonne (jobs)	0.89	0.77
Household Income		
Fishing (direct) ($m)	20.0	9.6
All other sectors (indirect) ($m)	21.8	11.5
Total ($m)	**41.8**	**21.1**
Total/Direct	2.1	2.2
Total/Tonne ($)	25,000	22,000

Source: EconSearch 1999a,b

Conclusions

This paper has made an initial investigation into the differences in the financial and economic performance of the Southern and Northern Zone rock lobster fisheries in South Australia. It has been five years since a quota management system was introduced into the Southern Zone, while the Northern Zone has remained an input control fishery.

Given that the profit differential at the end of the season for Southern Zone fishers, as illustrated earlier in the paper, is a real one then an obvious question is 'Why hasn't fisher behaviour changed in response to these apparent incentives?' There are a number of reasons that could be put forward why this theoretical advantage is not being realised. These could include:

- risk of not catching quota if fishing is left until too late in the season;
- catch rates lower late in the season;
- poor weather late in the season;
- lack of awareness among fishers of potential profitability late in the season; and
- unwillingness to change traditional fishing patterns for, perhaps, social and lifestyle reasons.

The results of the analysis presented in this paper point to the need for some further investigation into the behaviour of licence holders in the Southern Zone and to the consideration of management initiatives (e.g. extended season, carry over quota) that may enable the theoretical benefits of a quota system to be realised.

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Corporate Management

"Corporate governance: an option for fisheries management?"

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Abstract

The 1990s have seen the emergence of co-management of fisheries developing to involve stakeholders in the fisheries management process. In the past resource management concentrated on regulations and controls with rights regime enhancement and was almost the sole preserve of government.

Through "cost recovery", the industry have become interested in the provision of "management services", forcing an examination of more effective delivery in the co-management process. The momentum of this, and past fishery management developments, mean that industry may want to consider corporate self-governance models.

Corporate governance may involve the delivery of a fuller range of management services including management of the resource itself, within altered management arrangements. The basics of corporate governance are presented, as seen in the literature and from some recent international developments. These new management alternative need to be discussed by industry, government and the community as part of the sustainable fisheries management debate.

Introduction

The history of fisheries management has been that fisheries under open access tend to be over exploited. This leads to several solutions that have been tried:

- intervention and regulation
- cooperation -social solutions
- re allocation and rights
- altered ownership (governance alternatives)

Fisheries management turns from restricting exploitation to the development of management regimes (Scott, 1989 and Grafton, 1999).

Management

Fisheries management is costly and should add value to the resources? Has it? In many places the system of management has failed to deliver any economic benefits and sustainable fishery exploitation. New rights regimes have often been suggested as management options. Where implemented new fishing rights emerge from developing regimes. This process is unpredictable due to the importance of the political climate in giving opportunities to alter rights for better stewardship outcomes. In the 1990s co-management and suggestions of alterations in governance has forced a re think on the way management is delivered.

Co-management and cost recovery

Internationally there are moves to include stakeholders. Stakeholders is a broad ranging term, but generally refers to those who can influence management through production or "involvement". Industry show concern over the provision and cost of management services. Co-management alters governance and is a facilitative process (Figure 1: Stages in facilitation. Adapted from Glaser, 1992).

Cost recovery adds incentive for stakeholders to query the cost and delivery of management services. This creates a momentum in the corridors of management and eventually leads to considering an alteration in governance. This impacts power, control, devolvement and empowerment in the fisheries management process.

Altered Governance

Traditionally fisheries were management by the heavy hand of government; command and control. Gradually users came into the management planning process especially with the introduction of Management Advisory Committees (MACs) in Australia. Internationally there are moves to include communities in the decision process eg. indigenous peoples (Canada, United states, New Zealand and SE Asia). However, arising from the rights experiments in New Zealand have come two significant developments. Enhancing rights has led to altered governance and the emergence of Quota owning associations. This in turn opens the possibility of corporate governance - eg. Using corporate structures to manage the stock, as in the Challenger Scallop Enhancement Company in NZ (Harte et al., 1998).

Corporate governance

Corporate governance seeks to provide management functions and direction through the use of corporate structure. This alteration of traditional relationships enables new possibilities to emerge in the delivery of management services and even in the long run management of the fish stock itself, traditionally the preserve of government. The establishment of a corporate governance structure changes responsibility, control, and accountability in fisheries management.

How would a fish stock corporation work?

If a corporate entity is to be established to manage the fishing and the fish stock there are key relationships. These are:

- EXTERNAL: Corporation - government, Corporation and the community
- INTERNAL: within the corporation.

External Corporate relationships

The key issues are sustainable harvest levels and environmental integrity. These require the following:

- PLANS: (a harvest plan, stock plan and an environment plan)
- MONITORING of progress by the company
- AUDITING of performance (internal & external)

All research services would be contestable. All plans must include views and/or approval of other sectors impacted (recreationals, community, indigenous etc). One of the major issues would be data and the transparency of processes. "Who audits the auditors?" For compliance services the rules made both externally and internally among fishers. The company itself would be under government penalties for breaking reporting conditions. The government would have a bottom line and could intervene for gross mis-management or violation of key sustainability criteria. The harvest plan impacts both external & internal relationships.

Internal Corporate relationships

Establishment of corporate body would involve decisions on :

- Structure - Shareholders, Board of directors, Memorandum and Articles of Association;
- Issues of wealth distribution - establishing shareholdings (easiest route from ITQs?);
- Operational issues - who does what? All services can be competitive including management and fishing);
- Shareholders evaluate management performance and can hire and fire.

The harvesting plan has an important internal component (see Harte et al., 1998).

- Harvesting contracts (civil) between all players (eg: shareholders, lessees, skippers & corporation;
- All parties sign off on the harvesting plan and are aware of damages for non-compliance. Annual General Meetings gets concensus on the plan;
- Internal compliance rules and penalties (eg: Corporation-fisher; rules/agreements between fishers).

The benefits of Corporate governance

The main benefit is significant involvement and control in management. This can open economic opportunities through:

- using effective management and research services;
- co-operative harvesting at lower cost;
- long run stock management - incentives to invest in stock recovery and enhancement.

The limitations of Corporate governance

The transparency of management and data and the costs of this information will be high initially.

There is resistance in some parts of government, politics and the community/NGOs sector to the concept of industry self governing. Some want to keep trying old administrative means of management for new environmental reasons. This precludes producers from being rsponsible or accountable.

Several critics point to limited human resources in industry as management expertise. In most industries today this is hired. Why not for stock corporations?

The long term effectiveness of stock management may raise resource ownership issues. Under Individual Transferable Quota (ITQs) the rights are insufficient. The solution may be leasing to the company for a 40 year period. Payments to government would be a lease fee or rental. There are also concerns over incorporating other users.

Conclusions

In this paper I am suggesting that corporate governance experiments could be undertaken as part of the sustainable fishery management experiment. The corporate governance framework can be designed around local fishery conditions. Some fisheries are more suited to being able to establish corporate governance. They may be of high value, stable biology, export growth potential. On this basis corporate governance structures are an option for Rock Lobster fishery management.

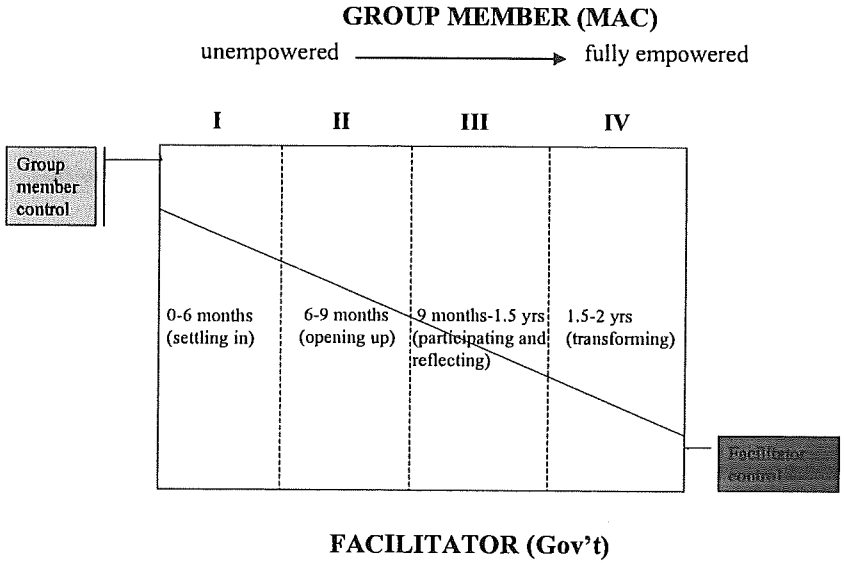

Figure 1: Facilitative process model (adapted from Glaser, 1992).

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Thanks

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I thank Mike Arbuckle, Manager of Challenger Scallop Enhancement Co. New Zealand for several interesting discussions on corporate governance models. I thank the South Australian Rock Lobster Advisory Council (SARLAC) for the invitation to the conference.

A Corporate Model

"Marine Resource Access Arrangements Utilising Commercial Mechanisms"

Mr Will Zacharin
Primary Industries & Resources South Australia

Abstract

Statutory fishing rights are being defined in legislation in Australia, but the mechanisms to facilitate management of improved property rights have not been addressed. Incorporation of a resource access right may have several advantages over other mechanisms both in maximising the economic return from the resource, ensuring long term sustainability and reducing costs to Government for management and administration. The model presented provides for ownership of a rock lobster fishery through a publicly listed company with different share categories being apportioned to a range of harvest and processing participants. An annual resource lease is paid to Government in consideration of a 20 year access right. The proposed company has the capacity to issue licenses to recreational fishers and provides an agreed level of access to the resource by these fishers. Biological and economic audits of the resource are required to report on the status of the fishery according to established performance indicators. There are heavy penalties for non-compliance or degradation of the resource base.

Introduction

Few statutory fishing rights have been created in Australia or worldwide in relation to inshore marine resources. The majority of wild capture fisheries have access arrangements determined by one being the holder of a commercial fishing licence or permit, which is usually issued for a period of 12 months under the relevant fisheries legislation. All Australian States and Territories have formal consultative structures and mechanisms in place which provide advice to Government on the best management or access arrangements for specific fisheries. However, the management committees are, in all cases advisory only, and this advice may be accepted, amended or rejected by Government for a variety of reasons, including strong opposing views from other stakeholders who may be affected by a management decision.

This lack of fishing rights worldwide is due to the common property nature of the resource which was termed by Hardin (1968) as the "tragedy of the commons".

If Government were to investigate moving forward in relation to independent day to day management of any marine resource, what are the organisational implications of delegating responsibility for management of the resource and the surrounding habitat? Social researchers and fisheries managers have suggested that private 'ownership' or delegation of the stewardship role is not appropriate for marine resources because of the common property nature of the resource. However, the agriculture, forestry and mining industries have gained legitimate long term access to these crown resources. The Government has leased these resources to the private sector in return for an economic rent from their exploitation. Can the same principles used to lease the access and management rights of mining and forestry resources be applied to the commercial fishing industry? What could motivate fishers to promote collective interests at the expense of individual interests? This paper canvasses the constraints, advantages and disadvantages in establishing a public company to manage a marine resource and uses the northern zone rock lobster fishery in South Australia as an example.

Northern Zone Rock Lobster Fishery

The northern zone rock lobster fishery extends from the mouth of the River Murray west to the border with Western Australia and out to 200 nautical miles. There are 73 licence holders in the fishery with individual pot holding on licences ranging between 25 and 60 pots per licence. The season is open from 1 November to 31 May. Fishing effort is controlled by input controls, the main mechanisms being an innovative flexible time closure system, restrictions on pots, boat horsepower and a minimum size (Zacharin 1997).

Public Company Concept

A public company in Australia is a company which has an unlimited number of members and may be listed on the Australian Stock Exchange (ASX). The Corporations Law in Australia considers the company to have 3 distinct elements: the legal/economic entity, the directors and the shareholders or members. The company must have a constitution (Memorandum of Association) and replaceable rules (Articles of Association).

In relation to the first element, the company as an economic entity has the ability to manage its own financial, physical and human resources to fulfil its primary objectives, which in most cases is profit. However, with the management of a marine resource this function would also include the determination of access arrangements, harvesting protocols, collection of licence fees from a variety of individuals or other companies harvesting the resource, and the responsibility for audits (both financial and physical) under the Corporations Law. For the purpose of this discussion, I will primarily focus on commercial access issues with some later comment on access by other extractive users.

Let us assume at this point that the Government is able to lease the resource to the company for a period of 20 years. I will return to discuss how this may be achieved later. The first question that needs to be addressed by the company is the determination of directors and the primary shareholders. Under the Articles of Association, groups of shareholders may have a right to appoint one or more directors and certainly in the first instance, the Government would also wish to nominate a director. The requirement for a Government director (for example similar to the current arrangements with Telstra) would be necessary to enable the Government to fulfil its statutory obligations under the current legislation and common law.

Ownership of forests and mineral resources in all instances which I have investigated remains with the crown and it should be no different in this case. However, the Government in entering into a long term lease of access to the company would require the ability to nominate a director to the board to protect their ownership and interest in such issues as environmental management, monitoring sustainable resource use and equity issues.

Other different groups of shareholders with a right to appoint should be current licence holders and perhaps any industry associations that represent a significant majority of licence holders. The board may also consider representation from the rock lobster processing sector, recreational fishing interests and any traditional users of the resource.

An appropriate initial board structure may be as follows:

Chairman (selected by the board members)
Directors (x3) (nominated by current licence holders)
Government nominee
Non-executive directors (x2)
Executive director (Chief Executive Officer)

Becoming the director of a public company for many fishers would be legally different from their current experience on fishery management advisory committees. The Corporations Laws in most countries stipulate that directors owe a 'fiduciary duty' to the company. A fiduciary duty has been defined by the High Court of Australia as the duty to act with fidelity and trust to another. That is, the director must act honestly, in good faith, and to the best of his or her ability in the interests of the company. (The courts have treated the company as being the shareholders or the members). The courts have, in some circumstances, also extended this to include future shareholders[1].

An interesting legal argument would be what obligations under the Corporations Law would there be on this company to prevent degradation of the resource or other negative impacts on future shareholders? It is highly recommended that the directors investigate liability insurance.

[1] Jeffree v The National Companies &Securities Commission (1989) in the Western Australian Full Court

Shareholders

How then could shares be allocated to existing licence holders, future licence holders, investors or other interested parties? There are numerous permutations one can develop, the most radical being that the company purchases all existing licences under an agreed pricing arrangement. This option would be terribly expensive and of no benefit to current licence holders. I would suggest that as an initial allocation mechanism, the following strategy could be adopted.

All current licence holders are issued shares that reflect their current access to the fishery. This could be determined by either a simple or complex calculation based on previous catch history, purely on the licence or some combination of licence plus number of pots. I suggest that as there are 3,950 pots in the northern zone rock lobster fishery, it would be simple to issue shares on pot number and valuation. For example, 3,950 pots at a current market value of $33,000 per pot gives a total pot valuation of $130.35 million or 130.35 million $1 shares. A licence holder with 60 pots could be issued a total of 1.98 million shares.

Only those holders with a minimum number of shares (25 pots or 825,000 shares) would be issued with a harvesting licence by the company (stipulated in the Articles of Association). Other shareholders that may subsequently purchase shares would have to lease those shares to harvesters, or accumulate a minimum share parcel to qualify for a harvesters licence from the company. As the fishery is managed by input controls, share holding must match pot allocations to respective harvesters, with 33,000 shares representing an 'active pot' in the fishery.

It must be remembered that the shares provide an access right to take rock lobster granted by the company under the lease contract with the Government. They do not provide for ownership of a proportion of the resource. However, the shares would be considered as 'property' and would have all the rights of an asset in relation to ownership and transferability.

As a 51 percent shareholder, the Government would hold 136 million shares in the company. Share trading would be similar to current transfer arrangements, where investors may hold shares and lease them to harvesters or licence holders may accumulate shares. This share trading process could be simplified if the fishery were managed by output controls in the form of individual transferable quotas (ITQs). An ITQ is a more tangible asset than a pot, as pots do not represent a specified proportion of the weight of the total allowable catch possible in the fishery.

Lease Agreeement

The most important issue for the company would be the legal obligations placed on the company by the Government in management of the resource. Not only would the Government (on behalf of the community) require that the company harvest the resource in an ecologically sustainable fashion, but that the company demonstrate sustainability by contracting or directly employing various professional staff to conduct scientific assessment, environmental assessment and other services as required.

In consideration of exclusivity to the resource, a lease or rent payment would be expected. The level of such a payment may be influenced by the significant rural and regional economic benefits that the rock lobster industry currently demonstrates, but the Government would expect some consideration for the access right.

Other lease conditions would relate to access provided to recreational fishers and traditional users of the fishery. A requirement could be that a proportion of the resource was made available to other user groups through an agreed licensing system, with payment of licence fees being collected by the company to assist with management costs. Current catch by other sectors in the northern zone rock lobster fishery is less than two percent.

Further conditions in relation to biological and environmental performance would also be required. The company may consider it is in the shareholders interest to fish the resource to uneconomic levels and invest the profits elsewhere. This strategy would not be acceptable to Government (or the community) who would require the resource be managed for optimal utilisation, while maintaining the resource base at a sustainable level set using biological performance indicators, such as catch per unit effort and exploitation rate.

Costs Of Management

At present all licence holders pay full cost recovery to Government under a fee for service arrangement. The current fees for the northern zone rock lobster fishery are approximately $700,000, of which $236,267 is for fisheries compliance activities. The company may be able to reduce the need for a high level of compliance, if shareholders and harvesters are motivated to adhere loyally to the regulations imposed for management of the resource. Hardin (1968) stated that 'the only kind of coercion I recommend is mutual coercion mutually agreed up by the majority of the people affected'.

Loyalty may be built up if shareholders have greater say with the management regulations, broader involvement in the decision-making processes and their implementation. However, the company would still require a public enforcement agency where harvesters breech the regulations. This cost would be borne by Government, but as a consideration in determining the lease fee. It is considered that a significant saving may be made in this area if compliance of the regulations by the shareholders were increased by company practices and procedures. One such practice could be the use of Vessel Monitoring Systems to record vessel position and daily catches. Assistance from the fish processor sector in monitoring catch performance may also provide an opportunity for the company in monitoring catch.

In regard to a number of other management costs, I have made an arbitrary assessment of costs for comparison in table 1. Additional cost savings could be managed by promoting greater use of the harvesters in providing data on the fishery for scientific analysis.

Table 1: A comparison of management costs for the current arrangements and the proposed public company.

Service	Management committee ($'000)	Company structure ($'000)
Scientific research	166.2	150.0
Economic research	3.6	3.6
Policy & management	31.9	30.0
Regulatory/licensing	34.3	15.0
Compliance	236.3	100.0
Directorate	20.4	220.0
Operational management costs	49.0	20.0
Extension officer	31.5	15.0
FRDC levy	62.6	62.6
Environmental program	30.0	30.0
Other services	43.0	10.0
TOTAL	708.8	656.2

The reduced costs in scientific research could be achieved by the direct employment of a research officer for the company and a review of data collection and analysis. Compliance may be significantly reduced if a corporate view were taken by licensed harvesters.

A major cost increase would occur in directorate costs. At present this represents costs for corporate services from Government which are minimal. With a company, the Chairman, directors and chief executive officer must be paid a salary and this has been set at appropriate market rates. The 'other services' represent costs for ancillary programs such as community awareness or additional research which may be significantly reduced in alternate years. Overall, the indicative budget suggests a potential saving of about $50,000.

Possible sources of revenue for the company may include licence fees from recreational fishers. There are approximately 3,600 pots used by recreational fishers in the northern zone fishery. Current pot registration fees set by Government at $45 per pot collect $162,000 per annum. A proportion of this revenue may have to be shared with Government, again in providing compliance services for this sector of the fishery. An agreement on licence fees for the recreational sector would be agreed as part of the contract conditions to ensure fair access by this sector. Additional revenue may be raised by the company by issuing additional recreational pots, or by conducting a voluntary share buyback over time and auctioning or leasing those shares to new or existing harvesters.

A new cost would be the agreed annual lease payment to Government for exclusive access and management rights to the resource. As suggested, this fee should cover costs to Government in enforcing regulations as and when required. Whether any additional rent is required would depend on the wider communities views on leasing of the resource.

Reporting Requirements

Under the requirements of the Corporations Law, the company must submit annual accounts and an audit of financial resources. However, it is the additional requirements of Government likely to be negotiated as part of the lease contract that would occupy the company's attention.

An integral part of the lease arrangement would be conditions to ensure that the rock lobster resource was not over-exploited, degraded in any fashion or managed in a way that would detrimentally impact on the adjacent marine environment. These conditions would be very difficult to quantify and monitor, but are critical for the company and Government to establish if long term access rights to a resource are to be agreed. This issue is probably best dealt with by establishing measurable biological performance indicators and reference points in a formal management plan which form part of the contract specifications.

Biological performance indicators currently used in the fishery are:

- Catch per unit effort (kg per pot lift);
- Exploitation rate (the fraction of the population harvested annually)
- Egg production (a derived index using legal sized females);
- Pre-recruit abundance (under-size catch per unit of effort); and
- Mean size (rock lobster landed across the fishery).

On an annual basis, an audit of the biological and environmental status of the fishery would be presented to the Government. These reports would be subject to external review by appropriately qualified scientists approved by both Government and the company. If no agreement could be reached within a specified period, a reviewer may be chosen by the Australian Securities Commission. This is similar to cases in dispute on the financial reporting of public companies.

To enforce performance, the lease contract would have to include substantial financial penalties for breech of contract. The financial penalty may be dealt with in placing a constraint on future catches by the company for a specified period, particularly if the resource was being over-exploited, or in a direct financial penalty. This would have to be recouped from revenue sources which would mean the current shareholders.

Benefits To Shareholders

What benefits would the proposed corporate model provide to shareholders (fishers) and Government?

It has been established in a number of countries that natural resource management can be improved through the strengthening of property rights. For wild fisheries, the challenge is to devise a system that will make the incentives of those who have exclusive access to the resource converge with the public interest in the conservation and efficient utilisation of the resource (Pearse 1994). Any management system must reward fishers for their collective effort and motivate all harvesters to think locally but act globally in exploiting the resource. There is no doubt that a collective co-operative approach could improve the performance of the fishery and the costs of management. Ultimately, fishers control to what extent a management system will work or not; almost no matter how much Government spends on compliance and enforcement (Jentoft and McCay 1995).

Benefits of providing company management rights may be:

- Greater control and flexibility in setting annual catch levels,
- Greater certainty in access arrangements to the resource,
- Improved flexibility in management decision making (ie changes to minimum size, market responsiveness),
- Greater compliance by harvesters,
- Reduced management costs to harvesters,
- Flexibility in the choice of service providers, such as research, compliance and market information; and
- Capacity to raise funds in the market for other opportunities.

Benefits to Government may include:

- Reduced cost for management of the fishery;
- No longer vulnerable to political pressure & power of vested interests; and
- Allocation decisions between commercial, recreational fishers and other stakeholders determined through agreed negotiation and formalised in the lease contract for a specified period.

What are the disadvantages of transferring management to a public company and changing the equity of current licence holders? Does the lease contract confer any stronger property right to the resource than currently exists? I would suggest it does not. Will private investors move into the market and purchase significant shareholdings, thereby changing the small business nature of the fishery and its contribution to regional economic growth? This is likely to occur if the face value of shares rises and fishers make a decision to invest their capital elsewhere. Will the actual costs of management increase as biological and environmental monitoring and performance require increasing resources to enable the company to fulfil audit requirements? Unsure at this stage. Greater participation by harvesters may result in the perceived cost savings.

Summary

I don't believe that Australian society is yet prepared to see ownership of marine resources transferred to the private sector as has happened in Japan. Fisheries management is very much a political issue as the manager needs to pursue multiple conflicting goals. Co-management and leasing long term access rights to the resource takes a middle road between overall Government concerns for efficient resource utilisation and conservation, and local concerns for equal opportunities, self-determination and self-control (Jentoft 1989).

Rock lobster fisheries are single species fisheries using single gear which make them conducive to private management. The proposed leasing of the northern zone rock lobster fishery to a company may be achieved because of the corporate culture already prevalent in the licence holders participating in this fishery. Without a collective corporate view being taken by licence holders the move to a public company model would not be achievable.

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Keynote Address – Indigenous Issues

"Resource Sharing in Indigenous Issues - Competition with Cooperation"

Sir Tipene O'Regan
Chairman, Waitangi Treaty Commission

Introduction

Competition with cooperation is the theme of my address. Maori Treaty of Waitangi fisheries claims arose because of competition for the resource between Maori and non-Maori colonisers of New Zealand. A failure of the Crown to fully cooperate with Maori and adhere to the promises made in the Treaty of Waitangi effectively dispossessed Maori of their fisheries. In High Court proceedings brought against the Crown by Maori in 1987, Greig J held: *"I am satisfied that there is a strong case that before 1840 Maori had a highly developed and controlled fishery over the whole of the coast of New Zealand at least where they were living. That was divided into zones under the control and authority of the hapu, and tribes had the dominion, perhaps the rangatiratanga, over those fisheries. Those fisheries had a commercial element and were not purely recreational or ceremonial or merely for the sustenance of the local dwellers."*

Background to Treaty of Waitangi Claims

Early Cooperation

The Treat of Waitangi was signed between Maori tribes and the Crown in 1840. The three articles of the Treaty provided the basis for the development of the modern relationship between Maori and the Crown. In the English text of the Treaty:

- Article 1. Maori ceded sovereignty to the Crown.
- Article 2. The Crown guaranteed to Maori the full, exclusive and undisturbed possession of their lands, estates, forests, fisheries and other properties.
- Article 3. The Crown granted Maori all of the rights and privileges enjoyed by subjects of the Crown.

In Article 2, the Crown guaranteed to Maori the full, exclusive and undisturbed possession of their lands, estates, forests, fisheries and other properties for as long as they wanted to retain them. The principle was that despite settlement, Maori would not be relieved of their properties without some further agreement.

The Maori text of the Treaty said much the same, adding another dimension – the right of Maori to exist as Maori under their own regimes. It was a high ideal, especially when pitted against European settlement at the time, but sensible, necessary and proper all the same. The principle survives in the international instruments to which most modern states adhere, that all peoples have the right to retain their properties for so long as they like, and to develop them along either or both customary or modern lines.

For some 25 years post-Treaty, fishing was not an issue. Maori numerically dominated the population and developed a strong commercial fishery that supplied the early colonists and towns with all of their fish. Fishing had always played an important role in the Maori economy because aquatic resources provided Maori with their only animal food apart from birds, dogs and rats, and any portion of sea could hold for them much higher value than any equal area of land. Prior to European settlement, Maori had highly developed fisheries ranging from shellfish gathering in harbours and on beaches to fishing expeditions undertaken well offshore to fish for bottom dwelling species on the continental shelf. Koura (rock lobsters) and paua (abalone) were prized species of particular importance to Maori as they were high quality seafoods found in abundance and easily harvested along the coastline. Kaikoura, in the South Island of New Zealand, is a place known for its abundance of rock lobsters, kai meaning food and koura the rock lobster.

Over the period from the 1840s to the 1860s, Maori were unrestricted in their fishing and fish trade and they in turn had no reason to seek limits on the settlers' fishing, for the colonists fished mainly for their subsistence and personal needs. A cooperative spirit flourished between Maori and the European settlers.

Increasing Competition

Then, in the 1860s, the numerical superiority of the settlers was attained, and at the same time Britain passed over to them its political control, and war with certain Maori was declared. Racial attitudes hardened. Competition increased, both for the resource and for the profitable trade in supplying fish to the growing colony. In the wake of the wars came a series of laws destined to break the Maori control of the resources of the land and sea, and significantly, to put an end to their competitive trading habits.

In the area of fishing those laws related first to oysters. The Oyster Fisheries Act of 1866 was targeted at the supply of oysters to Auckland. Less than one year beforehand, the House of Representatives had been furnished with a return showing that Maori had supplied to the settlement literally thousands of kits of oysters. Government forbad the commercial exploitation of oysters by Maori, and leased Maori oyster beds to non-Maori commercial interests. By subsequent Acts, Maori would be protected, it was considered, for provision was made for Maori oyster reserves. But none was reserved, at least not before 1913, and only after the local beds had been severely depleted by non-Maori pickings.

The more significant feature was that Maori were prohibited from selling oysters from beds reserved for them. Those beds were for personal needs alone, for that was what tradition – so the European believed – was said to imply. So was the view first established that the Maori interest in fisheries was non-commercial, and could be provided for by the reservation of a few fishing grounds.

As the European population grew, so did European involvement in the commercial fishery. The need for fishing laws increased to regulate fishing. Inland fisheries (from 1867) and then marine fisheries and fisheries as a whole (from 1877) were brought within the purview of statutory regulation. Commercial fishing was increasingly restricted by way of permits and licences and customary (Maori) fishing was non-commercial. Maori fishers found they had to apply for fishing permits and licences in order to ply their trade in commercial fishing.

The regime was continued in all fishing laws, thereafter, to the 1980s. The assumptions were basically that Maori fisheries were restricted, both as to the area of sea used and the species caught, that Maori fishing should be limited to satisfying personal needs. Fisheries were to be managed by the state as though Maori had no fisheries management systems of their own. As the commercial fishery expanded, Maori experienced the effects of resource depletion and gradual exclusion from the commercial fishery as restricted entry regimes were introduced into the commercial fisheries for rock lobster and other species.

Litigation

In 1986, as a response to concerns about serious overfishing, New Zealand adopted the Quota Management System (QMS) for its commercial fisheries. The QMS is based on Individual Transferable Quota (ITQ), a private property right to fish resources, which can be bought and sold on the open market. The reasoning behind New Zealand's introduction of the QMS was that fishers would care for the resource on the grounds of self-interest. The system, however, took no account of Maori fishing rights.

By 1986 a number of tribes had lodged land and fisheries claims with the Waitangi Tribunal – a special Tribunal constituted to hear Treaty Claims. In that year, the Muriwhenua people of the far North commenced hearings at the very time the Crown was moving to introduce the QMS. At the hearings, objections to the QMS, and in particular to the granting of property rights in the form of ITQ which Iwi believed was contrary to the Treaty, were discussed. The Tribunal warned the Director-General of Agriculture and Fisheries against allocating ITQ before Treaty rights to ITQ had been investigated, but the QMS went ahead anyway with the introduction of most of the important inshore and deepwater fish species into the system.

Four Maori parties – Ngai Tahu, Muriwhenua, Tainui and the New Zealand Maori Council then went to the High Court for a declaration that the QMS was contrary both to the Treaty of Waitangi and the law. In October 1987, a court injunction prevented the inclusion of any further species in the QMS on the basis that the full exclusive and undisturbed fishing rights belonging to Maori in those species would be lost to them.

The Courts considered that fish quota created a property right in fishing, and this was in conflict with the proprietary interests of Maori. Drawn-out negotiations between the Maori parties and the Crown finally resulted in an interim settlement between Maori and the Crown. The interim settlement provided for 10 percent of all quota then included in the QMS to be transferred to Iwi over four years, along with a payment of $10 million. This included access to 10% of the commercial rock lobster quota. The Maori Fisheries Act which implemented this interim solution became a law in 1989. However, the Maori parties had already returned to the High Court for a definition of the 'nature and extent' of the Maori fishing right. The main court hearings were to start in early 1991 but were adjourned when the Crown and Maori arranged in a cooperative spirit to step back from the litigation and give the 1989 Maori Fisheries Act a chance to work.

Agreement and the Deed of Settlement

In late 1992, after months of complex negotiations, an historic Deed of Settlement was signed in which the Crown agreed to fund Maori into a 50/50 joint venture with Brierley Investments Limited to bid for Sealord Products Ltd – New Zealand's biggest fishing company, holding 27 percent by volume of the New Zealand ITQ. In return, Maori agreed that all their current and future claims in respect of commercial fishing rights were fully satisfied, and discharged.

The $350 million purchase of a half share of Sealord gave Maori control of more than one third of the New Zealand fishing quota when combined with the quota transferred to them under the 1992 Maori Fisheries Act. In addition to acquiring a half-share in Sealord, the Deed of Settlement promised Maori 20 percent of quota for all fish species introduced into the quota management system in the future.

The Deed of Settlement also provided that in respect of all fishing rights and interests of Maori, other than commercial fishing rights and interests, their status changes so that they no longer give rise to rights in Maori or obligations on the Crown having legal effect (as would make them enforceable in civil proceedings or afford defences in criminal, regulatory or other proceedings). Nor will they have legislative recognition.

Such rights and interests were not, however, extinguished by the Deed of Settlement, they continue to be subject to the principles of the Treaty of Waitangi and where appropriate give rise to Treaty obligations on the Crown.

The Deed of Settlement also stipulated that such matters may also be the subject of requests by Maori and the Government, or initiatives by Government in consultation with Maori, to develop policies to help recognise use and management practices of Maori in the exercise of their traditional rights.

The development of this process has been the customary fisheries regulations which provide for the customary (non-commercial) harvesting of seafood by Maori under their Treaty rights which are detailed below.

Treaty of Waitangi (Fisheries Claims) Settlement Act

The Sealord purchase was enshrined in the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992. In addition to setting out the process for settlement of commercial fisheries claims, the Act outlined the process for protecting the Maori non-commercial fisheries rights. It stated that the Minister, acting in accordance with the principles of the Treaty of Waitangi shall consult tangata whenua about; and develop policies to help recognise use and management practices of Maori in the exercise of non-commercial fishing rights to recognise and provide for customary food gathering by Maori and the special relationship between tangata whenua and those places which are of customary food gathering importance (including tauranga ika and mahinga mataitai), to the extent that such food gathering is neither commercial in any way nor for pecuniary gain or trade.

Customary Fishing Regulations

Under the Settlement, the management of Maori customary resources is being increasingly delegated to Maori themselves. The key mechanism for this is the Customary Fishing Regulations.

The Customary Fishing Regulations were developed jointly by the Crown and Maori to give effect to the provisions of the Deed of Settlement. They seek to effectively provide for customary non-commercial fishing, while ensuring the sustainability of the resource.

The Regulations operate on the basis that Maori will control their own customary take. The regulations only apply in an area when the local whanau, hapu or Iwi have appointed Tangata Kaitiaki/Tiaki for North Island areas, and Tangata Tiaki/Kaitiaki for areas in the South Island.

Tangata Kaitiaki/Tiaki, and Tangata Tiaki/Kaitiaki, are individuals or groups who can authorise customary fishing within their tribal area or rohe moana, in accordance with tikanga Maori. Their appointments are notified by the tangata whenua of an area to the Ministry of Fisheries.

To the end of 1998, more than 40 Tangata Tiaki/Kaitiaki have been appointed in the South Island, and appointments of Tangata Kaitiaki/Tiaki in the North Island are expected to be made early during 1999.

Authorisations for customary harvests are tightly controlled by the system, with both the place of harvest and the quantity of fish tightly controlled to ensure protection of the resource and future customary use. Tribes are developing sophisticated research and administrative systems to monitor customary resources and keep track of the harvest in order to manage their customary fisheries. Where a prior authorisation has been given for a customary take under the Regulations, it is now possible for a commercial vessel to harvest that fish or shellfish because there are good monitoring and control mechanisms in place.

The ongoing working relationship between the Crown, represented by the Ministry of Fisheries, and Maori has been excellent with both parties committed to ensuring the regulations will successfully provide the desired outcomes for future generations.
In addition to the Customary Fisheries Regulations, there are also provisions for Taiapure and for Mataitai Reserves. Taiapure are areas of the coast where Maori have a special interest in fisheries. Where such an interest is recognised, the Minister of Fisheries can appoint a Management Committee on the recommendation of the local Maori tribe to advise on the management of that fishery. Within a Taiapure commercial, recreational and customary fishing can all co-exist but there is an enhanced opportunity for Maori to ensure there is better recognition of their special interest in the way the fishery is managed.

Mataitai reserves are exclusive Maori reserves – areas which are of such customary importance that they are reserved exclusively for Maori customary use. Generally they are small discrete areas used by a local Maori community for the harvest of a particular fish or shellfish. Extensive discussion with the public and commercial fishers has resulted in agreement to a number of Mataitai reserves and consultation is proceeding on others. These areas will be managed by local Iwi for their own exclusive use.

Development of Maori Commercial Fisheries

The transfer of quota to Maori under the 1989 Maori Fisheries Act, together with the Crown funding to purchase Sealord Products Ltd has made Maori major players in the New Zealand seafood industry, including the rock lobster industry.

Te Ohu Kai Moana (the Treaty of Waitangi Fisheries Commission) was set up in 1992 to receive the fisheries assets from the Crown and to arrange for their eventual distribution to Iwi. During the period that it has been developing an agreed model for allocation of the assets amongst Iwi, Te Ohu Kai Moana has made strategic acquisitions of fishing companies to increase the value of the Maori fisheries assets it holds as well as assisting Iwi to enter into the business and activity of fishing.

Growth in the value and size of the Maori commercial fishing assets has been impressive. The assets include more than 65,000 tonnes of individual transferable quota, cash to the value of nearly $50 million and shareholdings in three major fishing companies involved in the fishing and seafood industry – Sealord Products Ltd, Moana Pacific Fisheries Ltd and Salmond Smith Biolab Ltd.

Sealord is New Zealand's largest seafood company with assets in excess of $400 million. Sealord specialises in value added seafood products which are sold around the world. Salmond Smith Biolab is a diversified company with major seafood interests, including paua (abalone) and rock lobsters. Moana Pacific Fisheries Ltd has one of New Zealand's largest rock lobster operations, dominating the North Island rock lobster fishery and marketing rock lobsters around the world.

Individual Maori tribes are also developing significant commercial fishing enterprises. Ngai Tahu, from the South Island, own and operate Lobster New Zealand Ltd, one of the largest producers and marketers of rock lobsters in the South Island.

As the Maori influence has grown in the New Zealand seafood industry, there has been a high degree of cooperation between Maori and non-Maori commercial interests in dealing with Government and with industry issues. While there is the usual commercial competitiveness between Maori and non-Maori fishing companies, there is a high degree of cooperation between all industry participants in dealing with common issues. This has been most apparent in the controversial areas of statutory reform and cost recovery.

Maori Involvement in Australian and Global Markets

As the Maori fishing businesses develop, they are expanding their interests internationally. The profile of Moana Pacific Fisheries Ltd as a supplier of rock lobsters is already well known in the market place. For the newer and less well known Maori fishing companies, initially, their focus as they expand into the international market place is towards Australia, where there are strong markets for New Zealand fish and shellfish. For example, Maori companies like Ngai Tahu Fisheries Ltd market fresh chilled fish into the Sydney Fish Market. Over the next decade, we expect many more Maori fishing companies to become well known in global markets as suppliers of premium species such as rock lobsters and abalone.

Common Interests

In the international rock lobster industry, we have many things in common, sharing closely related rock lobster species, similar research needs, and many of the same marketing issues.

There is a long history of close international cooperation in fisheries research between New Zealand and overseas rock lobster scientists. The exchange of ideas, research information and enthusiasm are important to the development of solutions to fishery problems internationally.

New Zealand has recently made the provision of its fisheries research services contestable and overseas research organisations have been successful in competing for some of the research contracts. Both MAFRI and the South Australian Centre for Economic Studies have been awarded fisheries research contracts in New Zealand.

Technology can usually be acquired and does not have to be re-invented in each country.

All countries have a strong common interest in maintaining the sustainability of aquatic resources and protection of aquatic environments in their regions and can work together to prevent uncontrolled and inappropriate developments and fishing activities that threaten their fisheries.

Competition and Cooperation within the Rock Lobster Industry

In the same way that Maori and non-Maori interests now work together to protect customary and commercial interests in New Zealand, cooperation can help us all to thrive in the international market place by working together to foster our common interests. Although we may compete in the market place, we can achieve much more if we cooperate on common issues.

As we move into the new millennium, there is a need for much more cooperation between international rock lobster interests. Although we compete in many of the same markets, we share many of the same problems, especially on the marketing front. A cooperative approach is needed to fight the commodification of this remarkable product and to prevent price destruction. This strategy has had great success with other seafood products such as hake, hoki, and orange roughy.

As a trading nation, New Zealand is generally a very strong supporter of trade liberalisation. NZ sees trade liberalisation as the key to achieving greater world prosperity. The economic reform programme in NZ over the last 15 years has emphasised liberalising trade barriers as part of policies designed to improve the efficiency of the NZ economy and increase national income. NZ has taken major steps to progressively dismantle quantitative and qualitative trade barriers particularly in its manufacturing sector.

Other countries are also embarking on programmes of economic reform although not as expansively or at the same breakneck speed adopted in New Zealand. Asian and Pacific countries are involved in the work of APEC (Asian Pacific Economic Cooperation) in aiming to reduce barriers to trade in seafood products internationally.

Competition will continue to promote more efficient firms producing higher quality seafood products.

Liberalisation of trade barriers will increase the opportunities for each other's fish products to compete with each other in the international market place.

Future Cooperation and Joint Approaches

There is scope for cooperation amongst rock lobster producers in a wide range of areas. These include:

Harmonisation of standards in both markets. This would assist in easing the trade in fishery products between countries while also strengthening the ability of rock lobster producers to gain access to markets and develop market recognition as quality producers in the global fisheries market.

Technology joint ventures in the development of new fishing technologies and the sharing of existing technologies. The costs of research and development are very high.

Fisheries research initiatives must be a priority for joint approaches. Many of the species are the same and the costs of research are extremely high.

United approaches to liberalisation of international trade in seafood products and the removal of trade barriers.

Joint marketing/promotion and trade development initiatives are also important. The globalisation of the world economy has increased the need to work together strategically.

Seafood training initiatives also provide opportunity for joint approaches to increase the efficiency and effectiveness of industry training.

International Industry Organisations can also work more closely together in seeking to achieve the collective aspirations of their respective members.

Recreational Rights and Responsibilities

Mr Frank Prokop
Executive Director, Recfishwest

It's an interesting and potentially difficult talk to give at a gathering like this, on the recreational fishing sector. I hope that I'll take you through a rollercoaster ride. I'll say some of the things that you expect me to say and I hope I will say some of the things that you don't expect me to say.

At the least, I have been the commercial rock lobster manager in Western Australia, in the past, so I do have some basis for some of the things that I'll say, I'm not just a recreational fisherman off the street.

The rock lobster fishery, and most fisheries, are considered a community resource, which is vested in the government, to optimise a sustainable harvest. It's a simple fact, but it's a very important principle, when it comes to allocation principles. Social and economic benefits are being increasingly recognised, and the recreational fishing sector is pushing forward for the secondary benefits to be recognised at a very high level. The community is wanting a greater say in all management as it's being put forward.

You're now finding community reps, conservation reps, etc, on management advisory committees, that are not just sitting there, nodding at the appropriate moments, they are now sometimes stomping the table and having their say.

Resource sharing issues are probably the most difficult ones we have to deal with. Sir Tipene O'Regan highlighted some of the problems, particularly we don't have strong quantification of the various sectors, and I see that there are linkages talked about in Daryl's talk, which is following. It does make it very difficult, in terms of the allocation. However, recreational costs and benefits are increasingly being recognised. The thing that causes the politicians to get nervous is what they call the net present value of votes, which is making a decision which they think will be translated most directly into positive benefits to them at the forthcoming election.

A variety of solutions towards resource sharing have been tried, many of them are reactionary and perception-driven and, frankly, aren't working. They're not addressing the problem. The lesson is quite obvious. If the recreational and commercial fishing sectors do not co-operate, they run the risk of having politically driven decisions, in which no-one wins. They are generally taken with a short-term perspective in mind, and they are generally taken with a unilateral support of one of the other sectors. In those circumstances, winning is not winning because, frequently, what happens with a change of government is they reverse the decision to get back at the guys who put it in, in the first place.

Recreational fishers do have a right and it depends on what the extent of your definition of that word is, those of you who are going to Perth will hear days of debates on rights in fisheries management. They have a right to a share. What that might be and the extent to which they should have it expected from year to year is very much open to debate. The question that's being asked increasingly, especially here in Western Australia, and in South Australia, is are the recreational fishers the enemy in the resource sharing debate? Are they the ones that you look out on the horizon and say they represent a realistic risk to the future sustainability of commercial rock lobster fisheries throughout the world? The answer I think is no.

Recreational catches in WA are increasing. They are increasing in line with population increases and a little bit more than that. But so is recreational licensing revenue, and the stock level, and that's partly due to good commercial fisheries management, there's no doubt, and the recreationals are getting some of the benefit of that, but it's also being recruitment driven, and we're fortunate in WA to have very good recruitment driven models, that enable us to predict catches some time in the future. So it takes out some of the emotion that you get where, 2 months into the season, for example, you find out the catches are nowhere near what you expected, and suddenly everyone's pointing the finger at everyone else.

Recreational catch is in the order of 8% now but could even be 10%. I'd dispute that figure – I would suspect that it is in the order of 7 or 8%. Is recreational fishing a real threat, when you look at what might happen, for example with price pointing by other commercial fisheries going into foreign export markets, and offering their product $3 or $4 cheaper than what yours is, and taking away the markets.

I think it's very, very important to stop this 'us and them' mentality. For particularly the commercial fishing industry to say that the recreational sector are the bad guys, they're the rising damp, the incremental loss of our traditional access, they're out to get us – that just doesn't stack up with the figures. In 1989 the catches (it was a very good year) were A and B zone in Western Australia, 6.1m kgs, C zone 6.9m kgs and the rec fish zone was about 1m kgs. I think you need to think of them in terms of legitimate participants in the overall fishery. It could also be argued that, that is actually the 'D' zone, which stands for domestic consumption, because by and large, there is very small domestic consumption of rock lobsters here in Australia.

And this [graph] shows the extent to which the recreational catch is increasing. This sort of graph causes a lot of concern when the commercial fishers see it, because they see a huge jump, which I believe has also been demonstrated this year. But what you have to bear in mind is the extreme differences in scale on this particular overhead. We've got 10,000 tonnes on the left hand side, and hundreds of tonnes on the right hand size. So, if you put the two on the same scale, the recreational increase would be infinitesimal.

Since last year, C zone increased 41% from the preceding season. The recreational catch, by the figures, increased by about 27%. So there were significant increases in both sectors. But there is no proposal to place significant caps or limits on the C zone, and one of the reasons is, that we know quite clearly that this is a recruitment-driven fishery, and the C zone people are getting the benefit of good, natural recruitment. But the recreational people, for some reason, are being looked at as taking a disproportionate share of their particular catch.

Recreational fishing in Western Australia occurs mainly within 3-5kms of boat ramps. It's mainly in C zone, which is between Two Rocks and Bunbury, that's the Perth metropolitan area, for those that don't know it, plus or minus about 200 kms. It's rarely outside of 10m in depth range, and most recreational effort is on what they call the Whites, up until the end of January. Interestingly, when they brought in the last management package, the 77mm increase in the early part of the season, which was designed to shift some of the product into the Reds, had a very significant impact on the recreational sector, and reduced the take, for those people who take log books, of around 25-30%. Now, the difficulty with that was that there wasn't any consultation with the recreational sector, it was just imposed. So they, for reasons of maximising the export dollars, which was a perfectly legitimate aim, they had a significant impact on the recreational fishery.

Now here come the scary bits. In the commercial fishery, for the next year, they are paying $77 per pot, which is what it was worked out they actually expended during the past year. This gives $58,000 per percent of the catch. This is returned to the community, or resource rents or management costs. This is not export dollars and I recognise the significant weaknesses in this being used as an absolute. But it is an important illustration, as I'll show later. The recreational sector (and it's about 41 cents per kilo, from my rough calculations) is contributing about 72 cents per kilo, or 58 cents per kilo, if it's 10% of the catch. So they're actually contributing more for their proportion of the rock lobster stocks in Western Australia than the commercial fishing industry.

It's even more interesting here in South Australia, where the commercial contribution is around 55 cents per kilo. Interestingly, it comes back to a relatively constant figure, when you're taking into account the different prices that are gained in South Australia, versus Western Australia. But the recreational sector are paying $45 per pot, or $8.71 per kilogram of the catch, so they are paying a very, very much higher fee to government, and it's interesting because that revenue isn't completely protected, as it is in Western Australia to go into the recreational trust fund. So some of that, I believe, has the capacity to go towards commercial fisheries management. So the South Australian recreational fishers may, indeed, be subsidising to a certain extent, commercial fisheries management here in South Australia.

So just in terms of putting the numbers through, the commercial fishing industry is contributing 62% for the same catch share in absolute terms. In South Australia it's only 6%. Interestingly, recreational effort was reduced in South Australia by 33% since 1985, and although the commercial fishing industry has taken significant cuts, it hasn't been to the same extent. However, this is not necessarily a constructive debate, because it's focussing in on one particular issue. I merely illustrate today that the recreational fishing sector are not getting a complete free ride, in terms of meeting some of their obligations for management costs, and as contributors and participants in the fishing industry.

Dial L for licence in South Australia. This talk was going to be pretty quiet until they decided to cook the Adelaide phone exchange. The previous South Australian recreational pot licensing system was discriminatory, in my view. You could only renew it if you had one, so anyone who moved to South Australia wasn't able to get a pot licence. That creates difficulties and may, ultimately, have resulted in very significant questions as to how you might defend a system such as that. Since 1985 there was gradually reducing effort in licences, as people dropped out. A lot of those people were fairly old, they had less ability to go out and catch their fish. The recreational catch here by the figures I've been given is only about 2% of the total. Perhaps we had a situation there and, as is coming in everywhere, managing the perception of the infinite recreational fishery and the capacity that they might have to expand suddenly, and take an enormous increase in the catch share. What we found in WA is that recreational licence numbers track the commercial catches reasonably well. So as they've got good catches coming up, the recreational licence numbers will increase, and as the catches drop, they'll drop off, because they don't want to pay.

There are also about 25% of the recreational licences in WA that are inactive. They pay their $25, but they don't go. It's merely so if one of their mates asks them to go out they have a licence and they can just jump on the boat. That also, in my view, is a very strong reflection on the quality fisheries management that we have in place there, that people are willing to pay for that, knowing that it's going to go towards meeting management costs.

So the phone in, I think, 1.67m phone calls is pretty unique, and I know a lot of people in the marketing business that wish they could come up with a product that was previously not that charismatic that could generate that level of interest. The important questions are: Who decides what the recreational catch share is, anyway? Why are we managing towards explicit output controls? I believe that particular exercise highlights, immensely, the dangers of explicit recreational catch shares. In my view it is ludicrous to set targets on the numbers of licences. You can have catch shares, in terms of percentages and manage them, but you have to be reactionary. In other words, if you say it's going to be 5% or 6% or 7%, and during one year, it gets a little bit above that, you have to make your adjustments in subsequent years. Because, politically, you can't say, 'Sorry, we're closing the fishery on Good Friday,' when a third of the state may be deciding to take their holidays to fish for that particular species. You have to wear it, and it happens in a number of quota managed fisheries as well.

But if you put a ceiling on the number of recreational fishers, and what I believe has happened here in South Australia is, that everybody who bought a licence now will fish it to its maximum capacity. They will feel morally obliged to get the maximum benefit out of winning the lottery. And, although it was a bit like the Telstra share offer, what you'll find is, instead of people taking 5 kilos per pot, you might well get a very significant increase, because people will think, because there's a high premium, and public perception placed on that licence, that they have an obligation.

It is very important not to think of the recreational sector as the enemy, but rather as legitimate participants in the fishery, as people who have needs, wants, and whose goals and objectives are remarkably similar to that of the commercial fishing industry. They also want sustainable fisheries. We must have holistic management. Government has a fair bit to answer to in terms of this. Government must get out of its internal confrontation structures, with commercial and recreational fishers. Where I go to the recreational program manager and demand that they deal with commercial fisheries management. And the commercial fishermen go to the commercial manager, and demand that they get rid of those nasty recreational fishers. It has to be facilitative and it has to be based on holistic principles. The government must facilitate the outcomes. But stakeholders must be mature. In other words, we have to put forward legitimate claims. When you start to talk as equals, you find that the goals and wants are not that different. And you can negotiate around the 3-5% where there is real conflict. The poor processes of defined outcomes leads to the political behaviour, and we'll all lose.

You wouldn't try and remove a small part of the commercial fishery that more than paid its own way. That was one of the reasons I brought that up. The recreational sector does pay its own way, relative to its catches. You must include the recreational sector in decision making, not in a patronising token way, but as legitimate people. You have to let them get some of the things of their chests, so that you can move forward. You have to recognise that their wants and needs are out there. They might be a little bit different to yours, and there is conflict. We must recognise the majority benefit from rock lobster fisheries are rightly in commercial fisheries. It is nonsensical to be trying to advocate in Western Australia for 50% recreational, 50% commercial. It is ludicrous, nonsensical and not an argument which I've heard from anyone. But what you do have to say is, what's the nominal catch per year you think the recs should have? And if, as I believe, a lot of the recreational catch increases are caused by population growth, are you investing that responsibility on the recreational fishing sector when it's really just a vestige of the desirability, in our case, of people just wanting to live in Western Australia?

I think that talking is the way forward. You have to identify the issues. Commercial fisheries are the majority stakeholders, therefore they should be taking the lead in the debate. They should be identifying the issues where they have concerns with recreational fishing effort or pressures, and examples. And I think you need to be realistic. Just saying, 'Our only outcome is we want to limit the number of recreational fishers,' is, in my view, an unsustainable argument, politically. Saying you wish to limit the recreational catch is a legitimate and fair management outcome, but you have to also say what's the basis by which you are doing that.

You might want to be looking, for example, in Western Australia, and the use of power winches on recreational boats, where they now have the capacity to fish outside of the 10 metre depth line, and where, unfortunately, the illegal operators have the capacity now to pull commercial gear, whereas previously they didn't, they weren't strong enough to be able to get commercial gear up. That's not to say that commercials weren't able to, occasionally, early in the morning, haul the recreational gear.

We need to share the resource and share the benefits of sustainable fisheries but, in this case, we're not talking about inequitable sharing. What we're talking about is recognition of stakeholders, so we get the benefits, proportional to our participation, not in proportion to what the resource is.

You have to be careful, the other side of the coin is, for people who aren't from Australia pull out of your pocket a $2 coin, there's about 90% of them in circulation. It has an Aboriginal head on one side and the Queen on the other side. That's the one the recs use so often in resource sharing debates. Heads for the commercial industry, tails for the recreational industry. Recreational sector will ultimately win for low value commercial fisheries with direct competition. What we're advocating is that the reverse situation applies for those cases, because the recreational sector is the major steward of the resource.

We can't have confrontation. It's hard, unproductive work. It destroys the relationships which you need at the times when the resource is starting to suffer and you have to go to all users and you have to make the hard decisions. Western Australia is working very well, in my opinion, but we'll watch, for example, what happens with the rock lobster wet fishing, where the recreational view is that it's something that needs to be very critically reviewed.

Thank you for your time.

Sharing With Recreationals – A Market Led Solution

"Sharing With Recreationals – A Market Led Strategy"

Mr Daryl Sykes

My sincere thanks and appreciation go to the organisers and sponsors of the Lobster Industry Congress and to yourselves, the delegates. Your participation, courtesy, and friendship have sealed the undoubted success of this event. It is a pleasure to once again be in South Australia, and it is a privilege to have been asked to make this presentation to you.

Rather than simply make a speech to this conference I would prefer an open forum opportunity to share the collective knowledge, skills and experience of those in attendance. However time constraints limit me to this brief reflection on market solutions to recreational fishing in lobster fisheries and I can only trust that my comments might encourage some debate and some consideration if they are relevant to your fisheries experience.

In the context of rock lobster fisheries management, two common themes have emerged in the conference proceedings to date. First, to strengthen and improve the security of commercial property rights to fisheries – which by the way I have heard described as access rights rather than the more comprehensive ownership rights that I believe are attainable. **Second,** the need, and an urgent one in some instances, to "de-politicise" the fisheries management and catch allocation processes in rock lobster fisheries.

Today I propose that a rights based management regime which incorporates both commercial and recreational extractive users will enable market solutions to fisheries management and allocation issues, and in doing so will strengthen the nature of the commercial property rights and progressively de-politicise decision making.

It is my contention that recreational users should be allocated, by regulation and/or negotiation, an explicit share of the available yield from a fish stock. Further, it is my contention that the share must be expressed as *"catch conditioned by harvest rules"*, and ideally take the form of a collective but divisible property right.

Recreational fishermen and women should be allowed an individual harvest right within a aggregate catch total that is expressed as an explicit proportional share of the available sustainable yield from a fishery, or group of fisheries. I want to add one qualification to that scenario – that the aggregate catch total which is the recreational share – **be transferable, tradable, and adjustable, within and between sectors.** I contend that cooperative endeavour by both sectors united in a common objective of maintaining and/or enhancing fisheries is good business for the rock lobster industry and good business for the fisheries themselves.

The Nature of the Recreational "Share"

In my view, the collective recreational right must approximate as much as possible the commercial property rights in the fisheries. It is particularly useful to have a "common currency" in lobster fisheries in that it allows for a range of negotiated settlements between extractive user groups.

A number of benefits arise from such an approach.

- The commercial property rights are strengthened by the application of their recreational equivalent. There is less inclination to dismiss lightly the rights and opportunities held by commercial fishermen and women if similar rights are employed by or on behalf of recreational interests.
- The recreational catching sector is bound into the fisheries research and management processes, united in the common purpose of rebuilding, maintaining or enhancing fish stocks.
- The recreational sector will better assist commercial interests in constraining the level of fish thieving, which in NZ at least is costing millions of dollars in lost income and in management levies. Recreational and commercial interests have a readily identifiable common enemy.
- The recreational "fortunes" in the fishery (as measured by individual and aggregate tonnage and spatial and temporal access) will wax and wane according to the status of the stocks, not be preserved by political expediency. They could be preserved by negotiation between rights holders if that was deemed appropriate, but no more political favoritism. Explicit shares of the available yield are akin the to "decision rules" used in TAC setting – those are not tinkered with other to refine and improve them.

- In addition, a tradable rights regime will enable the issues of "more" or "less" to be settled by negotiation between the rights holders without political interference. The recreational stake in rock lobster may even be traded off completely to enable purchase of rights in more preferred species, or may be progressively increased as recreational interests stand in the market to buy or lease commercial rights as they become available.
- Recreational extractive users will at last become accountable for the impact that they have on the fisheries. Like their commercial counterparts, recreational fishers will be compelled to make restitution for their misdemeanours.

I should explain that last point more fully. Regulations usually provide for commercial users to be excluded from a fishery if in breach of the "rules". In addition to any Court imposed fines, commercial fishermen face forfeiture of boats and/or quotas, or at very least exclusion from the fishery for a period. Their misdemeanour is "repaid" by catch that otherwise would have been taken. The fishery is compensated for illegal removals.

This is not the case for recreational fishermen - they pay the fine and are free to go back fishing immediately. They make no restitution to the fishery. I do not want their money, I want the lobster that they illegally removed to be compensated for – restitution to the fish stock should be a priority. The collective, or aggregate share, allocated to the recreational sector should be adjusted downwards to allow for that restitution. If all other recreational fishers share the cost of illegal behaviour by a few then they will take the initiative to constrain the members of their collective and ensure high levels of compliance.

An Overview of Recreational Lobster Fishing

Here is a selection of observations about recreational fishing. Not all of these topics are relevant to all lobster fisheries, but I suspect that some of the following comments will strike a chord with delegates to this Congress -

- In Australia and NZ, and I suspect in most other countries, there is no such thing as a recreational lobster fishery. There is recreational fishing taking place within a lobster fishery. Recreational fishing must be managed within the context of the fishery. Fishery Plans cannot be limited to commercial fisheries management.
- In my experience the apparent tension between recreational and commercial interests is greatly exaggerated. Single, local issues, and strong personalities dominate the more public debates. Individual self interest is often the motivation for public denigration of commercial fishermen and in several notable instances in NZ the confrontation with us has been generated by commercial interests reliant on recreational fishing and/or eco-tourism.
- Criticism of commercial fishing and of the current fisheries management regime in NZ is marked by sometimes astonishing levels of mis-information. Industry is understandably reluctant to get involved in public slanging matches with the ill-informed critics and as a consequence, fiction soon becomes fact in the hearts and minds of the recreational sector.
- There are no compelling arguments for any priority allowance to be made to recreational fishing. Recreational fishermen and women do not constitute the community at large – they are not the "public". They comprise a sector group within society, albeit a large and sometimes influential one.
- Give me a rationale for current daily bag limits. In your fishery does a recreational bag limit have any association with the value of the rock lobster in dollar terms? Or the value as food? Or the value of an enjoyable experience? If so, how is the *"happiness quotient"* measured and evaluated? Does the bag limit purport to define some upper limit on aggregate catch, or does it just look about right when you do the numbers on the back of an envelope? Does the bag limit constrain recreational removals or represent opportunity for recreational catch to increase as stock abundance increases (or even if it doesn't)? Does the current bag limit take account of the increased recreational fishing population? Or increased leisure time and discretionary spending? When was the last time you heard any discussion about the propriety of recreational bag limits in your fishery? Bag Limits just are ....
- Recreational fisheries are not non-commercial. In fact they generate huge commerce in terms of fishing gear, vessels and equipment, electronics, books, magazines and videos, travel, accommodation, charter operations, advertising promotions and fund raising. In my mind this aspect of recreational fishing is extremely useful in terms of establishing the cooperative arrangements described previously. At very least this economic value is more easily calculated than the "happiness quotient".

Building Blocks - How we establish proportional shares and accountability for their use:

- A solid statutory underpinning of the cooperative management process within a rights based framework is the fundamental building block.
- Truly effective fisheries management requires a legislative framework that **loudly and definitively declares the legitimacy of sustainable commercial extractive use of sea fisheries.** Such use must be underpinned by commercial access and harvest rights that are respected and protected in law. Governments should set up the respective rights and attendant responsibilities in statute and empower and enable the cooperative user group processes.
- The recreational sector needs to be marshaled into regional collectives so that their elected representatives are able to participate in research and management planning processes and bind their constituents into agreed arrangements.
- The recreational sector must be guided into these new arrangements by a trusted agency. Recreational fishers continue to stand in awe of Government as the protectors and defenders of the public interest in fisheries. The strong notion of Government as an independent and objective protector of the community resource is an excuse for the recreational sector to do nothing except complain and criticise, if they perceive problems in fisheries. Likewise, Government agencies will respond to the political influence of the sector group rather than address the correct issues of principle that underlie the criticism.
- Accurate estimates of recreational removals from lobster fisheries are required in order to establish the opening position in terms of proportional shares. In the absence of good data, a "best guess" estimate is better than nothing.
- Cooperative user group management needs to be established in small, digestible, bit-size chunks, so that the recreational sector gains comfort and confidence from the process. The successes that are likely to eventuate from this approach will be seen as examples to aspire to, and enable the cooperative management concept to build momentum.
- Commercial users must be prepared to objectively and impartially educate the recreational sector. Take your lead from the South Australian industry which has raised the industry profile in the hearts and minds of the community and the politicians – it has established a "legitimacy" for itself which is lacking elsewhere. My experience has been, and is, that recreational fish and dive clubs are blotting paper for fisheries research and management information. Informed responses are better responses, maybe not always the preferred responses from an industry point of view, but better than the ill-informed commentary and criticism that marks much of the current denigration of the commercial sector.

Can it Work?

Undoubtedly the answer is "yes!". Proportional shares of the available yield linked by a tradable rights system is achievable and workable, and more importantly is a win/win/win situation for industry, recreational interests and Government. In closing I will provide one simple example of the successful application of tradable rights in lobster fisheries. A long standing historical grievance was acknowledged by the NZ Government. A decision was made to allocate 10% of the existing commercial rights in rock lobster fisheries to the aggrieved party (Maori) to compensate for their estimated lost commercial opportunity. The 10% allocation was a rather arbitrary decision but was meaningful both in terms of tonnage and value. The 10% was obtained by Government standing in the market and purchasing on a willing buyer/willing seller basis.

Maori negotiators accepted the settlement, used that 10% as a platform to reach their desired level of participation in the fishery, and parlayed that initial stake wisely, again on a willing buyer/willing seller basis to end up with the single largest stakeholding in NZ commercial rock lobster fisheries under their collective ownership. If there was one single transaction that gave real integrity and value to commercial property rights in NZ sea fisheries it was the one that entailed the use of a proportional share of the available yield expressed as ITQs as the currency to settle this acknowledged historical grievance. Future Governments will have cause to think very carefully about weakening the integrity of those rights because to do so would be to devalue the constitutional settlement between Maori and the Crown. Use that same model and substitute recreational fisheries for the "aggrieved party", be less arbitrary in deciding the apportionment of the available yield because better information about current recreational take is available to us, and then let the market operate within agreed constraints, and the result will be a cooperative user group united in the management and conservation of their asset.

Thank you for your attention and participation at the World Lobster Industry Congress.

What Do Scientists Offer?

Dr Paul Starr

We might have a question. We may have an answer. We want to know what the answer is. The real issue is: What on earth are we asking? I didn't pick the topic – Roger did. So I thought about it and I decided that fisheries science is a commodity. I mean that's what we have to think of – it's a commodity.

There are things we need to know about our fisheries. We have to know, in order to be sustainable. We have to have all these requirements. And if you're a fisherman, we also have to protect one's investment. It's just like owning your house, when you have your house. You paint it.

Finally, as we talked in the last two talks, is sharing the resource with others. It's not just the commercial fishery. People who are sharing the resource with some interest in it.

Fisheries science claims that it can actually address some of these issues. So that's the important point. We claim that and we act as if we can do that. I actually think there's cultures in this business. There's a group of people and they do tricky things. We call them scientists. Then there's another group of people who are extraordinarily independent and they also can do a lot of things. They're commercial fishers. Both people think they know what they're doing. Which could be up to some debate. They also look at each other and wonder, facing each other. There's also this issue of control. Sometimes the control is a problem and fishery scientists, especially like to think, 'We know what we're doing. We're doing a good job.' The fishermen, of course, because they're actually catching the fish, they want to be in charge. In some cases I think scientists often find themselves in a situation where things are just lacking. This happened to me in Canada a lot. And that was that there was just a lack of political and management leadership and very often scientists feel they have to step into the breach. So, it may not be control, they just really care!

There's a problem. That is that fisheries science, as an organised thing, has a rather poor track record. Now I can pick on Canada, since I'm a Canadian I can do that. We didn't do very well. But I think, basically, fisheries scientists overestimate the ability that they have... the things they say they do, I think, perhaps they don't do as well as they think they can.

There's also another problem and I call it water scale. Fishermen see their fishery in a particular way, and fisheries scientists see it in a particular way and it's different. Then, by definition, commercial fishermen know a fishery on a fairly individual, local basis. On the other hand, fisheries scientists almost never know the detail. More the fact that they're restricted by the scale of the information they collect, which is almost by definition, going to be the big picture. It's going to be on a gross scale, rather than on a fine scale. Largely that happens because we just don't have the information to look at things on a fine scale. Fishermen are really... it's almost like ships passing in the night.

There's another part here, and that's goals. Fisheries scientists, by and large, as a group are protectionists and it's largely the education process. We thought we were just the next closest thing to God. We're supposed to be looking after fish stocks. I remember when I was a young scientist I used to think I was in charge of the fish. The fishermen could catch them, but I was in charge and I was going to do it. Now we've added this whole thing on the environment, we have to take care of the environment, so we've actually made the job a lot bigger.

There is a consensus with government and with the public that we need to take care of these fish stocks and environment. On the other hand, we have a problem with fishermen. Basically, commercial fishermen by and large, have not endeared themselves to the government and the public. Now this is a matter of perception, I think, rather than reality. They're largely business oriented, they need to make a living – you can hardly blame them.

Sometimes they can seem to be greedy, and sometimes they seem to put themselves above the fish – this is how people see them. At the end of the day, commercial fishermen, as a group, have a really bad reputation with the public. If I tell someone in New Zealand that I work for the commercial fishermen, they say, 'Oh you're the guys who wiped out the orange roughy.' It never fails. That's the only thing they know about commercial fishing is that they raped the orange roughy stock.

Well it's not true. The reality is that commercial fishermen also want to conserve the resource. It's just obvious. I think the thing that we forget is that there are other legitimate and reasonable goals that are not resource based. They're legitimate, and they're reasonable and it makes sense. The real problem is that there is no recognition that those are just as legitimate as the resource.

I personally think that it's quite legitimate for fishermen to look after their commercial interests. It's also quite legitimate for the scientists to look after the conservationists interests. Commercial fishermen need to understand that they have to have a continued and assured stock level. It makes sense, they all know that. But they also have to get along with the other users of the resource. Now the fisheries scientists have to understand that the commercial fishermen actually provide a real benefit to society. Sometimes they forget about that. They also have to recognise that commercial fishermen are quite concerned about their resource.

But I'm going to argue that we need a cultural shift between commercial fishermen and scientists. I don't think this is ever going to happen until we have something like what we see in New Zealand. We have to change the culture of fishermen so that they have the incentive, the care and they have to take on responsibility. This, I think, will only happen in a rights-based fishery, which we talked about earlier. Now, typically what we have in New Zealand is an outputs, rights-based fishery which is ITQ. In principle, you could have an inputs-based, rights-based fishery. I think that the benefits would be similar.

The real problem is that government, and I have to include the scientists – I'm going to lump things a little bit – by and large treat commercial fishermen as children or perhaps, as I think, as teenagers. At the end of the day they're sort of like the father, letting his daughter out on her first date, when she's 15 years old and saying, 'Make sure you come home at 10.30.' The fact of the matter is that you have to allow the opportunity.

Commercial fishermen need to take control of the fishery. They have to take control of the research, they have to take control of the management and I emphasise it's not just them, but the other users. What we want and what, ideally, we'd seek is a situation where all the users co-operatively manage the fishery, and they're supervised by the government. It's really a model very much like parenting. But this group, the supervisors, need to pay for it and I don't think we need subsidies. In other words, you pay for what you get. That would allow for no economic distortions in these fisheries, but you have to recognise that there's probably public good. In other words, if there's a strong recreational component then, in principle, someone has to pay for it, either recreational fishers themselves, or the government.

You have to allow these people to make decisions about safe catch and effort levels. Again, the decision making includes all the affected users, but the important point is that it's not real if the government can just take it away. You have to allow the people to fail, the opportunity to fail. You have to accept the fact that if they're making the decisions, then they also have to wear the responsibility. I think the biggest problem we have in most of these situations is that the government makes the decisions, but if it fails, then it's the fishermen, all the fishermen who wear the consequences. No government workers lost their jobs because the Canadian cod fishery went belly up, but a heap of fishermen went into trouble.

Now where do the scientists fit in to this situation? Their real role is to provide advice, and they have to provide advice on the issues that they are actually experts on. Things like, how much and what type of research. They should know what they're doing and, as such, if you ask an expert what you want to know, you have to accept the advice. In other words, you don't go around second-guessing it. Very often I get fishermen who will second guess, they'll say, 'Well you don't really know what you're talking about.'

So the issue really is that scientists should become the advisers to the stakeholders – they're essentially the employees of the stakeholders. That's their role and that's all they should do. They also can provide real advice on management. They can provide advice on the safe levels of yield or effort. They can also look at auxiliary management tools, maximum size, minimum size, things of that sort.

Although we had Amos Barkai give us a talk on what I would call the decision rules or automated management procedures, I personally think that's the way of the future. We're going to go in that direction in fisheries management and it's the way to go. Scientists can do those kinds of things.

I'm going to give a short example here, and talk about New Zealand, because that's what we happened to know. We have a thing called the New Zealand Rock Lobster Industry Council. It's one of the sponsors of this conference, and they're basically representing all the commercial fishermen in rock lobster in New Zealand. In New Zealand, we have a rather unique system where the Minister of Fisheries, the government, chooses what research needs to be done, and then they don't do the research themselves. They put it out to tender and various people who are interested can bid on it.

In the case of rock lobster, the New Zealand Rock Lobster Industry Council bid on and received the contract to do all the rock lobster scientific research in New Zealand, as a contractor for the Ministry of Fisheries. So I'm in a rather unique position because I am a scientist who is giving advice to the rock lobster industry. I'm also the scientist giving advice to the Minister of Fisheries, even though I work for the fishing industry.

Now the Rock Lobster Industry Council then turns around, because they're not a scientific organisation, and they contract to NIWA, which is the former government scientists, and myself to do the science for them. They have a very typical research data collection, which is very much like a lot of things they've done in other venues in Australia.

The management of the fishery is a stakeholder group which includes the government, the industry council, recreational interests, customary fishing interests, environmental groups and last, but probably not least, the scientists. Now a quick example of this, a decision rule that we had this year, we have a management decision rule for what we call the NSS, I've got my map here, it's this area, it's about 50% of the total rock lobster fishery in New Zealand and typically it's been very important. We've had a lot history of declining biomass, you can see there's a tale of woe for you.

What they did, when they started to see this, in the early 90s, late 80s, they made substantial cuts to the TACC and we also had, in 1993, we agreed to a rebuilding trajectory. So, here's where we are in the early 90s, and here's where we'd like to be. We agreed we'd get there around 2015. Then we also agreed that we'd monitor it in a particular way. So we had an agreed indicative response and it didn't work. Here's what it looks like.

You can see when we made the agreement that all the data points were above the line. So everybody was happy. But you can see now that the last 3 data points, and there's quite a trend of declining biomass there, and in 1997 we told them, 'You guys are in trouble,' and in 1998 they were. So what happened was that we triggered this decision rule, and the result of the decision rule was a 20% cut in TACC. It was put in place 1 April 1999. But what happened?

The response from the commercial fishermen was, I thought, extraordinary. First of all, the first thing they said was, 'What more can we do? We don't like this.' In particular, the decision rule said that if that trend keeps on, and you can see it has to catch up with the increasing thing, you'll get another cut. But I went and did the analysis and I told them, 'You guys are going to get another cut, whether you like it or not.'

So they asked me to investigate a whole bunch of other management options, including changing the minimum legal size, and we looked at a maximum legal size. We looked at additional cuts, and we looked at closed seasons, and limited numbers of pots, and all that sort of stuff. At the end of the day we said, 'Sorry guys.'

We went and had a meeting at Invercargill back in November last year, and there was about 50-70% of the people involved in the fishery were there. Nobody could agree on additional things, but the important thing was the overwhelming endorsement of that decision rule. Even though they knew that it was going to call for another cut. They basically looked to the scientists, and it's an enormous responsibility, but they figured that we were on the right track.

The other thing we've done in New Zealand that I think the scientists have offered, is that we've developed and implemented a logbook program, and by logbook I mean it's a self monitoring by stakeholders. Each participant in the fishery has 4 pots. He treats them as he treats all his other pots, and he measures everything in those pots. Every time he lifts those pots he measures all the fish in the pots. And he collects other things, depth, soak time, all that. We've had this in place since June of 1993. It's active in 3 of the major areas. It covers over 50% of the fishery. We've had between 63 and 112 people per year working in it – this fishermen. 10 to 20,000 pot lifts have been monitored, and 40 to 80,000 lobsters measured. It's a huge and impressive effort by the rock lobster fishermen and I put this forward as an example of what people will do if they feel empowered and part of the system.

In conclusion, I have three points. First of all scientists and commercial fisheries need to be partners, and by partners I mean a real partner. Nobody has the advantage and, in fact, in some ways you could argue that it's not just partnership, we're their employees.

Scientists, their job is strictly to be an adviser. They cannot influence the management. I personally think that scientists shouldn't be allowed to manage fisheries. They're simply advisers, who give advice. At the same time, commercial fishermen have to agree to take that scientific advice seriously, and to use it. Otherwise, the whole thing is not going to make any sense.

What Value that Lobster? – the Market, Tourists, Parks and Recreationals

Prof Tor Hundloe

My task is, in this session on resource sharing, is to basically tell you about a major piece of work that I am doing at this point in time. As you'd know, much of the dispute in this country, to a lesser extent I think in New Zealand, but certainly Canada, where I was recently talking about the same issue, is between various sectors in the industry. And they use what they call economic data to say, 'I'm bigger than you are.'

We've seen that and we'll continue to see it in Australia until we do our economics right and we understand what measures we should have. I've been charged with presenting to the Australian fishing industry, broadly defined, and anyone else for that matter, managers, an economic framework for valuing fisheries resource use. In doing that we're looking at the value to the commercial sector, how that should be measured, the value to the recreational sector, the indigenous sector, and also the value to the 'look, but don't take' sector, if you want to call that the marine parks. So we're covering the four sectors.

It'll be published in, hopefully, easy to read book, by about January next year, and before it's published, myself and a few other characters are going to wander around Australia and sit down with groups like this and work through it, in case we've missed something, or the language isn't clear, or we're getting it wrong, or whatever.

So I'll say a little bit about that, and I'll actually give you a bit of an example. It won't be about lobster, because I'm not sure that I know what the price of lobster is, but I'll give you an example of where we used this framework recently, in the State of Victoria, and it helped in the big dispute that some of us saw in the bays and inlets, Bays and Inlets Fisheries, they chase snapper and whiting and bream. You had this major dispute between the recreationals and the commercial guys and I played myself and a colleague, Bob Carnie, who's a scientist, not an economist. Economists, we've got a better science, but we're like the people who forecast a little, we put our head out to see if it's raining, and often we'll tell you what's going to happen with inflation and everything else... I shouldn't say that because I want you guys to believe the framework we're going to tell you about.

I'll show you a little bit of data about that bays and inlets study, and I won't give you the value of the lobster, as I'm supposed to do. One of the examples of how we can get a little bit confused, and I'm not picking on Frank (Prokop), because Frank said, 'I'm going to show you some data on contributions to management.' Discard it. He showed you comparisons between recreational and commercial fishers. Interesting data, but you should discard it. It's not about the value of a lobster in a commercial pot or a recreational's fridge. You should discard that completely.

Part of the problem with, when people say, 'This sector, the recreational sector, is ten times larger than the commercial sector,' is what do they mean? What language are they using? They're saying it's more valuable in economic terms. Now economists use a whole host of jargon. You and I know what economics is all about because we make economic decisions every day – we go to the bank, we pay the damn mortgage, we buy fuel for the vessel or whatever else. Economists have fancy names that you and I use in every day language, which becomes confusing. Economists talk about efficiency. Now you think efficiency is using the best fuel, or whatever else. Efficiency means something entirely different. I'm not going to go into it now, for economists, the book will explain that.

Most of us, honestly, think what happens in the market place, the stuff you read in the newspaper, see on the TV, the financial analysis you see, is economics. I'm sorry to say, it's not economics. There's a whole host of things in there that distort, use a bit of jargon, the markets, subsidies, there's taxes, there's inflation, there's God knows what. Sorry about the Economics I lecture, but we've got to get rid of all that stuff. We want to get the language so we know what we're talking about. Secondly, get rid of all those things that distort an economic assessment. It's not your fault if you're confused, because I was confused most of my life and it's the media's fault, I reckon because they don't tell us the true story.

Let me use probably the best example of how this argument is being run to date, and the argument we want to put to bed. It's an argument based on, as I keep saying, the amount of money, or the revenue spent to catch a particular fish. If we look, in this country, and other countries I've mentioned, we look at the amount of money that you guys, if you're commercial guys, spend in buying your boat, your pots, or leasing them, your sheds, your 4WDs, the fuel you use, etc. You add all that up. Now, if you're a recreational guy, you can say, well look I've got a 4WD and this and that and whatever, gear, equipment – you add all that up. You'll find that on one hand, one sector is bigger than the other. You could use the indigenous sector, if you wanted to measure it the same way, or you could take those people that go out diving and like to look at pretty fishes and lobster and whatever else and see the amount of money they spend.

By and large, if you do that sort of exercise, the number of sectors that are going to lose are the commercial sector, most – not all, but most fisheries will lose, the indigenous sector will lose, because they don't do those sorts of economic sums the way that we do them. More often than not the recreational sector and the tourist sector are more likely to be seen as being more valuable, in economic terms, by adding up revenue spent.

Now, revenue spent doesn't tell you, me or anyone else anything about the economic value of that lobster on your dinner plate, not at all. What it really says is that the more money you've spent to catch a lobster, the more valuable it is. Absolute nonsense. A case in point. You might remember, a few years ago, major oil spill as a ship called the Exon Valdez was in Alaska. I don't know lobster up there, but it destroyed quite a lot of marine life, and the US Government spent billions of dollars in cleaning it up. Now, if you added up all that money that was spent up there and the flow-on effects, the workers that went up there and went into bars and restaurants and whatever else, an enormous sum. What would you say was the value of that oil spill? You'd say it was those billions of dollars. The oil spill destroyed resources, they had to be repaired.

So I hope I'm making my point clear. The more money you spend on something has no relationship at all to the economic worth of your lobster, of your whiting, or whatever else. Have I made that clear? By using the Exon Valdez argument. Because that's what people are doing in this country, and in Canada, and to some extent in New Zealand. They're adding up all these things they're spending money on and they're saying that is the value of the fish on the plate.

Now, what we do when we look at commercial fisheries, we get the data from you guys – what you spent, if you're commercial fishers, what you spent, also your selling price, on the beach, your landed price on the beach, we get what you'd roughly call the profit, and we look at it over a number of years. Simple stuff. We take out subsidies if there are subsidies and adjust for taxes and things of that kind. What do we do for those recreational people? Leaving aside the marine parks and the indigenous use for the moment, we'll just use recreationals as the comparison. What do we do? Well they don't enter in the market place. They do spend money, but they don't spend money like you in a commercial enterprise. They don't have to buy, as I might have to have on the beach, your product at the restaurant. They take it home and, if they're playing the game correctly and not being shamateurs, or whatever you call them, but if they're playing the game, there's not market derived value for that lobster. We have economists, believe me, we have a number of sophisticated techniques to find out what the actual value is to a recreational fisher of getting a lobster or king george whiting, you name it. We haven't got the time, and I'll have to explain this in very simple terms, but a number of the techniques we've used, and we've used them in a number of fisheries – the most recent one as I said was the Bays and Inlets Fishery, and I'll show you a little bit of data in a second on that. Maybe if I just do that now, to give you an example.

For those of you who don't know the Bays and Inlets in Victoria, snapper, whiting and bream, don't worry too much about the... just look at the numbers. Extra fish for the commercial sector. What we're doing is we're looking at the margin. We know how many fish are caught in Victoria by the commercial sector. I know how many are caught by the recreational sector. If we're looking at resource sharing, we can take the argument that Rex Hunt ran, give it all to the recreational guys – a bit shift one way, if you put them all and took the argument by commercial guys and we get rid of Rex Hunt, he wasn't a very good footballer anyhow... that's another story... we work out from data gathered from the recreational fishers and we went around to every port, got their profit and loss statements, you have to be fair dinkum if you're going to do this sort of exercise, gave us their data and we said an extra snapper caught to the recreational sector would be worth $9 Australian, assuming no increase in costs.

So it's going to cost you more to catch that extra fish or extra 10 fish or extra 100 fish – if there are extra costs we work that in the model. I'll make the model as simple as I can. We also looked at value adding up the chain. $9 on the beach, if it's further up the chain, retailing, wholesaling the snapper, if you like, on the table in the restaurant or at a fancy, classy fish and chip shop. So just keep the $9 in mind.

For the recreational fisher, using this technique which I haven't described at all, we found out that an extra snapper was $8. So we presented these overheads I'm showing you, went into a report for the Victorian Government, with all the mathematics and modelling behind it - $9 to a commercial guy, $8 to a snapper guy. Now the snapper fishermen, if you looked at what they've spent to get that snapper, there's a lot more than their $8, a lot, lot more. Big fancy 4WDs, gear that's imported from Japan, you name it. On the basis of that, we said that if any allocation or reallocation should take place for snapper in the bays and inlets, it should favour the commercial guys. We said by so much.

We skip to whiting – anyone who wants to read this in detail, we'll soon have it out in the publishers. When you get to whiting, we're using the same techniques, that found that the converse or reverse existed. What extra fish, and whiting's a smaller fish than the snapper we're talking about, is worth $2.50 if it happened to swim into your net, and there wasn't any extra cost. If there were extra costs, if you're going to get 100 or 1000 more whiting, we built it into the model on the data we got from the industry.

We also looked at whiting up the chain, the value added chain – wholesalers, retailers, your fancy fish and chip shop in Carlton (go Carlton, the premiership – Adelaide had its turn last year, and the year before). Okay, we keep going with the story. Somewhere on the next slide, or the one after, only when we get to the restaurant level is the whiting worth anything near the recreational value, which was roughly $8 per additional whiting, and you see this $4 there – what we did was we got data that showed for a recreational person – if you went out fishing, you caught an extra whiting, what was its value to you, by this technique. If you caught another one, and another one, on the same trip, and you get what we call diminishing margin of utility. All that says is, if you go to have one ice-cream, you might be willing to pay a buck. If you have two, you might pay another buck for that one. If you said, in the same hour or so, 'I'll sell you a third ice-cream,' you say, 'Alright, for 50 cents. I'm satiated.' You know, diminishing margin of satisfaction. It doesn't work with alcohol I've found, it goes the other way. I found out last night – it took me a long time to learn that.

But the point of this is that on this study we found that there should be a reallocation of whiting, which is one of the major species in the bay and inlet fisheries, it should go, there should be some allocation from the commercial to the recreational guys. Then we did bream and I'm probably nearly out of time, because I told the chairman I'd finish a couple of minutes early. We found bream to be very marginal. Of all this data, I've just given you a snapshot of the Victorian Government, and they resolved what was going to be an enormous political fight over the reallocation of fish in the bays and inlets.

The end of the story, for those who are from Victoria, of course, is that we also got the recreational guys, at long last, to buy a licence. I'll tell you a story. In 1992 I was industry commissioned – I did a major study and recommendation on cost recovery. Some of you might not have like it, most of you never even saw it. One of the things that the commercial guys liked in it was that I said recreational people should buy recreational licences, and that money should be used in the fishery.

That's not the point of what I'm saying now. The recreational money – there has been more than enough to compensate those fishers, in the bays and inlets, who opted to get out. In fact, we've got more people putting up their hands saying pay us out, compensate us, buy us out, we'll go. What you'll have in Victoria now, in the bays and inlets, is a very profitable, nice, little fishery. And it's being shared on the basis of proper economic data, not the waffly stuff we've seen before. The book will explain all this and, as I said, I'll be coming around. I'll be back in Adelaide probably in 2 to 3 months' time, talking about the 1999 premiership, and sitting down with fishers and managers and anyone and saying, 'Look, this is how you should do it.' It's got to be a genuine apples to apples comparison, not the apples to oranges thing we've had forever and a day, which has just frustrated us and allowed for political decisions on allocations.

So thanks guys and see you around.

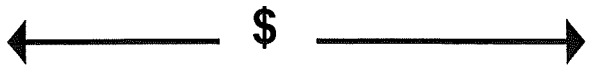
Investor Confidence

Mr Murray Hird
Agribusiness Adviser SA, NT & Tas, Westpac Banking Corporation

Investors invest for the future. Investment decisions are made on the evidence of past performance and future projected outcomes.

Who Invests In Rock Lobsters

Fig 1 **Investors In The Rock Lobster Industry**



Regulators	Researchers	Fishermen	Support Industries	Interest Groups

Community

Why Do People Invest?

Reasons for investing are as diverse as personalities.

It is important to note that the investment collateral is not always monetary in nature nor are the goals and desired outcomes always financially focussed. Consider for example the case of a fisherman, a researcher and a consumer.

The consumer invests in a rock lobster seeking a safe, quality product providing value for money. The payback on the investment may be in terms of a gastronomic experience or the pleasure of sharing and entertaining.

The researcher invests his time, effort and substantial intellectual skills. His return on investment may be some or all of publication opportunities, career enhancement or simply the intrinsic pleasure from "finding out".

The fisherman on the other hand invests to catch fish. His focus and evaluation of return are predominantly cash oriented.

What Do Investors Want?

Investors, irrespective of their identity, tend to seek three main characteristics in a potential or ongoing investment which may have appeal for them. They are:

(a) Certainty or safety
- How safe is my investment?
- Who is looking after my interests?
- Can I influence the decision makers?
- Will it disappear or lose substantial value without my knowledge or input?
- Can I prevent this?
- Can I easily retrieve or resell my investment?

(b) Performance in terms of return, both now and into the future.
- Will this continue to perform as it has in the past?
- Who or what can lessen my return?
- Can I influence this?
- How sure is my return?
- Future outlook
- Who is driving the performance activity?
- Do I trust them?

(c) Potential for growth or improvement in the value of the investment
- What contributes to the perceived value of this investment?
- Is the performance level sufficient to drive increasing value?
- Is the future operational environment for this investment conducive to continuing growth?

The existence of satisfactory responses to the above will help promote and maintain investor confidence.

In many cases the above tends to be defined in dollar terms if for no other reason than to establish a comparative base for decision making regarding present investments and but also the likely impacts of possible changes to management, regulation and other key elements.

The South Australian Industry at an Investor's Glance

Growth In Value - Lobster Pots $'000 (As at 5/99, advised by SARLAC)

	98/9	*97/8*	*96/7*	*95/6*	
Southern Zone	$22	$19	$22	$17	* Lease per pot est $1.7
Northern Zone	$35	$30	$27	$25	* Lease per pot est$2.5

A "lazy" investor purchasing pots and then leasing them out would have achieved a return of 7.7% in the Southern Zone with a PE ratio of 12.9.

The northern zone results are 7.1% and a PE of 14.

These figures would be regarded quite favourably on the ASX if presented for a listed entity.

Annual Catch(tonnes) As One Indicator of Investment Safety

	1993	*1994*	*1995*	*1996*	*1997*
Nth Zone	930	892	903	904	942
Sth Zone	1754	1669	1720	1684	1685

Management - Who is Looking after My Interests and by what Method?

Both zones by Fishery Management Committees composed of a mix of industry persons with additional members from Government and the recreational sector with an independent Chair.

As a lender my "Third Party" interests in licences are protected by legislation in most States hence I am able to confidently advance funds against licence.

Key Success Factors

Key success factors are like the legs on a three-legged stool. All three need to be in place for the stool to be functional. Two sound ones are not enough.

In considering the KSF's for the rock lobster industry in southern Australia it is fair to start with the observation that there is no money in catching rock lobsters. This perhaps startling observation is balanced by the realisation that it is the selling of rock lobsters which generates income, not the catching.

Following on from this premise is the equally truthful observation that one cannot sell a rock lobster one does not have. In turn, stemming from the above are the two crux issues or key success factors upon which the ongoing long term viability and future investor confidence in the industry depend.

These are the issues of RESOURCE SUSTAINABILITY and RESOURCE ACCESS.

Existence of both of these factors in concert are needed to sustain the likelihood of reliable funds flow, acceptable return on investment, investment safety and future or ongoing investor attraction.

In a fishery which can adequately demonstrate resource sustainability under present effort and management the matter of changes to resource access becomes potentially the largest threat to investor confidence both in terms of direct dollar terms and social impacts. Any reduction of effort **must** be accompanied by compensation or income replacement at commercial levels for at least those directly involved in fishing.

Additionally there is potential for impact on local support industries to consider, e.g. bait, fuel, engineering. A large number of coastal economies depend substantially upon fishing income as a central part of their economic and social make up.

As an example of this consider the effects of a 10% reduction in catch as a result of a reduction in access. Work by EconSearch (96/97) in South Australia estimated the industry at that time in SA contributed:

* $223 million in turn over
* $71 million in direct local impacts
* 152 million in flow on effects to other economic sectors
* 1969 people employed directly and indirectly.

If we allocated a full 10 % reduction to the first two items above and 5% to the other two the impact is in excess of $35 million of cost to the investors and the community at large.

The key question now becomes that of evaluating the benefit of such action to the communities and investors. That is, there is an annual cost.

What is the benefit?

Is it demonstrably more than equivalent to the cost?

Investors Invest For The Future

" He who can best imagine the future can best prepare for it."

Aquacultural production of rock lobsters will happen. Whether this can happen in an economically feasible system and whether it will cover the entire closed life cycle or be based on stripping and / or puerulus collection remains to be seen.

It is my understanding a number of large corporate investors have either begun investigations and trials or are preparing to do so..A major challenge ahead is to create a preferred future vision for the industry, including the role of aquaculture. I stress again the money is made in the selling of rock lobsters.

The rock lobster industry is part of the wider agri food sector. The trends evident in the sector will also influence your industry. Retailers are seeking alliances with larger suppliers processor and distributors to minimise their transactional costs of business and to ensure supply continuity, quality and quantity. The corporatisation of the industry will continue in both structure and nature.

It is important for industry participants take an active part in structuring those changes as part of an investment enhancement and protection strategy. In addition to access and sustainability KSF's for the future will also include marketing, distribution, value adding and logistics chain management.

Summary

As substantial investors in the rock lobster industry in southern Australia we are comfortable with our investment This congress is about our destiny and the choices ahead. It is fitting to consider the words of Plato:

" Your destiny shall not be allotted to you.....you shall choose it for yourself."

The Politics of Lobster Fishing

"Charles Darwin, Crystal Balls and the Politics of Lobster Fishing"

Richard B. Allen

Good morning everyone. It is my real pleasure to be here this morning in South Australia for the Third International Lobster Congress and I want to thank the organizers for making that possible. I certainly never would have imagined such an event when I began my career in the lobster fishery some thirty years ago. But this Congress is just one of a host of changes that have occurred in the lobster fishery over that time. Hydraulic trap-haulers, synthetic materials, fiberglass boats, sophisticated electronics, 200-mile fishing limits, limited numbers of licenses, trap limits, sub-legal escape gaps, biodegradable ghost panels, "whale-safe" fishing gear, air shipments of live lobsters to the other side of the world -- these are all developments that we have seen in our lifetime, and that have shaped our fisheries as we know them today.

We have seen technological changes, economic changes, and social changes in our fisheries. When I started my fishing career, lobstermen commonly held other jobs in the winter. Lobstering was a seasonal occupation. In contrast, in recent years on the Atlantic coast of the U.S., lobstering has been a full-time, year-round business for many fishermen. Thirty years ago, the typical lobster boat was made of wood and had a speed of about 8 knots. Three or four hundred traps was a big gang of gear. Once derided as "Chlorox bottles," most of the boats are now fiberglass and speeds of 20 to 25 knots are common. Trap strings of two or three thousand traps are not unheard of.

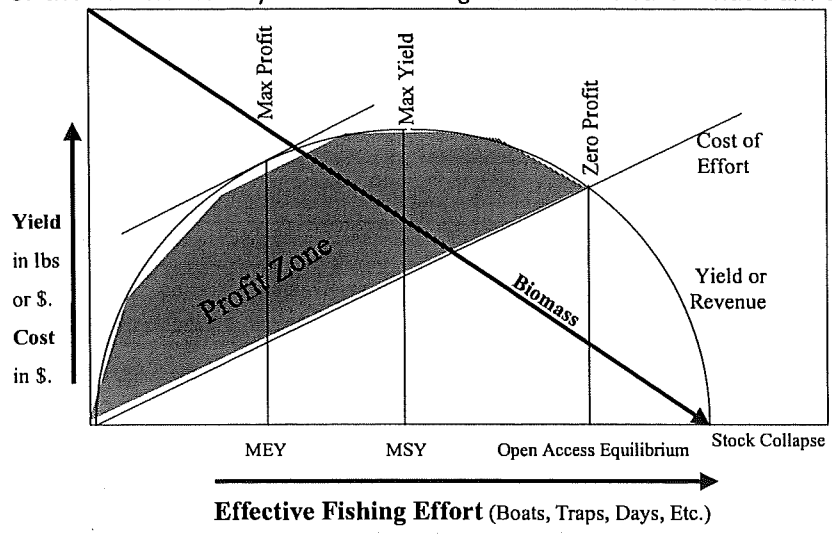
I look back over all of these changes -- the technical, the economic, and the socio-political, and I think of the entire process as the evolutionary development of the lobster fishery. But the challenge facing us today is not to look back and write the history of the lobster fishery. If we are interested in the future of the lobster fishery, we must recognize that evolutionary changes in our fisheries will continue. In thirty years, our fisheries will be as different from today's fisheries as today's fisheries are from those of thirty years ago. Our challenge, therefore, is to look into the future and plan for the changes that are sure to come, and which we can affect by our individual and collective actions. In most cases, and certainly in the case of the U.S., these actions will take place within the political system in our respective countries. I am interested, however, in reports circulating abroad that Australia has essentially insulated the fishery management process from the political system. The fact that the conference organizers put "the politics of lobster fishing" on the agenda here casts some doubt on the degree to which politics has been removed from the process. I hope that we will hear more about that.

It is clear, however, that politics will always be part of the management system, whether we are talking about the big "P" politics of elected government representatives, or the small "p" politics of dealing with our fellow fishermen, dealers, other interest groups, and our fishery managers. So our effectiveness in guiding our fisheries into the future will depend on our political skills, whether getting the votes to pass or defeat legislation, or getting the support of our colleagues in the fishery. I think we all know how important it is to cultivate good relationships with our elected representatives if we want to get favorable treatment in the legislative arena. I want to concentrate on the internal politics of the lobster fishery, and how it is that we decide what political positions we take as an industry. And I want to do this in the context of the most important political issue that our industry faces today. What kind of a system of fishing rights are we going to have that will conserve the lobster resource while providing flexibility and profitability to lobster fishermen?

One might hope that our political endeavors will be based on sound principles and rational approaches. At the present time, in the lobster fishery on the Atlantic coast of the U.S., I have to say that it is difficult to discern any fundamental principles, or any rational long-term approach to the management of our fishery. Keep in mind that this is a fishery in which, until very recently, an unlimited number of people could fish an unlimited number of traps and catch an unlimited amount of lobsters. We have only recently put any limits on entry into the fishery, and portions of the fishery are still open. Trap limits have been approved but not implemented in all areas, and those trap limits allow for significant increases in total effort in the fishery. And there are no controls on total fishing mortality on the legal-size stock. We have a fishery that has been officially declared to be overfished, but the stock assessment is so mired in controversy that a recent peer review of the science had to be postponed.

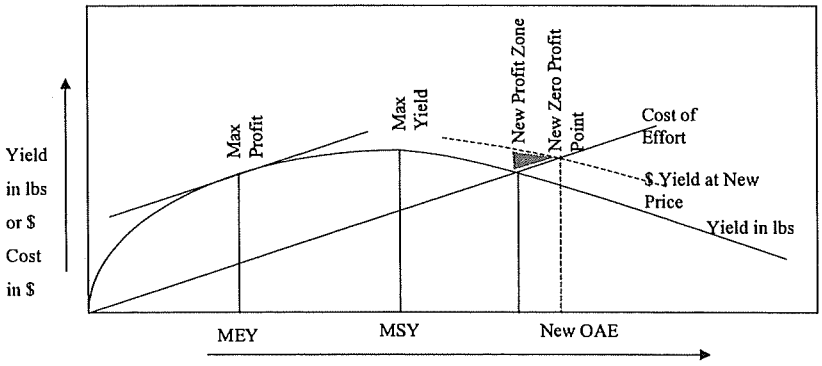
I am particularly frustrated with the situation in our fishery because I believe that we are leaving millions of dollars on the table every year because there is a lack of understanding within our industry, and within the management system, of some basic concepts of fishery bio-economics. For the most part, economics as a science is totally ignored in our lobster management system. The biology is so contentious only because of the economic implications of the biological advice. But the debate is uninformed by sound economic advice comparable to the biological advice.

I want to use one of the classic fishery economics diagrams to illustrate what I am talking about.

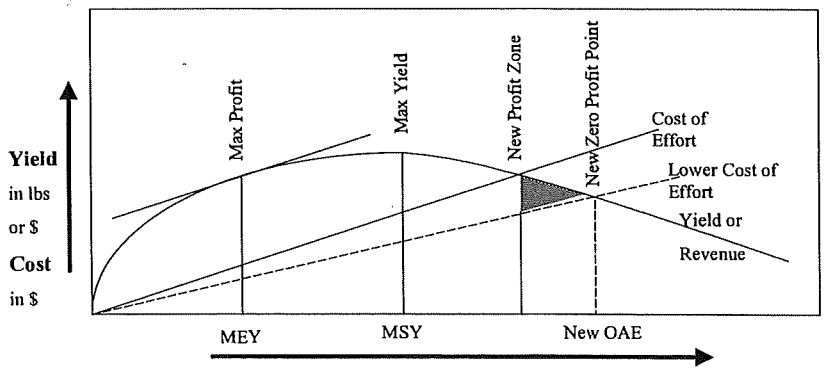


MEY - Maximum Economic Yield; MSY - Maximum Sustainable Yield

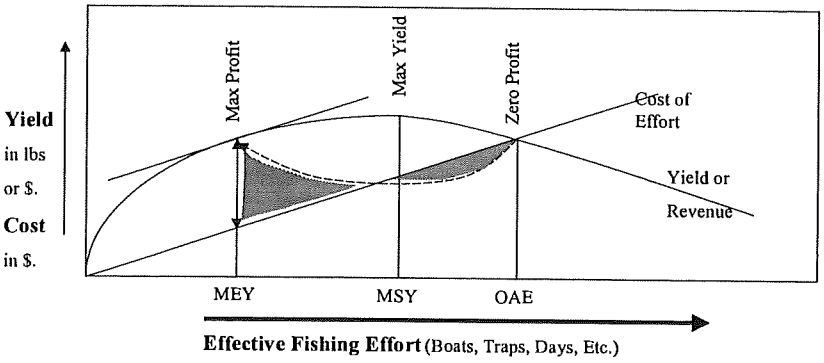
The Case of an Increase in Price



The Case of Improved Technology



The Cost of Stock Rebuilding

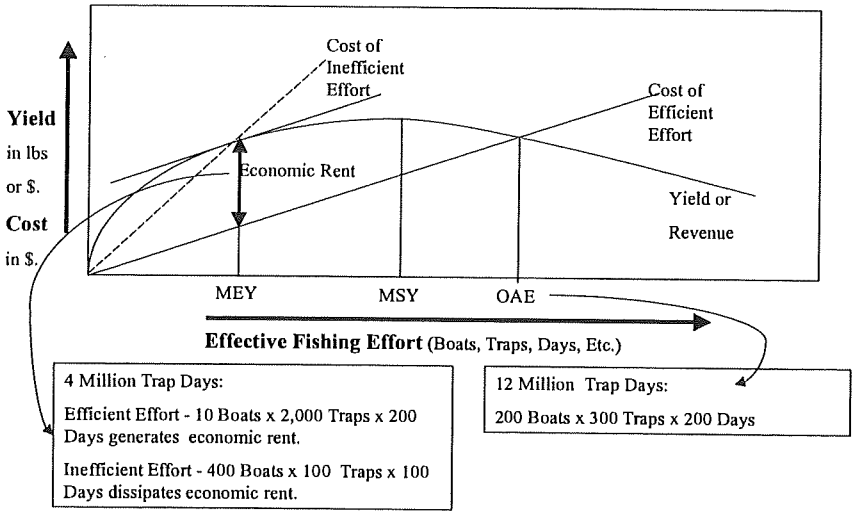


MEY - Maximum Economic Yield

MSY - Maximum Sustainable Yield

OAE - Open Access Equilibrium

Most Efficient, or Most Employment?



This may be common knowledge to some of you, it certainly appears that you have based your management on these concepts, whether or not you recognize the graphs. But it may help you to understand the politics of lobster fishing world-wide if you realize that some of the fundamental underpinnings of your management system are completely absent from the U.S. Atlantic lobster management system.

It is also my belief that the more conversant we all become with these concepts, the better able we will be to explain the principles that guide the development of our fishery management systems. And I am hopeful that an understanding of these principles will help us to gain support from our colleagues, from the environmental community, from fishery managers, and from interested politicians. All in all, I believe that a broader discussion of these concepts will contribute to the development and strengthening of more rational lobster management systems. And more rational management systems, I believe, will lead to a healthy resource and a profitable and progressive industry that can respond to the many challenges that we will face.

Let me just take a minute to point out some of the important information on this diagram, particularly that which sheds light on one of the major controversies in our fishery. We can see that increasing fishing effort, going to the right on the horizontal axis, increases the yield from the fishery up to the maximum sustainable yield (MSY). As fishing effort continues to increase, yield starts to decline, eventually reaching the point called "open access equilibrium" (OAE), where total costs (including normal business profit) to catch fish equals total revenue from the fishery. As long as conditions remain constant, fisheries tend to stabilize around the open access equilibrium. They may remain sustainable, but at a lower level than their potential yield. We can see from the graph that greater biomass, more egg production, higher yields and higher profits can be obtained with less fishing effort. But less fishing effort implies either fewer boats and people, or less production for each boat and person. What should an industry position be on reducing effort to obtain higher biomass, higher yield, and higher profits with less work? Until recently, at least, the internal politics of the U.S. Atlantic fishery favored the maximum effort, low profit approach. While there has been some recognition that further entry into the fishery just dissipates the profit available to those already in the fishery, there is little or no consideration of the possibility of increasing egg production, yield, catch per unit effort, and profit by actually reducing effort now in the fishery.

I contrast the situation in the U.S. Atlantic lobster fishery with that in Australia, New Zealand, and, to a lesser extent, Canada. From what I know of the Australian lobster fisheries, you have been engaged in a program to reduce fishing effort over many years, and have seen some of the theoretical benefits in practice. I'll be interested to learn more about your views on your system, and its contrast with ours. But it is already clear to me that many of you perceive a need to continue to strengthen the systems within which you operate.

We will all have many political issues to which we must respond -- there will always be brushfires to be put out. But I don't think I will get any argument when I suggest that the most important issue facing the lobster industry, and the fishing industry in general, is the question of limited access rights and property rights in the fisheries. I will further suggest that a recognition of the evolutionary trends in the fishery, as well as in society in general, can help us to face the issue of "rights-based fishing" in a way that will strengthen our industry. Events such as this Lobster Congress, I believe, help us to map out the evolutionary road ahead of us, because the process has proceeded at a varying pace around the world. Some of you might argue that there is not an evolutionary process at work, but simply different approaches to fishery management being tried in different jurisdictions. But when I compare lobster fishery management regimes, I believe that I can see an obvious trend over time. I am convinced that there is a natural progression of events in the development of fishery management systems, which gives those of us who are behind the trendsetters a heads-up on what to expect in the future.

If we are to be effective in serving the best interests of our fisheries, we need to approach our political activities with an understanding of the political evolution of the particular lobster fishery about which we are concerned. But we also need to recognize that there is a natural evolutionary process at work. And, like evolution in the natural world, some paths lead to success, some lead to extinction, and some lead, like the horseshoe crab, to the status of "living fossil."

For those in the lobster fishery who are concerned about the future of the industry, including but not limited to the future of their own business, I urge you to pay attention to what is happening elsewhere, not only in other lobster fisheries, but in society in general. Some of you are already far down the road toward professionalization. Others of you, I suspect, are at a crossroads -- you have a choice between professionalization and marginalization. You can align yourselves with the do-gooders and dilettantes who oppose individual property rights, and sail into the future playing the role of "Rory in his dory," or you can choose to embrace property rights that lead down the evolutionary path that has provided security and prosperity to many of your colleagues.

Industry Dreams Do Come True
"Co-Management in the Snow Crab Fishery"
Stuart J Beaton

Background
The Snow Crab fishery off the Western coast of Cape Breton Island, Nova Scotia and in the Gulf of St. Lawrence is a relatively new enterprise in Canadian fisheries. The fishery, in its early years, was characterized by a small number of participants; high landed volumes and low prices.

In the late 1980s several events occurred which dramatically altered the fishery. First, United States landings of both Snow Crab and King Crab decreased or collapsed creating an expanded market opportunity for Canadian production. Second, the Japanese economy was thriving and the Yen exhibited great strength against world currencies greatly increasing ex-vessel prices. And third, the Atlantic Canadian Groundfish fisheries declined to the point of a closure of those fisheries which is now in its eighth year.

The result of these caused a dramatic increase in prices, earnings and profitability for the existing license holders and precipitated a hue and cry by non-traditional fishermen, now displaced from the groundfish fishery, for entrance into the Snow Crab fishery.[1]

Fisheries management in Canada has been "crisis management" and largely driven by political expediency. As noted by T.D. Iles[2], a famous Canadian Fisheries scientist, there are four possible questions in any management system.

The Biological Question How many Fish?
The Economic Question How many Dollars?
The Social Question How many Jobs? And...
The Political Question How many Votes?

The Canadian Atlantic Groundfish fishery and the Pacific Salmon fishery stand as unparalleled examples of inane political skullduggery. In Canada the fish have been sacrificed on the altar of political expediency to provide short-term jobs in boats and processing plants and abundant votes at polling times, with little regard for sustainability or economic viability of the fishery. The equalization of poverty seems to have been the result, if not the goal, of Canadian policy making.

When Snow Crab prices increased and the Cod fishery collapsed, it caused huge unrest in coastal communities with great clamour for access into the now profitable Crab fishery. Lobbying by non-license holders, harbour blockades and general civil disruption created a brew too heady for our politicians to resist.

From time-to-time in Canada an innocent man is sent to the legislature, but there were none in evidence in the 1990s. The Snow Crab license holders felt very imperiled, and for the first time, banded together into a well-financed organization in an attempt to limit the damage which seemingly loomed inevitable.

Fisheries Co-Management
The Area 19 Snow Crab Fisherman's Association[3] had been in existence for a number of years as a voluntary group representing the fishermen at various fisheries management functions. Dues were $100 [in Canadian dollars] per year, enough to lick the stamps for the notices of annual meetings.

But at the 1994 meeting it was moved and approved to increase the dues to $2000, hire legal counsel, undertake an economic study of fleet performance and pursue all efforts to save the holdings of the existing licensed group.

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[1] For a full history see the "Overview of the fishery" page 1 ff. in "Integrated Fisheries Management Plan- Area 19 Snow Crab 1996-2001" as prepared by J. Hanlon and G Roach.
[2] The Natural History of Fisheries Management.T D Iles, Proc. N.S. Inst.Sci. [1980] Vol. 30 pp3-19.
[3] www.area19snowcrab.com

The executive of the Association was empowered to investigate the possibility of litigation against any efforts by the Department of Fisheries and Oceans [DFO] to reduce the quota holding of member fishermen [which the DFO intended to redistribute gratis, to displaced groundfish operators] and/or to attempt to negotiate a long term agreement with DFO to pursue the following goals:

Conservation.....The resource must come first.
Gain security of tenure.
Gain control of the management of the fishery.
Gain security for the Association as sole bargaining agent in the fishery.
Gain hands on involvement in the stock assessment process.
Improve and participate in fisheries enforcement.
Create a system which provides for flexibility for the operators [ITQ].
De-politicize the process of allocation.
Identify and define "stakeholders"... and...
Make the fishermen responsible for input and outcomes.

Fortuitously, the Canadian economy was in shambles. The government was anxious to cut the federal deficit wherever possible and keen to download the costs of government services to user groups.

This situation provided a window of opportunity for the Crab Association negotiating team. This team consisted of the six members of the Association executive and legal counsel Ms Deborah Baker LLB [the group had engaged Ms Baker because of her previous experience in fisheries matters and her background in resource economics]. Under the spur of fiscal necessity and faced with a credible threat of litigation, the government was prepared to deal.

Fifty two meetings among the directors, our solicitor, the general membership and the DFO negotiating team were held over the next twelve months, culminating with the signing of a formal Co-management Agreement with the Minister of Fisheries in the spring of 1996.

There had been numerous attempts in the past to formulate such agreements by other fisheries groups, in various fisheries on both coasts of Canada, without success.

The Area 19 agreement was the first in Canada and has been recognized as a hallmark in Canadian Fisheries management.[4]

The plan which was developed was essentially a Public sector/Private sector/Partnering Agreement [3P]. The Fishermen, through the Association, pay most of the "avoidable"[5] costs of the fishery. The DFO surrenders a great amount of its control over the fishery and the fishery is run by the fishermen within prearranged parameters and under some mutually arrived at decision rules.

And the association now had the power to enter into binding contractual agreements with the DFO, thus providing improved security of tenure and remedy for default.

The plan is unique in Canada to the extent that the Association has, as well as considerable decision making authority, a great deal of fiscal control over the costs and levels of service negotiated with the DFO. The Association collects most of the fees involved in the program and holds those moneys in trust with joint signing authority [the association and DFO] required to disperse funds.

The dues of the Association are maintained separately. I will try to detail how this works by outlining the various components of the agreement as they unfold in a given fishing season.

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[4] The Report of the Auditor General of Canada, Ch 4 Fisheries and Oceans, cite the success of management, science gathering and catch monitoring in Area 19 . 4.67 ff.
The DFO negotiating team was awarded an award for excellence by the DFO internal audit function.

[5] There are costs involved in the fishery which accrue constitutionally to the government. There are also costs which would be borne by the government if, for example, the fishery were closed. Stock assessment would still be required at some level to determine if and when the fishery might re-open; enforcement would be required to prevent poaching even in a closed fishery. "Avoidable" costs are the costs which accrue directly to the fishery from which the operators benefit.

Management

The management of the fishery consists of three or four joint meetings a year. Perhaps two prior to the fishery, one at season's end [as a review of how things went, what problems arose and so on] and a winter planning meeting [to iron out solutions and directions for the coming year before the TAC levels and stock assessment reports are on the table].

At the meetings before the season the association will set the exploitation rate for the fishery and set the fishing plan in motion. If that rate is within the stated boundaries outlined in the agreement, the catch and quota levels will be approved by the Minister automatically. If the exploitation rate is above or below the levels in the agreement, a negotiation ensues. The biology of the Snow Crab is such that exploitation rates can be extremely high if the right conditions prevail.

A consensus is usually arrived at.

Gear type modifications, starting dates, trip limits, and other mechanical parts of the fishery are presented to the DFO as *a fait accompli* and, as long as such changes are within the general conservation goals of the fishery and conform to the agreement, they are approved by the DFO as a matter of course.

We find this part of the agreement to be very useful and have been able to implement changes in a matter of an hour or two that would have taken years to achieve under the former management scheme.

Enforcement

The level of enforcement activity undertaken by the DFO is negotiated on a fee-for-service basis. The DFO will present an estimate of the required Fisheries Officer time, patrol vessel hours at sea and air surveillance requirements. Hourly rates for Fisheries Officer time and patrol vessel operation are set and billed accordingly. The Association will often upgrade or downgrade the recommended levels submitted by DFO in order to bring this service in line with the changing requirements of the fishery.

Typically the Association budgets for a long season and places the appropriate funds in the contingency account to allow for this. In practice, we have always budgeted more than we in fact spent. A short season [due to high catch rates] or a lack of concurrent fishing between adjacent zones, will greatly alter [usually reduce] the funds required to adequately patrol the fishery.

At the close of the fishery the Association receives a detailed statement of operational hours incurred by the DFO and the account is settled. Any surplus is retained to offset future costs.

We have also negotiated the ability to use fisherman owned vessels as platforms for DFO officers in times when patrol vessels are not on-hand or if we suspect incursions into Area 19 by vessels from adjacent zones during our non-fishing months.

The compliance rate of the fleet is very good and the general level of respect for and rapport with DFO enforcement personnel is much improved from the former days.

Dockside Monitoring

In any TAC (Total Allowable Catch) fishery, and especially in a fishery conducted under Individual Transferable Quotas [ITQ], it's essential that there be a means of verifying how much of the resource is taken and that the integrity of the TAC is maintained. In Area 19 Snow Crab this is ensured by means of dockside monitoring of landings at designated landing stations. The Association contracts with a DFO certified, private-sector monitoring company to provide this service at a set rate per ton.

The contract is awarded on a competitive bid basis and the Association and the DFO [both and jointly] meet regularly with the monitoring company to evaluate performance and deal with any problems which may come up in the course of a season.

Effective dockside landings verification, combined with a growing sense of proprietorship among the fishermen, has greatly improved compliance with the TAC since the development of the co-management agreement.

Science

The heart of the fishery is the state of the resource. The stock assessment conducted by the Snow Crab Section of the DFO Science Branch under Dr Mikeo Moryasu is without question the best fisheries science in Canada.

The assessment is conducted using a number of tools, which check, balance and compliment each other.

The principle tool is a trawl survey conducted after the fishing season is finished. An approved privately owned vessel is contracted by the Association to sample pre-designated stations using a digging Nephrops[6] trawl. The trawl is small mesh and all retained crab are sized and counted.

The abundance of fishable crab and recruitment at various stages of growth and maturity can be estimated by this means.

Logbooks are maintained by all vessels in the fishery and yield both Catch-per-Unit-Effort [CPUE] and the location of fishing activity. On-board-at-sea observer coverage verifies logbook data and traps are sampled to cross check pre-recruit abundance and provide other data useful to the assessment process.

The assessment process provides the TAC estimate and the fishermen are given density maps showing areas of concentration of fishable crab, as well as recruitment.

Tagging surveys and experiments concerning trap selectivity and other fisheries related matters are undertaken by the science branch. In addition some "pure" research is done on life-cycle, habitat, genetics and so on.

Dr Moryasu's team has gone to considerable lengths to incorporate the experience of the fishing captains into his *weltanschau.* Fishermen are invited to see the trawl survey being conducted and to provide opinion concerning suspected nursery grounds or juvenile recruitment areas. In short, there has been a growing trust and sense of co-operation between science and industry, which is a hugely positive outcome of the agreement.

The Association pays virtually the entire cost of the trawl survey and can request additional work be done to gain more specific information in a given area, for example. The Association has worked jointly with the science branch on specific projects such as tagging and trap design and modification to decrease sub-legal retention and or mortality.

Observer Coverage

At-sea-on-board observers monitor 5% of all trips and act as an adjunct to the science branch.

This service is contracted with an approved company and is competitively bid and tendered. The presence of "white", or soft shell crab in the traps is monitored by means of the observer coverage enabling the association to make in season adjustments to the management plan in order to maintain product quality and reduce discard mortality.

Mechanics

The Association performs many of the mundane tasks, as a contribution in kind, involved in the day to day operation of the fishery such as supplying and issuing trap tags, issuing replacement tags and so on. The Association also maintains a quota registry and keeps DFO informed of fleet holdings and transfers.

Transfers of licenses are administered by the DFO under the terms of the Gulf of St. Lawrence Licensing policy.

[6] Nephrops are Norwegian Lobster which are harvested in the Northeastern Atlantic by trawling.

Conclusion

The first four years of the agreement have been a signal success. That is not to say that there are not areas that need work. In 2001 the five-year term of the agreement will be up and it is hoped, and expected, that a rollover can be implemented with some minor tweaking and fine-tuning.

In terms of the objectives of the Association at the outset of negotiations, I should report:

Conservation has been foremost in all considerations. The Science Branch has set the TAC with acceptable precision and the exploitation rate set by the association has been prudent. There have been numerous measures to improve juvenile escapement and to reduce discard mortality. White shell protocols have been jointly developed and have been effective and had good compliance from the fleet.

Security of tenure has been greatly increased *for the term of the agreement* and it remains to be seen how honourable the DFO is and how committed they are to the concept. We are still short of the development of a property right in perpetuity and there are legal and constitutional issues which will take time to evolve. We feel however that the thin edge of the wedge has been introduced.

Control over the management of the fishery has been in great measure achieved at least insofar as yearly operations are concerned.

To date the Area 19 Snow Crab Fisherman's Association is the sole contracting body with the DFO concerning this fishery. We expect there will be efforts by non-crabbers to attempt to intervene during the rollover negotiating process. At this point the DFO must show its true colours.

The participation in and understanding of the stock assessment process has been an unqualified success.

Improvements in the relationship between DFO Enforcement Branch and the crab fleet have been a breath of fresh air in the usually hostile relationship, which previously existed, and persists in many other fisheries.

ITQ systems are always beneficial as long as they are fishermen driven and tailored to meet appropriate economic and societal objectives. ITQ represents freedom.

Time will tell if the serfs and goose steppers we elect to Parliament can possibly stay out of other people's business.

The stakeholder issue, stakeholders being defined as persons with a demonstrable vested interest and capable of offer, acceptance and consideration [the ability to enter into a contract] is unresolved. This issue is of the highest importance if there is to be any hope of fisheries in general being able to stand on their own feet.

Responsibility is the price of freedom. We are working on it.

Thank you for your kind time and attention.

The Great Management Debate – Input Controls vs Quota

"Input or Output – Success or Failure!"

Mr John Fitzhardinge

What is the Difference?

Input controls use various restraints on fishing – time, gear, vessels, and area restraints, all of which are variable, depending on the outcome required – this is called adaptive management.

Output controls rely solely on setting a total catch.

This is then either divided among the participants, who are given individual quotas, or allocated to groups. Alternatively, a mechanism is created to terminate fishing when the total catch is reached, an "olympic system". Both these systems require precisely counting the fishermen's catch. The olympic system encourages a rush to fish with all the resultant problems, and has so little to recommend it that it has been discarded.

The hybrid system which uses both input and output controls is not considered here. This is an all or nothing debate.

Fisheries Management - What Do We Expect of It?

In order of importance, these are the requirements from the fisherman's perspective:

1. Maintain or improve the stock
2. Ensure the breeding stock is maintained at an acceptable level,
3. Develop a long term, reliable set of data to support these aims. This must reflect changes in effective effort.
4. A practical workable uncomplicated enforcement regime acceptable to the majority of fishermen. The rules developed must be capable of minimizing evasion.
5. Provide an economic model in which fishermen can make an acceptable wage for their effort and return on their investment.
6. Develop a framework to achieve these aims in a transparent, economical manner, with equal opportunity for all fishermen.
7. To provide sufficient flexibility in the management rules to capitalize on market changes.
8. To maintain the ownership of the fishery by the fishermen.

What management tools are in use by the world's lobster fisheries?

While there are many small lobster fisheries that are basically unmanaged, a scroll through the majors shows us that with the exception of New Zealand and South Africa, every fishery has input controls as their management tool.

Even New Zealand have their fishery divided into zones, which significantly constrains fishing flexibility. Cuba, a 10 000 tonne mature fishery similar to the Australian and New Zealand ones, is input controlled, as are the American East and West Coast Fisheries. Although these fisheries are over exploited, they are all considering or implementing effort reductions through input control as their preferred method.

Within Australia, all the major fisheries are controlled through input controls, although the Southern Zone in South Australia and recently Tasmania have imposed output controls on top of their established input controls. One can only surmise at the reason this has occurred. This approach inserts a significant cost burden, without testing the theory that output controls alone allow better resource utilisation and market interface.

In fact, in the Southern Zone in South Australia, since the introduction of their Clayton's quota, the fleet has never legally caught the TAC, proving that their input controls are working!

Obviously to get the desktop theoretical benefits of output controls, all other impediments to efficiency such as seasonal closures, gear and boat restrictions and fleet area restrictions must be removed.
So the endlessly repeated claim by fishocrats that "everyone is moving to output controls" is false.

That leaves us to investigate the benefits of the traditional input control system against an output control system, divided into individual quotas.

Returning to the 8 points I displayed at the beginning, I will stand both systems up against each requirement. I have assumed that both systems are correctly set to allow sustainability. To assist our thoughts, I have scored each point.

1. Both systems can probably achieve this requirement, however the more rigid catch allocation system of output controls is unable to cope with large naturally occurring catch fluctuations such as we have in the Western Rock Lobster Fishery.

   Which system can best rebuild a depleted stock? NZ under output controls, rather than re-build the stock has reduced the TAC from 3792 tonnes in 1990-91 to 2848 tonnes in 1999-2000, **a 25% reduction.** WA, on the other hand, with input controls, has increased the sustainable catch from 7500 tonnes in 1970 to 10500 tonnes today, **an increase of 25%.**

   Score Input 10 Output 5

2. Again both systems can achieve this result, although it is far simpler to put in place extra protection for females within an input system without affecting quotas.

   Score Input 10 Output 8

3. The internationally recognised measure of fisheries health is the **catch per unit effort.**

   It is easy to achieve a reliable data set with input controls because the effort is both controlled and known. Output controls, however with no constraint on effort, and no need for the fisherman to monitor it rigorously, makes collection of reliable data difficult and perhaps impossible.

   Score Input 10 Output 6

4. **Enforcement is the black hole for output enthusiasts!**

   For an enforcement system to work it requires acceptance by at least 90% of the participants. This has proven easy to achieve with input controls.

   The long history of input controls in WA, SA and Tasmania show very high levels of acceptance and compliance.

   It is relatively easy to police overpotting, (because most fishers are co-operative) and heavy penalties for transgressors discourage even the dishonest. other requirements such as season and area closures are simple to police being so obvious. It is estimated that 1-2% non compliance can be expected.

   Counting the catch however, has proven to be complicated and difficult.

   NZ chose to run their system on the desk audit principle, with few personnel in the field. This has been a spectacular failure! it is thought that the illegal catch runs at around 20%, with few prosecutions.

   The NZ regulators admit to 13% illegal catch, substantially by non quota holders.

   In South Africa the evasion is so entrenched that the fishocrats even proposed issuing quota to the illegals so they would then be legal! Unbelievable!

   Remember, any evasion accepted by the system disadvantages the honest fishermen.

   Score Input 9 Output 4

5. It is claimed that with only output controls, fishermen will become more economic, as they will work at the most profitable time, with the lowest costs possible.

   What really happens?
   The only example we have is NZ, and it is hard to believe that their system can claim to meet these aims.

   In some zones all the fishermen work between 200-400 very large pots, to take a relatively small catch. Their boats obviously are reasonably big, even though they rarely stack many pots, because every bit of ground is saturated with gear, and in some cases is left there for 12 months to hold ground.

   It would have been expected that over the ten years since the introduction of quota management the fleet size would have rationalized to fewer larger more economic units. However the reality is that still 487 boats set out to catch just under 3000 tonnes over a 12 month season. In WA just over 100 more boats catch on average 10 500 tonnes in 71/2 months.

   Score Input 8 Output 6

6. There can be no argument that input is far cheaper to run than output, both by the fishermen and regulators, whose cost is generally met by the fishermen anyway. NZ has extremely high enforcement costs particularly since they don't work anyway! The experience in South Australia also shows increased costs in the Southern Zone against the Northern Zone. So far, Tasmanians have doubled their enforcement costs, which is even worse since they have reduced the seagoing inspection substantially.

   Score Input 10 Output 6

7. Both systems have the ability to provide flexibility to get the most dollars from the fishery. However the output system is better suited to achieve this if the fishery has a stable catch pattern.

   Score Input 5 Output 8

8. The introduction of output management in NZ has seen 50% of the quota being controlled by the processing sector and the Maori groups, who were allocated quota, although they had no catch history. In many cases the fishermen are told when to fish, and what to catch, and have lost control of their destiny. Input controls have been unattractive to investors because of the complication of owning boats and gear. More recently the practice of leasing pots to existing fishermen has become more common, with the result that processors are investing in pots to tie fishermen to them, however they have little other control over the day to day operations of the fishermen.

   Score Input 8 Output 4

Final Score **Input 69** **Output 47**

Wait! I have forgotten the most divisive part of moving to quota **allocation.** Many friendships have been lost over this issue. Before quota is allocated, all the other interest groups — recreational, native claimants and marine parks chisel away at the fishermen's slice.

While it is accepted that a move to a different management regime should never entail a change to a fisherman's entitlement, this is what always happens. AFMA and Tasmanian Fisheries have developed re-allocation when changing to output controls into an art form!

Finally, experience in the Western Rock Lobster fishery is that the less effort expended to take the catch, the healthier the fishery, and the better the returns. All fishing imposes mortality, and the 40% reduction in effort in WA over the past 30 years has resulted in the 25% increase in the catch.

The Great Management Debate

Mr Allan Gard

Mr Chairman, Distinguished Guests, Ladies and Gentlemen

I have anguished over the format of this diatribe for some days now, and please bear with me, as I don't often speak to forums of such a magnitude, and standing, or to peers whom I hold in such esteem. The topic is, as you all know, **INPUT CONTROLS VERSES OUTPUT CONTROLS EG QUOTAS** it does not matter how many smart words or titles we use, the issue is the same.

I debated with myself as to whether the topic should be treated light heartedly, but have come to the conclusion that fisheries management is not a light hearted topic, it is serious and has momentous repercussions, both biologically and socially for all concerned when it is got wrong, so I have decided to treat the issue seriously.

I believe that our experience in New Zealand has proven that Output Controls, (from here on referred to as Quotas) are by far the easiest, and most cost efficient way of managing a fishery, however that is absolutely dependent on getting the Total Allowable Catch (hereafter referred to as TAC) calculations correct, or as close as possible to correct. If this is correct and can be administered then no other regulations are required for the fishery. However this would be a perfect World scenario, and we do not have one so it is fair to say that a small amount of regulations perhaps need to go with this. My suggestion would be biological region boundaries, and size restrictions any other regulations only lead to further confusion, and cost. I know this is hard for fishers and processors, and perhaps even Managers to swallow, however the keep it simple regime in the end is generally the best and our experience has proved that it does not take long for the system to settle down, and the advantages to become obvious.

I can see the eyebrows raised and hear the grunts of derision from fishers and processors but from our experience in New Zealand, where we have got the TAC correct, we have extremely healthy and viable regional fisheries. Where we have, for whatever reason not got the regional TAC correct, we have fisheries that are struggling biologically, socially and economically.

It has been our experience that fishers, and processors are eternal optimists, and will call upon most any thing they can find to support their claim that the managers have got it wrong, and the TAC, or the quota allocation can be much higher. Take it from me, if you are conservative with your management program you will reap the economic benefits very quickly. The best example of this is in the regions in New Zealand that the lobster fisheries are healthy, Pot numbers are dropping, on the water conflict are subsiding, the catch per unit of effort is increasing rapidly, and fishers are maximizing their return by landing the most desirable market size product at the times when the market is paying the best, the will among fishers, processors, and other users, to co-operate for the common good is growing. There have been some suggestions that the window of opportunity that New Zealand enjoys, eg the winter months, where the catch is almost totally male lobsters may be having some biological ramifications by creating a gender imbalance however this is a long way from being proven, and even if it was proven the quota management system would be robust enough to be able to react to this quickly and effectively.

The other major advantage of a quota system is that because of the need to only count landed catch, the cost of compliance for the system should decrease, thereby freeing up much needed funding for research and development and other productive management processes. For reasons I will go on to explain in a minute this has not been the case in New Zealand.

All this of course is only as good as the infrastructure in place to make it happen. It has been our experience in New Zealand that we did not get this right from day one, we in the main got the quota right, however we have still not got the management right. The key I believe is the rapport between the users and the managers, and the major aspect to decide before anything else, is whether you want an open access fishery (no control on who owns the quota), or whether you wish to regulate by tonnage or description who can own the quota, which is after all the currency of the fishery. We in New Zealand opted for an open access fishery, and I personally believe this was a mistake, as our small owner operator fishers and processors were substantially taken over, bought out by corporates who had access to borrowing that the smaller enterprises didn't.

The situation in New Zealand is that the TAC is gauged using the best estimates available from all the users, eg commercial, recreational, and cultural. Obviously the only really accurate figures come from commercial, so the other two contributors are somewhat of a guess, how ever in saying that I would also have to admit that these other groups are becoming better every year in their surveying techniques and thereby leading to much more accurate assessments.

From these annual assessments is derived the TAC for the coming year, and each of the user groups gets its allocation. However once again the only sector held to their allocation, almost down to last kilo, is commercial. Of course the commercial sector finds this unacceptable, and is pushing to have a system whereby all users must keep within their allocation. In the case of recreational, we are looking at some form of licensing system for amateurs. The cultural sector in our case in New Zealand is a real can of political worms, and as a result it is left pretty much alone.

The management is critical, unless your industry has a very good rapport with fishery managers, then do not even contemplate going to a quota based system. The main reason for this is that this type of management tool is used as an adaptive management tool; in other words able to be altered if required, on a month-by-month basis. It has been our experience in New Zealand that our managers would prefer to be on holiday all the time, than to contribute to fisheries management, so even when a problem is starting to arise, we the industry can expect a ten year battle with bureaucracy, (which they inevitably lose) to fix the problem. We do not have a satisfactory rapport with our managers; hence the infrastructure in our fisheries has become cumbersome and complex, and large amounts of time and effort and money are wasted in confrontation, and positioning I would not expect all of the people to agree all of the time, but I would expect at least open honest dialogue with the outcome being for the common good, we do not have this.

As a result we have a lobster industry that because it is seen to have more surplus wealth than perhaps other fisheries, with the exception of perhaps *Paua* (abalone) it is effectively taxed to support such things as compliance, research, and management in other less valuable fisheries. All this taken into account, I would doubt that you would find many fishers, or processors who would aspire to any other system of management.

Once again all this aside the output control system still, I believe has major advantages over its opponent. As a straight up sustainability management tool I believe it has no parallel, as it is so straightforward, eg count the landed catch at point of landing, and can react to changes rapidly. All the other regulations such as pot limits, sizes of pots, boat sizes, closed seasons, closed areas etc, are all-cumbersome, and are open to substantial slippage, and if policed properly are extremely expensive.

I believe that it has been our experience in New Zealand that if we could have had a more co-operative approach from all the fishing industry we could have had an extremely effective, simple and cost effective management system that is user friendly, and if any other body was looking at its management program then the quota management system/output control system is definitely the best option available at this time, but do look at the mistakes that New Zealand has made, talk to the industry at large and learn from them.

As an end to this speech, debate, whatever you want to call it, I would be more than happy to answer questions, and or talk to anyone on the issue. I have been a fisher, processor, marketer, I have fished on and off commercially since I was 11 years old. I have been involved in the management of particularly rock lobster fisheries in New Zealand, to some small degree, and I can say from the heart that I believe an output control system set up correctly would be as good as it gets, but bear in mind to keep it simple.

Thank you for bearing with me, I am not an accomplished speaker, and hope I have not bored you too much, however I am passionate about the fishing industry, and the players in it, better people you just don't find.

Thank you.

Scientist Workshop Report – Data for Management – Industry as Front Line Scientists

"Catch Sampling Workshop"

Mr Jim Prescott

Introduction

Prior to the commencement of the 3rd International Lobster Congress, the opportunity was taken for scientists from South Australia, Western Australia, Victoria, Tasmania, New South Wales, New Zealand and South Africa to discuss the pros and cons of catch sampling techniques carried out in their jurisdictions, their cost-effectiveness and their value in providing data for stock assessment modeling. Representatives from the fishing industry in New Zealand also took part in the discussion. The list of participants appears in Appendix 1.

Presentations by each scientist centred upon a brief summary of their state/country research monitoring programmes and the highlighting of issues considered important from their perspective. This paper summarises the main points from each presentation and concludes with a collaborative general view of future directions in catch-sampling methodology. Please note that the term log book is used commonly but has a varying definition between states/countries.

State/Country Methodology

1. South Australia (Jasus edwardsii)

The South Australian rock lobster fishery is divided into two management zones: northern and southern. The northern zone is managed by input controls, i.e restrictions on days fished, vessel size and horsepower, number of potlifts per day and size limits. The southern zone is managed by output controls in addition to most of the input controls in place when the fishery was only input managed.

a) The main sources of data for the South Australian programme are compulsory daily catch and fishing effort returns collected on a spatial scale of one square degree areas, commercial catch sampling by both fishers and research staff, and a puerulus monitoring programme.

b) Most catch sampling is undertaken by volunteer fishers, but has been supported by research staff sampling on commercial vessels to varying degrees. This programme has been in place since 1991.

c) McGarvey et al. (1999) demonstrated that sampling done by volunteers was statistically more efficient than sampling done by research staff because staff were forced to commit too much sampling effort to a single licence on one day (because each person could only be on one boat each day). In addition to efficiency there is also a question of the possible sample bias in terms of time, space and licenses if research staff only sample from a few vessels at infrequent intervals. There are advantages, however, if research staff participate in the sampling as this is a good public relations exercise and provides hands on fishery experience and insights into the operation of the fishery for those involved.

d) During the term of voluntary catch sampling programme, participation rates and sample sizes have varied from as high as 40% of licences and 1.8% potlifts to very few samples when greater emphasis was placed on an intensive tagging programme in which commercial fishers undertook to make many of the tag releases.

e) To encourage wider participation, the current sampling programme requires volunteer fishers to sample only one pot each day they fish, compared with three or more in the past. The biological data collected from lobsters in each sample pot includes the carapace length of each lobster (nearest millimetre) , the sex and, if female, the presence of eggs and/or ovigerous setae. The presence of octopi in the pot is also noted. Spatial information is collected on the scale of one minute of latitude and longitude. Depth, swell height, wind speed and direction, and current direction are also recorded.

f) Data have been used to estimate mortality (using equilibrium methods), female length at maturity, and length specific vulnerability. Data have also been used as benchmarks against which estimated lengths are compared in the SARL model, a spatially explicit dynamic model of the fishery. It is expected that the data will be used as input to length based assessment models in the future.

Issues

- The entire sampling programme for the South Australian fishery is fishery dependent.
- Participation in the sampling programme is dependent on fisher satisfaction with research and management, leaving the programme vulnerable to unpopular decisions.
- Despite relatively wide spread participation in the programme there are spatial and temporal biases in the data collected. In addition, there may be additional bias as a result of the volunteer participants not being a random sample of all fishers.

2. Victoria (Jasus edwardsii)

The main data sources used in Victoria are:

a) Daily commercial catch and fishing effort returns at relatively fine spatial resolution (by 10' longitude strips and depth).
b) Commercial catch sampling by research staff while they are on board commercial fishing vessels.
c) Monthly port processor sampling at Portland and Warrnambool.
d) Voluntary fisher log books which have been trialed over the past two seasons. These log books provide length-frequency, sex, female reproductive state data from the catch of 5 pots over a 2 month period in 1997/98, from 3 pots on 3 days per month through the 1998/99season. It was concluded that data from a few pots on a daily basis over the whole season was the better sampling option and future voluntary logbook programmes will aim to get a large number of fishers involved at lower level, eg. Measuring the catch from at least 1 pot throughout the season.

Issues

- A move to quota management is being considered seriously. If quota is introduced, stock assessments and will need to rely heavily on sampling by fishery-independent surveys.
- The continued uncertainty in management has reduced considerably the will of fishers to cooperate with scientists in the collection of data. Thus, future research is totally dependent on regaining the support of industry.

3. Tasmania (Jasus edwardsii)

A number of sampling programmes are undertaken between which there is considerable overlap.

a) Historical market measuring still continues at a very low level on an *ad-hoc* basis. It involves the recording of size, sex, colour, and damage of animals in holding tanks but is not considered to be cost effective. Pre-sorting of catches is a problem.
b) Pre-recruit abundance indices are estimated from a number of sources - puerulus monitoring, juvenile transects (using regular annual sampling by divers in regions adjacent to collectors) and under-size (sub-legal size) data from research catch sampling.
c) Research catch sampling on commercial vessels targets different regions each year for specific issues. It involves placing an observer onboard vessels to record the biological details of all animals caught and to tag animals released.. This year (1999/2000) we are improving growth information from the south west by increasing the number of tagged animals.
d) Compulsory commercial log-book data including estimates of catch weight , numbers of lobsters retained, and fishing effort by grid location is collected from the fishery.
e) Catch sampling on dedicated research cruises is undertaken to provide regular and repeatable sampling. These data provide an independent measure of catch rates using more standardised methodology (pot design, bait, soak time) for assessing annual trends. In addition, the cruises are used for validating assessment techniques - most importantly the change in ratio technique (CIR).
f) A volunteer log-book programme has recently been introduced to extend the CIR method used on research surveys to broader areas (and with lower cost). Counts of sized and undersized animals are used to obtain exploitation rates and legal sized biomass estimates. Participation is very low with only around 5% of the fleet involved.

Issues:

- Tasmanian scientists are able to utilise the fact that a single annual moult occurs in the southern half of the fishery. This facilitates the use of the change in ratio technique to estimate exploitation rates and legal sized biomass.
- This technique currently relies on data collected by research sampling on a fisheries vessel. However, while the use of a research vessel is a valuable resource for testing methods, it is expensive for long term. So, to use our resources more cost effectively we need to obtain this data through commercial fishers.
- The Tasmanian volunteer log-book system simply requires fishers to count the numbers of sized/under-sized, males/females in several pots in November, April and August. Whilst a fair response has been achieved, data are coming from a few dedicated fishers working quite hard on the project, rather than a small amount of effort being expended by all fishers, which is the ideal situation, yielding data more representative (spatially) of the fishery.
- Part of the problem with this response is communication. It is difficult to contact fishers regularly and communication of results is vital for maintaining participation.

New Zealand (Jasus edwardsii)

The New Zealand lobster fishery is divided into 9 management regions and catch sampling/monitoring data are gathered by the Ministry of Fisheries and the NZ Rock Lobster Industry Council from three general areas of research:

a) The collection of catch and effort data which are used to estimate CPUE to provide basic abundance indices. The compulsory catch and effort landing returns are reported by day and by "statistical area", a relatively large area which precludes detailed spatial analyses. The CPUE estimates are standardised by GLM techniques with the main effects being statistical area and month. No detectable vessel effect has been found to date.

b) Tagging has been carried out to provide data on growth, with some interest in movements. Over the period 1995 to 1999, overall rates of return for each management area have varied between <1% to 16.4%.

c) Two programmes of length sampling are used in NZ: one which is undertaken by researchers and a separate programme undertaken by fishers based on a voluntary log book. The basic design for the research sample is to target peak months in the statistical areas with the highest catch, thus ignoring marginal areas and months. The sampling effort usually consists of one or two trips per statistical area and month. Research sampling was commenced seriously in 1989and a total of between 10 and 30 days of sampling are undertaken per year, depending upon the management area with one or two observers present on each trip. In some areas, research sampling has been replaced by a voluntary log book scheme. The log book scheme has been in place since 1993 and is active in three major areas and partially supported in the other two major areas. Some of the minor areas also have limited log book support from commercial fishers. The basic design of the log book scheme is for each participant to choose four representative pots which are fished in the same manner as the other gear. All lobster in each of these pots (up to a maximum of 31 individuals) are measured, sexed and staged, and ancillary data eg depth, soak time, predators, etc are also collected. The numbers of fishers particpating in this programme have been reasonably consistent over the period 1993/94 to 1998/99, resulting in a consistently large number of sampled pot lifts. Reasonably large numbers of lobster have been measured eg between 21,000 and 45,000 in CRA 8 and 9,000 to 18,000 in CRA 2. For all areas, the total number of lobster measured per year have ranged from 38,400 in 1998/99 to 83,500 in 1994/95. The information presented at the workshop updated the results contained in Starr and Vignaux (1997).

Issues:

- An important conclusion from the length monitoring programme was that commercial fishers can collect accurate and useful data for use in stock assessments.
- Results obtained from the voluntary log book programme were comparable to those collected by researchers when the length frequency distributions were compared (Starr & Vignaux 1997) . CPUE estimates based on the length frequency data were comparable to equivalent estimates from the compulsory reporting programme. In some cases, comparability of the length frequency distributions between research sampling and the voluntary programme seemed to break down. This appeared to be the result of poor sample sizes in one or both data collection methods or to simple observation error. CPUE tended to be higher for log book participants compared to all lobster fishers, but this is likely a result of the more motivated fishers tending to be involved in the project. This possible bias should not affect population parameters estimated from the length frequency data collected from the voluntary log book programme.

5. Western Australia

The data collection systems in place are:

a) Compulsory monthly catch and fishing effort returns indicating weight landed, pots used and days fished by 1° blocks. This provides overall catch and fishing effort (pot lifts) for the fishery.

b) Compulsory processors' monthly returns indicating the monthly catches purchased by vessel and grade of product produced for sale by product line. This provides another estimate of total catch and grade category information from various sectors of the fishery.

c) Voluntary log-book information supplied by >35% of the fleet giving detailed daily records of catch and pots used by depth in 10' x 30' transects. Estimates of numbers handled of under-size, berried females, females with ovigerous setae and females greater than the legal maximum size, and other information including environmental variables are entered.

d) Estimates of numbers of pueruli settling at nine locations provide independent indices of recruitment to the fishery. Sampling occurs continually on a lunar monthly basis.

e) An annual fishery-independent survey of the breeding stock of the western rock lobster coupled with biological information provides an annual index of egg production.
f) An at sea catch monitoring (sampling) system attempting to sample monthly 4 depths at 4 key locations in the fishery to provide length frequency distributions by sex and colour (migrating and non-migrating lobsters) and maturity state of lobsters caught in pots.

Issues:

- The distribution of fishing effort determines whether data can be gathered in the different depth categories. All depths are only sampled in a few months when fishing is wide spread. In other months fishing may have occurred in a particular depth but resources were not available to take advantage of it.
- One or two boat rides provide the sample but sometimes the required sample size is not achieved.
- The programme has been conducted in the same way since 1971. A re-evaluation of the requirements for stock assessment (modeling) may provide direction for a more representative and more cost efficient use of resources.
- The Abrolhos Islands are monitored only at the start of each 4 month season. For the first time in 1999/2000, the Abrolhos will be monitored as coastal sites have been. Additionally Kalbarri in the north of the fishery will be monitored continuously for the first time. Lack of information from these two regions has been a problem in assessing the impacts of management regulations on a regional basis.
- By virtue of one dedicated fisher's will to continue with a small amount of catch sampling following an escape-gap project, length data from between 4 and 10 pots on an almost daily basis for just over 2 seasons allowed comparison between fishery and research data. Sample sizes were greater than for research data and comparisons of size at 50% maturity were "significantly" different between the two data sets. Noting the fishery data is from one vessel only, this, nevertheless, raises the question of the representativeness of research data and its application to modeling and stock assessment.
- Monitoring by commercial fishers is being considered as a cost effective alternative means of data collection, although both programmes would be required to run simultaneously for some time to ensure continuity of data sets.

6. New South Wales (Jasus verreauxi)

The data collection systems in place are:

a) Each lobster landed for sale by a commercial fisher must have a current NSW Fisheries' Management Tag attached to its second antennae. The tag has a unique number on it so, it is possible not only to maintain an accurate count of the number of lobsters being taken from the population by commercial fishers but also to trace the sale of the lobsters.
b) A compulsory daily log sheet must be filled out at the point of landing of the catch. It requires that the fisher fill in the number of the management tags used that day and a verified weight (kg) for the catch. Hence, the log-sheet provides accurate information about the weight and number of lobsters landed. It requires that the fisher provide information about fishing effort in the form of the number of traps/pots lifted to take the catch and the average soak-time of this gear. Also, fishers are required to provide estimates of the numbers of berried, over-sized and under-sized lobsters discarded from the days catch. The information is recorded on the spatial scales of 10 minute parallels of latitude, distance from shore and depth. The information is therefore in a form where the scientist or manager using the data can stratify it into whatever spatial scale is required for the specific purpose.
c) Observers sample at sea the total catch of four randomly chosen vessels per month during the fishing season. This is done at 4 locations along the NSW coast. The Observer Program provides information about the sizes of lobsters caught and landed by commercial fishers, numbers of lobsters in berry, longer than the legal maximum length, or undersized that occur in catches, the type of gear used and the by-catch in the trap. In addition, any lobsters that are not retained by the fisher are tagged. Lobsters that are not retained may include under-size, over-size or those not wanted marketing reasons. This tagging supplements that done as part of a dedicated tagging study to collect information about growth and movements.
d) An annual fishery-independent survey of the breeding stock is done at 4 locations along the coast to provide unbiased information about the relative abundance of the spawning stock. This information is supplemented by that coming from the log-book and observer programmes.

e) Estimates of numbers of pueruli settling at four locations provide independent indices of recruitment to the population. Sampling occurs on the first-quarter of each lunar month between August and January (inclusively).

Issues:

- Considering that there is a legal maximum size and that the NSW fishery is managed by individual catch quotas, these arrangements influence the operations of the fisher so that the unit of fishing effort consistently changes and fishing is targeted towards certain sized lobsters ("high grading").
- Accurate estimates of the level of unreporting of catch and of the catch by recreational fishers are needed.
- The influences of factors that affect the catch rates of traps need to be understood.
- It is important to develop a spatial, length-based model for the eastern rock lobster resource. To this end the biological information needed for such a model is currently being collected.

7. South Africa (Jasus lalandii)

The South African west coast rock lobster resource is being managed by means of an Operational Management Procedure (OMP) which was chosen from a range of other candidate OMPs on the basis of its performance under a range of assumptions about possible resource dynamics. The OMP is a formula which produces a TAC calculated directly from the latest indices of CPUE, abundance estimates and moult increments.

The operating model which was used, to test the performance of the different OMPs in 1996, was a size structured model developed by OLRAC in 1990. It was used for the management of the resource until the 1993/1994 fishing season. It was modified in 1995 by the MCM (MCM is the new name for SFRI: the Sea Fisheries Research Institute of South Africa) and replaced by a considerably more complex model. An OMP based on this second version model was used for setting the TAC for the 1998, 1999 and 2000 fishing seasons. A new OMP is presently under development, and the Bayesian size structured model is being revised so that an improved operating model can be used as the basis for testing the performance of the new OMP.

The South African West Coast rock lobster resource is divided into 8 areas with stock sampling undertaken on an area by area basis. Data inputs for the model and OMP are:

a) Complete and comprehensive CPUE of trap, dinghy and mother boats since 1990. Prior to 1990, data were less representative. Generalised Linear Modeling (GLM) techniques and area weighting have been used to provide a standardised, single resource index for each method of fishing.
b) Annual estimate of the unweighted average somatic growth rate of male rock lobsters for the resource derived from tagging data and calculated using GLM techniques.
c) Scientific surveys provide survey abundance data which are analysed using GLM techniques yielding a CPUE and area weighted whole fishery abundance index. These annual fishery independent monitoring surveys (FIMS) are depth-stratified trap surveys of all 8 management areas using 60mm mesh panels rather than the commercial 100mm mesh size. Catch rate, size and sex data are collected from all areas.
d) Port sampling of catches have been undertaken since the late 1960s to estimate the catch size structure each year. Size frequency data is separated by gear (ie trap and ringnet) since the gear is a two gear model and separate fits for CPUE and size structure by gear are possible. The summary scientific data are summed into 5mm size classes.

Issues:

- For CPUE estimates several fishing strategy changes have occurred which alter the nature of the relationship between CPUE and abundance and which have not been fully addressed in the GLM runs: 1) a greater proportion of the sets now occur during the day rather than overnight; 2) vessels are not travelling as far afield because adequate catch rates are achieved close to port; 3) vessels operate on tallies since the skippers are limited to a certain catch each day (tallies specified by individual processors); 4) the are now fewer ringnets per dinghy.

- Sharp reductions in resource abundance in 1990 and which have persisted to 1999 have been triggered by significant reductions in moult increment. The routine mark-recapture work only provides an annual index of adult male growth rates since females, which rarely appear in the catches, and juveniles are not routinely tagged. The growth rate for all sizes of both sexes is related to adult male data by a functional relationship. There is some controversy surrounding the growth data. The lobsters are tagged prior to the moult and season opening and tag recaptures are then landed during the season and measured by the inspectors who man the scales used to monitor each days catch. While scientists argue that moult stage can be ascertained, there would seem to be some evidence to suggest that the inspectors may not, on the basis of simple examination, be able to decide whether or not an animal had moulted. V-notching of the tail is being used to overcome this dilemma. The use of fast drying epoxy paint also has been proposed to ascertain if a moult has taken place. Another issue is that since 1969, sampling techniques and tagging sites have changed and previously, no change in a rock lobster's size was taken to mean it had not moulted. Now zero or negative moult increments are accepted as real "growth". In addition, it appears that in the past tagging was conducted not only for growth estimation but population size estimation, but historic records are confused about whether records refer to growth or population size research.
- The FIMS sample lobsters down to 45mm carapace length (CL). The use of the full range of these data in the models may allow better estimates of recruitment trends given that up till now the use in models of size structure data was limited to carapace lengths above the legal minimum size of 75mm. While the surveys were randomised by depth in year 1, re-randomising did not occur in subsequent years.
- Sampling of catch for size and sex data is done predominantly in port thus under-sized lobsters are discarded. The discards include the majority of females. Thus the size structure of the discards routinely cannot be estimated. A limited number of at-sea observer samples are available and are being considered for use, particularly in the estimation of discard mortality. The discard mass was considerable prior to 1992 when the legal size was 89mm CL, but the discard mass now is minimal with the new minimum of 75mm. The size structured model uses an arbitrary 10% for discard mortality with sensitivity tests carried out at the 5% and 15% levels, however, recent suggestions indicate the possibility of a discard mortality closer to 50%. Some thought is being given to the structure of the model likelihood term for the size and sex data, where simple log transformation does not produce homoscedastic residuals. The alternative approach is to use the assumption of normality of the square root transformed catch proportions and then to weight the residuals by a weighting function related to catch proportion.

8. Norwegian Ranching and Enhancement Programme (Homarus gammarus)

In the 1930s catches about 1000 were taken, but serious stock declines occurred through the 1960s and later until only about 30 tonnes were landed in recent decades. This contrasted the earlier situation where Norwegian catches constitute 30 - 40 % of the total European landings. A ranching and enhancement programme was commenced in 1990 and cultured lobsters were released at the Kvitsøy Islands to enhance production. The cooperative tag-recapture project within the ranching and enhancement programme was outlined. The fishery is open access with access restricted only by a seasonal closure and a minimum legal size of 25cm total length (TL).

a) Lobsters were cultured to a size of 3.5 - 5 cm TL, micro-tagged and distributed to fishers who then released them in the best fishing localities, which may not necessarily have been the best nursery areas. Between 1990 and 1994, around 127,000 lobsters were released. In the early years of the programme, the recapture information from fishers was not good.
b) In order to gauge the success of the programme, there needed to be developed a much closer relationship with the fishers. Both fishers' associations, Kvitsøy County, Fishery Management Agency in Rogaland and, in later years police were involved in monitoring the fishery, and about 95% of all landed lobsters (both commercial and recreational) were being passed through a microtag detection process. Streamer tags were used to tag undersized lobsters as well as larger individuals which were relased for more detailed studies of migration and growth.
c) A reward system was introduced to improve the chances of detection of cultured lobsters in the legal catches. $5 was given for a reported tag plus market price for the recaptured cultured for analyses of microtags. Due to budgetary reasons only up to a maximum of 600 lobsters could be purchased. The most reliable fishers were contracted to provide daily log book data for catch rates and other information. They were paid $500 per season.
d) In an attempt to provide better information on the composition of wild and cultured lobsters in the catch mtDNA and microsatellite techniques are now a part of an ongoing EU project on European lobster genetics.

Issues:

- The biological aspects of both wild and cultured seeded lobsters were very similar eg, no striking differences have so far be observed in size at maturity, fecundity, breeding season or frequency of berried females. Growth rates of cultured lobsters proved to be highly variable in the wild, with some lobsters recruiting to the fishable stock in a few years while others were taking 8-9 years.
- The close cooperation of fishers, both commercial and recreational, was extremely important in providing an adequate sampling regime for cultured lobsters in the catch. The importance of close liaison with fishers and other interested parties was emphasised together with the added need to provide incentives such as payment for log-book data and rewards for tag recaptures to provide sufficient detailed data to assess the success of the programme.

General Issues and Conclusions

The cost of research into rock lobster fisheries in Australia and New Zealand are recovered from the various fisheries. In other words industry pays for research. The level of funding relies on the overall value of the catch. Annual catches vary significantly between regions, eg approx. 11,000 tonnes in WA, less than 3,000 tonnes in South Australia, Tasmania, New Zealand and South Africa less than 500 tonnes in Victoria and less than 200 tonnes in New South Wales. Additional funding may be provided by external bodies such as the Fisheries Research and Development Corporation in Australia. It is vital that cost effective research programmes are in place to gather the essential data needed for stock assessments.

Whilst the ageing of lobsters is possible, to a certain extent (Sheehy *et al* 1998), it is expensive and time consuming and impractical in stock assessment terms. Thus, scientists have relied upon length structured models to describe rock lobster populations and determine how management regimes affect them (eg Punt and Kennedy 1997). There are several requirements for the data used in these models:

- Length data should be representative, ie good spatial and temporal coverage and include the full size range of lobsters, both discards and those legally kept.
- A good understanding of the distribution of effort and the bias it causes with respect to the spatial distribution of lobsters on the sea bed.
- Good time series of effort data to drive the model, estimates of the mortality of discards, selection curves of the gears used, good growth and migration data.

The first two points are of particular importance when considering the methodology of gathering such information. Obviously port sampling has its limitations and is not considered to be very useful, particularly in situations where "high-grading" occurs due to market demand. Programmes such as that conducted by Western Australia have tried to account for the spatial and temporal variation in fishing but have been partially unsuccessful as a result of limited research resources and the level of overall funding industry is prepared to support.

Trials of industry catch sampling have yielded good data (eg Starr and Vignaux 1997) but also have their share of problems. Industry catch sampling has the ability to provide representative data but only if the sampling is conducted on a continuous basis throughout the fishery and all lobsters are measured, not just the legally retained ones. Examples of the success of various methods of industry sampling were provided from New Zealand, Tasmania and South Australia which confirmed, by general consensus, the desirability of fishers to measure lobsters from a small number of pots throughout the entire fishing season. This methodology raised a number of issues:

- that fishers actively become part of the research effort in their fisheries;
- that the pots probably were best marked in some way and needed to be fished in the same manner as the remainder of a fisher's gear;
- that all lobsters, including discards, needed to be measured probably to the nearest millimetre and sexed;
- that considerable industry liaison was needed to be provided by researchers to teach fishers correct methodology, collate data and ensure its quality, maintain a fisher's enthusiasm and commitment, and providing adequate feedback results to fishers and the uses to which the data are put, and that project budget adequately reflects this need;
- that it was probably necessary to run a condensed, cost-effective research catch monitoring project alongside the industry programme, to maintain continuity of existing data bases and to investigate specific issues as the need arises;

- that while individual states/countries, in the absence of information on recruitment dynamics, by necessity, deal with stock assessment from a "unit stock contained within our own borders" approach, the use of standardised catch sampling techniques over the geographic range of a species where the stock is managed by a number of jurisdictions, would be useful in the longer term ,eg for consideration of stock and recruitment processes.

In summary, the meeting reached a consensus that length based models are ideally suited for the management of rock lobster resources. The collection of the length data (including discards) should be undertaken by commercial fishers throughout the fishing season, regardless of the type of management arrangements (input vs output controls). However, considerable support (liaison) from researchers will be required to ensure the effectiveness and longevity of industry participation. The estimated level of error associated with fishers' length measurements appears to be no greater than that for researchers, provided adequate training is given. This should ensure data representative of the catch and of the distribution of fishing effort is collected in a cost-effective manner, which in turn should reduce the levels of uncertainty in the stock assessments. It would be sensible to standardise methodologies where a single species is fished under several different jurisdictions and treated as separate stocks in each.

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Keynote Address - Resource Conservation and Private Management Solutions

Mr Michael De Alessi

The frequent failure of government fisheries management around the world over is well documented, these failures have generally stemmed from the fact that most regulations or restrictions on fisheries did not take the fundamental importance of the distribution of property rights into account. Property rights (or, who owns what)essentially define who has the right to do what with a resource, and economists studying natural resources, and fisheries in particular, have been quick to point out the fundamental importance of property rights institutions to conservation. The allocation of property rights essentially set the rules of the game, and are generally assigned either to no one (open-access), government, or to private individuals or groups. Any attempt to exert control over resources is an attempt to define property rights.

Thus,, the classic case of the tragedy of the commons described by Garret Hardin is really a problem of ill-defined property rights. Without the right to exclude anyone from a resource, there is no way to benefit from practicing conservation, and so everyone tries to harvest as much as possible, as quickly as possible, or, as Hardin described, "ruin is the destination toward which all men rush."

Getting the incentives wrong has resulted in all sorts of fisheries management nightmares, from common tales of overfishing, to more outlandish examples of the Chesapeake Bay's oyster-catching skipjack fleet which is still powered by sail, to salmon boats in Alaska fishing with feet of each other. One of the most telling examples used to be the Alaskan Halibut fishery, where for many years regulators attempted to limit harvests in this fishery by through the length of the fishing season. Not surprisingly, the industry responded by figuring out how to catch more fish more quickly, and before long a season that was once months long was down to two days, with no discernible reductions in the total harvests.

Garret Hardin recognized the importance of incentives, and in his seminal article he suggested private ownership as one possible solution to the problem. Unfortunately, clearly defined and readily enforceable private property rights to marine resources are rare. However, those few examples that do exist strongly support the arguments of theorists who have promoted private property rights in the oceans as a means to improve resource management. One example is the oyster industry in the United states, where private oyster leases and public beds both exist in the Chesapeake Bay. In the 1970s by Richard Agnello and Lawrence Donnelley, economists at the University of Delaware, looked at oyster beds in the Chesapeake Bay (in Maryland and Virginia) and compared those managed by state regulators with those owned by private leaseholders. They found that the leased oyster beds were healthier, better maintained, and produced better quality oysters.

The Washington state oyster industry has even more secure rights to their oyster beds – Washington is the only state in the U.S. where there is fee simple ownership of tidelands and subtidal lands. In contrast to the technological stagnation in Maryland, Washington oyster harvests have soared with seed from the Washington oyster growers' own high-tech hatcheries.

Another form of private ownership that can be effective but which is often overlooked is the institution of common property, where rights are controlled by a group instead of individuals. In many cases these regimes are not legally recognized, but as long as they are enforceable they can be workable. In the Maine lobster fishery, for example, the lobstermen have formed 'harbor gangs' that mark territories and turn away outsiders. As a result, lobstermen in these gangs have higher catches, larger lobsters, and larger incomes than lobstermen who fish outside controlled areas. These gangs are often composed of members of a particular family or of long-standing community membership.

Another example is coral reef protection in some areas in the South Pacific. Reef tenure there may take the form of ownership by a clan, chief or family, and often extends from the beach to the outer edge of the reef, sometimes even miles out to sea. These reefs are valuable assets to the community and so are fiercely protected. In Palau, community-managed fisheries employ closed seasons and areas, abide by size limits and even impose quotas to ensure conservation.

The recent trend in fisheries management regimes, however, has been a move toward approximating these rights, in particular by instituting some form of tradable harvest rights, most often known as Individual Transferable Quotas, or ITQs. In fact, since ITQs were created in the Alaskan Halibut fishery in 1995, the season is back to a normal length and the fishermen still in the fishery are generally pleased. A recent letter from a small boat halibut fisherman to the *Alaska Fisherman's Journal* summed up some of the advantages of the Alaskan ITQ program: "We fish better weather, deliver a better product, and have a better market. This is a better deal."

The most comprehensive systems of ITQs have been created in New Zealand and Iceland, and in both cases appears to be a great success. The quota system has reduced the race to fish and addressed many of the perverse incentives that existed under previous regulatory-intensive regimes. In fact, there is little argument today over the positive effect of an ITQ-type system on the economics of fishing (although just how to allocate them is still a major hurdle). Conservation, however, is another matter.

Where overfishing was the reason for government intervention in the past, it is now quickly becoming conservation and environmental protection. The worry is not over the target fish, but over the marine environment in general. Issues such as bycatch, protecting biodiversity, the effects of dredging on the seafloor, and perhaps most importantly, marine reserves, are all leaping to the forefront of the fisheries management debate.

But it is worth asking whether a political, regulatory approach to marine environmental protection be any more successful than the political, regulatory approach to overfishing has been? It would appear not.

Well-defined private property rights, however, offer a real chance to not only protect the surrounding environment, but also to reduce conflict between fishermen and those advocating increased government involvement in the fisheries for conservation reasons.

Forms of marine reserves, for example, were commonly created in the South Pacific by communities with secure tenure over their reefs. Companies in New Zealand also set aside large areas to investigate the effects of reserves on their fisheries. They are hesitant to publicize any of this information, however, because of the fear that they will lose the right to fish there should they choose in the future, again underlining the conflict that a regulatory approach creates.

One of the best examples of private resource protection comes from the oyster industry in Washington state, where clear title to oyster beds has also led to a long term interest in the health of Washington's waters. In fact, the Washington oyster growers have been, for almost a century, the staunchest defenders of water quality in that state, and are the main reason that Willapa Bay in the southern part of the state is often referred to as the cleanest estuary in the United States.

Similarly, private riparian rights to salmon are common in England and Wales. Under the common law there, riparian owners have an undisputed right to clean water, so in the event of pollution upstream, downstream owners can sue for damages. Since its formation in the 1950s, riparian owners under the auspices of the Angler's Cooperative Association (ACA) have successfully prosecuted thousands of cases against polluters.

Private ownership of the rights to fish salmon in inland waters are also the norm in Iceland, and this has inspired Orri Vigfusson, chairman of the North Atlantic Salmon Fund (NASF), to go farther afield to protect salmon. By buying out almost the entire offshore salmon fisheries of Greenland and the Faeroe Islands, NASF has ensured very large returns of salmon to rivers and streams throughout the North Atlantic.

Just about everywhere else in the world, however, commercial and recreation fishing interests are at odds. Without any clear ownership of either segment of the fisheries, it is almost impossible for these disparate interests to broker deals amongst themselves as they have in the UK and through Orri Vigfusson. Instead, conflict and political expropriation is the norm.

Despite different views on what fish are worth to recreational vs. commercial fishermen, the only real indicator of willingness to pay is when the rights to catch those fish are freely tradable between the sectors.

Those conservation measures that are not grounded in better identifying who own the right to what ignore what has caused most of the fundamental improvements in fisheries management that we have today – that is, strengthening, or at least approximating, private property rights. By undermining those rights, both the marine environment and those who depend on it for their livelihoods will suffer.

Of course, there is form of fishing right that is a silver bullet. Each case is different and constantly changing with the costs of defining and enforcing those rights that do exist. The South Australian lobster management system – where one section is managed under ITQs and the other simply by controls on inputs (e.g. trap limits) – is a perfect example. While some may argue over which system – input or output – is superior, it seems clear that both sides are right! In other words, the lobstermen have had enough of a hand in defining how their fishery is managed that each system has evolved to suit the situation in the fishery. In the more crowded southern area, ITQs make sense because they are easier to monitor and deliver higher returns. In the spread-out northern zone, input controls make more sense.

What is most important in this case is the ability of these rights to evolve. The experience of the New Zealand ITQ system, for example, has shown that the closer an ITQ resembles a private right, the greater the flexibility there is to adapt and evolve into a system with the strongest possible incentives for conservation. The fishing industry there is continually taking on more and more responsibilities for fisheries management and scientific research, and innovating new ways to protect their investments by maintaining the healthiest ecosystem possible.

To conclude, it is simply impossible to say what the ideal structure of property rights is, and thus it is crucial that in any system of private rights to the fisheries, those rights must be allowed to evolve and change over time. For the lobster fishermen of Australia, of course it is important to address specific management concerns such a certain marine reserve proposal or the input vs. output debate. But it is also worthwhile to stop every once in a while to remember just how far you've come, and to look to the future to see just how far you might go to "Manage your destiny".

Industry Environmental Stewards

Mr Duncan Leadbitter
Oceanwatch

What is Stewardship?

Like all talks that revolve around a word I went to the dictionary to look up the definition of stewardship. Interestingly both dictionaries I looked in had the word steward but not stewardship. One definition of steward is someone employed to look after someone else's property. However, I felt that did not really describe what I thought stewardship to be so I consulted a book about environmental management.

In an environmental context stewardship describes a more harmonious relationship with nature, not one of dominion and exploitation. The book also made reference to a religious interpretation of stewardship, namely the acceptance that whilst humans have dominion over nature they have a duty to use it wisely.

Are fishermen employed to look after someone else's property? Not really, although they do use public property as a source of income. Some fishermen believe that they have a duty to help protect the environment, which is considered to be publicly owned and thus someone else's property.

From an environmental perspective many would argue that a truly sustainable fishery is one where fishermen work within the limits placed by nature and do not seek to modify the ecosystem in any way.

Humans have an enormous ability to control elements of the environment. The ability to exercise that control in a wise manner is to many people one of the issues that separates those that exercise stewardship from those that don't.

Exercising stewardship in a fisheries context therefore implies doing more than going fishing but accepting some responsibility for looking after the environment including its fish resources. There is a gap between simply always obeying the laws and going beyond the minimum requirements. Exercising stewardship implies some self management and being proactive on issues even in the absence of direct legal obligation.

Why are we talking about this word in the first place? Stewardship is a term that is increasingly being used in a fisheries context. For example:

- The Marine Stewardship Council is an eco-labelling program established by Unilever and the World Wide Fund for Nature. The Council aims to promote sustainable fisheries by allowing a label to be used that tells consumers that the product they are buying has been caught in a sustainable fashion. The Marine Stewardship Council's (MSC) aim is to work for sustainable marine fisheries by promoting responsible, environmentally appropriate, socially beneficial and economically viable fisheries practices, while maintaining the biodiversity, productivity and ecological processes of the marine environment, through:

    - conserving marine fish populations and the ocean environment on which they depend
    - promoting responsible management of fisheries, ensuring the sustainability of global fish stocks and the general health of the marine ecosystem
    - establishing and promoting the application of a broad set of Principles and Criteria for Sustainable Fishing

- In the US a commercial fishing association, the Pacific Coast Federation of Fishermens Association has as its promotional line – Stewards of the Fisheries. Having spent some time with this group it's a line they take seriously.

- A final example comes from next year's bycatch conference scheduled for Alaska. One of the aims of the conference is "Promoting global environmental stewardship in order to conserve and wisely manage the World's marine and coastal resources to promote and enhance sustainable economic opportunities."

Why are some fishermen and some fishing industries interested in exercising stewardship anyway? Why accept responsibility for making some of the tough decisions about controlling fishing pressure? Why accept the responsibility of doing something about pollution or other threats to the marine commons? After all it can be easier to let government do the hard thinking, make the hard decisions and take the flack. Getting involved in non-fishing activities such as Coastcare or lobbying for better pollution controls costs time and money.

The reasons are manyfold and there are many examples both here in Australia and overseas of individuals or industry groups taking action on either management, environmental protection or both. However discussions about stewardship in the industry have arisen in the context of the following related concepts:

1. industry exercising more responsibility for environmental protection
2. industry demands for greater rights
3. industry seeking greater self management

These concepts are all inter-related. Discussions with governments about rights, especially property rights are always accompanied by discussions about responsibilities, usually in the form of financial responsibilities! Governments commonly fear allocating rights and delegating greater decision making responsibility because of a perception that industry is not responsible and will not be accountable for making poor decisions.

However, one does not have to delve too deeply into the literature to find examples of self governance by fishing communities and industries in many parts of the world. In Japan the inshore fisheries have been well managed for centuries and each local region is managed by fishing communities who effectively own their patch of water in which they fish. These rights are strong enough such that if polluters or developers affect fishing grounds the fishermen are entitled to compensation as a matter of course.

Traditional fisheries provide a number of examples of local community ownership of fishing resources. In the Pacific many local communities own their own reef area and use it to the exclusion of others. Management rules have evolved over centuries and have been driven by the understanding that poor management leads to starvation and war.

In North America, Canadian and American Indian bands have traditionally carved up patches of waterway for themselves and have complex allocation rules to deal with migratory stocks such as salmon.

All these above examples of self management systems have evolved in the absence of governments and fisheries managers as we know them.

However, it is not just indigenous peoples that have practiced self management. Of direct relevance to the rock lobster industry is the case of the Maine lobster industry in the North East United States which has been 'ruled' by fishing communities for many years. In this case we start to see an interaction between western fisheries management and management which is more in the style of traditional fisheries in the sense that there are some government rules and government assistance with research, for example. However, many of the rules that govern access and resource allocation are devised at the local level.

Even in more areas of more heavily regulated, top down management approaches there are attempts by fishers to control their local fishery and thus take more control of their own destiny. For example, in the mid 1980's in NSW several fishing communities protested against the long running open access policy of issuing as many commercial fishing licences as could be sold for two dollars.

It's clear that self management or at least minimal government intervention can work. But where is the middle ground between the lawlessness and short-term interest of the high seas (as we've seen recently with Patagonian toothfish and orange roughy) and the over-regulated, iron fisted control characteristic of some fisheries management regimes? How can the public's scepticism about putting the foxes in charge of the hen house be addressed? And how can a culture of stewardship be engendered in fisheries that have had a long history of responsibility and control being vested only in government?

One thing is clear from the examples I've just discussed is that ownership is important. This is not just a simplistic ownership of the resources but an ownership of the decisions that need to be made and an ownership of the consequences of those decisions. Traditional communities quite obviously learned that poor decisions lead to starvation.

How does most of our fisheries management differ from these traditional fisheries?

Firstly we cling to the quaint view that the sea and its resources belong to everybody, which is all well and good when the capacity to take resources is well below the productive capacity of those resources. Few would argue that that is the case in most parts of the world today. Resource scarcity generates the need for more formal allocation rules than a free-for-all.

Secondly, as a consequence of making the seas' resources public property we have placed the responsibility for protecting those resources into the hands of governments. This breaks the link between the consequences of poor decisions being felt directly by the decision maker. How many fishery managers lose their jobs if a stock collapses but how many fishing families suffer when such an event happens? It also encourages fishermen to not accept responsibility for decisions because if they have little role in making them its easy, to be frank, to blame someone else.

Thirdly, we have moved away from community ownership of resources to individual ownership. At the end of the day individuals look after themselves and the consequences of this on local communities or industries can be unpredictable. Fisheries where there are no rights and responsibilities do not encourage a long term view, only short-term individual gain. However, and just as importantly in fisheries involving individual rights, is the potential for short-term private gain resulting from the purchase and accumulation of tradeable rights.

Does this mean that all fisheries should be managed in the same way and if so will this lead to a greater sense of stewardship amongst industry participants? Its unlikely but given the widespread interest in greater self management there may be much to learn from or pass on to others. For example, the front page of the most recent English industry newspaper, Fishing News, carried the following banner headline:

Fishermen 'must manage fishing'.

According to the article the president of the Scottish Fishermens Federation also said:

".. prosperity depends, at least in part, on a strong economic link between coastal communities and their adjacent fisheries."

And

"... the federation has convinced the new Scottish government that fishermen should have a leading role in the development of inshore fishing policy."

And

"... hopefully we will see the end of insensitive and inappropriate policy being foisted on fishermen by remote bureaucrats."

Rhetoric aside the sentiments expressed are common to not only fishing communities but many other rural communities in many countries.

What can be done to make the pathway to stewardship easier? From my preceding discussion its obvious that some of the major elements include greater delegation of decision making to industry groups and fishing communities, and the strengthening of property rights. Both of these two aspects go hand in hand. However, its not the end of the story.

As I mentioned earlier there is real public concern about what is perceived to be putting the fox in charge of the hen house. Such concerns provide strength to those in agencies that are opposed to such solutions. Gaining the support of the public is an essential element of the pathway to stewardship. How can this be done?

The keys are being proactive on solving issues facing the industry, being active on non-fishing issues in the local community and keeping the community informed.

In terms of environmental management the community view of industries has been shown in questionnaires to be very low. People are far more likely to believe environmental groups, scientists and government agencies than industry when it comes to an environmental issue. Industry is commonly viewed as being resistant to change or only willing to address issues when forced to do so. Addressing issues up front conveys the message that the industry takes it future seriously and can act responsibly.

People respect those who make a contribution to the wider welfare of the community. This is not always a financial contribution. Getting involved in beach cleanups, acting as a pollution watchdog, promoting the rehabilitation of degraded areas have benefits for all. Watchers of the recent Victorian election will have noted that the new member for Gippsland East is an abalone diver and his election platform was restoring environmental flows to the Snowy River, a matter unrelated to the welfare of his industry. Given that exercising stewardship is partially about looking after common property such as waterways the sorts of actions I've suggested (whilst not advocating going to the extent of becoming a member of Parliament) not only generate respect but are a practical demonstration of stewardship.

Providing information to the community is something the fishing industry generally does very poorly. People love seafood but know nothing about where it comes from or how it's provided. Most of the information they have access to is provided by the media. Those who go to a retail outlet are bombarded with health messages and recipes but no information about the industry. How many people would idly read through material whilst waiting for fish and chips to be cooked. They would take small educational cards home for the kids.

Educating the public can be simple and relatively cheap. Indeed I believe that the glossier and more polished the package becomes the more it looks like propaganda. Besides, in terms of bangs for the buck, it's better to get some simple information to many people than a lot of information to a few. It's important for the industry to tell its story. You won't convince everyone but that's not necessary. If the industry is doing good things and exercising stewardship why not tell people about it?

Finally there is one major component on the path to exercising stewardship that can't be planned or bought and that's leadership. There is little value in having strong property rights, good decision making structures or information for consumers if the industry is represented by people without vision and leadership skills. The industry is famous for its rugged individualism and finding people who can unify the industry and provide direction and purpose is no easy task. Those that do demonstrate leadership skills need to be supported.

To Summarise

I've suggested that stewardship is all about going beyond what is required by the law and taking responsibility for both decisions about fishing and for the well being of the wider environment.

Rights and responsibilities go hand in hand. Thus there is a strong link between exercising stewardship and the industry having an influential role in decision making. There are many examples from around the world where a direct link between the welfare of a fished resource and the welfare of the community that depends on it has created strong self management systems. It may well be worthwhile for the industry to explore the potential of property rights systems other than individual rights.

And finally, the support of the non-fishing section of the community is vital if the industry is to achieve its preferred mix of rights and responsibilities. The community's natural concern about the allocation of rights and the delegation of decision making should be acknowledged and addressed by actions not words. The industry should acknowledge that it has to earn the trust of the community.

Marine Parks – Sustainable Use or Multiple Abuse?

Ms Margi Prideaux

Thank you for this opportunity. I'd like to just start by saying this was originally a PowerPoint computer whiz-bangery presentation, which has got broke, so I've had to transfer it to overheads, so you don't have the pleasure of looking at all of the nice pictures that I'd put in the middle to distract you from what I was saying.

I'm here representing the Australian environment movement. The movement in Australia has never been stronger. Collectively, we represent 107,000 individuals. Increasingly, our membership is picking up the signals about declines in world fisheries, and the increased pressures on biodiversity levels. They understand the importance of conserving biodiversity in the present and as a buffer for the future. Therefore one focus area for us, as campaigners in these organisations – a tool, as it were, in the kit bag of tomorrow, is marine protected areas.

Strictly protected biodiversity conservation zones. That's going to be the focus of what I'm going to talk to you about today.

ACF (Australian Conservation Foundation), just to give you a quick snapshot, is one of Australia's largest, national environment groups. We're an independent, non-government organisation, supported by a membership base, so our positions are truly independent, we're not aligned with government in any way. I'd just like to get that out of the way first and foremost.

As the national marine campaigner, I work directly with a number of Commonwealth fisheries management committees and industry associations. We're committed to this involvement, all of the campaigners in the environment movement now are committed to this involvement, across the industry sectors, because it allows us a greater understanding to grow to each others' positions. I think that's important for you to know, that's just a little bit there about ACF.

Sustainable use or multiple abuse? This is actually one of my campaign document titles and it's out the front reception if anyone wants to find out what I'm up to.

When I was asked to give this talk, the conference organisers had chosen the topic for me and I had to wonder at the time if I was being set up a little bit, for a showdown, but I think that I'm still happy to stand behind those words. We do have a situation in Australia, of marine protected areas, but the concept of marine protected areas being eroded somewhat. I think it's a good opportunity, in conferences like this, for me to explain to you what our position is, such that we can dispel some myths that are going around, and actually maybe come to the realisation that we're on the same side and we're working for the same thing.

So, sustainable use or multiple abuse? I disagree with a couple of Michael's premises that he put up this morning, about property right, based on resource conservation. This is a little bit ad hoc. I hadn't the opportunity of knowing what he was going to say before I got here, so I'll just speak on this really briefly.

While we, internally in the movement, are having some discussions about property right and what that means for our sector, which is the conservation sector, I think that there's a fundamental flaw in the way this is being discussed as a conservation tool. Property right, in its own self, can probably lead to conservation of species. It doesn't extend, at this stage, to the ecosystem. It doesn't extend to the conservation of biodiversity in a region. It extends to conserving the resource that the interest is in. I think, for that, it's worthy of a tick, but I think we need to be not embracing it with blinkers on, we need to be looking at what it actually means in the broader context. So it just gives me more emphasis, I think, to discuss with you what marine protected areas actually mean to the conservation movement and what we're hoping to achieve.

Australia's marine environment now suffers, as you know, many impacts, originating from land and sea. They range from land clearing to ballast water, over fishing to industrial sewerage. I don't need to tell you that the pressures are mounting. You, of all industries, are going to be aware of this. Biodiversity is known to be declining, and ecosystems have been changed in a number of Australia's waters. Recent research on the Great Barrier Reef, showing the impacts of trawling operations and other parts of the country have lost whole seagrass beds from industrial sewerage. This list goes on.

International trends also indicate there's more pressure about to be mounted on Australia's fishing zone. The FAO has alerted those of us in the south to the potential threats of the northern fleets, increasing effort around our waters as their stocks collapse and decline in the north. Meanwhile, the concept of marine protected area management is being systematically eroded, here in Australia. At a time when we should be embracing biodiversity conservation, we seem keen to throw caution to the wind, run our chances with an insecure future.

While the many uses and pressures increase, the complexities of management become almost overwhelming. Traditional conservation concepts are giving way to multiple use management, and we are abandoning high conservation management. I think we need to seriously ask ourselves at this point, are we moving down a path of sustainable use? Or multiple abuse?

Marine protected areas have become a complex and politicised conservation tool to negotiate. I think if we can get to the core of meaning of what we have, we'll get a better chance of co-operatively moving forward. I'd like to take a moment to dispel some of the myths, and to clear up some of the uncertainties about the environment movement's perspective here.

'No take' marine reserves, these are the big bug bear, I know, between certain parts of the industry and the conservation movement. They are seen as the 'no go' zones, or the areas where we're trying to lock people out. It's not actually the case. These areas are set aside free from human use, quite deliberately. They are protected from human impact, quite deliberately. The primary object is for the conservation of biodiversity and ecosystem function. To enable it to evolve and react to natural events over a natural period of time, maintaining strength of genetic and species diversity. That is the core of what the conservation movement is on about. It has nothing to do with locking industry out of any area or trying to shut anyone down, it has to do with conserving biodiversity for generations yet to come.

Marine reserves can also be used as scientific reference sites. It is interesting to note that a number of scientists around the world are showcasing the merits of strict protection or reserve concepts. These are happening in the Florida Keys, New Zealand, Kenya and in our own Tasmanian waters. Indeed, studies in the Philippines have shown that adult fish are migrating from the refuge areas, the reserves, into the surrounding areas, helping to restock some of their more depleted fisheries.

This is a really important issue for us to consider, in Australia's temperate waters. We have been geographically and climatically isolated for about 65 million years. About 95% of the known species are endemic, or restricted to this geographic area. These are startling figures. They make us very alone in the world, and we're responsible for looking after what we've got. Lose it, and it will be gone forever.

This moves me to what the importance of sanctuary zones is from our perspective. I frequently get asked, 'What's the big deal about limiting impacts so much? Why can't we just allow ecosystems to evolve as they will?'

We see 'no take' reserves as an ecosystem conservation tool. We don't see them as a means of limiting industry, and that's very important for you to accept from me. We do not see that as being the primary goal. They act as a refuge for species and biodiversity from the rough and tumble of impacts outside. Barrett and Edgars' work around Tasmania has clearly shown the merits of 'no take' reserves. Four reserves at Governor Island, Maria Island, Tinderbox and Nine Pin Bay were declared in September, 1991. Maria Island, the largest, at 1500 hectares, has just had some impressive results. After 5 years, fish abundance increased by 29%, relative to outside the reserve. Invertebrates went up 31%, seaweed 13%.

The number of large fish, that's more than 300mm, increased inside, and began to increase outside. Of interest to you, numbers of cray inside the reserve increased by 260% over the 5 year period, with an average weight increasing from 240g to 2330g. Bigger animals equal more eggs, reproduction increased ten fold. This obviously has flow-on effects outside the reserve. It also says something about impacts and allowing ecosystems to regulate themselves.

I think, I'm just trying to shorten this, because I know that I'm limited to 15 minutes so I'm, in my head, deciding what I will and won't say. These sorts of reserve systems are putting biodiversity and conservation for future generations – it's a precautionary measure, to ensure that we provide for our children's children.

The counterpoint to this concept, at the moment, is the multiple use principle. So where do we see multiple use fitting in? This is the catch cry of the Australian Government policy, and it's fast becoming a catch cry of certain sectors of the industry. The conservation movement sees multiple use as a tool for management. It's not a conservation objective in its own right. It allows managed, commercial access, according to basic conservation principles. While a useful tool, it is important to realise that it does not provide a high level of protection, or adequately conserve sensitive areas. But multiple use zones are important. They can be useful buffer zones, providing inter-connectivity between sensitive areas, with management that reflects the needs for transferring organisms.

This is providing that they are underpinned by strong conservation areas, and there are 'no take' marine reserves, nested in the network of multiple use areas. If I had my whiz-bang PowerPoint thing, you'd actually see that all happening in real time, but what I've tried to represent, with this circle at the bottom, is what our ideal system of a network of marine protected areas would look like. We'd have an area that was a large marine ecosystem, managed with industry use within it, along strict conservation principles, but allowing continued resource extraction.

Into that, the sensitive areas that are the areas that need clear restriction from use because of the biodiversity that needs to be protected in there would be nested, these strict, protected reserves. They are the blue dots, as it were, in the middle of that thing. I know this is not very real, it doesn't look like an ecosystem, but take my word for it, that's what we're actually meaning.

The flow between those reserves would be something that would be mapped out or understood. We would ensure that the uses that went through there didn't upset that flow. I'm not just talking about fishing here, I'm talking about all impacts on the marine environment, from seismic testing to effluent being pumped from urban centres, to run-off from agricultural practices along the coastline. Everything would have to be managed, and this is what we call, this is the conservation movement's version of ecosystem-based management. So that's difference to us, between multiple use marine protected areas and reserves.

Ultimately, I would say, stronger management should lead us to stronger biodiversity conservation across all sectors. I can assure you, when this is achieved, we will actually move onto another topic. If we could really, really believe, that biodiversity conservation was going to be protected, biodiversity levels were going to remain in trust for future generations, this is not an issue that we'd be tackling. We would be spending all of our time with uranium mining, or all of our time with the remainder of the forests. We wouldn't be concerned about marine protected areas. We don't get involved in this because we're trying to get in the way of industry in any way, shape or form. We get involved in this because we're very concerned about the biodiversity levels of our marine ecosystem, especially along the southern, temperate coastline.

So if we're not opposed to multiple use management, then what's the problem, you might ask. And it's a good point. It's a matter of degree and priority at the moment.

In Australian waters, our EEZ (exclusive and economic zone) and the state waters, marine protected areas account for less than 5%. Of that 5%, 0.04 are actually 'no take' or these strictly protected reserve areas. Furthermore, the Great Barrier Reef Park accounts for 70% of the total marine protected area in Australia. So if you look at that pie chart that I've got up there, the yellow piece of the pie is the multiple use areas – 70% of that yellow piece of the pie is actually the Great Barrier Reef. This is hardly a situation of the conservation movement locking away vast areas of marine territory around the countryside. I think that's a really graphical way of showing this.

This is why we, the environment movement, always seem to have our heels dug in on this issue. The way that marine protected areas now are proposed seems to come from a premise, immediately, and this is coming from the government, I appreciate that it's not coming from industry, of multiple use, of what we call category 6 parks. We don't have the core as my other diagram was showing, we don't have the core of the reserve system to protect biodiversity being negotiated. We only have large-scale multi-use areas which, granted, are good management, and I commend them for their good management, but they don't actually do the end game, which is to protect biodiversity.

So, just shortening what I'm saying, the environment movement gets pushed into a corner. We have an inability to negotiate on equal terms because the ground is already shifted on us. This is what we experience on a regular basis and why we now seem to be coming in hard every time a marine protected area is proposed. Some of you who have actually known me from other circles will know that this has had to be my position in a number of negotiation circumstances.

The other thing that we have a problem with is the fact that we are not able to talk to the fishing industry as individual sectors. Because there's an adversarial situation built up between the conservation movement, government and industry, we tend to be faced with the fishing industry holding in solidarity with other brothers in arms, so to speak, so we don't have the capacity to discuss with, say you, the rock lobster fishers, the potential of marine protected areas around your zones, without other lobby efforts coming in from other fishing sectors, because they're concerned about not just the principle, but they're also concerned about the precedent being set.

So where do we go from here? We need to, across the table, understand that we don't undermine each other's position. In truth, conservation benefits industry as much as anyone else. Our aim is to ensure that the marine environment, our aim being the conservation movement, is maintained for generations to come. I know that's your aim as well.

So that wealth, beauty, mystery, challenge, all of those nice words are still available for our children's children. We strongly believe that reserves are a fundamental part of this insurance policy. We don't seek to undermine industry. We do seek to protect and provide for the future.

I'll just end with a very short quote that I like to end these talks with. It's from one of my favourite authors, Carl Sofina. "A few inches from where I stood, human history ended. The bronze age, the industrial revolution, the space age – gone. One hundred years ago, one thousand years ago, one million years ago, ten million years ago, much of the world looks like this. Sixty million years ago, the creature I was now watching, the shark, slowly circling me, looked like this. Already perfected. But now, in less that one hundred years, our footprint may change this all."

Thank you.

Marine Parks –Multiple Use or Industry Abuse? An Industry View

Mr Nigel Scullion

Thank you, Mr Chairman, and thank you everybody for attending. I must say it's an absolute delight to be a part of such a professional conference, and I'm just so very proud to be associated with an industry that takes their future so seriously and in such a sustainable way.

I very much enjoyed Margi's presentation. There were a couple of things in there that I think we should continue to remember. There always seems to be a focus from the conservation groups on just how badly we're running the world's fisheries. Just like at home, you've really got to fix your own backyard up first and I think that, on an international base we need to continue to remember, and I think it would be responsible for the conservation groups to continue to say that Australia enjoys the finest fisheries management in the world.

In terms of the small slice of pie, about 5% of the pie is not really an appropriate thing, if we are going to compare ourselves internationally, I think it's also worthwhile remembering that Australia has more protected areas than the remainder of the world put together.

Marine protected areas, multiple use? Or industry abuse? I really think that in fisheries management, and that's what it is really about, we need to get over this paradigm of, 'It's okay, everything's cool bananas, we've got the fish under control so it's going to be alright. We've got the best fisheries management, what's the problem?' The very real problem is, the fact of the matter is we don't manage the total environment, we only manage the fish. The process that we live in, the system we live in says, the law says that you can manage fisheries. Fisheries, Department of Fisheries manage that specific thing or species. If there's any of the ills that are happening to fisheries, and we say we can keep pointing at the recreational fisheries and they point at us, the real culprits of course, sit on the sideline and rub their hands together and say, 'Isn't this terrific?'

It's because we've failed to recognise that managing the fish by themselves is never enough. We need to manage the total environment and it's terrific to see that Margi and a whole range of other agents have decided that the oceans are very sexy and they're not only great subscription raisers, but are something to really get into. I think it's our responsibility to ensure that we focus their energies and their resources in the right direction.

I think it's also good to remind ourselves every now and then of what this is all about. We're not really going to change the world within our time on this, running our little rubbery legs around, we're not going to change anything within our time, in terms of the environment, that we can recognise. But we should be able to do it for little Johnny. These are our children, this is our future, this is what it's really about. I think we need to continue to remind ourselves that this always has to be a long term vision. We're not going to be able to change it tomorrow.

Marine protected areas. What is a marine protected area? When we talk about conservation zones, all this sort of stuff. My real concern is, that's the total bloody focus at the moment. Marine protected areas are going to be the panacea. Let's have a marine protected area, we'll fix everything. Oceans policy – terrific. National representative group of marine protective areas. That's it. That's the bloody offering. We're going to be able to fix fisheries management, the environmental challenges of the ocean by putting up marine protected areas.

Now, multiple use, industry abuse, yes it's an issue that I'll touch on, but the principle issue that I'd really like to put across to you today. This is one of a suite of management tools to be used, but it is certainly not the panacea, or anywhere near enough. It's only a very small part of the answer in terms of trying to get this, the ocean situation, right.

Marine protected areas, they're always really sexy, aren't they? They're just absolutely terrific. Full of colourful things, the water's normally clear, you know and it's got a lot of coral or a few sexy megafauna swimming around dolphins, that sort of stuff. It all gets your attention, it's really snappy stuff. And it's out there and it's terrific. I think we need to start thinking about what they're normally characterised by.

Let's say we have a marine protected area, we'll think it has to be somewhere nice. No-one will support a marine protected area if it's somewhere else. It has to be somewhere like this. So you can imagine, for little Johnny's sake, we're going to put a marine protected area. We're going to make this into a marine protected area, why not? It's a long way away, it's cool bananas, water's clear, white beaches, nice spot. No-one would complain. Probably no-one lives there. But you've got to remember, that what we're actually doing here is we're making this for little Johnny. So think about this protected area. We're saying, we're going to make this a marine protected area, your inheritance of the natural heritage of the oceans of Australia, is going to be there for you. That's absolute and utter bullshit.

In 2010, you know these people you go around, you take them out bushwalking, you show them something natural and they say, I could probably put a drive in there, I could get a car park in there, or a McDonald's, sling one up there, you know. Do a little bit of visioning now. You can see on that peak there, you've got the 19 holes of the golf course, a couple of condos running down the middle. We're taken away all those native forests there, cut them down, plant introduced species, pour heaps of phosphate on there, heaps of insecticide, heaps of herbicide, but we've got a marine protected area here, it's okay. We're got a couple of lines on the water, it's going to be fine. No worries at all.

So while you've got your mind fixed on the golf course, can you see the green right at the end there, and the couple standing on the end there? Well there's actually a husband and wife team and it says, 'Listen darling, be a bit careful here, those condos are pretty expensive. I know it's your first time at golf, but just whack it down the middle. The stick okay, don't open the shoulders too much, just give it a little tap and you know, we'll walk down and hit it again.' So he's teed off. Sweet hit, down the centre. She's stood up and he's said, 'Steady, darling,' but she's right onto him and said, 'It's okay, it's cool bananas.' And she's hit it absolutely as sweet as a nut. Unfortunately it's sliced heavily to starboard and gone straight through the window of the nearest condo. So they've slipped down and knocked on the door.

Door's opened and this fairly shocked looking, swarthy bloke in his white pyjamas is there and he says, 'Listen I'm really sorry mate. Absolutely, I apologise. I didn't realise, I don't know what happened, the golf ball through the window.' The bloke says, 'No mate, it's fantastic,' he says, 'I live next door to the golf course, the golf course is an absolute nightmare. Everything's okay. I don't actually live here. When the golf ball went through the window it broke the bottle I was in – I'm a genie – it's fantastic. 200 years in a bottle is just unbelievable.' So he gives this guy three wishes.

He says, 'Austerity measures, it's 2010 – you only get a wish each.' Now everything changes.

So the bloke says, 'Fantastic. I hate making choices about things.' He says, 'I've got to be careful about this one wish stuff, you know, I've got to be a bit cautious about this, a bit canny.' I'll tell you what he said, 'I'll choose what I'm going to have, you just put $1m in the bank account.' Genie said, 'Done,' and turned to his Mrs. Mrs said, 'Well I was in a lottery the other day for a $500,000 cash spending account at Myers. I didn't win it, but that would do me fine.' So he said, 'Absolutely – it's done.' So he turned to the genie and said, 'What about you, mate?' He said, 'You know, it's an awful lot of springs, you know 200 springs, you don't get any hornier than I am at the moment, he said, 'It wouldn't be too much of an imposition if I just slipped upstairs with your Mrs?' The bloke turned to his Mrs and says, 'Well you broke the window, it seems reasonable enough.' $1.5m! So he's slipped upstairs and done the business and the genie's sitting back, doesn't smoke, 2010, you know, not politically correct, and said, 'How old is your husband?' She's said, '38.' He said, 'And he still believes in genies?'

So I guess the take home message from that little comment is that I don't believe in genies either, and I also don't believe that the marine protected areas are anywhere near the panacea for the ocean's ills. No-one's going to wave a magical wand to fix this. So I think we also need to have a look at the sorts of things that are going to impact. What's going to happen is that they'll start chucking these marine protected areas out all over the joint. What's going to be the social and economical impact? And how's that going to look and how's that going to impact on how we manage our stocks? Case in point: Kakadu. A lot of people think this is what Kakadu looks like. Actually mostly it looks like this.

When they introduced Kakadu they decided, somehow, it was inappropriate (because you're in the Commonwealth, you can absolutely do what you like with the Territory, that's the way the Constitution goes). They said, 'What are we going to do about this? We'll make it all a marine protected area. That means we're going to chuck out all the commercial fishermen. No drama at all.' So we threw out all the commercial fishermen and they said, 'What are we going to do?' The commercial fishermen had to leave. The only place within the span of their vessels closer to Darwin, was the Mary River. So the 5 fishermen were actually fishing Kakadu sustainably, peacefully, spread out effort in a managed fishery.

Wonderful, 1982, one of the first managed fisheries that really worked, has the ownership of the fishermen. All jumped into the Mary River, Mary River collapsed. The fishermen got up in arms, and you'll notice by the fashion statement of the wild catch fishery that there's nothing new under the sun. We fought and we went outside Parliament House to bash people, did all that stuff. Didn't matter. The fishery collapsed. Industry were the people who got up and said, 'We'll all put $10,000 and a pot for a buy-out scheme to take those people out of the fishery and reduce the effort that disaster had caused. Now what that really did was it took us into 10 years of the darkest years in the history of the fisheries in the Northern Territory. The principle people who suffered out of that weren't people, they were the bloody stocks. Because the fishermen weren't involved in a genuine discussion one to one, a close relationship with the managers. And because we didn't have that very close, co-operative management regime, the stocks suffered, we suffered, it was just an absolute shitfight.

What we need to remember is if we inappropriately start sticking these marine protected areas around the place and not manage, to ensure we can control the consequences of our activities, we're going to see a social downturn. I think quite a clear reminder of the sort of stuff, if you're going to muck about with regional Australia, quite often the voters will do to you what they did to Kennett.

I think that some of the issues, while they're very passionate on the side of the industry, people need to see themselves as all in that position. A lot of people out of that thought they might be winners. We had the recreational fishers, of course, who don't ever hurt anything, and they're not really involved in that. One of the things about the recreational fishers is that they're an enormously powerful, political group. This is not an indication of latent effort, although you can see it that way if you like. Because their effort now – they can fish now. There's no problem any bloody training needs to go to these blokes to help them fish. These are latent voters, and that's what we need to concern ourselves with. I think you need to ask the question, in terms of marine protected areas, these people are going to demand legitimately unrestricted access. There are 2 crayons, in terms of the rezoning situation. There's a big box of blue crayons that says, 'No commercial fishing.' And no-one owns the red crayon that says, 'Recreational fishing,' because you're not allowed to have it. Very politically unsound and we don't like to upset them too much.

I think we need to continue to say, if the recreational fishers are so bloody powerful, if you can go out there and say to their governments, 'Continue to give me access, continue to give me allocation,' why then are they still the largest unrestricted, unregulated, unlicensed effort in this country? If they've got that political power, why haven't they gone to the government and said, 'Licences, regulators, restrictors. We are legitimate components and applicants into this process.' Marine protected areas are exactly the same. You've got to have a rezoning area – they've got the wrong sort of bloody crayons. You'd better keep an eye on that.

I think one of the other things we've got to recognise is that, don't kid yourself, and we talk about... Margi has come from a land-based industry as most of the people do, that this whole situation involves. We are used to this. Every bloody we day we drive to work past piles of wheat fields. What are they doing there? They've made biodiversity... they've legislated against it? You start off with all this native forest, you cut the bastard down, you get in there and then you say, let's make a policy, if a single, native species sticks its head up, you shoot it, you poison it, or you cut it down – that's the policy.

Biodiversity is a non-endemic, introduced species. We water it, we look after it. People say, 'Water it – that's terrific.' It makes no difference at all. They call the stuff that runs past the farm wasted, in water. You think about the consequences of all that irrigation. It's not only what we do to the water, but where the water is going.

Cray fishermen. What triggers the puerulus leaving the water column and going down to water? We know it's probably involved in something in the water. So water quality is so important. We mightn't know much more than that. But if the salinity of the water is changing because we're stopping all this run-off, remember the old Snowy River? You couldn't cross it without getting your whiskers wet. Wouldn't get your boots wet now. Those sorts of changes we seem to take for granted every day in the growing of wheat and the production of food. It's okay, but somehow we're not.

We've allocated heaps of areas of land to food production, but if you can allocate a trawl zone, it's been using for 20 years, that's somehow rude and disgusting. I think it's a paradigm we need to convince the community to get over.

Coastal development – it's all very hard, the politicians work very hard at it. It's another major issue. If we are going to protect the marine environment, most of the stuff we have to protect is stuff that's happening on land. As a community, we need to start tying in the consequences of land use with what's happening in the ocean. That's the deal, nothing else really matters.

Why is it then, if we've got all the problems with ground water run-off, we've got absolute disasters with nursery areas being destroyed, we've got mayhem on any of the mangrove areas around north Australia. They're the first thing that gets done – it's cheap to build on the ocean because it doesn't cost you any money, you can put a bit of mud on it and build on it. Why is it that marine protected areas look like this? It's just an expanse of ocean. They're terrific, though, because politicians can point at them and say, 'We've got a marine protected area there, look,' and they say, 'Terrific – isn't that great? Yeah that looks calm, Johnny'd be happy with that. That's fantastic.' Of course, it's politically sound, everybody's really happy with it. At the moment, marine protected areas are areas where we are protecting the existing conservation zones. I think, intrinsically, they're very good things. They're things that I think will protect areas that will protect biodiversity to some degree within that. Some of the places that I think we should be thinking of, this is a seagrass habitat that might be a stand alone habitat. It's a habitat for our fisheries, it's a habitat that's going to be so delicate, it's going to be the first thing that's hurt.

The first thing we do is the last thing we need to do. What about prioritising our energies? What about everyone getting together and pulling together as a community to prioritise the protection of these sorts of places, rather than the sexy megafauna and the coral reefs and the faraway marine protected areas. Let's go and put some at Herb McDonald Island Why? Because no-one will know! It doesn't make any bloody difference.

So, some of the places we have them... I mean, a marine park here, that'd be great. Come on Dad, let's go down and drag mud through the mud, that'll be terrific. I'll pay money to go to this park, we'll slip into here and that'll be just absolutely bloody brilliant, you know.

Tropical Australia, our entire environment in the water depends on these trees. These are a magnificent thing. These are so developed, and such an animal, and such a plant, that has developed so far that the actual Zygo is actually growing, it's a growing animal – there's a seed, the root comes out of it. Then it decides it's already going, breaks off, splunk, in the mud, got another one. Absolutely squillions of years to get it right, only takes a few seconds for a dozer to run over it and nobody even blinks an eyebrow. We're never going to have parks... we don't seem to have people who are prepared, politically or otherwise, to say, 'This is something that you really need to protect, as a priority.' Forget about your sexy metaphor and your other bloody things down the road, this is the stuff we need to get into as a priority. I think that's where we need to start using this tool of marine protected area. A marine protected area should be protecting the entire environment as part of a co-management model that we've demonstrated can be so successful today.

I think, if we're ever going to protect this sort of area, for little Johnny in the future, we've just got to absolutely know that they're a very useful tool, but we've got to redirect the way they're being applied. If we can actually claim that we are managing the totally marine environment, to protect the inheritance and our natural heritage for little Johnny. Let me tell you, when Margi and the mates say, 'Let's have some more protected areas,' you tell her, 'We don't believe in genies.'

Thank you.

Marine Parks – Biological Effects and Management Tools

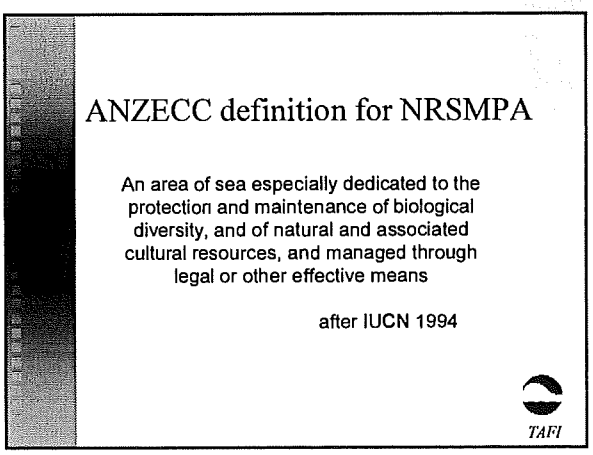
"Marine Protected Area – Biological Benefits"

Dr Colin Buxton and Dr Caleb Gardner
Tasmanian Aquaculture and Fisheries Institute

Marine Protected Areas (MPAs) are being proclaimed around the world with the primary purpose of conserving marine biodiversity. The National Representative System of Marine Protected Areas (NRSMPA) is at the center of the Australian and New Zealand Environment and Conservation Council's (ANZECC) plan to secure the long term future of Australia's coastal ecosystems. The main focus of this plan is the conservation of biodiversity through a comprehensive, representative and adequate system of Marine Protected Areas.

But MPAs may be proclaimed for a variety of other reasons. As harvest refugia, Marine Protected Areas have also been advocated as having a range of potential benefits for fisheries. Included are: the protection of spawner stock; a source of propagules and surplus adults; research areas; and insurance against the failure of conventional management.

Fishing industry's response to these arguments center on concerns that access to resources will be diminished and that remaining stocks will be pressurised as a result of shifting effort patterns.
This paper examines the current state of knowledge in terms of lobster fisheries.



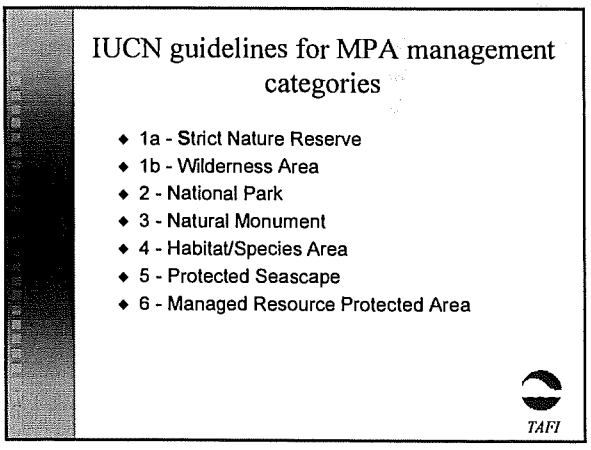
The ANZECC has adopted the International Union for the Conservation of Nature definition of MPAs in their efforts to develop a National Representative System of Marine Protected Areas as follows:

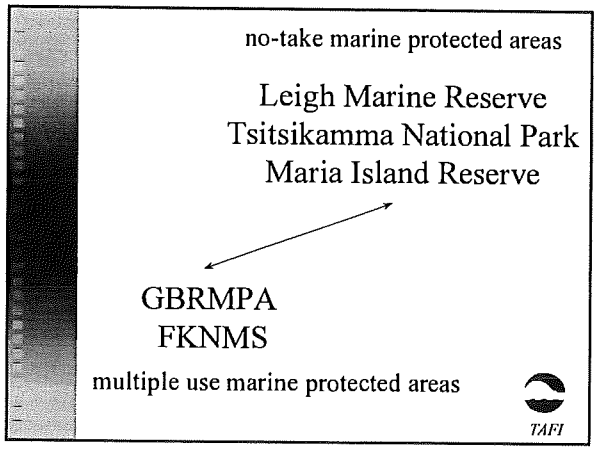
"*An area of land or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means" (IUCN 1994)*

More information can be obtained on ANZECC guidlines on the Internet at:
http://www.erin.gov.au/marine/or2000/mpa/mpa.html

Several different categories may be recognised within the IUCN system of MPAs and are summarised below.

Category	Reserve Type
1a	Strict Nature Reserve: managed mainly for science
1b	Wilderness Area: managed mainly for wilderness protection
2	National Park: managed mainly for ecosysytem conservation and recreation
3	Natural Monument: managed for specific natural features
4	Habitat/Species Area: managed for conservation by intervention
5	Protected Seascape: managed for seascape conservation and recreation
6	Managed Resource Protected Area: managed mainly for sustainable use of natural ecosystems





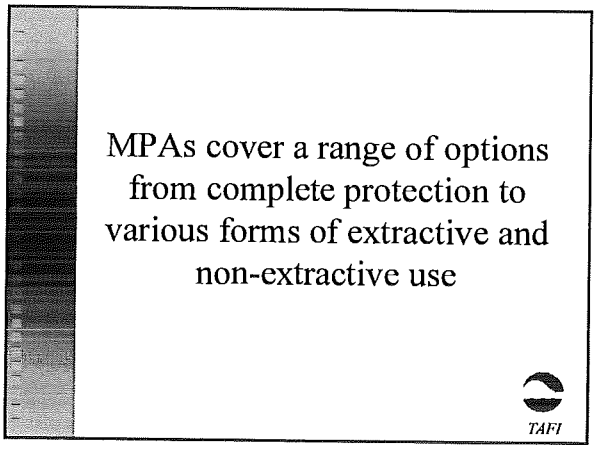
This range of options provides a continuum of protection ranging from strict no-take areas, for example, Leigh Marine Reserve in New Zealand, Tsitsikamma National Park in South Africa and the Maria Island Marine Park in Tasmania. These reserves provide total protection to all flora and fauna, but allow access for recreation, research and other non-extractive uses.

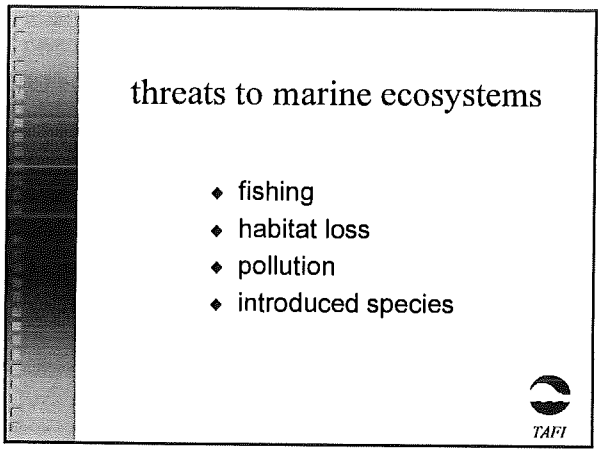
On the other end of the scale are the multiple-use parks such as the Great Barrier Reef Marine Park in Queensland and the Florida Keys National MarineSanctuary in the United States.

These areas provide for a range of activities within the protected area according to a management plan and, importantly, under the management of a single agency. Areas within thereserve are zoned for different uses and some of the area is set aside as no-take.

The important message in this is that the concept of MPA goes beyond no-take. In large multiple use marine protected areas sustainable fishing can and does take place in certain areas.

The issue of MPA protection can be considered from two perspectives - ecosystem conservation and sustainable fishing. Often these are perceived to be conflicting positions when there is a potential to lose a fishing ground and when fishing is perceived as a threat to biodiversity. But we believe that they may be compatible and it is important we believe to look for a middle ground.





Threats to marine ecosystems can be classified into 4 main areas:

Fishing

With few exceptions the threat of overfishing and the physical damage to the environment caused by the act of fishing has been a major cause of concern around the world. The literature is full of examples where stocks have been overfished, most recently the collapse of the Canadian groundfishery being a good example. In many cases the stocks do not recover as expected even after fishing has ceased.

Physical alteration of the benthos may also cause significant damage, for example through trawling, and loss of gear can add to the problem through ghost fishing. Lobster fisheries are relatively low impact in terms of gear damage and bycatch is low.

Habitat Loss

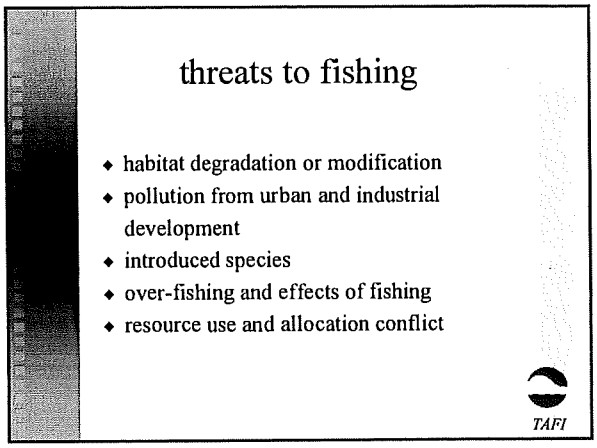
The impact of a range of human activities including harbours, development, ocean outfalls, jetties and other development has led to significant loss of habitat, especially at a local scale in areas where coastal development is high.

Pollution

The impact of pollution on the environment is very varied and may be dramatic at small temporal and spatial scales e.g oil spills or more widespread and long-term e.g heavy metal concentrations in estuaries.

Introduced Species

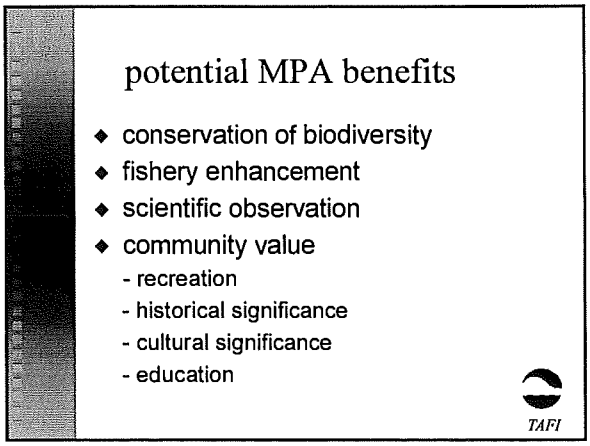
The threat from introduced species is a relatively new and increasingly significant phenomenon in many areas. For our lobster industry a concern is the formation sea urchin barrens on the east coast.



On the other hand we may consider the major threats to fisheries to include:

- habitat degradation or modification from a range of human impacts;
- pollution from urban and industrial development;
- the threat posed by introduced species;
- over-fishing including recruitment overfishing (taking too many large fish before they have had a chance to breed), growth overfishing (taking too many small fish before they have had a chance to grow to a large size) and ecosystem overfishing (serial depletion of stocks that leads to a negative impact on the integrity of the ecosystem);
- effects of fishing such as bycatch, benthic modification and ghost fishing; and
- resource use and allocation conflict, including the act of reserve establishment itself.

The key is to assess how MPAs may serve to both contribute to conservation objectives while at the same time offering a potential benefit to fisheries.



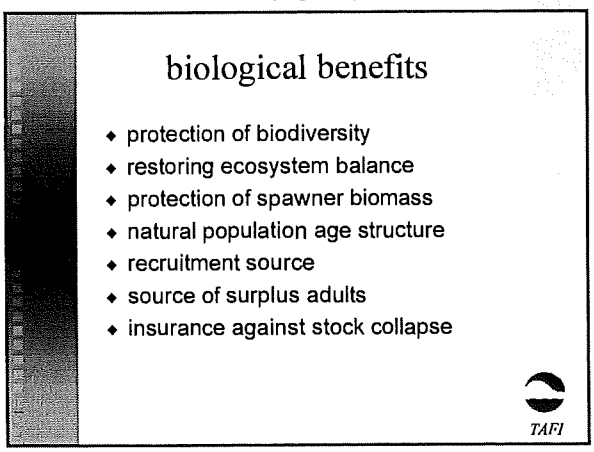
An examination of the literature reveals a range of potential benefits ascribed to area protection. The main focus at present is the argument that MPAs will ensure the overall protection of marine biodiversity through a network that includes representation of our main bioregions. It is worth noting however, that in most cases the actual threat to biodiversity is implied, not quantified by rigorous scientific examination.

Another major potential benefit is fishery enhancement through the protection of spawner stock. This is described in more detail below.

An often overlooked but significant benefit of MPAs is for scientific observation. They provide areas where biological populations can be studied in their natural state, often providing insights into commercial species that are not apparent in fished populations. Thus MPAs form an important baseline from which we can better understand fished populations.

There are many other benefits that we have lumped as community values. These include recreation, protection of places of historical (eg shipwrecks), cultural (eg sea country) and geomorphological (eg stromatolites) significance.

Clearly MPAs offer places where a range of educational benefits can be obtained, particularly for school and community groups.



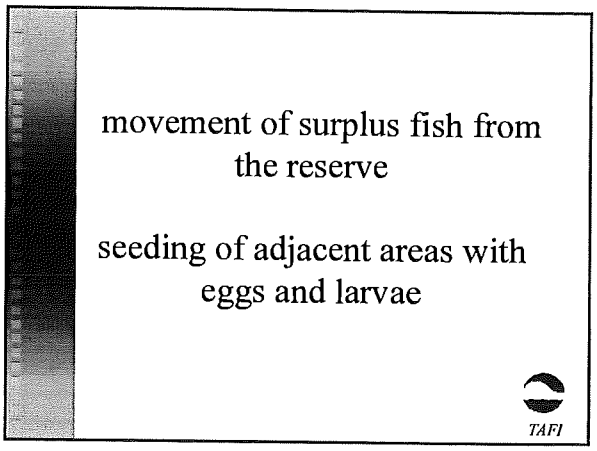
At the biological end the benefits of marine protected areas are the protection afforded to biodiversity. This includes genetic, species, habitat and ecosystem diversity

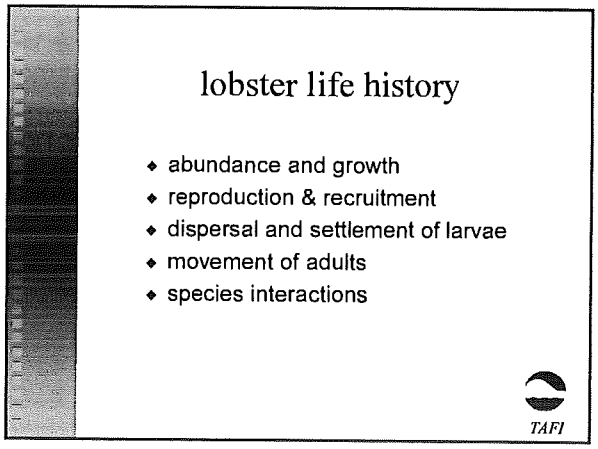
The benefits to fisheries are argued to arise out of the return to a more natural population age structure (more large animals), which by virtue of the relationship between fish size and egg production, increases the population reproductive output. The MPA thus acts as source of eggs and larvae and a source of surplus larger fish that recruit to the fishery adjacent to the MPA.

From a fisheries perspective the MPA may also function as an insurance against stock collapse in the event that fisheries management fails in the face of conventional management. Under such a scenario it is argued that that stock will recover from the nucleus protected in the MPA.

In summary, the main benefits of an MPA in terms of fisheries will be:

- movement of surplus fish from the reserve (increase in yield)
- seeding of adjacent areas with eggs and larvae (source of recruitment)

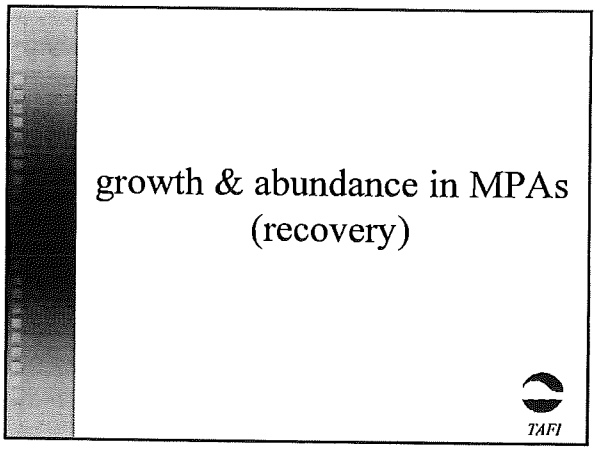




From an individual species perspective it has become apparent that the potential benefits of MPAs will be to a large extent dependent on the life history of the species. In the case of lobsters the important aspects of this will be:

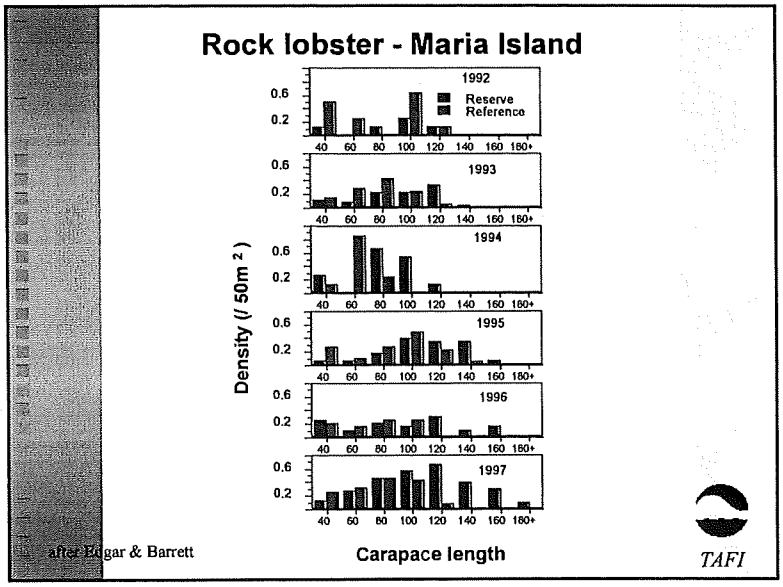
- abundance and growth (growth rate can vary between different areas within a fishery and this is compounded by the effect of density - higher density typically causes slower growth)
- reproduction & recruitment (there are indications that sex ratios and size distribution that are extremely different from the unfished state can result in reduced fertility)
- dispersal and settlement of larvae (larval dispersal is over scales of 100's of kms so point sources of egg production may not manage recruitment. Note that this type of larval dispersal system typically has sinks and sources - areas that are important for larval production and areas that are of little value)
- movement of adults (how large does the area need to be to protect animals from wandering outside the boundaries - or provide the opposite goal of a yield benefit from spill-over ? Some species undergo large migrations of 10s kms)
- species interactions (seagrass and sponge habitats are important for the recruitment of some species, and the interactions between rock lobsters, sea urchins and macroalgae may be important).

As expected studies on the abundance of species in MPAs have shown a consistent trend of increase in abundance and average size for most resident species. This has been demonstrated in both tropical and temperate environments in a range of localities around the world.



As a rule therefore one can expect a shift from the exploited state to some form of unexploited state - presumably closer to one that existed prior to exploitation (unless there has been a shift to a different equilibrium state).

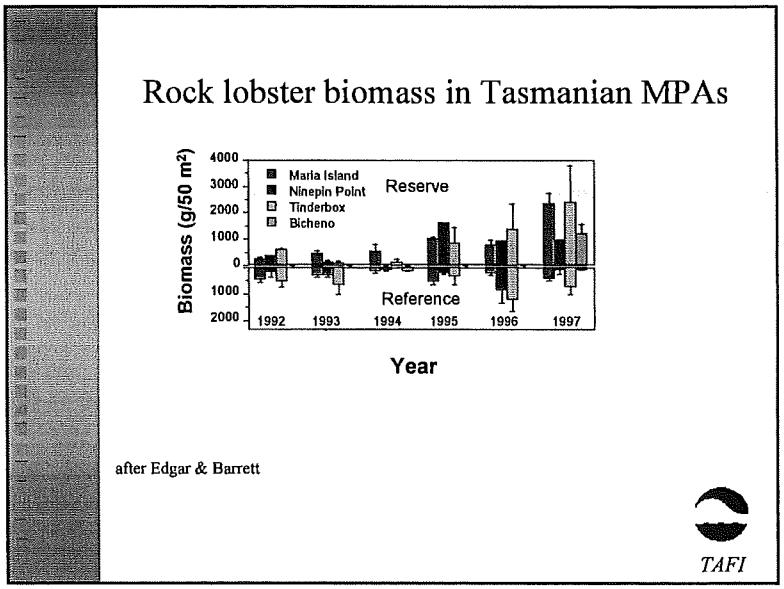
Some examples are given on the next page.

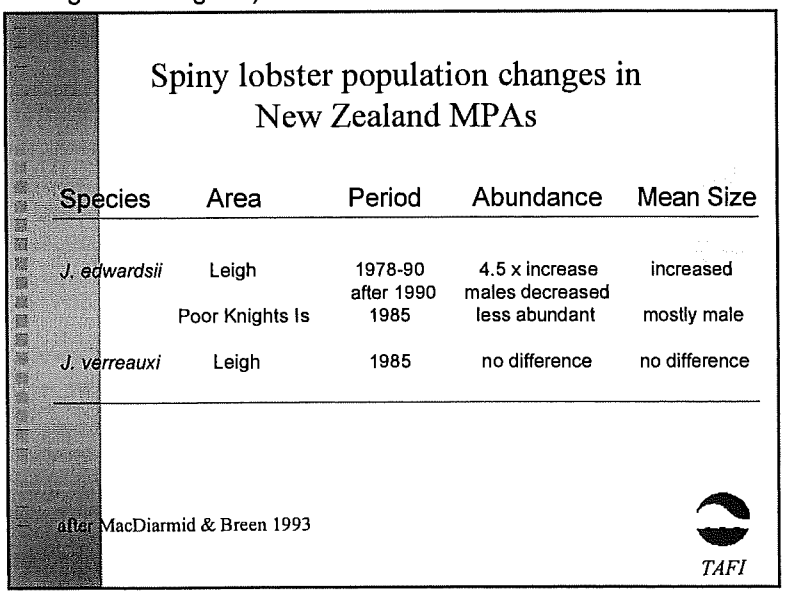


Edgar and Barrett (1999) have demonstrated an increase in the size and abundance of rock lobster (*Jasus edwardsii*) in the Maria Island marine reserve on the east coast of Tasmania over the period 1992-1997.

Further evidence of the change in the lobster populations following the proclamation of MPAs is provided in the diagram below, which shows the changes in biomass in all 4 of the reserves proclaimed in 1992. While there were changes in all of the sites studied, the effect was most apparent in the larger reserves and less clear in the smaller areas.

In the largest reserve, Maria Island, there was a trend of increasing biomass over the study period. This was not as clear in smaller reserves such as Tinderbox and Ninepin Point. In the former biomass increased and decreased over the study period, and in the latter biomass declined in the first part of the study but increased later (i.e. there was no clear trend). The same patterns were evident in the control sites, indicating that either the reserves were too small and were influenced by the movements of the species, or that other effects were contributing to the changes (e.g. improvements as a result of normal management regime).





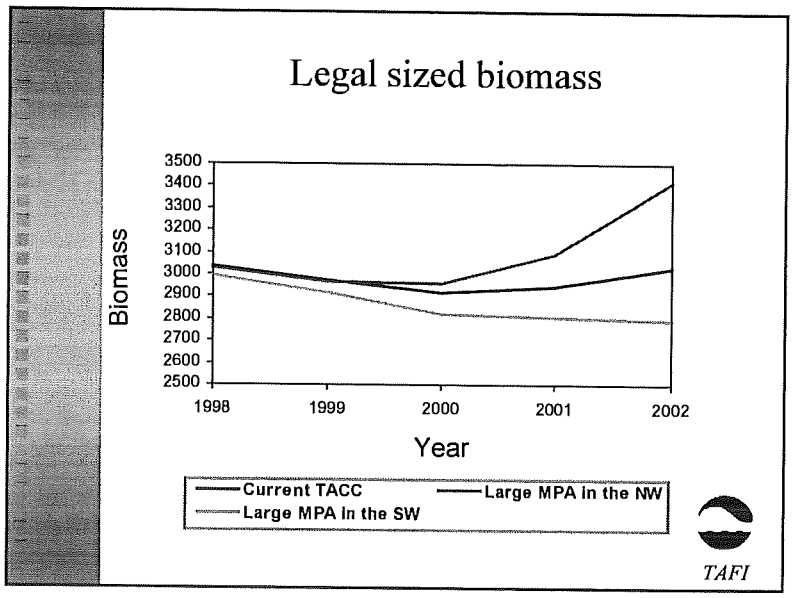
Similar changes were demonstrated in a study of the lobster population in Leigh Marine Reserve in New Zealand. Here the population was observed to increase 4.5 fold over the period 1978-1990 together with an increase in the mean size. However, following this initial period the males were observed to decline in abundance, ascribed to migration of adults to breeding grounds. A similar increase in abundance was not evident in the Poor Knights Island reserve, where *J. edwardsii* was found to be less abundant in the reserve when compared to the reference sites. This result was attributed to the habitat in the reserve, which was not considered to be optimum.

A study of the congeneric *Jasus verreauxi* did not reveal any difference between the reserve and reference sites. This result was attributed to the wider range and movement of this species, which ranged well outside the reserve area and which was therefore susceptible to fishing.

MacDiarmid, A.B. and Breen, P.A 1993. Spiny lobster population changes in a marine reserve. In: Battershill et.al. Proceedings of the Second International Temperate Reef Symposium. pp 47-56.

The effect of declaring MPAs in Tasmania has been modeled in a general sense using the Tasmanian stock assessment model constructed by Punt and Kennedy (1997). The key aspects of this model are that growth differs between regions, that the commercial catch is capped by a total allowable catch (TAC), and that the effort of fishers tends to move to areas of higher catch depending on season (some areas tend to receive less effort in certain months due to weather and beach price).

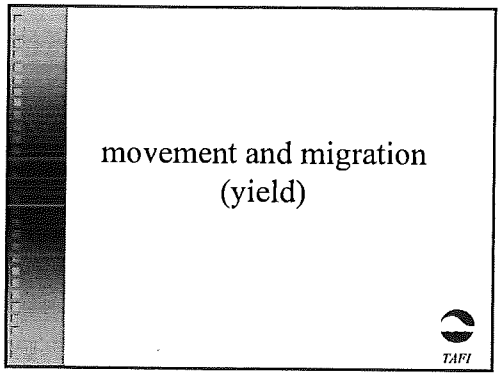
The model results show that the location of MPAs can affect the resulting biomass statewide.



When MPAs are created in areas with slow growth, commercial effort is shifted to regions with higher growth. So even though the reserve contains more large lobsters, the overall statewide effect is a decline in legal size biomass. The reverse occurs when the MPA is situated in the high growth, NW region.

This has implications for the proposed benefit of increased yield through the creation of MPAs. The model results show that overall biomass does not necessarily increase. This is because commercial fishing effort is simply concentrated elsewhere, and catch remains the same because of management by TAC.

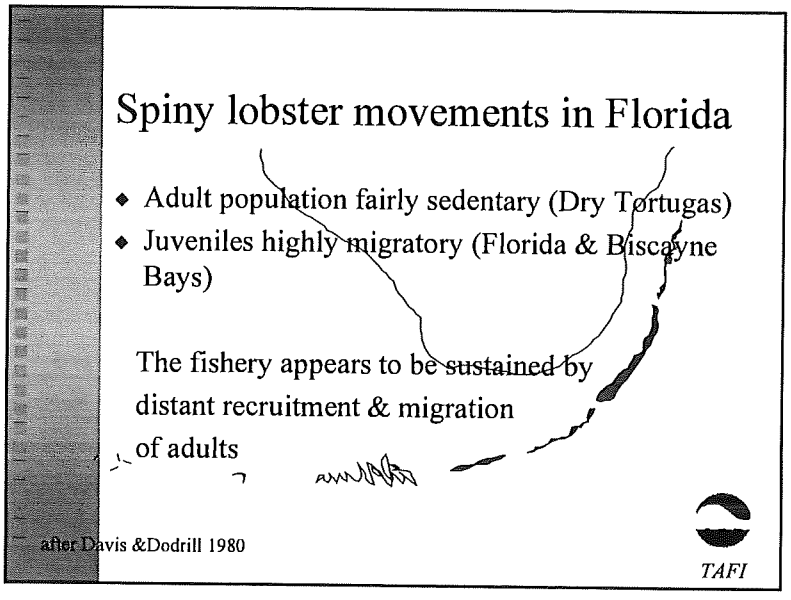
*Punt, A. and Kennedy, R. B. (1997). Population modelling of Tasmanian rock lobster, Jasus edwardsii, resources. Marine Freshwater Research. **48**, 967 - 980.*



Movement and migration are an important consideration in that species that are resident are more likely to benefit from area protection. The size of the home range relative to the size of the reserve will determine whether the species remains susceptible to fishing. Highly migratory species will not be afforded protection through area closure.

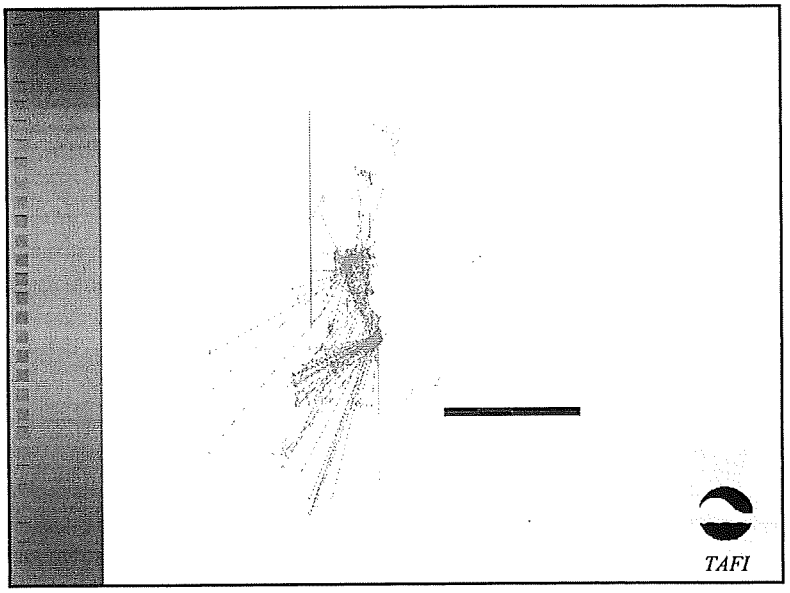
The importance of lobster movement in relation to any potential benefit from MPAs is illustrated in work done in Florida on the spiny lobster *Panulirus argus*.

Studies show that juveniles of this species are found in large nursery grounds in the Florida and Biscayne Bays, between the mainland and the Keys. Post larval lobsters grow up in the bays and as juveniles and adolescents migrate from the nursery grounds onto the Keys where they are heavily fished. Few adults survive the fishing season and recruitment to the nursery is thought to occur from distant downstream sites in the Caribbean. Initially also thought to come from the MPA at Dry Tortugas, more recent work suggests that the local oceanography is unlikely to enable lobsters spawned here to be able to settle in the Florida area.



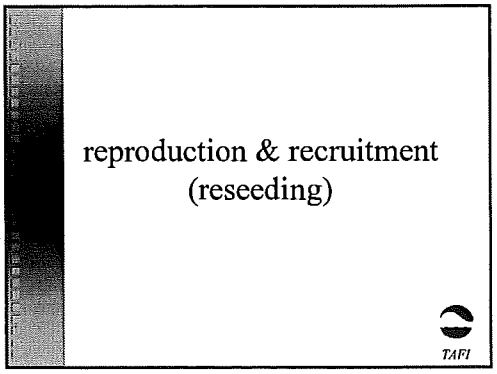
The important message is that if lobster recruitment in the Keys was dependant on the offspring of its own resident animals it would fail because of heavy fishing pressure. It is being sustained by distant recruitment from areas where fishing is less heavy. If identified an area could be declared an MPA aimed specifically at ensuring recruitment. The alternative is that an MPA could be declared in the "wrong" area so that egg production does not contribute to the fishery.

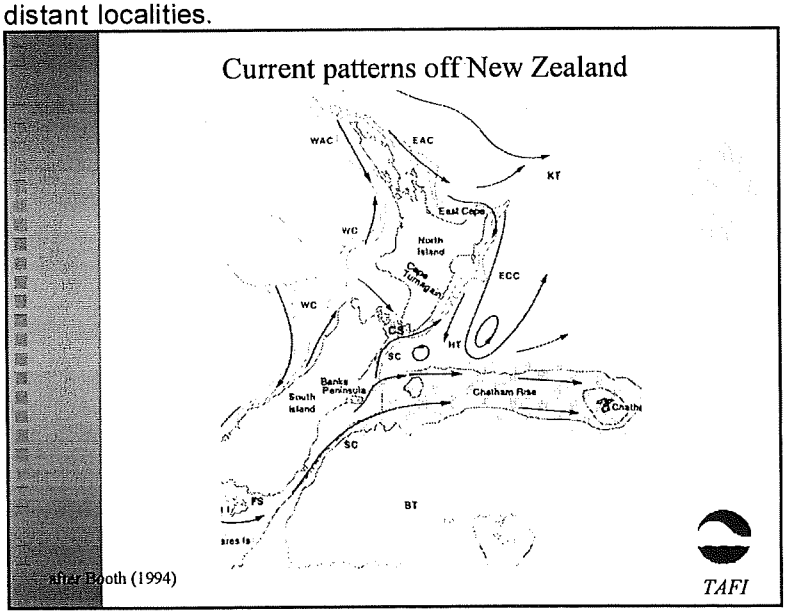
Davis, G.E. and Dodrill, J.W. 1980. Marine parks and sanctuaries for spiny lobster fisheries management. Proceedings of the Gulf and Caribbean Fisheries Institute32: 194-207.



The other component of movement involves the degree to which animals are capable of being protected in a reserve. In Tasmania, rock lobster movement is variable between different areas. Recaptures of tagged lobsters typically show movement of less than 1km for most of the state. However, around King Island larger movements are quite common. An MPA in this region would be expected to lose much of its legal size biomass through migration between protected and open areas, effectively negating the benefit of the reserve.

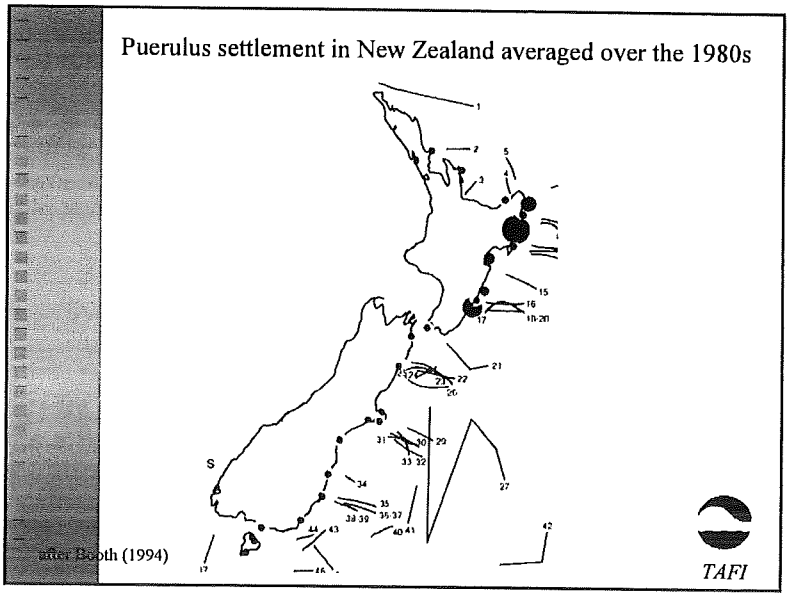
Rock lobsters have a relatively long planktonic larval stage where the phyllosoma larvae may spend months in the open ocean, travelling 100s or 1000s of kilometers before settling onto the reef. This characteristic is relevant in the context of MPAs as propagules that originate from a reserve may seed distant localities.





The fate of rock lobster larvae is strongly influenced by current patterns. The commercial fishery in New Zealand is highly productive along the North East coast, which appears to be a function of larval supply; puerulus settlement is very high in this region. Eddies formed by the Chatham Ridge retain rock lobster off the North East coast. On the south east coast, currents tend to carry larvae northwards.

What does this mean in relation to MPAs? Firstly, it shows that larval supply can influence catch, so a management goal of high egg production is worthwhile - whether this be achieved by MPAs or any other management technique. The important influence of complex current systems also shows that it is best to have egg production in certain regions. In practice, we rarely know which areas provide the most important sources of larvae. Given this uncertainty, a strategy of widely dispersed egg production would be favoured over the concentration of egg production in a few small reserve areas.

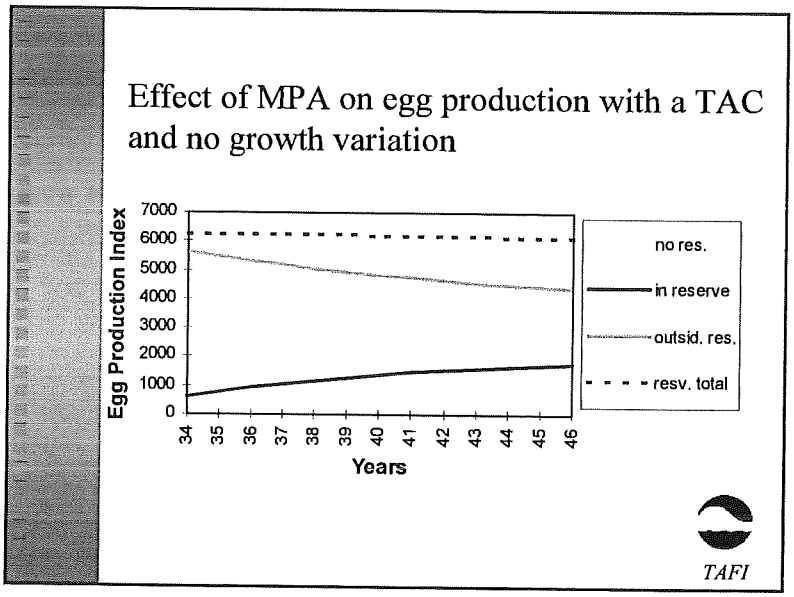


This figure emphasises some of the points made with the last slide. Puerulus settlement is highest in those areas adjacent to eddies formed in the North East. Higher puerulus settlement results in higher catches from these regions.

Booth, J.D. 1994. Jasus edwardsii larval recruitment off the east coast of New Zealand. Crustaceana 66: 295-317.

The results of model illustrating the effect of MPAs on biomass has already been shown. But what of the effects on egg production? The figure below shows a very simple model to explain the concept of effort displacement using a model based on that described by Hastings and Botsford (1999; density dependent reduction in the intrinsic rate of population increase was also included). The figure shows two scenarios. In the first scenario, there is no MPA and the egg production is stable.

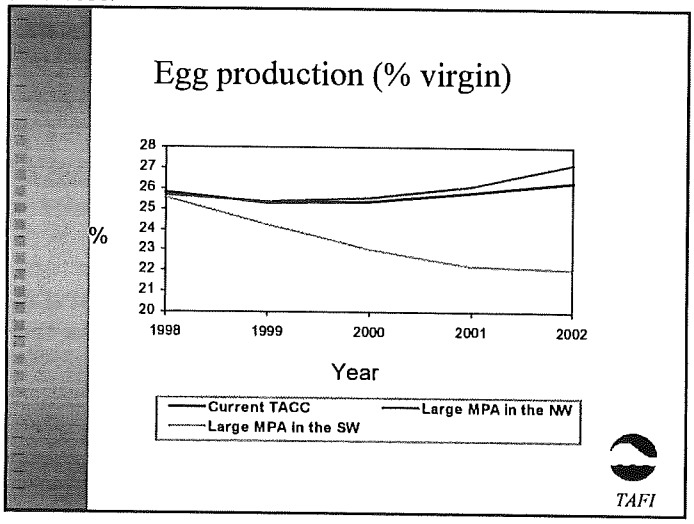
In the second scenario, an MPA is declared which covers 10% of the range of the fishery. In this scenario, egg production inside the MPA increases through time (as confirmed by research conducted in some MPAs) while egg production outside the reserve decreases. This decrease is due to the initial reduction from loss of area (some of the fishable area was made into an MPA) but the continuing decline is an effect of commercial fishers concentrating their effort because they could no longer fish in the MPA.



When management is by a TAC, the increase in egg production inside the reserve is exactly equal to that outside the reserve, so the net change to total egg production is zero.

The effect of the MPA has been to concentrate egg production in certain regions. As we've discussed in the previous slides, this is rarely desirable.

*Hastings, A. and Botsford, L. W. (1999). Equivalence in yield from marine reserves and traditional fisheries management. Science **284**, 1537-1538.*



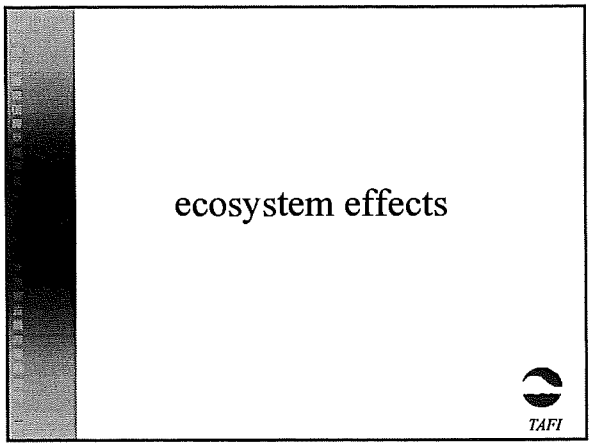
The previous model was excessively simplistic for several reasons, one of which is that it assumed that it's world was perfectly homogenous or even. In reality, it's unlikely that a rock lobster living in an MPA would grow at the same rate as one living elsewhere, because growth is so variable. Other aspects of a lobsters biology would also change between regions, such as abundance and fishing pressure. The figure shown here is a model output which attempts to include these other factors for the Tasmanian region.

The model shows the statewide egg production under scenarios of no MPAs, a large MPA in the NW, and a large MPA in the SW. The figure shows that MPAs in the south west would tend to seriously reduce overall statewide egg production, while those in the north would tend to increase egg production slightly.

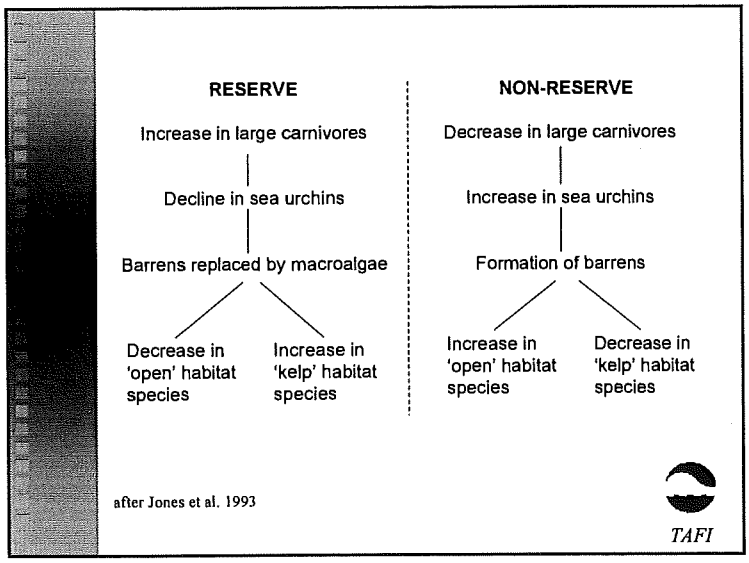
The message from this is that in the real world, MPAs can both harm and benefit egg production of rock lobsters. Their effect is not easily predictable and will be influenced by factors such as existing fisheries management, and regional variation in biological characteristics.

Perhaps their most useful application of MPAs in terms of rock lobster egg production is managing regional problems of low egg production.

Rock lobster abundance and growth is influenced by interactions with other marine species. On a most basic level, predators and prey items influence abundance and growth. Higher densities of rock lobsters leads to food and shelter limitation which suppresses growth and raises mortality.



Concerns have been raised about the effect of rock lobster predation on sea urchins and the interaction between urchins and kelp. Put simply, there is concern that a reduction in rock lobster abundance leads to greater numbers of sea urchins which then graze down kelp and cause "urchin barrens". These urchin barrens are poor areas for recruitment of rock lobsters so the cycle positively reinforces itself.



This diagram (left) illustrates the ecological links that result in urchin barrens through the removal of large carnivores like rock lobsters. To some extent the figure is very extreme in that it suggests that areas outside MPAs are headed inevitably towards urchin barrens. It is more helpful to think of the non-reserve scenario as an extreme of high fishing pressure because it is possible to maintain fishing without creating urchin barrens. However, if exploition is too high, then barrens are an environmental consequence.

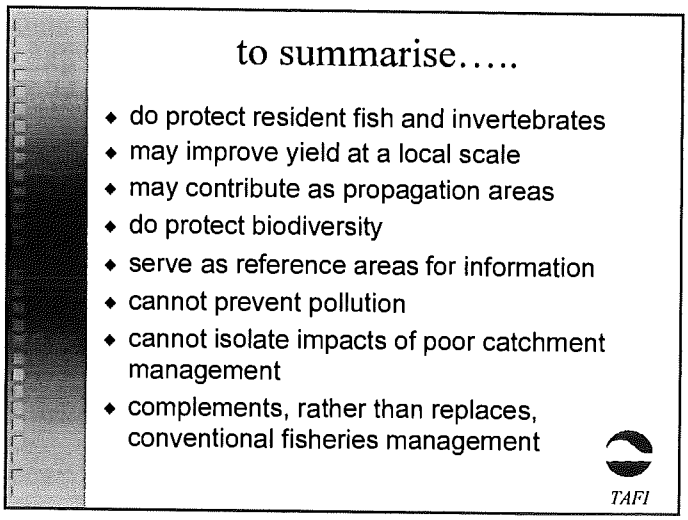
We have already seen that MPAs tend to increase lobster biomass inside the MPA and decrease lobster biomass outside the MPA by effort shift. In some fisheries the net effect will be an increase in biomass, in others it will be a net decrease, or there will be no net effect. Regardless of the net effect, the urchin/rock lobster/kelp interaction suggests that MPAs will tend to cause rebuilding of kelp stands inside MPAs, but increase the risk of urchin barrens outside the MPA. This is because MPAs act to reduce the abundance of large exploited predators across the remainder of the coast by effort displacement.

If an aim of MPAs is to increase rock lobster biomass to reduce the risk of urchin barrens forming, then a strategy of reducing effort across the fishery by conventional management is likely to be more effective. The question should be: do we prefer to have lower risk of urchin barrens in some small areas (MPAs) and higher risk across the rest of our coast, or do we prefer to adjust conventional management to reduce the risk across the whole coast ?

Jones, G.P., Cole R.C. and Battershill 1993. Marine reserves: Do they work? In: Battershill et.al. Proceedings of the Second International Temperate Reef Symposium. pp 29-45.

Our understanding of the potential benefits of MPAs remains largely anecdotal and more research needs to be done before we can clearly state how they work.

However, a survey of the literature on the effects of the establishment of MPAs provides clear evidence of the fact that resident fish and other species recover from the impact of exploitation and are both of a larger average size and more abundant in the reserve. This is an expected result that has stood up to examination in tropical and temperate waters for a range of different fish and invertebrate species.



More importantly from a fisheries perspective it has been shown in some cases that yield in adjacent fisheries improves at a local scale. As an example, this has been observed in New Zealand where lobster fishermen target good catches of fish close to the boundary of the Leigh Reserve. Studies in South Africa have shown how the CPUE of reef fish in areas adjacent to the large de Hoop Nature Reserve have increased. The well documented study by Russ and Alcala showed how a Philippine coral reef fishery was maintained in the presence of an MPA. While there is evidence of yield benefits on a local scale around boundaries (spillover), there is limited evidence of any broader benefits for yield.

The evidence that MPAs function as a source of eggs and larvae is less convincing than the boundary effect on yield. Some evidence exists to suggest that increased egg production is a likely outcome for inshore reef fish of a large marine reserve in South Africa, the Tsitsikamma National Park, but generally little else is known of this potential benefit (Tilney et. al 1996).

Many of the problems encountered in the marine realm such as oil pollution, siltation, freshwater runoff and eutriphication and other problems related to poor catchment management are not excluded from MPAs. We also need to be aware that MPAs can work against fisheries management objectives, such as increasing egg production, as well as aiding them - sound planning with a sufficient knowledge base is crucial.

In our opinion one of the most important roles of MPAs is their value as reference areas for marine research - areas where ecosystem function and species biology can be studied without the confounding effect of fishing.

It does not take a rigorous scientific study to demonstrate that an MPA will afford protection to biodiversity. A more difficult task will be to demonstrate that this will make a significant difference to the overall situation (given that very little of the coastline is protected in this way), or that the protection of biodiversity will be guaranteed by the establishment of MPAs under a scheme such as the NRSMPA.

On balance, the evidence indicates that there is a place for MPAs and that they provide an additional string to the bow of coastal conservation and protection of our fisheries. Just as we do not expect every area of land to be given over to development and farming, so too is it unreasonable to expect that every square inch of the sea should be fished!

The challenge is to examine and understand the benefits, particularly those that may accrue to fisheries.

Barrett, N. and G. Edgar 1998 —How marine reserves work for the fish. Fishing Today. ***11*** *(2): 23-27.*
Russ, G.R. and A.C.Alcala 1994—Sumilon Island Marine Reserve: 20 years of hopes and frustrations. NAGA, The ICLARM Quarterly, July 1994: 8-12.
Tilney, R.L. Nelson, G. Radloff, S.E. and Buxton, C.D. 1996. Ichthyoplankton distribution and dispersal in the Tsitsikamma National Park marine reserve, South Africa. S. Afr. J. Mar. Sci. 17: 1-14.

Eco-systems Management

Ecosystem protection and lobster fishing: reconciling radical and reactionary perspectives.

Stephen J. Hall

Abstract

"Ecosystem management", "Ecologically Sustainable Development" and "Ecosystem Health" are all terms that are being used increasingly often to describe objectives which fisheries must take into account. Unfortunately, finding useable (operational) definitions of them is extremely difficult. Nevertheless, deciding what these terms really mean and what, if any, action needs to be taken requires information on the effects lobster fishing has on ecological communities. This paper will 1) review what we know about the key interactions that control the ecological status of lobster fishing grounds; 2) examine whether there are any key questions that remain un-resolved and 3) explore how the industry might address concerns about the wider ecological impacts of the lobster fishing.

Introduction

There is no doubt that the social and political climate in which fishing is being conducted has changed. Society is now painfully aware of how easy it is to make fish stocks collapse and how difficult it is to manage them effectively to ensure a sustainable resource supply. In addition to concern about the stocks themselves, however, there is now also anxiety about the wider consequences of fishing activity for marine ecosystems. Such anxiety has stimulated a wealth of activity in recent years, aimed at understanding what these wider consequences might be. On the strength of these efforts we are beginning to appreciate the nature of fishing effects for ecosystems and communities (for reviews see, for example, Hall, 1999; Jennings & Kaiser, 1998).

Concepts of health and stress for ecosystems are important because human beings identify strongly with them and arguments that are made using them can have a powerful effect on public opinion. As a means for communicating messages about desires or concerns for the marine environment they carry considerable weight. The term "health of an ecosystem" can usefully be used in summary statements in much the same way that the term "health of the economy" is used. Similarly, the notion that a particular ecosystem is "in poor health" or "good health", with respect to a stated set of criteria about what the system is used for (e.g. healthy fishery production) has a valuable communication role. Difficulties arise, however, if one tries to define management goals in terms of these concepts. At this stage, there is no general consensus about what characteristics or integrated measures of a system could be used to assess health or the acceptable functioning of a system. This is a research area of great interest, but at present science can offer no clear guidance about measurable targets for health or integrity of ecosystems for managers or fishers.

Nevertheless, while the concepts remain somewhat fuzzy, the intent is clear – society and the longer term future of the fishing industry requires that fisheries be managed with a system level perspective in mind. In other words, the fishers place and the consequences of their actions for ecosystems need to be documented and understood. Without such understanding, we are at the mercy of hyperbole. Most would accept, that there is no place for either a reactionary perspective ("We've been doing it for years, and there's been no problem - what's it got to do with anyone else?"), nor a radical one ("Everything fishers do leads to disaster and we should stop them"). The only defence from criticism by parties adopting either perspective is credible scientific assessment of the effects of fishing on the communities of plants and animals that share their habitat with the target species.

Key Ecological Interactions in Lobster Habitats

Lobsters as keystone predators

For lobster fisheries, perhaps the key issue that needs to be addressed is the ecological role of the target species in the community[7]. If the abundance of lobsters is reduced substantially can we expect to see lobster habitat change in dramatic or undesirable ways? A recent review by Tegner & Dayton (1999), examining the effects of fishing on kelp forests has drawn much of the available information on this question together - a brief summary is provided here.

[7] For the most part, damage by fishing gear is probably a lesser concern in lobster fisheries, especially when compared to trawl fisheries. This is not to suggest, however, that the issue of gear damage should be completely ignored.

Because kelps are highly productive and often the dominant structural component in lobster habitat, and they support a highly diverse community in association with them, fishery induced changes which lead to reductions in kelp cover are of particular concern from an ecosystem perspective. Of the biological interactions that might lead to such change, it is the rate of grazing on kelp that appears most important.

In particular, the density of sea urchin species has been shown to have an important control on kelp cover in some systems (Lawrence, 1975; Dayton, 1985). Indeed, most instances of severe reduction in plant biomass seem to be associated with increases in urchin densities (Lawrence, 1975), often in association with disturbances such as major storms or El Niño events. So dramatic can the effects of urchin grazing be that transitions from kelp forests to bare rock systems known as "urchin barrens" are widely documented.

From an ecosystem perspective such a transition is dramatic with large changes in primary productivity and available habitat for the rest of the community. Barren grounds may persist for months or years, but break down when urchin numbers are affected by factors such as storms or disease (Dayton, 1985)

If lobsters are important predators on urchins, it is possible that a reduction in lobsters will lead to an increase in urchins, thereby leading to reductions in kelp cover and perhaps ultimately urchin barrens. Such a sequence of changes, which ripple down the food chain from predators through herbivores to plants has been termed a "trophic cascade" and has been the subject of considerable attention.

Perhaps the best documented trophic cascade in urchin kelp systems is caused by *Enhydra lutris*, the sea otter (Estes & Duggins, 1995; Estes, 1996). Based on the otter experience the potential for trophic cascades in response to the removal predators in rocky sub-tidal communities seems quite large. Is there evidence that lobsters also play this role? On the evidence available in the scientific literature, the answer appears to be equivocal and to vary geographically (Table 1). The brief summary provided in Table 1 suggests that, while lobsters certainly can be key species in systems (with the consequent potential for fishing to induce marked changes in the ecology of lobster habitat), they are not always.

The Generality of Responses

Given the compelling evidence in some systems it is tempting to assume that all predators that occupy a similar trophic position will determine system structure in the same way. Such an assumption, although erroneous, can lead to pressure to alter fisheries management regimes to limit or mitigate potential cascading effects. A concrete example of this comes from the lobster fishery in eastern Canada where adherents to the keystone species paradigm strongly urged fisheries managers to consider this interaction when deciding between management options (Elner & Vadas, 1990). Unfortunately, there is a tendency in ecology to be somewhat uncritical of studies that appear to support the established wisdom of the day. Put simply, studies indicating that a cascade does not occur in a particular system are less likely to be published that those that claim it does. Elner & Vadas (1990) argue that this tendency was readily apparent in the literature on lobster urchin interactions. Many of the studies which purported to support the keystone species paradigm for lobsters were uncritical and failed to specify adequate null hypotheses or experimental tests with appropriate controls. Moreover, evidence that ran contrary to the paradigm tended to be discounted. It was only gradually over a 15-year period that the hypotheses shifted away from predator control to one involving disease outbreak and shifts in temperature regimes.

There is ample evidence that other factors, both biological and physical can exert major influences on the ecology of kelp systems and a major challenge for ecologists is to determine the relative contribution of factors such as storms or El Nino (Tegner & Dayton, 1987), disease outbreak in urchins (Elner & Vadas, 1990) or predation by other species (eg Cole & Keuskamp, 1998). At present we have no clear picture of the circumstances that might make lobsters more or less likely to be important in any given instance. In other words, if one wishes to understand the ecological role that lobsters play in a specific system, dedicated research in that system is probably required. When such research is undertaken, very unexpected results can sometimes be obtained.

Alternative Stable States?

The idea that ecosystems can occupy two different states and that switching from one to another requires a rare, and/or intense perturbation, is one that has intrigued ecologists. When this occurs, a system has been said to occupy alternative stable states. As a general proposition, could fishing be forcing systems into other states from which they cannot return? Theoretical analysis suggests that fishery induced alternative stable states are certainly possible and that complicated (species rich) communities, once perturbed by fishing, may not return to the same state, even if fishing ceases (Gilpin & Case, 1976). The theoretical message from multispecies systems seems to be that the probability of alternative stable states is high. While ecologists have little real idea of how likely system flips are, there is at least one example of it occurring - it also happens to involves lobsters.
Barkai & McQuaid (1988) showed that two islands, approximately 15km apart off South Africa, support markedly different benthic communities. One island was dominated by seaweeds and rock lobsters, which prevent the establishment of mussel beds. On the other island mussels dominate and rock lobsters and seaweeds are almost absent. On this second island a whelk species that is usually prey for lobsters is also very abundant. By transplanting lobsters to the second islands, the authors showed that when densities are high , whelks overwhelm lobsters, thereby reversing the usual predator prey roles. This prevents a lobster population from establishing on the island. Local fishermen report that the two islands were similar some 25 years ago, but the original cause of the disappearance of lobsters is not known. One possibility is a period of low oxygen levels that was known to have occurred near the island in the 1970's, or perhaps there was a disease outbreak at one site. Apparently in this case it seems unlikely that exploitation by fishermen was responsible for the changes, but the example clearly illustrates the potential for fishing to push communities into another stable domain.

Ecosystem-Based Management and the Role of Science

Initial steps

Given the potential for changes in the abundance of lobsters through fishing to lead to dramatic changes in marine communities, what should the fishing industry do? Or put more generally, how does one sustain an economically viable and productive fishery within a framework that recognises the potential for wider ecological impacts and manages for them. I believe the fishing industry must do two things. First, it must manage the resource itself in a sustainable fashion – an objective that is universally accepted, but sometimes difficult to achieve. Second, it must make a credible effort to understand the effects its action is having on the wider ecosystem. In other words, it must actively support independent scientific inquiry. This is an action for which there is often only limited support among fishers, and one that is likely to be strongly resisted in cases where, to establish the effects of fishing, excluding the activity from some areas is proposed.

In the longer-term such resistance may be counter-productive because, despite perceptions of widespread damage, there has been relatively little research done on the ecosystem level consequences of commercial fishing in most areas. This gap is harmful because it leaves a fishery open to uninformed speculation or accusation about fishing impacts that cannot be adequately challenged. Without a sound scientific assessment, claims that current practices are not harmful are difficult to sustain against pressure from effective lobbyists. On the other side of the coin, if fishing is causing large-scale changes they should to be documented and decisions made about whether and how they should be managed. Either way, these are issues in which the industry needs to be actively involved. Individual fisheries management advisory committees need to discuss and decide on the meaning of precautionary fishing in relation to its sector.

Ecosystem Objectives

The question of what one should actually do once an assessment has been undertaken is one for which science can only have an answer if an objective has been agreed upon. It is in the setting of objectives, however, that the roots of the difficulty about ecosystem based management lie. One difficulty is the (often implicit) association of the term "healthy" or "normal" ecosystem with one where man's influence is minimal. The corollary is that systems affected by man are inherently abnormal or 'unhealthy' – a conclusion that is difficult to sustain. This is not to say that the changes mankind has made to systems are always desirable or morally defensible - clearly many of them are not. It is simply that there is no *a priori* reason why a system we have affected should be viewed as functioning any more or less well than one in which our influence is minimal.

It is perhaps preferable to substitute an analogy with health for one about appearance or looks. We are happy with the notion that there are degrees of attractiveness in people or art and that our judgements are subjective. We should, perhaps, be prepared to acknowledge and accept, therefore, that we must make the same judgements about the 'state' of ecosystems, rather than investing ostensibly pristine environments with some form of moral superiority.

Having taken such an explicitly value laden perspective in which we concern ourselves with what we want systems to look like, not what they "should" be like, the role of the scientist in the decision making process becomes clearer. For me the preferred model for scientists in debates about fishing is something of a cross between a cook and a waiter. In one sense scientists ought to be cooks who decide what the outcomes of particular actions are likely to be for the marine populations, communities and ecosystems and prepare a menu of alternatives for the customer (society, fisheries managers, fishermen, elected politicians) to choose from. In an ideal world each of the alternatives on the menu would have a cost associated with it, but unlike in a restaurant there would also be a probability of success in producing the dish. In the role of cook, scientists play no part in saying what should be done, only what could be done. However, scientists should perhaps also have a role as a waiter, to explain the alternatives and perhaps recommend the dish of the day. In the end the decision lies with the customer, but the waiter can influence the choice through weak advocacy of particular options.

Concluding Thoughts

There seems little doubt that society will continue to demand that we struggle toward an ecosystem based fisheries management regimes, however fuzzy the concept might be at the operational level. It also seems certain that movement towards such a goal will be incremental and continuous, probably with no clear end-point. In the same way that manufacturers strive to produce better and better products we can probably expect demands for continuous improvements in the quality of information on human impacts and in industry practices to mitigate them. The fear by some fishers that support for science might result in undesirable findings that adversely affect current fishing practices is understandable; it would dishonest to suggest that this is not a possibility. I believe the reality, however, is not that a fishery would be under threat of closure or bankruptcy by "adverse" findings, but that it would need to engage in the debate about what states for systems are acceptable and, if necessary, adapt to accommodate the outcome. In doing so, the economics of the industry may even improve. It is not unrealistic to imagine, for example, a market advantage from offering a more ecologically friendly product. Ignoring the issue may be far more perilous for the long term future of the industry.

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Table 1. Summary of findings on urchin-kelp interactions and the importance of lobsters for controlling urchin abundance in kelp forests systems. Derived largely from Tegner & Dayton (1999).

Region	Evidence	Reference
Southern California	• Urchin control of kelp well demonstrated.	e.g. Dayton (1985)
	• Gut content studies, laboratory experiments, field observations in areas with and without predators suggest that spiny lobsters (*Panulirus interruptus*) may play an important role in controlling sea urchin populations.	Tegner & Levin (1983)
	• Sheephead (*Semicossyphus pulcher*) – a labrid fish that also eats urchins also appears to be important in this system.	
Northwest Atlantic	• When urchins are rare kelp communities flourish in this region, but high urchin abundance has been shown to maintain urchin barrens dominated by encrusting corraline algae.	Mann & Breen (1972), Vadas & Elner (1992)
	• Although the explosion in urchin numbers in Nova Scotia corresponded with dramatic declines in commercial landings of American lobster (*Homarus americanus*), research has failed to identify any predators capable of controlling urchins in this region	Elner & Vadas (1990)
	• Studies in the Gulf of Maine suggest an important role for large predatory fish, which control urchin, lobster and crab numbers. When large fish are present urchins, lobsters and crabs are rare, but kelp is abundant.	Vadas & Steneck (1995)
Australasia	• Grazing by urchin species shown to create barrens in some areas, but in most parts of temperate Australia grazing intensity is usually insufficient to create them.	Jones & Andrew (1990)
	• Gut content studies, laboratory experiments and field observations in areas with and without predators suggest that neither spiny lobsters (*Jasus edwardsii*) nor predatory fish controlled sea urchin populations in northern New Zealand.	Andrew (1988), Andrew & MacDiarmid (1991).
	• Closed area studies in New Zealand show greater abundance of lobsters and fish, an increase in kelp cover and lower urchin abundance. Higher urchin mortality rates also demonstrated in reserves.	
South Africa	• Increases in the abundance of spiny lobsters (*Jasus edwardsii*) coincide with disappearance of urchins at sites on the southwestern cape. Increases in kelp predicted along with decreases in other lobster prey.	Tarr et al (1996), Anderson et al., (1997).

Markets – Importer's View
Mr Stu Simmons

Thank you and aloha!

First of all, I would like to thank the International Lobster Congress, for the honour to speak to such a distinguished group of lobstermen and women. I'd also like to thank Roger Edwards and his staff for doing such an outstanding job in organising this event. Is Roger here? Give him a big hand, because his staff have been tremendous.

We are not the largest importer of lobster in the world, but we do market more types of lobster than anyone we know. In fact, we market lobster from Hawaii, Western Australia, Southern Australia, Northern Australia, New Zealand, Tristan, South Africa, Chile, Brazil, Oman, Florida, Mexico, Honduras, Tonga, Nicaragua, the Bahamas, Scotland, Maine and Canada. Besides rock lobster, we also market slipper lobster, atlantic lobster, deep sea lobster, squat lobster, freshwater crawfish and even lobster horn meat.

We maybe should rename our company, 'Lobsters Are Us', because we carry a lot of lobster.

I hope I can breen a unique perspective to the panel of discussions on the lobster markets. When I found out I was going to be a speaker for the Lobster Congress, I called up a good friend of mine who does a lot of public speaking and asked her for some advice. She said, 'Stu, what I recommend you do is when you get up on the stage, you look out at everyone, and you imagine they're all wearing their underwear. Only.' I tell you what, it's not a pretty sight.

Let me start things off by giving you my perspective on the current world lobster markets, and the potential trends in the near future. As of today I have great news. Worldwide, cold water rock lobster inventories are low and prices are rising. In addition, warm water rock lobster inventories are low and their prices are rising. Furthermore, the US market is strong, the European market is strong, and the Asian market is looking good. What is driving this great news? I think the biggest factor is the millennium celebration.

Everyone is in a buying frenzy because they don't want to run out of lobster for the holidays and the New Year celebration. I think this is great news for all of you because I think you're going to get great prices into the new year. Other factors include Hurricane Floyd devastation of the Bahama Islands, also Japan's economy has rebounded. But I should forewarn you that the word on the street is probably by mid January we expect to see a drop in the market price.

Okay, now let's talk about the long term world lobster market and potential trends. First of all, what I'm going to say is only my theory and if I really knew what was going to happen in the future I wouldn't be here, I'd be with Bill Gates and Warren Buffet. But let me take a stab at it and give you what my opinions are. First of all we know things are going to not stay the same. Some type of change is inevitable with everything. In my opinion world marketing is changing from prestige oriented marketing to value oriented marketing and the internet is one the major influences of these changes.

What I mean by this is a new generation of consumers who are more oriented towards receiving value and performance for their purchases. They want to get the biggest bang for their dollar. Now, up to now the Australians, South Africans and New Zealanders have done an outstanding job marketing their lobster, they're the best in the world. Today the cold water rock lobster producers command any where from 66% to over 300% premium over their warm water and Atlantic lobster counter-parts. Now I'm going to give you some numbers here; a five ounce Atlantic or Maine, Canadian lobster tail commands, in US dollars, around $33 a kilo. A warm water Caribbean rock lobster is also about $33 a kilo. But a five ounce or five to six ounce of Western Australian tail is commanding around $55 a kilo and the same can be said for live lobster. In fact in live lobster, some of the lobster fishermen here may be shocked when they hear this, but an Atlantic lobster, a Maine lobster is commanding only $9 a kilo, and I was told that Southern Australian live lobsters command over $30 a kilo. That is a big, big difference.

The question is will the cold water rock lobsters continue to demand a very large premium over other types of lobster? What's going to happen when other species improve their quality by cryogenic freezing, improved live lobster handling and shipping techniques and improved air shipment schedules. Already we're seeing an improvement in quality from many warm water and Atlantic processors. A good example is Nicaragua, the improvement of their product has been tremendous and we've seen their pricing now get very, very close to the Brazilian and I believe every year they keep getting better and better. And earlier in this week we had a speaker who talked about Maine's and Canada's efforts toward improving the quality of their products also.

Back in Hawaii, which is a Japanese colony, and understand that Queensland is now a Japanese colony, we're finding that the Japanese tourists are accepting Atlantic lobster as a cold water quality lobster. Now, five years ago this never happened. Apparently the claws no longer seemed to be a negative impact, at least to the tourists who are visiting Hawaii. I believe the new generation of Japanese consumers are becoming more westernised, they not as concerned with prestige nor expecting greater value and we're seeing this a lot, we're seeing that they're not going into the Gucci stores and buying the thousand dollar purses like they use to, they're changing and I think we all need to change with them if we're going to continue to market to that market. So what does this mean? Well, I believe in a few years, maybe five or maybe even ten, either warm water and Atlantic lobster prices will increase to their cold water rock lobster counterparts or you're going to see a decrease in the cold water rock lobster market or maybe a combination of both. But I think one thing definitely that's going to happen is you're going to see the gap between the two close up. And I predict that the premium that the Australians, New Zealanders and the South Africans can command will probably be in around 10 to 25% and you folks should prepare for that.

Okay, let me talk a little bit about market product diversification. Just like investments you need a diversified portfolio. As the old saying goes 'don't put all your eggs in one basket'. The down turn of the Japanese economy is an excellent example of what happens when you focus only on a few markets. When the Japanese economy declined last year the Western Australian tail prices plummeted by over 50%. They have rebounded, but they plummeted by 50%, primarily because I believe Western Australia neglected the US market and they allowed it to dry up to the extent where increased production came on and went into the US market and we weren't ready to accept it.

Now, in addition to diversifying your markets I also recommend lobster producers need to diversify their product forms. In addition to live lobster you should be developing markets for lobster tails, should be also offering whole cooked frozen and whole splits and whole cooked fresh and fresh tails, even lobster horn meat. All these products you should be developing some markets for, because we just don't know what's going to happen next. In fact we should ask ourselves what would happen tomorrow, and I'm talking about the Southern Australian, if the Chinese market declined, what would happen if there was an embargo on trade to the Chinese. Do we have a plan in place, could we shift our marketing efforts quickly, I think these are questions you all need to ask yourselves because, as I mentioned earlier, everything changes.

Now, the next question I have is 'should we target the US market?' And in my belief, absolutely. The US market is, well the consumer market is the largest in the world. And to not be putting some effort into the US market I think is a big mistake. You need to keep a presence in the US market, at least with the tail market and I think the Western Australians would agree because they did have a presence in the US market that was a big saviour when the Japanese market declined for them. Furthermore I believe there is potential for developing a live rock lobster market in the US and there's also potential for the whole cooked frozen.

How do we penetrate the US market today? Well the key I believe in the US market now is to establish perceived market advantages for our lobster and let me emphasise perceived, because reality is not enough. What matters is what the consumer thinks, not what we think. Create an image that justifies the product's price, make the consumer feel they're getting value for their purchase. Today there's a culinary renaissance taking place in the US and I recommend you should take advantage of it and the best way to do that is I recommend you should target your efforts toward the chefs. In fact, many chefs in the United States are becoming celebrities and are having a very strong influence on consumers buying trends.

Do you folks, have you ever heard of Emeral? I don't know if he's known here in Australia. He's a chef in the United States and one day I turned on the TV and he was on. He was up on a stage with about 5000 people in the audience. He had a rock band behind him, he had his cooking display in front of him, he got the drums, he was playing the drums, he was screaming he was yelling, the crowd was screaming and yelling. I couldn't believe it, he was like a rock star and he's a chef and these people watch him every single day of the week. He has great influence upon the market places, and this is what you folks need to do, you need to find these people and have them push your product – and you have an outstanding product, so it shouldn't be difficult to do. I also recommend that you should be using your web sites to emphasise the market advantages of your products. Now I'm not just talking about competing against other lobster products or producers, I'm also talking about competing against other protein entrees like fish, beef and chicken, because that is your competition.

Futhermore, and talking about the television, we actually in the US have a television network called the food channel and the food channel is all about food. It's on seven days a week, 24 hours a day, and this could be an excellent avenue for marketing of your lobster, in fact you could produce a documentary on the lobster and what makes it special and have it shown nationally over the US market and probably it would go on into other markets too because I think this is a growing trend. Or possibly, maybe you could sponsor a cooking show, like Emeral, and have him prepare your lobster.

Well, finally let me talk about internet commerce and what does it mean for lobster. Let me ask you folks, how many of you use the internet? Could you raise your hands? Okay, quite a few. How many of you use e-mail on a daily basis? Quite a few. And how many of you have web sites? Not too many. Well let me tell you the internet is the future, if we were all pretty smart we'd get together and we'd do what Amazon.com and what the other .com companies did; we'd form lobster.com, we'd go public, sell stock for a billion dollars everyone makes a profit, cash out and be billionaires for the rest of our lives. Unfortunately it's probably too late to do that, but what you can do is you can use the internet as a tool for marketing your products, and in the very least the internet is going to give you exposure and it's going to allow the world to become a smaller place, it's going to open up new markets for you.

Now with seafood I'm not sure how it's going to work because it's a different type of product as compared to more consistent quality products like a book or CD. There's a lot of variables with seafood and I believe relationships and proven performance is the key in making transactions. But the internet can and should influence the marketing of your product. If you're not using the internet, don't wait any longer get on the info highway and see where it takes you.

Okay, in summary the current lobster markets are very strong and I think we'll all profit from that, but in the long term we should expect to see the gap between the cold water rock lobsters and other lobster producers become smaller. We should definitely include the US in our marketing plans, and I think, I had a gentleman tell me 1/3 to Europe, 1/3 to US, 1/3 to Asia. I don't know if that's realistic, but I think at least 15% of your product should be geared toward the US, and maybe you won't command the highest price and maybe you won't get the best return but you'd be maintaining a market that I think will in the long term be beneficial for you.

The way to penetrate the US market is to create an image of perceived market advantages over other entrée options, and finally the internet will be an important factor in marketing lobster in the future.

Well thank you very much, it's been a pleasure.

Markets – Exporter's View

"Australasian Lobsters – Managing your Destiny"

or

" How can chooks with their heads cut off find their way through continually closing windows of opportunity?!"

Mr Leith Pritchard
General Manager, Geraldton Fishermen's Co-operative Ltd

In the past 8 years Mr Pritchard has been directly responsible for the strategic marketing of approximately 2700 tonnes of Western Australian lobsters per year.

The presentation will examine the positive and negative aspects of all Australian and New Zealand Lobster Producers combining to devise a long term international marketing strategy, which would potentially benefit all sectors of the industry.

Included also will be an overview of the global situation, the relevance of the Australasian market in that context, current impediments to effective marketing and an attempt to predict future changes with a view to being prepared for change rather than reactive to it after the event.

Introduction

The aim of this Presentation is to motivate members of the Australian and New Zealand Lobster industries to consider a more appropriate way of marketing their valuable products in the international trade arena.

It will give an overview of the relevance of the Australasian industry in terms of world production, and it will also show the break up of production of New Zealand and the Australian States compared to the Australasian total.

Is there a better way to sell lobsters?

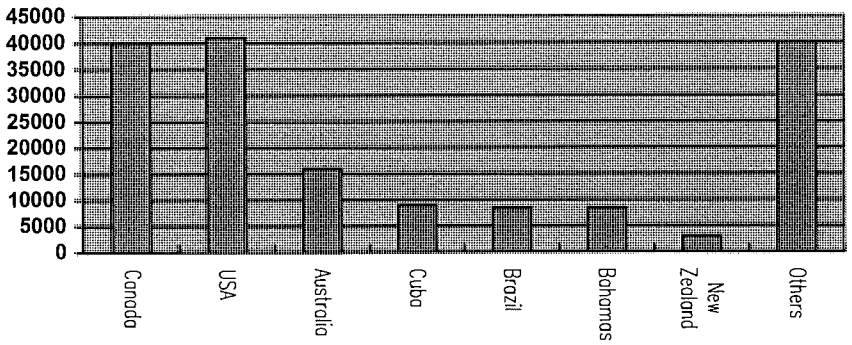
At present we are just 'price takers' or 'opportunity takers'. Alternative strategies need to be examined where if possible we control our destiny.

Is there a better strategy?
What is a window of opportunity?

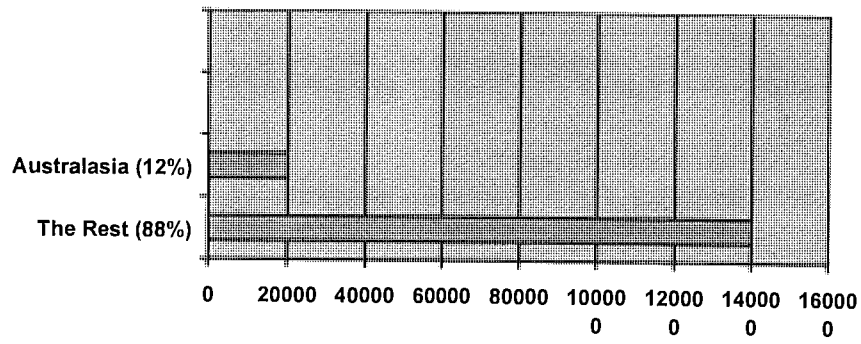
This presentation will spend some time analysing those concepts and will ultimately ask members of the Australia and New Zealand industry to look to the future to perhaps consider presenting a united force in strategically marketing their valuable commodity to the world.

Your Place in the World

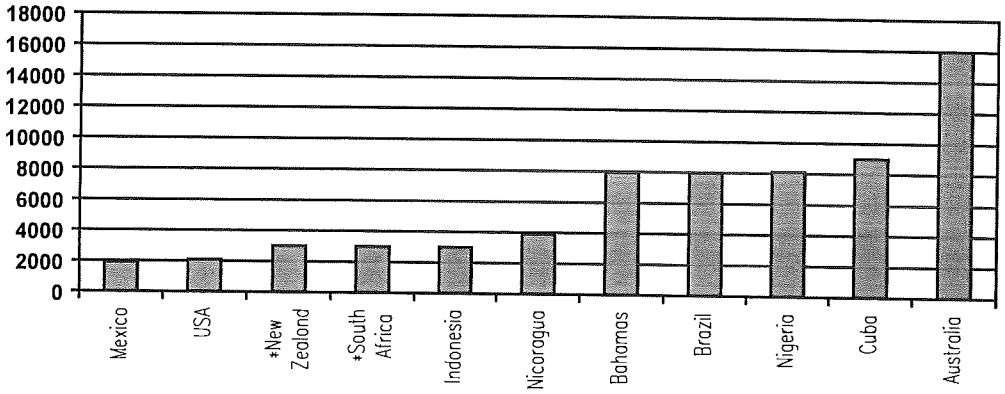
Australia and New Zealand, compared to major world producers for all lobsters (homarus, spiny, slipper).



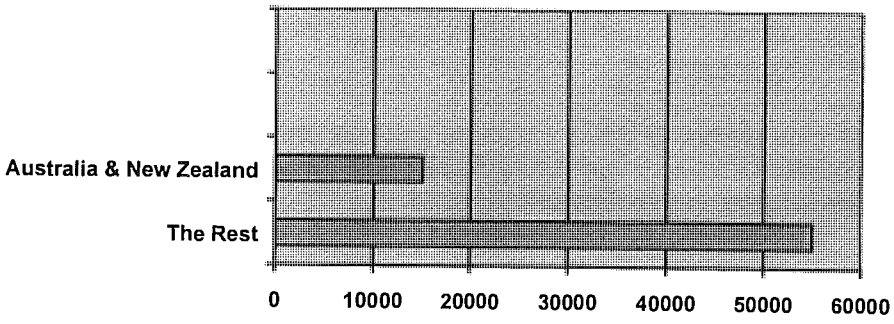
Australian and New Zealand combined production compared to the rest of the world.



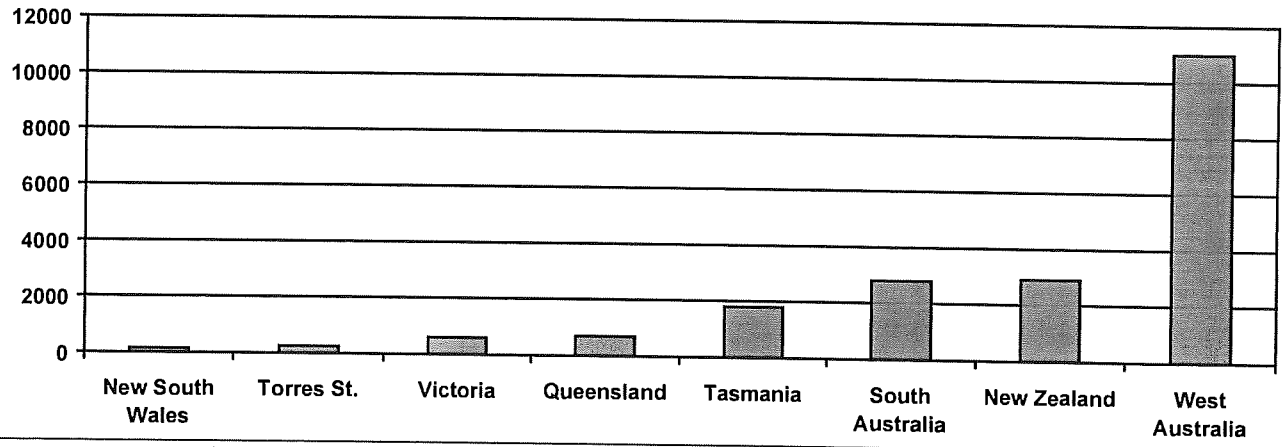
Australian and New Zealand compared to major world producers of Spiny Lobsters.



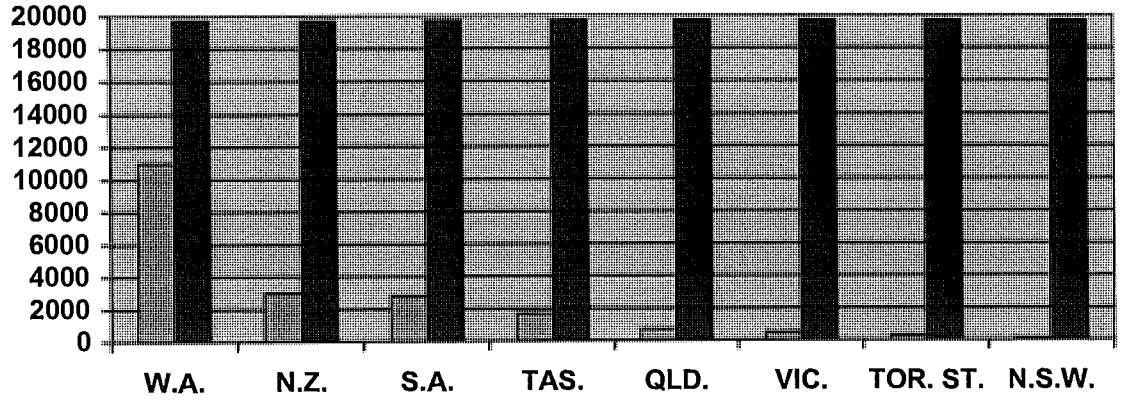
Australian and New Zealand combined production compared to the rest of the world's Spiny Lobster production.



New Zealand and Australian States production comparison.



New Zealand and Australian States production compared to Australasian total.



The Current Situation

There is generally a perception that our industries are fairly buoyant. We are getting good prices for our product – at times prices are quite staggering! Even highs of US$40.00 per kilogram!

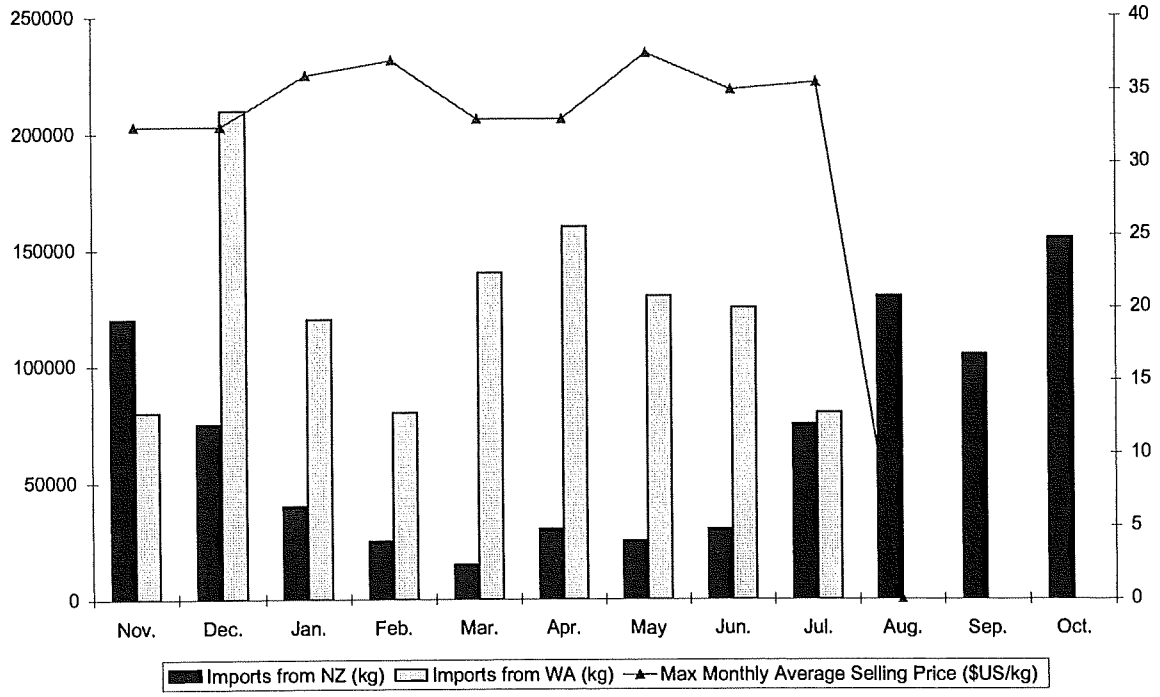
But who is in control?

Are we strategic Marketers or are we just 'price' or 'opportunity' takers? A "Price Taker" could be deemed to be one that takes the best price at the time of offer. An "Opportunity Taker" could be seen to be one that waits for the best opportunity to sell. The "Price Taker" is at most times at the mercy of the next best option. In a period where supply exceeds demand he is vulnerable. An "Opportunity Taker" is only effective when the 'window of opportunity' is open.

Windows of Opportunity

In the international market place there are periods which exist, from year to year, when demand tends to exceed supply. They are many and varied and we know some of them: Chinese New Year, Christmas in Japan, July when the Western Australian industry closes, May/June in Hong Kong/China, pre-Christmas in France. They mainly apply to non-frozen product. Ten or more years ago the whole year was a 'window of opportunity' for live lobster. Look at it now!!

The 'windows of opportunity' are gradually closing!



Figures indicate that Japan can take about 200 tonnes/month. Western Australia now exports about 1100 tonnes of 'A' size but has available 3600 of 'A' size. Western Australia has the ability to close *all* windows of opportunity in Japan. When the window of opportunity closes, supply exceeds demand and the live lobster price plummets.

Can a way be devised to stay just below the critical point where supply equals demand?

The Price Taker

When the window of opportunity closes, the seller becomes nothing more than a price taker, and the price taker is vulnerable to the point where his product sells at or just above the level of the next best option We have all seen situations where the processor down the road will drop his price to ensure a sale –so that at least he has quit his product before the price falls again. This happens between processors in the one location and also between countries. The price falls to the point where the product (e.g. live) gives a return less than the next best option (e.g. boiled frozen); so the next best option is taken. In periods of very high supply what was the next best option falls to the value of the now next best option (e.g. boiled to tails).

Is there a solution?

In periods of high supply, sellers must turn their attention to raising he lowest option. Almost be definition, the largest volume of sales takes place at the lowest price.

Can we lift the lowest option?

An example relative to tail production indicates that we can, but it requires cooperation and commitment among all suppliers to the particular market in question.

Therefore, can we to some extent become price makers, not price takers?

Yes! – but it requires co-operation!

Back to looking at leaving windows of opportunity open or staying just below the point where supply is greater than demand; can this be achieved?

It can; but it would mean a level of co-operation never before experienced.

A Major Drawback

The fisherman is king! Now matter what effort the processor makes to lift the return, any gain finds its way to the fisherman. The processor has little motivation to change the system if there is nothing in it for him. This is a major drawback when initiating a new concept.

Conclusion

The international lobster market is big! – probably bigger than most of us thought. Internationally all lobster producers are getting better at what they do, and the windows of opportunity are closing; therefore we are more and more becoming the 'price takers'.

If an individual State (or New Zealand) is able to institute positive change, the effect of that change will be nullified from outside – i.e. by another State.

Collectively on an international basis we are not very big, but individually we are minute.

At the moment, within the States or nationally we have no marketing strategy other than to take the highest price of the day or dive through the ever closing windows of opportunity.

The leaders of our industry must make some attempt to bring together the lobster industries of Australia and New Zealand to at least identify the problems that we are facing and plan a strategy for the future.

Pulling Together the Threads

Dr Gary Morgan
Director of Fisheries, Primary Industries and Resources South Australia

When I look at my role here for the next 10 minutes, it's listed down as 'pulling the threads together'. So I guess I feel a little like whatever the male equivalent to a seamstress is, sitting in a cotton field, wondering, 'Where the hell do you bloody start?'

Because I think this conference, in my mind, and I"ve been to quite a few of them over the years, has been probably one of the most stimulating, professionally run, obviously, and invigorating conference that I think I've ever been to. I think there have been so many threads, so many ideas that are coming out, that we'll all go away from this conference with something from it.

However, the conference, in my mind, really comes down to a number of key points. I think it was Murray Hird who was talking about a three-legged stool, so I've sort of fudged the three-legged stool a little bit. I really want to sum this Congress up under 3 main headings:

- **sustainability**
- **access of allocation**
- **quality and safety**

First of all, the sustainability issue. I think we all talk about sustainability. We all think we know what sustainability is and many of our fisheries think that we've actually achieved sustainability of our resource. But I think what has been apparent from this Congress and from other issues that are coming across my desk on a daily basis, is that this sustainability, increasingly, is not only about the sustainability of our rock lobster resources, but it's increasingly about the sustainability of the resource and the environment in which they live.

The issue of a broader public perception of what is sustainability, and this includes issues such as biodiversity, is something that we can't ignore. I think the industry is addressing it and I think the way the industry is addressing it by being proactive in the discussion is an appropriate response.

Sustainability can also mean a number of things to a rock lobster industry, not the least of which is that it does confer a market advantage to those fisheries who do address this broader issue, this broader definition of sustainability.

The marketing in places like Europe and North America are increasingly being influenced by the community perceptions of wanting to ensure that the things that they're eating are coming from sustainable fish stocks, that they're caught in a way which is environmentally sensitive. This is increasingly leading to a range of environmental accreditation schemes which, in some countries, are almost becoming mandatory.

What I think is currently missing in Australia, even though the seeds are starting to... I was going to say grow, but I think they've just about been sown and we're not sure whether to pee on them or whether to water them, but the seeds of a common understanding, with all user groups, that's the recreational sector, the conservation groups and the community at large, as well as the commercial industry, of what is sustainability. What do we, as a community, want to get out of the resource to ensure that it is still there for future generations? In the process, there ought to be a very viable commercial fishery, as part of that, and that I think will convert into market advantage for those fisheries who are able to take that view.

The sustainability indicators that this implies are starting to be developed, as I mentioned. I think, over the next few years, we're going to see some very interesting debate, and hopefully at the end of it, a consensus, of exactly what are the indicators that we ought to be fishing to?

The second issue I think is probably the major one that's confronting us at the moment, and that's the one of access and allocation. The allocation issue between industry, recreational sector, conservation groups and others, is coming to a head, not only in the way in which the initial allocation of bits of the resources, but most importantly about how changes in allocation shares ought to be handled.

It's a little bit like a pre-nuptial agreement. I notice the other day it has now been legislated for that we ought to have a pre-nuptial agreement with all the user groups, regarding how we handle changes in allocation of what is always going to be a limited resource for all of us.

Daryl Sykes, during the last few days, mentioned the application of market mechanisms for handling the changes in allocation, changes in shares between recreational and commercial groups. I think that sort of approach has certainly got a lot going for it.

The issue of security of access has come through as a constant theme over the last few days and it's a security of access, not only for commercial fishers who have a large investment in their businesses, but as the 2 million people who called us last Monday week will testify, there's also concern about security of access to the resource from the recreational sector.

On the commercial side, the talk by Murray Hird, I thought, provided some very interesting insights on what might be some of the implications, as we move down the track, of better defining and strengthening that access security for commercial users of the resource. To me, one of the things that we are still to address in any sort of detail is that a more secure access right will eventually imply a trade-off between capital growth and return on investment. As an industry and as individual fishers, the question of whether you want a large capital growth in the underlying value of your licence, or whether you want a good return on income, I think is going to be a key policy question that we're going to have to deal with as part of the discussion on strengthening access rights.

Today's session has been focussing on the third theme of what I think are the 3 main themes of the Congress, and that is the marketing and trade issues – I've summed it up as quality and safety. There's a clear need for the commercial industry to fish smarter, not harder, and most particularly to fish to the markets. I think it was a nice phrase that was mentioned during the last few days that was, 'You don't make any money catching fish, you make money selling them.'

I think the information and experience that's now been brought to forums such as these, of marketers and processors and financial people, ought to be used to adjust fishing practices so that you are able to fish to the market, fish to what the consumer wants, thereby increasing your returns on investment while, at the same time, retaining that sustainability of the resource which underpins everything.

More flexible management arrangements are making these sorts of things possible, and I think the way of the future is going to be providing a management environment where this fishing to the market can more easily occur. So the three themes of sustainability, access and allocation and quality and safety – I put safety there deliberately, even though we haven't really talked about it, because the food safety issue, again, is a major emerging one for the food industry, worldwide. In my view, it can't be separated from the quality issue.

I think those three themes of sustainability, access and allocation and quality and safety are something that a government conference on the lobster industry probably would have come to the same sorts of conclusions. What I think has changed in this particular Congress and what is changing worldwide, is not so much different themes, but how these issues of sustainability, access and allocation and quality and safety are being delivered.

There has been a long tradition that many of these things are government functions only. In some countries, there have been industry only functions. I've had the advantage over the past years of seeing a number of fisheries regimes in action around the world. When I sit back and think, 'What is it, what is the best way of delivering those three points of the three-legged stool?' the one common theme that comes across. When government only does it, it doesn't work. I can think of a number of examples where government has really stuffed it up. On the other hand, I can also think of many examples where, particularly in developing countries, where industry only approaches don't work either.

If we think about that for a little while, it ought to be logical, that simply industry and government have different views and different timescales to these problems.

What I have seen work and those of you who know me, know that I am absolutely dedicated to, is industry-government partnerships. I think these partnerships do work in delivering a sustainability, delivering us good access and allocation outcomes and delivering us an environment where commercial fisheries can maximise quality and safety issues to the benefit of the consumer.

Picking up those points, as I walked in here, I believe there have been some resolutions adopted by the Congress, which are about to be done.

I think the theme of this Congress has been managing your destiny. I think there's been a number of broader changes that are happening globally, particularly in the way in which governments operate and the sorts of things governments are involved in, which now make managing your destiny a possibility. I think the opportunity is certainly there for more industry self-management. Governments will never be out of the picture and as I said I don't believe they ought to be. The issue of government-industry partnerships is, in my view, the best way of delivering outcomes for both the resource and the commercial industry, but the opportunities are there for the commercial industry to manage their own destiny.

Like other responsible industries the opportunity is there, but it's up to you. I think your destiny is certainly in your hands and I think the environment is conducive to that greater move towards self management.

Before I finish, and we get onto the resolutions of the Congress, I would certainly like to very sincerely thank the organisers of the Congress. I think Roger Edwards and the rock lobster industry from South Australia are a living testament to how professional this industry can be. This has been a professionally organised Congress from a very professional industry.

Last but not least, I'd like to thank you all as participants in this because, at the end of the day, without you and without your active participation and questioning of the speakers, the Congress wouldn't have achieved the outcomes that I certainly think it has.

So thank you all and I'll look forward to seeing you all at the dinner this evening.

APPENDIX 2

List of Staff

Congress Staff

Project Manager: ..... Roger Edwards

Event Management: ..... Carolyn Anderson

Project Administrator:..... Karen Raymond

APPENDIX 3

Promotion and Registration Materials

3rd INTERNATIONAL
LOBSTER
CONGRESS

SEPTEMBER 21-24, 1999
ADELAIDE, SOUTH AUSTRALIA

Manage your destiny

Stamford Grand Hotel

Adelaide

South Australia

3rd International Lobster Congress

Invitation to attend

Dear Lobster Industry people

We, the Rock Lobster Industry of South Australia and the State Government of South Australia, would like to invite you to the 3rd International Lobster Congress which is set to be a watershed for the lobster industry, globally.

The Congress has been specifically designed with a blend of practical yet key issues which directly affect lobster fishers' business all over the world. This has been mixed with a blend of science, management and markets to come up with a program which we believe will provide tremendous benefits whether you are a fisher, manager, scientist or marketer.

We are proud to be following on from the lead set by the Americans, who hosted the first and second International Lobster Congresses in the early 90s. We look forward to achieving a similar standard in Australia in 1999.

The Congress will also feature ropes, floats, pots and boats.

We expect up to 700 participants from around the globe.

You can also take part in various activities, detailed in this brochure. In particular, we draw your attention to South Australia's magnificent wine regions and the timing of the Congress, which has been especially chosen to link up with the famous Australian Rules Football National Grand Final in Melbourne, Victoria.

There will be the dockside Fishermen's Frenzy to celebrate the lobster season launch and the opportunity, from 1 October, to join our industry on the water and see how lobstering is done in South Australia.

We urge you to join industry and government in what will be great for your business and markets and an outstanding opportunity to network with the global lobster industry.

Yours sincerely

Daryl Spencer
Director
South Australian Rock
Lobster Advisory Council
(SARLAC)

Gary Morgan
Director of Fisheries
Primary Industries and
Resources South Australia
(PIRSA)

The Issues

Secure access to the lobster resource world wide is emerging as the single most important impediment to long term investment in the industry and incentive to conserve the resource.

The resource sharing challenges facing industry, managers and scientists from conservationists and recreationals will be tackled. Industry responses and global initiatives will be presented and hotly debated.

The global push to a representative system of marine parks will be assessed from a number of angles. What are the conservation benefits? Are parks a useful management tool? What is eco-systems management and bioregionalisation? These are a few of the questions that need to be answered.

Industry as managers? A pipe dream or reality within view? There are major success stories you need to know about and the quota versus input controls debate could last all week!

In a secure environment with sustainable stocks, ***development beyond the wharf*** comes into play. A 'Water to Waiter' snapshot will be taken throughout the Congress, touching on post harvest handling, processing and lobster culture.

The Congress will conclude with a species 'taste off' and ***exporter/importer exchange***.

Some Key Speakers

Michael De Alessi - author of Fishing For Solutions will give the keynote address, 'Resource Conservation and Private Management Solutions'.

Sir Tipene O'Regan - Chair of Waitangi Treaty Commission, New Zealand, will give the opening address, 'Resource Sharing and Indigenous Issues'.

Dick Allen and Stuart Beaton - lobster fishers from the US and Canada will show that 'Industry Does Have a Future in Management'.

Daryl Sykes - Executive Officer of the New Zealand Rock Lobster Association will show how the market can fix sharing with recreationals.

Ted Loveday - President of the Queensland Commercial Fishermen's Organisation will answer the question, 'Marine Parks - Multiple Use or Industry Abuse?'

Trade Display & Posters

The Congress will feature a range of boats, ropes, floats, electronics and other state of the art technology, with the new Scania engine on display. The display will include science and education service providers' information and presentations.

We are also bringing together a display of pots from around the globe as part of a poster session profiling the great lobster fisheries of the world.

Congress Venue

The Stamford Grand Adelaide
Moseley Square, Glenelg,
South Australia
Telephone: +61 (8) 8376 1222
Facsimile: +61 (8) 8376 1111

The Stamford Grand Adelaide reflects a character reminiscent of the grand European hotels of the Victorian era and is situated in the heart of seaside Glenelg. The hotel is located on absolute beach-front, only 20 minutes from the city and 10 minutes from the domestic and international airports.

This resort style hotel is surround a huge range of recreational activ seven day shopping, movie theat cafés and an historic tram to the The hotel has an incredible choice food and beverage facilities plus outdoor heated swimming pool, s and sauna.

Key Dates

Early bird registrations: close o 30 July 1999.

Late registrations: a late fee ma be charged for registrations after 6 September 1999.

Sponsors

The 3rd International Lobster Congress is hosted by the South Australian Rock Lobster Advisory Council (SARLAC) and Primary Industries and Resources South Australia (PIRSA).

The Congress is sponsored by:

- **Fisheries Research & Development Corporation - *Major Sponsor***
- Westpac Banking Corporation *Major Corporate Sponsor*
- Australian Fisheries Academy
- Australian Maritime College
- Mountadam Vineyard
- K&S Diesel Power
- Scania (Australia) Pty Ltd
- South Australian Research & Development Institute (SARDI)
- West Coast Insurance Brokers Pt
- Ansett Australia
- Western Australian Fishing Industry Council (WAFIC)
- Seafood Council (SA) Ltd
- Yalumba
- Bickford's
- University of Maine
- Horwath (SA) Pty Ltd - Charter Accountants, Business Advisors
- The University of Adelaide
- Ocean Baits Australia Pty Ltd

Pre Congress International Lobster Health Symposium - Optional

Sunday 19 - Tuesday 21 September 1999	
Sunday: 7.00pm	Welcome Function – SARDI Aquatic Sciences
Monday: am	Crustacean Stress and Immunity - Application of Stress and Immunity Studies to Aquaculture and Post Harvest Handling
Monday: pm	Lobster Live Export
Tuesday: am	Health Management in Lobster Aquaculture and Long Term Holding of Wild Caught Stock
Tuesday: pm	Lobster Health Management Case Studies

Official Provisional Program – Major Sponsor FRDC

Tuesday 21 September 1999	
3.00pm – 8.00pm	Congress Registration
6.30pm – 8.00pm	Ice Breaker Reception – Stamford Grand Hotel

Wednesday 22 September 1999		
	Theme: Water to Waiter – Sponsor Australian Maritime College	
8.00am – 6.30pm	Registration Desk Open	
9.00am	Official Congress Opening; Deputy Premier of South Australia, Hon Rob Kerin MP	
9.15am	Major Sponsor Address	
9.30am	Leading the Way – Lessons from the Australian Wine Industry	
10.00am	**Coffee and Trade Display**	
10.30am	Quality & Markets: Water to Waiter – Sponsor Australian Fisheries Academy	
10.50am	Survival & Condition	
11.10am	Lobster Processing & Product Utilisation	
11.30am	Food Safety and Training	
11.50am	Panel	
12.30pm	**Lunch and Trade Display**	
	Theme: Lobster Culture *Concurrent Sessions*	**Theme: Management**
1.15pm	Holding Systems	Up to 6 submitted papers with open discussion forum. *Please submit abstracts by July 1 to Congress Management, see page 9*
1.45pm	Puerulus and Sub Legal Growout – An Industry View	
2.00pm	Re-seeding and Stock Enhancement	
2.15pm	Lobster Health	
2.30pm	Panel	
3.15pm	**Coffee and Trade Display**	
4.30pm – 6.30pm	**Port Visit – Maritime Museum Lobster Industry Display**	
7.00pm – late	Fishermen's Frenzy and Season Launch A Great Aussie BBQ, Dockside, North Parade, Port Adelaide with boat inspections.	

Official Provisional Program (continued)

Thursday 23 September 1999

Theme: Resource Sharing – Sponsor Westpac Banking Corporation

8.30am – 6.30pm	Registration Desk Open
9.00am	Keynote Address – Indigenous Issues
9.30am	Recreational Rights and Responsibilities
10.00am	**Coffee and Trade Display**
10.30am	Sharing with Recreationals – A Market Led Solution
10.50am	What Do Scientists Offer?
11.10am	What Value that Lobster? – the Market, Tourists, Parks and Recreationals
11.30am	Investor Confidence
11.50am	Panel
12.30pm	**Lunch and Trade Display**

Theme: Industry Management – Does It Have a Future? – Sponsor WAFIC

1.30pm	The Politics of Lobster Fishing
1.50pm	Industry Dreams Do Come True
2.10pm	The Great Management Debate - Input Controls vs Quota
2.50pm	Panel
3.30pm	**Coffee and Trade Display** **Great Lobster Fisheries of the World – Posters and Pots**
7.00pm	Optional - Grazing On Gouger, tram travel to Adelaide's prime eating street

Friday 24 September 1999

Theme: Conserving Industry and the Ocean – Sponsor Seafood Council (SA) Ltd

8.30am – 6.30pm	Registration Desk Open
9.00am	Keynote Address – Resource Conservation and Private Management Solutions
9.40am	Industry Environmental Stewards
10.00am	**Coffee and Trade Display**
10.30am	Marine Parks – Sustainable Use or Multiple Abuse? - A Conservation View
10.45am	Marine Parks – Multiple Use or Industry Abuse? - An Industry View
11.00am	Marine Parks – Biological Effects and Management Tools
11.15am	Eco-systems Management
11.30am	Panel
12.30pm	**Lunch and Trade Display**

Theme: Markets and Trade

1.30pm	Markets – Importer's View
1.50pm	Markets – Exporter's View
2.10pm	The New Trade Barriers
2.30pm	Panel
3.00pm	Pulling Together the Threads
3.15pm	**Coffee and Trade Display** **Great Lobster Fisheries of the World – Posters and Pots** **• Trade Display – Holding Tanks All Species** **• Trade Delegations and Exchange with Exporters**
6.30pm	'Food For the Future': Species Taste Off and Species of the Year Award Pre Dinner Drinks
7.00pm	Congress Dinner

The Organising Committee reserves the right to amend the provisional program.

Optional Pre Congress Symposium

International Symposium on Lobster Health Management

Adelaide, 19-21 September 1999

About the Symposium

An International Symposium on Lobster Health Management will be held at the South Australian Research and Development Institute (SARDI), 2 Hamra Avenue, West Beach, from Sunday, 19 September to Tuesday, 21 September, 1999.

The Symposium will precede the 3rd International Lobster Congress and will comprise four sessions.

The Program

Crustacean Stress and Immunity – Application of Stress Immunity Studies to Aquaculture and Post Harvest Handling (Monday, am), Lobster Live Export (Monday, pm), Health Management in Lobster Aquaculture and Long Term Holding of Wild Caught Stock (Tuesday, am) and Lobster Health Management Case Studies (Tuesday, pm).

Key Speakers

Key speakers at the Symposium will include Professor Kenneth Söderhäll, University of Uppsala, Sweden, an international authority on crustacean immunity, Professor Bob Bayer, Lobster Institute, University of Maine, USA, an international expert on lobster health management and Professor Rick Cawthorn, Atlantic Veterinary College, University of Prince Edward Island, Canada, director of the Lobster Health Research Centre, the mandate of which is to apply the principles of veterinary medicine to the post harvest sector of crustacean fisheries and crustacean aquaculture, in particular clawed lobsters.

Further Information

For symposium announcement brochures and further information contact the **Symposium Secretary**, Aquatic Science Research Unit, Curtin University of Technology, **telephone +61 (8) 9266 4400** or **fax +61 (8) 9470 5815**. Registration fees are A$150 for full registration and A$75 for one day attendance. Please register direct with the Symposium Secretary if not attending the Congress. For Congress delegates the Symposium registration fee is A$75 (see page 11). A late fee may apply after 6 September 1999.

Call for Abstracts

Abstracts should be submitted to the Symposium Secretary prior to July 1, 1999 in the format recommended in the symposium announcement brochure.

Sponsored by:

- Fisheries Research and Development Corporation (FRDC)
- South Australian Research & Development Institute (SARDI)
- South Australian Rock Lobster Advisory Council (SARLAC).

Social Program

Ice Breaker Reception

Tuesday 21 September

Time 5.30pm – 7.30pm

Cost Inclusive for delegates, A$30 for guests

Location Stamford Grand Hotel

It is hoped all delegates, partners and exhibitors will attend this relaxed evening. Join old friends and make new acquaintances with personalised hospitality from the South Australian Rock Lobster Advisory Council.

After the Cocktail Party, we recommend you choose one of the restaurants in the Glenelg area. Over 40 restaurants, specialising in a large range of food, are within walking distance of the Stamford Grand Hotel. Whether you are looking for an à-la-carte restaurant, outdoor café or simply want to enjoy some tasty take-away fish 'n' chips on the beach – you will find it all at Glenelg. Full details will be available from Registration.

The Fishermen's Frenzy and Season Launch

Wednesday 22 September

Time 7.00pm

Cost A$30

Location Fishing Industry House, Dockside, North Parade, Port Adelaide

From 4.30pm Fishing Industry House will be open to delegates and you are invited to view this outstanding facility which houses the Australian Fisheries Academy. Also within walking distance is the Maritime Museum, which is acclaimed as one of the best in the world. Extending over three distinct sites, the Museum includes two floating vessels and a South Australian Lobster Industry Exhibition. Other points of interest at the Port include: Port Dock Station Railway Museum, Port Dock Brewery Hotel, Lipton Street Café plus a heritage area and antique shops.

Maps of Port Adelaide and information about the free shuttle bus service from Glenelg to Port Adelaide will be available from Registration.

7.00pm Local fishermen will provide a night to remember – from the sumptuous South Australian seafood to the spectacular setting and guaranteed good time! The evening will include an opportunity to meet skippers and deckhands from the South Australian Rock Lobster fleet as we launch the 1999–2000 season.

Social Program (continued)

Grazing on Gouger (Optional)

Thursday 23 September

Time 6.30pm

Location Tram Stop outside the Stamford Grand Hotel

Ride the chartered tram from the doorstep of the Grand to Victoria Square in the heart of the city. Wander along cosmopolitan Gouger Street and dine at any of the superb restaurants.

After dinner, it's just a quick taxi ride across to the Casino for some late night fun.

Maps of Adelaide (including Gouger Street and other highlights in Adelaide) will be available from Registration.

To book your complimentary seat on the chartered tram to Gouger Street, please fill in the appropriate section on the Registration Form.

Congress Dinner

Friday 24 September

Time 6.30pm

Cost A$60 (includes 3 course meal and drinks)

Location The Grand Ballroom, Stamford Grand Hotel

We hope all delegates and their guests will attend this glittering finale and make it a memorable evening.

Dress Jacket and tie.

After Dinner Speaker 'A Mainstream Extremist?' – Dr John Wamsley

Pre and Post Touring

Bunnik Travel is delighted to be the official travel agency for the 3rd International Lobster Congress and is proud to showcase our beautiful city and state whilst you are here. We have selected a number of very special day tours which feature the best of what Adelaide and South Australia has to offer.

In addition to this, we are able to arrange other, tailor-made tours both within SA and around Australia, thereby allowing you to combine this conference with a small holiday. All our staff at Bunnik Travel are committed to providing you with the very best service and look forward to welcoming you to Adelaide.

Kind Regards
Dennis Bunnik, Bunnik Travel

Suggested pre and post tours include:

- Australian Football League Grand Final
- Adelaide Hills, Southern Vales and Barossa Valley wine regions
- Kangaroo Island
- Whale Watching
- Hunting trips
- Red Centre Camping Safari

To book pre and post tours or for more information please contact Dennis Bunnik, from Bunnik Travel on Tel: +61 (8) 8359 2295
Fax: +61 (8) 8359 2305
Email: bunniktl@senet.com.au

Further information is also available on the industry web site http://www.rocklobster.org.au

Rock Lobster Fishing Trips

Special tours for members of the Rock Lobster Industry have been developed to visit fisheries in South Australia and Western Australia. Please contact Karen Raymond from the South Australian Rock Lobster Advisory Council on kraymond@gazebo.os.com.au for further information.

Partners' Activities

Bunnik Travel believe that just because the delegates are out enjoying themselves at the Congress it doesn't mean you shouldn't have some fun. Several tours for partners have been organised to entertain, excite, educate and relax you during your stay in Adelaide. These include a Cook's Tour of Asia, a Shopping Tour, Market Adventures, Southern Highlights and the Ultimate Indulgence!

To book partners' activities, or for more information, please contact Dennis Bunnik, from Bunnik Travel on Tel: +61 (8) 8359 2295
Fax: +61 (8) 8359 2305
Email: bunniktl@senet.com.au

Further information is also available on the industry web site http://www.rocklobster.org.au

Accommodation Options

The seaside suburb of Glenelg, location of the Congress, has several excellent accommodation options available. The official hotel and venue of the 3rd International Lobster Congress is the Stamford Grand Hotel. Bunnik Travel has also negotiated special conference rates at several other accommodation options within walking distance of the Grand Hotel. These rates are also available before and after the Congress if you are able to extend your stay and enjoy our beautiful city.

To book accommodation, or for more information, please contact Dennis Bunnik, from Bunnik Travel on Tel: +61 (8) 8359 2295
Fax: +61 (8) 8359 2305
Email: bunniktl@senet.com.au

Further information is also available on the industry web site http://www.rocklobster.org.au

Travel

Domestic Travel

Ansett Australia is delighted to have been chosen as the official airline for the 3rd International Lobster Congress. Delegates will be given access to a special Congress airfare that represents up to 45% off the full economy fare. This fare is subject to seat availability at the time of reservation. The fare is fully refundable and does not require a minimum or maximum stay. To ensure that you are advised of all fares and services available, please contact your nearest **Ansett Australia** reservations office and quote the master file number below. **Telephone 13 13 00 Australia wide**.

Or if you prefer, book through your local Travel Agent and ask them to contact Ansett reservations office to quote the following master file number:

Master file N°: MC06607

International Travel

We welcome our International delegates to the Congress. For all your travel requirements, may we suggest utilising the seamless travel experience provided by our Star Alliance partners. Wherever you are travelling, the Star Alliance group will get you there with the minimum of fuss. Members of the Alliance are:

- Air Canada
- Ansett Australia
- Scandinavian Airline Systems
- United Airlines
- Air New Zealand
- Lufthansa
- Thai Airways
- Varig

Please see your local Travel Agent to book your Star Alliance experience.

Transport

Transport from the Adelaide Airport to the Stamford Grand Hotel

The Stamford Grand Hotel is only 10 minutes from both domestic and international terminals.

Taxis cost between A$12 – A$15 Suburban Taxis. Tel: 13 10 08

Smartcars (an executive passenger service) cost A$13.50. Tel: 8285 8555

Transport from the Stamford Grand Hotel to the City

The Stamford Grand Hotel is approximately 20 minutes from the heart of the city.

Trams (from outside the front door of the hotel) A$2.70. Tram timetables are available from the Concierge in the foyer of the Stamford Grand Hotel.

Taxis cost between A$15 – A$20. Tel: 13 10 08

Smartcars cost A$17.50. Tel: 8285 8555

Parking

Parking at the Stamford Grand Hotel is available for hotel guests for A$10 for 24 hours.

Parking at the Stamford Grand Hotel is available for Congress delegates for A$6 per day (9.00am – 6.00pm) upon presentation of Congress name tag to parking attendant.

Climate

South Australia has a mild, mediterranean climate. The Congress venue is located on the seafront and delegates can expect cool sea breezes at night. Average temperatures for September range from a minimum of 9.4°C to a maximum of 18.5°C.

Timing

South Australian Rock Lobster Season

The 3rd International Lobster Congress has been timed to coincide with the opening of the South Australian Rock Lobster season. Lobster fishing trips in South Australia can be arranged for delegates – please contact Karen Raymond. *See Congress Management section for details.*

Tasting Australia

The Congress will be followed by Tasting Australia to be held in Adelaide from 4 - 10 October. Tasting Australia is a week long festival of the finest Australian produce, which attracts food and wine professionals, over 150 national and international food and wine media and 30,000 members of the public.

For further information about Tasting Australia please contact Karen Raymond. *See Congress Management section for contact details.*

Australian Football League (AFL) Grand Final

A highlight in the Australian sporting calendar is the AFL Grand Final held in Melbourne on Saturday 25 September. Post Congress tours to Melbourne can be organised through the official Congress tour operator, Bunnik Travel. *Please see the Pre and Post Touring section for contact details.*

Congress Proceedings

Proceedings will be provided in an electronic format to delegates as part of their registration. These will be emailed to delegates after the Congress.

Congress Management

For further information please contact **Karen Raymond** from the **South Australian Rock Lobster Advisory Council** (SARLAC).

12 Greenhill Road, Wayville,
South Australia, 5034, Australia
Email: kraymond@gazebo.os.com.au
Telephone: +61 (8) 8272 7766
Facsimile: +61 (8) 8272 7767

Please note: the preferred method of communication is via email.

The staff at the Registration Desk will be happy to assist you with any queries. Please refer to the Provisional Program for the Registration Desk hours.

Registration Fees

The delegate registration fee includes:

- Entry to all sessions
- Morning tea, lunch and afternoon tea each day of the Congress
- Ice Breaker Reception
- Proceedings
- Access to Trade Exhibition

Partners' registration fee includes:

- Entry to all sessions
- Morning tea, lunch and afternoon tea each day of the Congress
- Ice Breaker Reception
- Access to Trade Exhibition

Method of Payment

Payment of fees must accompany all registration forms.

All cheques must be made payable to SARLAC. Bank cheques must be drawn at any major branch of an Australian Bank in Australian dollars.

Credit cards accepted are Master-Card, Visa and Bankcard and credit card payment can be made through the industry web site.

Cancellation Policy

All cancellations or alterations should be put in writing or by email to Congress Management.

If cancellation is received in writing:

Before 30 July 1999 A$100 cancellation fee will be charged.

After 30 July 1999 50% of total monies paid will be retained.

After 6 September 1999 Refund only in exceptional circumstances.

Registration Form

3rd International Lobster Congress • 21 – 24 September 1999

Please register for the Congress on the web site at http://www.rocklobster.org.au

OR

Please complete one form per delegate and return with payment to:

3rd International Lobster Congress
C/- SARLAC, 12 Greenhill Road, Wayville, South Australia, 5034 Australia
Telephone: +61 (8) 8272 7766 **Facsimile:** +61 (8) 8272 7767

Registration will be acknowledged within 5 working days of receipt.

Please contact Congress Management (see page 9 for details) if you do not receive confirmation of your registration within this period.

SECTION A: Personal Details

Title Prof / AProf / Dr / Mr / Ms / Mrs / Miss (please circle) **Given Name** _____

10

Family Name _____ ☐ **Male** ☐ **Female**

Preferred name on badge _____

Institution/Organisation _____

Position Held/Title _____

Address _____

State _____ **Postcode** _____ **Country** _____

Area of interest

☐ **Fisher** ☐ **Processor** ☐ **Service provider** ☐ **Culture** ☐ **Researcher** ☐ **Manager**

☐ **Other, please specify** _____

Telephone: Business _____ **Personal** _____ **Mobile** _____

Facsimile _____ **Email address** _____

Dietary considerations _____ _____

Spouse/Partner

Name (for name badge) _____

Two Ways to Register

Complete Express Registration Form below (to register for the full program)
OR complete Sections B - E

Full Program Express Registration

Express registration for delegates and spouses/partners includes:

✓ Congress Registration

✓ Deposit on accommodation at the Stamford Grand (one night on twin share basis)

✓ Full Social Program: Ice Breaker Reception, Fishermen's Frenzy, Tram Ride, Congress Dinner

	Before 30/7/99	After 30/7/99	Payment
Delegate	A$395	A$495	$ _____
Spouse/Partner	A$330	A$430	$ _____
Optional Symposium _____ Places @	A$75	A$75	$ _____
Total Payment			**$** _____

Pay by cheque
(make cheques payable to SARLAC in A$)

OR

Pay by credit card

Please tick box ☐ MasterCard ☐ Bankcard ☐ Visa

Cardholder's name _____

Card number ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

Expiry Date _____ / _____

Signature _____ **Date** _____

Please forward Section A: Personal Details, this form and payment to:
SARLAC, 12 Greenhill Road, Wayville, South Australia, 5034 Australia

SECTION B: Registration Fees

	Before 30/7/99	After 30/7/99	Payment
Full registration	A$245	A$345	$ _____
Spouses'/Partners' registration	A$180	A$280	$ _____
Optional Symposium _____ Places @	A$75	A$75	$ _____
Payment: Section B			**$** _____

SECTION C: Social Events

(Please mark number of tickets and total value)

____ tickets to the Ice Breaker Reception* Tuesday 21 Sept @ $30.00 each. Total value $ _____

____ tickets to the Fishermen's Frenzy Wednesday 22 Sept @ $30.00 each. Total value $ _____

____ tickets on the Tram to Gouger Street Thursday 23 Sept complimentary

____ tickets to the Congress Dinner Friday 24 Sept @ $60.00 each. Total value $ _____

** included in Full and Spouses'/Partners' registration fees, payment needed for other guests only*

Payment: Section C **$** _____

SECTION D: Total Payment

PAYMENT: SECTION B (Registration Fees) $ _____

PAYMENT: SECTION C (Social Events) $ _____

Total Fees Payable **A$** _____

☐ My cheque, payable to SARLAC in A$ is enclosed

OR

☐ My credit card authorisation is completed below

SECTION E: Credit Card Payment

Please tick box ☐ MasterCard ☐ Bankcard ☐ Visa

Cardholder's Name _____

Card Number ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

Expiry Date _____ / _____

Signature _____ **Date** _____

Please forward Section A: Personal Details, this form and payment to:
SARLAC, 12 Greenhill Road, Wayville, South Australia, 5034 Australia

3rd International Lobster Congress

Manage your destiny

From September 21-24, 1999, the international lobster industry will meet in the beautiful city of Adelaide for the 3rd International Lobster Congress.

This is a congress for the lobster industry run by the industry. Key issues to be dealt with include:

- marine reserves
- resource sharing and access security
- recreationals
- post harvest handling, culture and health.

Add boats, ropes and floats, great lobster fisheries and pots of the world display, trade delegations with species taste off, side trips to South Australia's famous wine regions, lobster fishing and the Australian Football League Grand Final - this is a must for thinking lobster industry fishers, managers and scientists in 1999.

For further information

Contact us on any of the following:
web site http://www.rocklobster.org.au
email kraymond@gazebo.os.com.au
fax +61 (8) 8272 7767,
phone +61 (8) 8272 7766 or
post SARLAC, 12 Greenhill Road, Wayville South Australia 5034.

We look forward to welcoming you in Adelaide!

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AUSTRALIA'S FIRST BAR

Major Corporate Sponsor

Spon

Australian Maritime College

SCANIA

WAFIC
Western Australian Fishing Industry Council Inc.

SEAFOOD COUNCIL (SA) LTD

YALUM
AUSTRALIA'S OLDEST FAMILY O

LOBSTER INSTITUTE
University of Maine

MOUN

Hos

South Australian Rock Lobster Advisory Council

APPENDIX 4

Congress Program

INTERNATIONAL
3rd LOBSTER CONGRESS

SEPTEMBER 21-24, 1999
ADELAIDE, SOUTH AUSTRALIA

Official Program

Manage your destiny

Stamford Grand Hotel

Adelaide

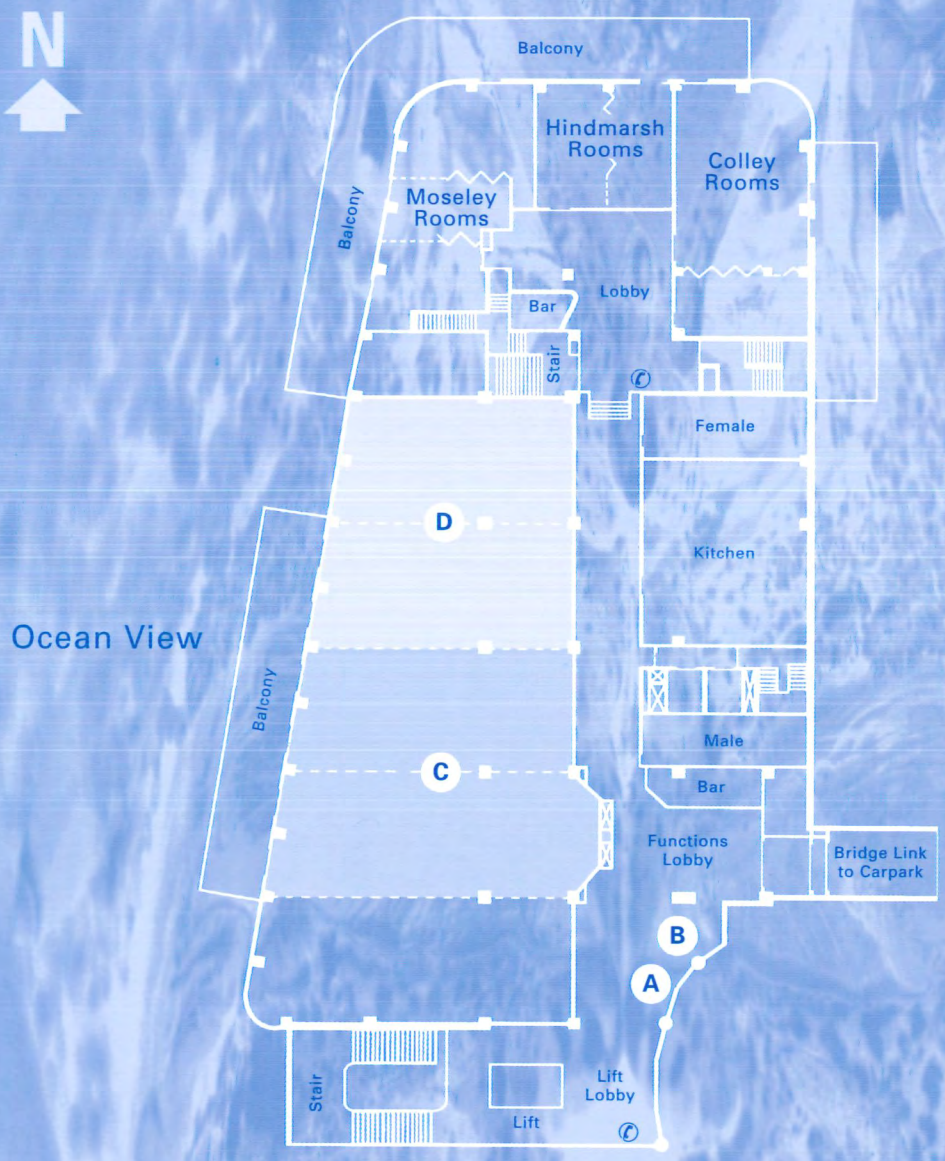
South Australia

3rd International Lobster Congress

SOUTH AUSTRALIAN ROCK LOBSTER INDUSTRY

3rd International Lobster Congress

The Grand Convention Floor Plan
First Floor



A Registration Desk
B Ice Breaker Reception
C Conference Room
D Trade Exhibition and Refreshment Breaks

Welcome

Dear Congress Participant

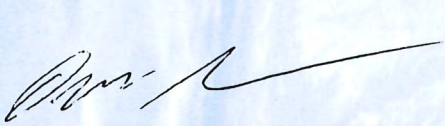
We, the Rock Lobster Industry of South Australia and the State Government of South Australia (PIRSA) would like to welcome you to the 3rd International Lobster Congress.

The Congress has been specifically pitched with a combination of practical yet key issues, which directly affect lobster fishers all over the world as a business. This has been mixed with a blend of science, management and markets to come up with a program which we believe will provide tremendous benefits whether you are a fisher, manager, scientist or marketer.

We are pleased to be following on from the lead set by the Americans who hosted the 1st and 2nd International Lobster Congresses in the early 90s. We hope we can achieve a similar standard this week in Adelaide.

We invite you to enjoy the vigorous social program and we draw your attention to South Australia's magnificent wine regions. The Deputy Premier of South Australia will launch the lobster season on Wednesday evening and you can go lobstering with the fishermen from 1 October. We are sure that the 3rd International Lobster Congress will be great for your business and markets and an outstanding opportunity to network with the global lobster industry.

Yours sincerely



Daryl Spencer
Director
South Australian Rock
Lobster Advisory Council
(SARLAC)

Gary Morgan
Director of Fisheries
Primary Industries and
Resources South Australia
(PIRSA)

General information

Venue

Stamford Grand Adelaide
Moseley Square, Glenelg
South Australia
Telephone: 08 8376 1222
Facsimile: 08 8376 1111

Please refer to map of the venue on inside cover.
The focus of activity for the Congress will be on the first floor of the hotel.

Registration Desk

The registration desk is located on the first floor in the foyer outside the conference room and staff will be at the desk to assist you at the following times:

Tuesday 21 September	**3.00pm – 8.00pm**
Wednesday 22 September	**8.00am – 5.30pm**
Thursday 23 September	**8.30am – 5.30pm**
Friday 24 September	**8.30am – 5.30pm**

Event Organiser Contacts

Carolyn Anderson: 0411 416 417
Roger Edwards: 0418 806 103

Messages and Announcements

There is a message board next to the Registration Desk. All private messages, general housekeeping announcements and changes to the program will be placed here. PLEASE CHECK the message board REGULARLY.

Name Badges

Each delegate to the Congress will receive a name badge on registration. The badge is your official pass and must be worn to obtain entry to all sessions, morning and afternoon teas, lunches and the Icebreaker Reception.

To assist delegates, members of the South Australian Rock Lobster Advisory Council will have red name badges, sponsors can be identified by yellow badges and speakers by blue badges.

Transport

The Stamford Grand Hotel is approximately 20 minutes from the heart of the city. Trams, which leave from outside the front door of the hotel cost approximately A$2.70. (Tram timetables are available from the Concierge in the foyer of the Stamford Grand Hotel.)

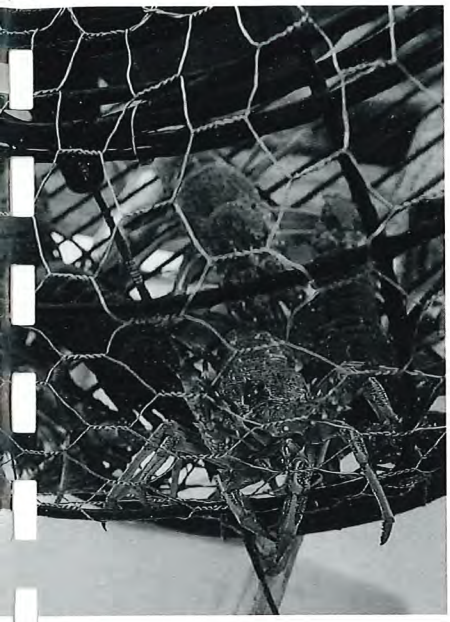
Taxis cost between A$15 – A$20. Telephone: 13 10 08.

Smartcars (an executive passenger service) cost $17.50.
Telephone: 8285 8555.

Parking

Parking at the Stamford Grand is available for hotel guests for A$10 for 24 hours.

Parking is available for Congress delegates for A$6 per day (9.00am – 6.00pm) upon presentation of Congress name tag.



Social Program

Ice Breaker Reception

Tuesday 21 September

Time 6.00pm – 8.00pm

Cost Inclusive for delegates, A$30 for guests

Location Stamford Grand Hotel

It is hoped all delegates, partners and exhibitors will attend this relaxed evening. Join old friends and make new acquaintances with personalised hospitality from the South Australian Rock Lobster Advisory Council.

After the Cocktail Party, we recommend you choose one of the restaurants in the Glenelg area. Full details will be available from Registration.

The Fishermen's Frenzy and Season Launch

Wednesday 22 September

Time 4.30pm & 5.00pm

Cost A$30

Complimentary buses to Port Adelaide (where the Fishermen's Frenzy and the Season Launch will be held) will leave from the Stamford Grand Hotel.

Delegates are asked to assemble at the Concierge desk on the ground floor of the Grand.

Those catching the earlier buses will have an opportunity to visit some of the many features of Port Adelaide, including the Maritime Museum, which is acclaimed as one of the best in the world and houses 'Rock Around the Pot' a history of the lobster industry. Fishing Industry House, the venue for the Fishermen's Frenzy and Season Launch is just a 5 minute walk from the Museum, and will be open to delegates. You are invited to view this outstanding facility which includes the Australian Fisheries Academy.

Other points of interest at Port Adelaide include: Port Dock Station Railway Museum, Port Dock Brewery Hotel, Lipton Street Café plus a heritage area and antique shops.

Maps of Port Adelaide and information about the free shuttle bus service to and from Port Adelaide will be available from Registration.

Time 6.00pm

Location Fishing Industry House, Dockside, North Parade, Port Adelaide.
Local fishermen will provide a night to remember – from the sumptuous South Australian seafood to the spectacular setting and guaranteed good time! The evening will include an opportunity to meet skippers and deckhands from the South Australian Rock Lobster fleet as we launch the 1999–2000 season.

Time 10.15pm

Complimentary return bus travel to the Stamford Grand.

Social Program (continued)

Grazing on Gouger (Optional)

Thursday 23 September

Time 6.30pm

Location Tram Stop outside the Stamford Grand Hotel

Ride the complimentary chartered tram from the doorstep of the Grand to Victoria Square in the heart of the city. Wander along cosmopolitan Gouger Street and dine at any of the superb restaurants.

After dinner, it's just a quick taxi ride across to the Casino for some late night fun.

Maps of Adelaide (including Gouger Street and other highlights in Adelaide) will be available from Registration.

Congress Dinner

Friday 24 September

Time 6.30pm

Cost A$60 (includes 3 course meal and drinks)

Location The Grand Ballroom, Stamford Grand Hotel

Dress Jacket and tie.

After Dinner Speaker 'A Mainstream Extremist?' – Dr John Wamsley

Pre Congress International Lobster Health Symposium

Venue: SARDI, 2 Hamra Avenue, West Beach

Monday 20 September 1999

9.00am	Health Management in Lobster Aquaculture and Long Term Holding
11.00am	Immunity and Health Assessment
1.45pm	Lobster Health Management Studies
3.40pm	Health Management Issues in Lobster Aquaculture

Tuesday 21 September 1999

9.00am	Stress Assessment Techniques
11.00am	Stress and Health Management
2.00pm	Lobster Postharvest and Enhancement
3.30pm	Lobster Live Export

Pre-Conference Meetings

Tuesday 21 September 1999

Workshop 1 **9.30am – 5.00pm**	A Sampling Workshop will be held at the Conference Room. Level 2, Plant Research Centre, Urrbrae.
Annual General Meeting **10.00am**	The AGM of the Northern Rock Lobster Fishermen's Association will be held throughout the morning in the Brighton Room at the Stamford Grand.
Workshop 2 **1.00pm – 5.00pm**	Primary Industries and Resources SA are running a free Rock Lobster Aquaculture Seminar and Workshop on the afternoons of Tuesday 21 and Wednesday 22 September 1999 in the Brighton Room. The Seminar on Tuesday 21, is open to anyone interested in the Fisheries Research and Development Corporation (FRDC) Rock Lobster Enhancement and Aquaculture Sub-program. Speakers include Dr Rob van Barneveld, Dr Piers Hart and Dr Simon Bryars with special guest speaker Prof. Knut Jorstad from Norway. The Workshop on Wednesday 22 will provide an opportunity for members and potential members of the SA Lobster Growers Association (SALGA) to discuss the Association's future. This 2 hour session is aimed at those individuals who are willing to commit to the development and unity of SALGA.
3.00pm – 8.00pm	Congress Registration
6.00pm – 8.00pm	Ice Breaker Reception – Stamford Grand Hotel Official Welcome: *Mr Rob Lewis, Chief Executive South Australian Research and Development Institute (SARDI)*

Official Program (continued)

Wednesday 22 September 1999

8.00am – 5.30pm Registration Desk Open

9.00am Welcome: *Mr Terry Moran, Director SARLAC*

Theme: Setting Our Sights High – Sponsor Fisheries Research and Development Corporation

Chair: Dr Gary Morgan

9.05am Official Congress Opening: *Deputy Premier of South Australia, The Hon Rob Kerin MP*

9.15am Major Sponsor Address: *Mr Peter Dundas-Smith*

9.30am Leading the Way – Lessons from the Australian Wine Industry: *Ms Jane Ferrari, Yalumba*

10.00am **Coffee and Trade Display**

Theme: Water to Waiter – Sponsor Australian Maritime College

Chair: Dr Paul McShane

10.30am Quality and Markets – Water to Waiter: *Mr Tony Gibson*

10.50am Survival and Condition: *Dr Brian Paterson*

11.10am Lobster Processing and Product Utilisation: *Professor Al Bushway*

11.30am Improving Industry by Education Beyond Everyone's Expectations. Our Biggest Challenge for the New Millennium: *Mr Hagen Stehr AO*

11.50am Panel

12.30pm **Lunch and Trade Display**

*Concurrent Sessions	**Theme: Lobster Culture*** ***Chair: Prof Louis Evans***	**Theme: Management Matters*** ***Chair: Mr Daryl Sykes***
1.15pm	Re-seeding and Stock Enhancement: *Professor Knut Jorstad*	South African Management Decision Rules: *Dr Amos Barkai and Dr Mike Bergh*
1.45pm	Holding Systems: *Dr Simon Bryars*	South Australian Input Controls and Quota – 5 years down the track: *Dr Julian Morison*
2.05pm	Puerulus and Sub Legal Growout – An Industry View: *Mr Rodney Treloggen*	Corporate Management: *Dr Alistair McIlgorm*
2.25pm	Lobster Health: *Dr Bob Bayer*	A Corporate Model: *Mr Will Zacharin*
2.45pm	Panel	Panel

3.15pm **Coffee and Trade Display**

4.30pm **Port Visit – Maritime Museum Lobster Industry Display**

6.00pm **Fishermen's Frenzy and Season Launch**

A Great Aussie BBQ, Dockside, North Parade, Port Adelaide with boat inspections.

Hosted by the SA Lobster Industry, Australian Fisheries Academy, Australian Maritime College, with support from Ansett Air Cargo, West Coast Insurance Brokers and Quin Marine.

Official Program (continued)

Thursday 23 September 1999

8.30am – 5.30pm	Registration Desk Open
	Theme: Resource Sharing – Sponsor Westpac Banking Corporation
	Chair: Westpac Banking Corporation
9.00am	Keynote Address – Indigenous Issues: *Sir Tipene O'Regan*
9.30am	Recreational Rights and Responsibilities: *Mr Frank Prokop*
10.00am	**Coffee and Trade Display**
	Theme: Resource Sharing
	Chair: Westpac Banking Corporation
10.30am	Sharing with Recreationals – A Market Led Solution: *Mr Daryl Sykes*
10.50am	What Do Scientists Offer?: *Dr Paul Starr*
11.10am	What Value that Lobster? – the Market, Tourists, Parks and Recreationals: *Prof Tor Hundloe*
11.30am	Investor Confidence: *Mr Murray Hird*
11.50am	Panel
12.30pm	**Lunch and Trade Display**
	Theme: Industry Management – Does It Have a Future? – Sponsor WAFIC
	Chair: Mr Steve Hinge
1.30pm	The Politics of Lobster Fishing: *Mr Dick Allen*
1.50pm	Industry Dreams Do Come True: *Prof Stuart Beaton*
2.10pm	The Great Management Debate – Input Controls vs Quota: *Mr John Fitzhardinge; Mr Alan Gard*
2.40pm	Management Workshop Report: *Mr Daryl Sykes*
2.55pm	Scientist Workshop Report – Data for Management – Industry as Front Line Scientists: *Mr Jim Prescott*
3.10pm	Panel
3.30pm	**Coffee and Trade Display**
	Great Lobster Fisheries – Posters and Pots
6.30pm	Optional – Grazing On Gouger, complimentary tram travel to Adelaide's prime eating street

Friday 24 September 1999

8.30am – 5.30pm	Registration Desk Open
	FRDC Rock Lobster Enhancement and Aquaculture Sub-Program Scientific Committee Meeting (Committee Members only)
	Theme: Conserving Industry and the Ocean – Sponsor Seafood Council (SA) Ltd
	Chair: Mr Dick Allen
9.00am	Keynote Address – Resource Conservation and Private Management Solutions: *Mr Michael De Alessi*
9.40am	Industry Environmental Stewards: *Mr Duncan Leadbitter*
10.00am	**Coffee and Trade Display**
10.30am	Marine Parks – Sustainable Use or Multiple Abuse? – A Conservation View: *Ms Margi Prideaux*
10.50am	Marine Parks – Multiple Use or Industry Abuse? – An Industry View: *Mr Nigel Scullion*
11.10am	Marine Parks – Biological Effects and Management Tools: *Dr Colin Buxton*
11.30am	Eco-systems Management: *Professor Stephen Hall*
11.50am	Panel
12.30pm	**Lunch and Trade Display**
	Theme: Markets and Trade
	Chair: Mr John Fitzhardinge
1.30pm	Markets – Importer's View: *Mr Stu Simmons*
2.00pm	Markets – Exporter's View: *Mr Leith Pritchard*
2.30pm	Panel
3.00pm	Pulling Together the Threads: *Dr Gary Morgan*
3.15pm	**Coffee and Trade Display**
	Great Lobster Fisheries of the World – Posters and Pots
6.30pm	**Food for the Future Species Taste Off and Pre-Dinner Drinks**
7.00pm	Congress Dinner: *Dr John Wamsley*

The Organising Committee reserves the right to amend the program.

Order of Speakers

Icebreaker Welcome

Mr Rob Lewis

Rob Lewis has a research background in marine science, particularly in fisheries population dynamics, stock assessment and life history studies. He has a BSc (Hons) from the University of Adelaide and is currently Chief Executive of the South Australian Research and Development Institute (SARDI).

Rob Lewis has spent 24 years in research and research management. Previously he has been a research scientist, Principal Research Officer and Director of Fisheries in the former South Australian Department of Fisheries.

1973 – Commenced research on rock lobster life history, population dynamics, stock assessment and larval development.
1981 – Principal Research Officer, Department of Fisheries
1987 – Director of Fisheries

Other current activities include Chairman of the Australian Maritime College Council (AMC) and membership of the Boards of the Australian Fisheries Management Authority (AFMA), the Cooperative Research Centre for Aquaculture, the Cooperative Research Centre for Molecular Plant Breeding, the South Australian Advisory Board of Agriculture, the Board of the Faculty of Agriculture and Natural Resource Sciences of the University of Adelaide, the Advisory Board of the Department of Science, University of Adelaide, and Board Director, Airborne Research Australia. He is also a member of a number of professional organisations.

Welcome

Mr Terry Moran
9.00am
Wednesday

Terry Moran is a fisherman with over 30 years' experience in the lobster and trawl fisheries, operating from Beachport in the South East of South Australia. He is Chairman of the South East Professional Fishermen's and South East Trawl Fishing Industry Associations, Director of the South Australian Rock Lobster Advisory Council, industry representative on the South Australian Southern Zone Rock Lobster Fishery Committee and a committee member of the Australian Seafood Industry Council.

Theme: Setting Our Sights High

Chair: Dr Gary Morgan

Dr Morgan is the Director of Fisheries, South Australia. He is responsible for management of all fisheries and aquaculture activities in South Australia, including strategic policy issues for regulation and industry development, compliance, licensing etc. Emphasis has been in the implementation of a greater customer-focussed, cost effective and accountable delivery system for Government services to the broader fisheries and aquaculture industries and Government.

Official Congress Opening

Hon Rob Kerin MP
9.05m
Wednesday

Deputy Premier, Minister for Primary Industries and Resources and Regional Development, Mr Kerin was appointed to Cabinet in December 1995 as Minister for Primary Industries.

Following the October 1997 election he was appointed Minister for Primary Industries, Natural Resources and Regional Development.

In July 1998, he was appointed Deputy Premier of South Australia. Mr Kerin was first elected in December 1993 to represent rural electorate of Frome in the North of South Australia, based on the important regional centre of Port Pirie, and including the Clare Valley. Mr Kerin, aged 45, had wide experience in agribusiness prior to entering Parliament. He was the former Managing Director of Kerin Agencies Pty Ltd, a company that is involved in supplying agricultural merchandise to the State's farming sector.

He was educated in Crystal Brook and Adelaide, and studied economics at the University of Adelaide. Mr Kerin has four daughters: Lauren 18, Hayley 16, Caitlin 13 and Hannah 8. He has been active in a number of sporting associations in the Mid North region as a player and administrator.

Order of Speakers (continued)

Mr Peter Dundas-Smith
9.15am
Wednesday

Major Sponsor Address

'How Industry can manage its R & D Destiny'

The answer is simple, but the first step is the hardest.

First, in partnership with your stakeholders, you need to identify your planned outcomes for R & D. If you get this right, the next steps are easy.

Wine: The Big Picture
9.30am
Wednesday

Leading the Way – Lessons from the Australian Wine Industry

In 1996, the Winemakers' Federation of Australia developed a strategy – STRATEGY 2025 – which was essentially a 30 year plan for the wine industry.

The Industry's vision was that "by the year 2025, the Australian Wine Industry will achieve $4.5 billion in annual sales, by being the world's most influential and profitable supplier of branded wines, pioneering wine as a universal first choice lifestyle beverage." That vision was underpinned by a series of strategies that covered – Image and Influence, Competitive Advantage, Markets, Wine Tourism, Resource Capacity, Profitability, Government Partnership, and Industry Institutions. Jane Ferrari from The Yalumba Wine Company will outline several of the already successful facets of this strategy, which may be modified to contribute to a similar development in profile and value for the Rock Lobster Industry.

Chair: Dr Paul McShane

Theme: Water to Waiter

Dr Paul McShane is the Director of the Faculty of Fisheries and the Marine Environment at the Australian Maritime College. Trained in science and business administration, he has held senior management positions with marine research institutions in Victoria, South Australia and New Zealand. In 20 years experience in research and management, Dr McShane has worked closely with the fishing industries and government agencies of Australia and New Zealand. As a consultant he has provided advice to governments and industry on issues pertaining to aquaculture, marine park management, fisheries science, marine pollution, new fisheries development and fisheries management. Dr McShane has more than 120 publications in marine science with a particular emphasis on fisheries biology and subtidal ecology. His research interests include eco-system effects on commercial fishing and allocation mechanisms in marine resource management. Dr McShane is supervising the introduction of a new graduate degree program in Marine Resource Management starting in 2000.

Mr Tony Gibson
10.30am
Wednesday

Quality and Markets

THE INDUSTRY – an overview of the lobster industry

QUALITY – a definition and its application in the lobster industry

RESPECTIVE ROLES – from fisherfolk to exporter

MARKETS – where are they? The 'old' and the 'new'

GENERIC PROMOTION – who does it, who pays and who benefits?

THE GLOBAL SCENE – the 'Aussie' factor!

INDUSTRY OPPORTUNITIES

SUMMARY

CONCLUSION

Order of Speakers (continued)

Survival and Condition

Dr Brian Paterson
10.50am
Wednesday

Concern for the survival and condition of lobsters during post-harvest handling can be spelled out by regulations or sought by the market. Firstly, some of the harvested lobsters turn out to be undersized and must be returned alive to the sea. Secondly, keeping legal-sized lobsters alive to the point of processing ensures that their quality is optimal when cooked and/or tailed. Finally, the practice of storage and marketing of live lobsters maintains quality through the handling and distribution chain to the final customer. The handling, transport and storage of live lobsters after harvest, and associated issues, can be considered against this background. Opening up new markets can still involve going back to basics to ensure the packaging is suited to the journey.

Lobster Processing and Product Utilisation

Professor Al Bushway
11.10am
Wednesday

Frozen lobster is not a new product as frozen lobster tails have been in the market place for several decades. Traditionally, these products have originated from Australia, New Zealand, South Africa, etc. The maritime provinces of Canada have had frozen whole lobster packed in brine and referred to as "Popsicle" packs for over twenty-five years. Minimal information is available in the scientific literature regarding the processing and quality evaluation of frozen lobsters. Studies by Getchell and Highlands in 1957, Zacharia in 1986 and Gall and Lawson in 1992 reported on factors affecting the quality of frozen lobster products. Undesirable factors encountered in freezing lobsters in the shell include toughening meat, development of off-flavors in storage and difficulty in separating the meat from the shell after thawing and cooking. The application of cryogenic freezing to seafood processing has provided the lobster industry with an opportunity to expand its national and international markets while maintaining a high quality product.

This presentation will provide an overview of lobster processing while providing information on current research efforts to maintain high quality frozen lobster products.

Improving Industry by Education Beyond Everyone's Expectations. Our Biggest Challenge for the New Millennium

Mr Hagen Stehr AO
11.30am
Wednesday

Training is an unappreciated field of endeavour and the Rock Lobster Industry is no exception. In fact, given that the lobster industry is one of Australia's highest value fishing industries, it never ceases to amaze me just how little emphasis and effort this industry places on something which will be its saviour into the new millennium.

Moving towards 2000 and indeed beyond, no-one in industry can afford to deny the importance of having a properly skilled and competent industry. But education for the new millennium goes much further than just ensuring that the skipper of your vessel has the correct fishing ticket or that your deckhand has done the appropriate sea safety training.

In order to survive in an increasingly competitive and consumer-dominated world, this industry has to start to take stock and take notice of how it can improve itself. Education must go beyond the traditional compulsory qualification training and must move with the times.

Industry needs to start embracing in a very serious fashion aspects such as education in food safety, business management, fisheries management, environmental and resource management and even political awareness just to name a few. Fishermen should start to understand that they will not survive in our fast moving, ever changing world of technology nor will they survive under the ever critical eye of the consumer unless they become socially, environmentally and politically aware of their world and their society beyond the boundaries of their fishing grounds.

The challenge therefore is to create a new way of thinking amongst industry. To educate and make aware in a much broader sense than has ever occurred previously within our industry. To create a new breed of leaders and fishermen who will be able to face the challenges of what 2000 and beyond will bring.

Order of Speakers (continued)

Chair: Professor Louis Evans

Theme: Lobster Culture *(Concurrent Session)*

Associate Professor Evans directs the activities of the Aquatic Science Research Unit, a research group with interests in aquaculture, seafood science and aquatic resource management and manages an annual budget of approximately $0.9 million. She has an active involvement in industry and professional organisations and has occupied various professional positions including Vice Chairperson of Aquaculture Council of WA (1988-94), Executive Committee Member or Vice President, WA Marron Association (1991-96), Member, National Committee for Aquacultural Training (1988), Executive Member, WAFIC (1992-93), University Representative on WA Aquaculture Development Council (1992-94), Member, WA Aquaculture Education and Training Accreditation Committee (1995-96) and Board Member, International Astacology Association (1996-on).

Professor Knut Jorstad
1.15pm
Wednesday

Re-seeding and Stock Enhancement

Lobster resources in the south and western coastal areas of Norway have supported local fisheries for several centuries in spite of large fluctuations in the harvest. The annual catch was around 1000 t in the 1930s, but was reduced to about 600-700 t in the post-war period followed by a collapse in the lobster stock between 1960-1970. This situation initiated research on developing aquaculture approaches aiming on rebuilding lobster stocks. As part of the national Norwegian Sea Ranching Program (PUSH) initiated in 1990, about 125000 micro-tagged lobster juveniles were released at the Islands of Kvitsoy in south-western Norway. The commercial lobster fishery at Kvitsoy was carefully monitored through a close cooperation between local fishermen, local management authorities and scientific personnel, and more than 95% of all lobsters harvested were investigated for microtag and thus cultured lobsters identified.

From 1996 the frequency of culture lobster in the fishery increased substantially, and in the 1998 fishery about 60% of all lobsters were of cultured origin. Estimates of catch per unit effort demonstrated that the observed increase in total lobster catches in the area was due to cultured lobsters recruiting to the local fishery.

Dr Simon Bryars
1.45pm
Wednesday

Holding Systems

Live-holding of adult southern rock lobsters in South Australia is possible on three time scales: short- medium- and long-term. Short-term holding of several days is the usual practice for lobster processors prior to local sale or export and is conducted in land-based facilities with recirculating water. Medium-term holding of more than a few days to several weeks can be practised by processors but is increasingly being conducted by commercial fishers prior to sale of their catch as it enables strategic marketing against the fluctuating export price of lobster. To better facilitate medium-term holding by commercial fishers, two large purpose-built sea-based floating pontoons have been built in South Australia. These facilities enable not only medium-term holding but also the possibility for long-term holding of several weeks to many months. Similar long-term holding could also be performed in raceways such as those developed for the abalone aquaculture industry in South Australia. The reasons for long-term holding lie in the possibilities for value-adding to the existing catch through weight gains and for improving the physiological condition and external condition (ie colour) of lower-priced 'white' lobsters. Long-term holding may also enable new markets to be created during the closed season of the commercial fishery.

Order of Speakers (continued)

Puerulus and Sub Legal Growout – An Industry View

Mr Rodney Treloggen
2.05pm
Wednesday

The emergence of rock lobster culture in recent years has raised a host of challenges for the wild sector of the rock lobster industry. In particular the collection of puerulus has stirred the emotions and questions that need to be answered include:

- Where does industry fit into rock lobster aquaculture?
- Who participates and how?
- What should government involvement be?
- What restrictions should be in place to protect the wild fishery?
- How many puerulus can be collected, what size and from where, and can returns enhance the fishery and how many should be returned?

The likelihood of disease being transmitted to wild rock lobster by animals returned under an enhancement program is of widespread concern as is the impact on the market both from a price and quality perspective. 'Why invest in something that might see the demise of an existing industry?' is a common question.

Many fishers want to know how do they and the wild stock stand to benefit from this type of program, as it seems very risky.

Lobster Health

Dr Bob Bayer
2.25pm
Wednesday

The American lobster, *Homarus americanus*, is subject to several health problems that appear during post-harvest storage and transport. Major sources of post-harvest losses include gaffkemia or 'red tail', ciliated protozoan disease, shell disease, and vibriosos and other types of Gram-negative bacterial infections.

Catastrophic losses of lobsters have been most consistently associated with gaffkemia. Infection results when the bacterium *Aerococcus viridans* breaches the integument through wounds. A fatal sepsis is the ultimate outcome of infection, with the onset of mortality dictated by temperature. Gaffkemia is presently monitored by individuals in the lobster industry, with a simple hemolymph culture technique that uses syringes pre-loaded with a selective medium. Lobsters in storage can be treated for gaffkemia with a feed that contains oxytetracyline. Industry use of this feed has greatly reduced associated mortalities. Residue of the antibiotic is easily measured using a modification of a test used to detect antibiotics in cows' milk. This test is routinely used and takes only 2.5 hours.

Ciliated protozoan disease is also associated with some lobster mortality in storage. Shell disease also contributes to some market losses in long-term storage facilities. There is also a strong relationship between shell disease and lobster source, and a possible link to lobster nutrition.

We have taught fishermen and lobster dealers to diagnose, treat or make market decisions based on their own observations.

Order of Speakers (continued)

Chair: Mr Daryl Sykes

Theme: Management *(Concurrent Session)*

Having completed 20 years as a self-employed commercial fisherman, Daryl Sykes is now an inshore fisheries research and management advisor and the Executive Officer for the New Zealand Rock Lobster Industry Council Limited, a commercial stakeholder group that has consistently led the way in developing cooperative management group responses to rock lobster fisheries issues in New Zealand.

Dr Amos Barkai
1.15pm
Wednesday

South African Management Decision Rules

Potential benefits and pitfalls of Operational Management Procedures with examples from the South African West Coast Rock Lobster Fishery *(Jasus lalandii).*

The use of Operational Management Procedures (OMPs) (ie formal pre-agreed rules for resource management for an extended period of time) in South Africa presents new challenges for the different parties involved in fisheries management. Clarity on the development and use of OMPs is important for their successful implementation.

The OMP concept has value by forcing industry and scientists to confront uncertainty and risk and to realise the long-term implications of particular management approaches. However, because OMPs require long-term commitments, those party to the commitment are bound to want to have a proper understanding of the relevant details. This would include, for example, an appreciation of the biological and economic trade-offs attached to different OMPs proposed during the numerical development stage, and the reliability of these projections. There is also a need for clarity about the role of ongoing scientific inquiry during the period of OMP implementation, when it is permissible to depart from the OMP ("exceptional circumstances"), and the relevant period for implementation of an OMP in this presentation we will describe the process which led to the development of an OMP for the South African West Coast Rock Lobster Fishery.

We will ask whether the OMP concept as interpreted and implemented in South Africa is self-consistent and point out areas of arbitrariness and subjectivity. We will highlight contentious issues which were hotly debated during the development of the OMP, and give our personal assessment as to who has ultimately benefited; The Industry? The Resource? Or simply policy makers and bureaucrats?

Dr Mike Bergh
1.15pm
Wednesday

South Australian Input Controls and Quota – 5 years down the track

Dr Julian Morison
1.45pm
Wednesday

The South Australian southern zone and northern zone rock lobster fisheries have distinctly different management regimes. The southern zone is a fishery that has had quota management for five years while the northern zone remains an input control fishery. Fishing the same species in the waters of the same State and in an almost identical socio-economic/cultural environment, these two fisheries provide a unique opportunity to assess differences between input control and output control management systems. Drawing on data available over the past five years this paper analyses differences between the fisheries in terms of management costs, operator costs, operator behaviour, operator profitability and economic efficiency.

Order of Speakers (continued)

Corporate Management

From Fisheries Co-Management to Corporate Governance?

Dr Alistair McIlgorm
2.05pm
Wednesday

The 1990s have seen the emergence of co-management of fisheries developing to involve stakeholders in the fisheries management process. In the past resource management concentrated on regulations and controls with rights regime enhancement and was almost the sole preserve of government.

Through 'cost recovery,' the industry has been interested in the provision of 'management services,' forcing an examination of more effective delivery in the co-management process. The momentum of this, and past fishery management developments, means that industry may want to consider corporate self-governance models.

Corporate governance may involve the delivery of a fuller range of management services including management of the resource itself, within altered management arrangements. The basics of corporate governance are presented, as seen in the literature and from some recent international developments. These new management alternatives need to be discussed by industry, government and the community as part of the sustainable fisheries management debate.

A Corporate Management Model

Mr Will Zacharin
2.25pm
Wednesday

Statutory fishing rights are being defined in legislation in Australia, but the mechanisms to facilitate management of improved property rights have not been addressed. Incorporation of a resource access right may have several advantages over other mechanisms in maximising the economic return from the resource, ensuring long term sustainability and reducing costs to Government for management and administration. The model presented provides for ownership of a rock lobster fishery through a publicly listed company with different share categories being apportioned to a range of harvest and processing participants. An annual resource lease is paid to Government in consideration of a 20 year access right.

The proposed company has the capacity to issue licences to recreational fishers and provides an agreed level of access to the resource by these fishers. Biological and economic audits of the resource are required to report on the status of the fishery according to established performance indicators. There are heavy penalties for non-compliance or degradation of the resource base.

Order of Speakers (continued)

AUSTRALIA'S FIRST BANK

Chair: Westpac

Theme: Resource Sharing

Westpac Banking Corporation's traditions and values – integrity, trust and confidence; a commitment to customers, staff and the community; and leadership through innovation – have developed over its long history and have endured. They evolved through active participation in the dynamics of a growing country and continue to guide management in decisions, practices and policy making.

From the currency crisis which spawned it to the complex financial services marketplace in which it operates today, Westpac has continually striven to deliver better solutions for its customers. By recognising the imperative of change and fusing this with strong traditions and values, Westpac has survived where others have failed.

Sir Tipene O'Regan
9.00am
Thursday

Indigenous Issues

'Competition with Cooperation'

Competition with cooperation is the theme of my address. Maori Treaty of Waitangi fisheries claims arose because of competition for the resource between Maori and non-Maori colonisers of New Zealand. A failure of the Crown to fully cooperate with Maori and adhere to the promises made in the Treaty of Waitangi effectively dispossessed Maori of their fisheries. In High Court proceedings brought against the Crown by Maori in 1987, Greig J held: "I am satisfied that there is a strong case that before 1840 Maori had a highly developed and controlled fishery over the whole of the coast of New Zealand at least where they were living. That was divided into zones under the control and authority of the hapu, and tribes had the dominion, perhaps the rangatiratanga, over those fisheries. Those fisheries had a commercial element and were not purely recreational or ceremonial or merely for the sustenance of the local dwellers."

As a consequence of the threat of litigation, the Crown agreed to negotiate with Maori and a settlement of commercial and customary fisheries claims was achieved between the parties in 1992. The 1992 Settlement was only achieved through cooperation between Maori and the Crown. There are now statutory provisions which protect Maori customary fisheries interests and Maori have regained a substantial position in the commercial industry through the provisions of the Settlement.

Under the Settlement, the management of Maori customary fisheries is increasingly delegated to Maori themselves. Maori are able, for example, to authorise customary harvests for cultural purposes and to arrange for commercial vessels to take authorised harvests of seafood for customary purposes. Maori have had to grapple themselves with the potential for conflict between their own customary and commercial interests. The Settlement returned access to commercial fisheries resources to Maori through the allocation of individual transferable quota in a full and final settlement. Maori commercial enterprises now compete as equals in the New Zealand seafood industry and enjoy no special protections.

Now that Maori are significant players in the commercial seafood industry in New Zealand, there is a high degree of cooperation between Maori and non-Maori commercial interests in dealing with Government. While there is the usual commercial competition between Maori and non-Maori fishing companies, there is a high degree of cooperation between all industry participants in dealing with common issues. This has been most apparent in the controversial areas of statutory reform and cost recovery.

As Maori commercial fishing interests develop, they are expanding their horizons to the regional and international seafood industry, including Australia. At present there is a strong competition between New Zealand and Australian producers in the same rock lobster markets. However, we have many things in common, sharing closely related rock lobster species, similar research needs and some of the same marketing issues. As we move into the new millennium, there is a need for much more cooperation between New Zealand, Australian and other rock lobster producers. The aim of such a grouping should be to fight the commodification of this remarkable product and to prevent price destruction. This strategy has had great success with other seafood products such as hake, hoki and orange roughy.

In the same way the Maori and non-Maori interests now work together to protect customary and commercial interests in New Zealand, competition with cooperation can held us all to thrive in the international marketplace by working together to foster our common interests.

Order of Speakers (continued)

Recreational Rights and Responsibilities

Mr Frank Prokop
9.30am
Thursday

Fisheries resources are generally accepted as being a community resource which can be allocated to gain maximum return to the community from the available resource which should be harvested in a sustainable manner.

There are numerous groups which have a strong interest in the 'optimum' allocation of the resource. Commercial fishing interests, recreational fishers and the general community often have differing views on allocation processes and outcomes. In many fisheries, commercial fishing and recreational fishing are managed separately and individually are not likely to over-exploit the resource, but collectively are putting increasing pressure on resources.

Coupled with increasing community concerns about over-exploitation of our oceans, there is increasing pressure on all users to distribute the catch among the users and applying the precautionary principle. This can lead to highly subjective resource allocation debates and conflict, particularly when interpreting sometimes rubbery scientific figures.

Rock lobsters in Australia support extremely valuable commercial fisheries generating many millions of dollars in export earnings. Very little is consumed locally and the assertion that all fish consumers support the commercial industry is specious. However, there is little doubt that the bulk of the catch should be allocated to the commercial area where the greatest returns are available.

Curiously in Western Australia, the recreational sector makes a significantly greater contribution to government for its nominal 5% or so share of the catch than does the commercial industry. Challenges for the future include managing the recreational catch, developing cost recovery mechanisms which are equitable and getting both groups together to develop future management strategies.

The cooperation and consultation which exists in Western Australia suggests that resolution of the difficult issues is possible for the betterment of the resource and its users.

Sharing with Recreationals – A Market Led Strategy

Mr Daryl Sykes
10.30am
Thursday

This presentation will highlight the dramatic 'leakages' and inequities that are currently a feature of rock lobster fishery management initiatives in New Zealand and in Australia and then suggest a range of approaches that can be taken to ensure the correct alignment of the respective rights and responsibilities in shared fisheries.

The presentation will demonstrate the constraints that currently exist in various management regimes designed to rebuild depleted fisheries or to maintain stock sizes at levels that enable both the economic return to the community and the recreational harvest opportunity to be optimised. The prospect of market driven solutions to existing problems is not limited solely to fisheries currently managed under a strict property rights regime such as ITQs, but may engage spatial and temporal aspects of different stocks to achieve mutually beneficial management outcomes for all user groups. However these solutions will certainly entail both commercial and recreational sector groups setting aside historical perceptions and grievances.

Order of Speakers (continued)

Dr Paul Starr
10.50am
Thursday

What Do Scientists Offer?

Paul Starr, Chief Scientist for the New Zealand Seafood Industry Council (SeaFIC), is a stock assessment scientist with a long association with lobster industry personnel in New Zealand and Australia. Paul Starr is a leading advocate of industry involvement in field work and data collection, and, in cooperation with science colleagues and industry stakeholder groups, has instituted a comprehensive Voluntary Logbook Program in New Zealand fisheries. In this presentation Paul Starr advances the proposition that the scientific fraternity has a great deal to offer to the seafood industry in general, and rock lobster industry in particular in terms of security of property rights, future economic growth, and interaction with other user groups. The Starr philosophy can be demonstrated to be effective in New Zealand where the close collaboration between science providers and industry has enabled significant revisions of stock assessment methodology incorporating industry-generated data, which in turn have provided greater certainty in yield estimates and quota allocations. The New Zealand industry has confirmed the benefits of the collaboration and is now exploring a more extensive application of the marriage between scientific disciplines and the collective skills and experience of career fishermen and women. Paul Starr offers knowledge, experience, commonsense, pragmatism, understanding, and opportunity. He is a scientist.

Professor Tor Hundloe
11.10am
Thursday

What Value That Lobster – the Market, Tourists, Parks and Recreationals

The Meaning of Economic Values as Applied to a Lobster

A major problem is fisheries management is the debate about relative 'economic values' of a fish caught by a commercial fisher, caught by a recreational fisher, caught by an indigenous fisher, and a fish left to look at.

Economists have a particular definition of 'value' in mind when they undertake measurement. If economic value is to be a criterion on the criterion for determining the relative strength of the case of access, it is necessary to be absolutely clear on what economists are valuing. To a large extent the debates in fisheries management have resulted from a misunderstanding of concepts and terminology. This paper aims to correct this small matter.

Mr Murray Hird
11.30am
Thursday

Investor Confidence

Westpac is a specialist lender to the seafood industries having developed a specific sector policy for fishing, and in particular, the rock lobster industry.

Westpac (SA, NT & TAS) is pleased to be the Major Industry Sponsor for the 3rd International Lobster Congress.

The rock lobster industry is a major contributor to the socio-economic base of a number of coastal ports throughout Southern Australia. Westpac acknowledges the substantial flow on effect provided by the rock lobster fishing to local service and support industries which, in turn, provide present and ongoing employment opportunities for their communities.

Commercial investment in the industry will continue to be underpinned by the key elements of resource sustainability and resource access. Any moves to reduce access must be accompanied by commercial compensation to maintain investor confidence.

Recent management changes, such as these in the South Australian Northern Zone, further confirm the sustainability of the fishery.

Westpac confirms its commitment to the industry and would welcome the opportunity to discuss how we can assist and meet your business goals.

Order of Speakers (continued)

Theme: Industry Management – Does It Have A Future?

Chair: Mr Steve Hinge

Steve Hinge is a rock lobster fisher in the South Australian northern zone rock lobster fishery having held a licence for the last 17 years, during which time he has built a successful business spanning fishing, retail and aquaculture. Steve is an ex-President of the SA Northern Zone Rock Lobster Fishermen's Association, ex-Director of the South Australian Rock Lobster Advisory Council and presently sits on the Seafood Industry Development Board and the Seafood Council (SA) Ltd.

The Politics of Fishing

Mr Dick Allen
1.30pm
Thursday

Charles Darwin, Crystal Balls, and the Politics of Lobster Fishing

Lobster fishing, lobster politics, and the larger society in which they take place all share one trait in common – they are all constantly evolving into new forms. Lobster fisheries around the world are at a critical junction in the evolutionary path along which they are inexorably forced by the changing world around them. Lobster fisheries now face a fundamental choice between professionalisation and marginalisation.

Many well-meaning people within the lobster industry, along with a host of do-gooders and dilettantes, wish that they could preserve the fisheries and fishing communities as they idealise them. One can question whether this idealistic view squares with reality, even in the romantic past, but it would be very difficult to argue that the fishing industry can march in place as the rest of the world passes by.

The most important political issue facing lobster fisheries around the world at this point in time is 'rights-based fishing' and the use of free market forces to allocate fishery resources. Limited licences, transferable or non-transferable trap limits, individual transferable quotas and the security of the rights associated with these fishery management systems will play a huge role in establishing the future of lobster fisheries. Our challenge is to look to the past without being bound to the past, to look at the world around us without automatically accepting or rejecting the solutions of others for our own, and to look carefully and sensibly down the evolutionary road ahead as we establish the political positions that will guide our industry in the next millennium.

Order of Speakers (continued)

Is this door opening to opportunity, or shut on opportunity lost?

Professor Stuart Beaton
1.50pm
Thursday

Industry Dreams Do Come True

The topic 'Can dreams come true' is a sanguine hypothesis. Fisheries management in Canada has been largely driven by political and social concerns. This is not to say that fisheries managers have not been honourable in their intentions but rather the fishery has been managed for votes and as an employer of last resort in rural areas where other economic opportunities have been scarce. Sustainability and profitability have not been at the forefront of managerial decisions.

The Snow Crab fishery, due in part to its relatively short history has been somewhat of an isolated case. This fishery at the outset was high volume and low value. Subsequent reduction in world supply and favourable market outcomes in Japan led to greatly increased profitability for the participants. Concurrent with these favourable conditions there was a collapse of the Cod fishery in Canada resulting in considerable political pressure to 'share the wealth' with the displaced Cod fishermen.

Snow Crab fishermen who had considerable investment in their fishery sought to improve their security of tenure in the face of mounting political pressure to dissipate the rents of the fishery at the expense of the resource. In the face of mis-guided political initiatives which would result in an 'equalisation of poverty' the Crab Association entered into negotiations with the Department of Fisheries and Oceans to develop a Co-Management Partnership Agreement and ITQ management strategy. The paramount factor in this program was the integrity of the TAC; the resource must come first.

The resulting agreement was characterised by a strong sense of social responsibility and a strict sense of 'user pay – user say'. This fishery is almost entirely run by the fishermen. Almost all managerial decisions are made by the fishermen within the constraints of the TAC and virtually all 'avoidable' costs of the fishery are borne by the user group. Strict accounting and clear and cogent billing procedures are adhered to. The holdings of the participants fall short of a property right per se but the organisation and the history of the agreement and the Association represent a 'credible threat to litigate' and in addition the program has been an unqualified success from a resource and a managerial perspective. This fishery has been held up as a model in Canada and has elicited interest worldwide.

We feel that the fishery has been largely de-politicised but is still short of a property right in perpetuity.

Order of Speakers (continued)

The Great Management Debate – Input Controls vs Quota

Mr John Fitzhardinge
2.10pm
Thursday

Input Controls are 'In' and Output Controls are 'Out'

In 10 years' time we will look back and ask 'what the hell was that push to quotas all about?' The quota zealots of the 1990s will be nowhere to be found!!

While we all understand the economics of profit maximisation and strengthening of property rights supposedly embodied in the quota concept, that have been used to trick fishers into adopting quotas, we have seen little of these so called benefits materialise in practice.

Quotas in lobster fisheries have failed to deliver property rights – we need only look at the erosion of rights occurring in quota and input control fisheries, through the global push to marine parks and changes in shares being demanded by recreational and indigenous groups. Issues of cost blowouts in research and compliance and market and stock uncertainty have served to prevent the theoretical 'economic' benefits of quota materialising.

With quota now exposed as the soft option for managers, what makes input controls the preferred option?

With the right mix of input controls, size limits and ongoing measurement and adjustments, input control regime can achieve stock sustainability. Fishing behaviour and technology (effective effort) change slowly. With careful planning of effort, the stock and catch can be managed sustainably. This has to be out first objective.

With the right mix of inputs for sustainability and with holding/storage systems, economic performance can also be managed.

Output Controls – There is No Debate

Mr Allan Gard
2.10pm
Thursday

The argument for any other rational form of management control can not be sustained against that of output controls eg. QUOTA.

The fact that the monitoring of the whole fishery can be done from the point of landing, with only one aspect to be considered, this being the amount of product landed as that part of the T.A.C.

The absolute imperative is to set the T.A.C. (total allowable catch), at a sustainable level or preferably at a level that allows for gradual rebuild of the stock. If you do not get the T.A.C. right or near as right then the whole output control system will collapse. However any other system would also fall down if whatever management controls you had in place were not effective. It is much easier to alter a T.A.C. than to change sizes, pot numbers, closed areas etc.

The only other issues to be considered are those of the structure of the Fishery, be it an open access Fishery, or whether you have the need for or desire for controls on access, size limits, closed seasons etc.

The less regulation you have the easier and cheaper the Fishery is to manage, and the more effective the management will be as the issues are less open to interpretation, by the managers, fishers and processors, and most importantly by the legal system eg. The Courts?

Order of Speakers (continued)

Mr Daryl Sykes
2.40pm
Thursday

Management Session Report

The major outcomes from the management session undertaken on Wednesday 22 September will be presented.

Mr Jim Prescott
2.55pm
Thursday

Scientist Workshop Report

The findings and outcomes from the sampling workshop held on Tuesday 21 September will be presented.

Order of Speakers (continued)

Theme: Conserving Industry and the Ocean

Chair: Mr Dick Allen

Dick Allen began his 34 year commercial fishing career as a clam digger while attending the University of Rhode Island. Allen's entry into commercial fishing in the early 1960s coincided with a number of major developments in fishing technology and policy. He currently fishes 1600 lobster traps from the port of Pt Judith, RI with the forty four foot 'Ocean Pearl.' He began a parallel career in fishery consulting in 1972 and has represented the fishing industry on a variety of public policy issues since that time.

Resource Conservation and Private Management Solutions

Mr Michael De Alessi
9.00am
Friday

Interest around the world in rights based fisheries management demonstrates a growing awareness among policy makers and fishermen that positive incentives are fundamental to management success. To date, however, most of the analysis has focused on economics, not conservation, and while there seems to be little doubt that ITQ-like rights improve the economics of fishing, their effect on conservation is still hotly debated. Concern over bycatch, highgrading, technological change, habitat protection, recreational fishing and the imposition of marine reserves have all been cited in arguments against self-management and stronger ownership rights for fisheries.

This presentation will examine the underlying principles that led to the creation of ITQ-type rights, stressing the importance of a sense of ownership and the opportunity for rights to evolve. It will address the promise and peril of leaving the aforementioned concerns to work themselves out under a private system, and suggest ways to strengthen private management institutions so that they can deal with these concerns. Examples will include the evolution of private property rights on the frontier American West (which was once viewed as a boundless resource, much like the oceans were not so long ago), the US oyster industry, ITQs in New Zealand and other marine management regimes (both lobster-specific and not) from around the world.

Industry Environmental Stewards

Mr Duncan Leadbitter
9.40am
Friday

The dictionary definition of stewardship refers to the situation where a person or persons look after the property of others. If we translate this concept to fishing communities and the marine environment we need to look at situations where this has occurred and under what circumstances.

Despite the fact that most members of the public would equate having fishers looking after the sea with the fox looking after the hen-house there are many examples where marine stewardship by fishers works well and has done so for hundreds of years.

Most coastal indigenous people, especially those in the tropics, have quite complex fishery management systems because they have to make do with the resources in their backyard. Poor management and a lack of attention to the general health of the reef would lead to the loss of a valuable food resource.

For Western fisheries we also find examples of stewardship and self management, the most famous one being the lobster fishery in the US State of Maine. Although there are government regulations many of these are set by fishers and there are also many local rules established by fishers to fine tune catch controls. Japanese inshore fishers have had powerful cooperatives and have owned their fish resources for centuries.

Fishers are also involved in wider issues than just regulating catches. In Australia there are many fishers who get involved in the multiple stakeholder committees that advise governments on catchment, river, estuary or coastal zone management. Others are active lobbyists on pollution control and fish habitat protection.

A brief analysis of what predisposes fishers to exercise stewardship would suggest that small scale fisheries operating out of small towns with a long standing involvement in fishing are important factors though not necessarily the only factors. Indeed, more work needs to be done in this area if only because there is a limit to what regulations can do and self motivation is probably more important in making fisheries sustainable.

Order of Speakers (continued)

Ms Margi Prideaux
10.30am
Friday

Marine Parks – Sustainable Use or Multiple Abuse?

Highly protected marine reserves have historically been established to conserve and rebuild marine biodiversity, including aspects of importance to commercial fisheries. The contemporary trend toward multiple use management in marine protected areas has altered the conservation intent, as multiple and divergent uses argue maintenance of access with minimal restriction on operation or activities. This process results in areas that have less conservation value but stronger management arrangements. Abandoning strict protection for multiple use management also negates the conservation benefits that still need to be achieved. We should question – are we moving down a path of sustainable use or multiple abuse?

Mr Nigel Scullion
10.50am
Friday

Marine Parks – Multiple Use or Industry Abuse?

Environment agencies and conservation groups are calling for an increase in the number of marine protected areas around our coastline. ASIC believes the push for more MPAs and more restrictive access regimes within these areas needs to be met with a comprehensive policy that ensures unnecessary uncertainty, job losses and other socio-economic impacts on the industry are avoided. ASIC has such a policy.

MPAs have emerged as a key plank in a number of State and Federal government initiatives over recent years, particularly the Oceans Policy and the National Representative System of Marine Protected Areas strategy.

MPAs should not be seen as the panacea for all the oceans' ills, but rather as another management tool, to be applied as part of a suite of measures to ensure a total environment management approach. The inappropriate level of priority that has been placed on establishing MPAs has lead the community focus away from the real challenges facing marine environment management.

MPAs should be used to counter the destruction of our inshore fish nursery habitats and to ensure appropriate coastal development and catchment management, rather than as lines on a chart that agencies and conservation groups can point to by way of achievement.

Dr Colin Buxton
11.10am
Friday

Marine Parks – Biological Effects

Marine Protected Areas (MPAs) are being proclaimed around the world with the primary purpose of conserving marine biodiversity. The National Representative System of Marine Protected Areas (NRSMPA) is at the centre of the Australian and New Zealand Environment and Conservation Council's plan to secure the long-term future of Australia's coastal eco-systems. The main focus of this plan is the conservation of biodiversity through a comprehensive, representative and adequate system of Marine Protected Areas.

But MPAs may be proclaimed for a variety of other reasons. As harvest refugia, Marine Protected Areas have also been advocated as having a range of potential benefits for fisheries. Included are: the protection of spawner stock; a source of propagules and surplus adults; research areas; and insurance against the failure of conventional management.

Fishing industry's response to these arguments centres on concerns that access to resources will be diminished and that remaining stocks will be pressurised as a result of shifting effort patterns.

In the light of current knowledge, this paper examines the pros and cons of both sides of the argument, attempting to find the middle ground between sustainable exploitation and conservation.

Order of Speakers (continued)

Eco-systems Management

Professor Stephen Hall
11.30am
Friday

Eco-system protection and lobster fishing: reconciling radical and reactionary perspectives.

'Ecosystem management', 'Ecologically Sustainable Development' and 'Ecosystem Health' are all terms that are being used increasingly often to describe objectives which fisheries must take into account. Unfortunately, finding useable (operational) definitions of them is extremely difficult. Nevertheless, deciding what these terms really mean and what, if any, action needs to be taken requires information on the effects lobster fishing has on ecological communities. This paper will:

- review what we know about the key interactions that control the ecological status of lobster fishing grounds;
- examine whether there are any key questions that remain unresolved and
- explore how the industry might address concerns about the wider ecological impacts of the lobster fishing.

Order of Speakers (continued)

Chair: Mr John Fitzhardinge

Theme: Markets and Trade

John Fitzhardinge has operated his lobster fishing business in Western Australia, with his wife Beth since 1962. John was a member of the Western Australian Rock Lobster Industry Advisory Committee from 1973 – 1993 during the period when 28% of the pots were removed from the water and the season was shortened by 6 weeks. Joining the board of Geraldton Fishermen's Cooperative in 1973, he has been the Chairman since 1987. John has 38 years of practical experience with fisheries management both as a fisherman and from the regulatory side.

Stu Simmons
1.30pm
Friday

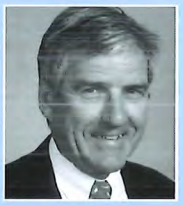
Markets – Importers View

'Should you target the US Lobster market?'

Stuart Simmons is the President/CEO of Seafood Connection in Honolulu, Hawaii, which is the largest importer and distributor of lobster in Hawaii. Seafood Connection markets lobster from around the world including Hawaii, Australia, Chile, New Zealand, Tristan, South Africa and Nicaragua.

The presentation will focus on;

- Current world lobster markets and potential trends
- Market and product diversification
- Should you target the US market?
- How do you penetrate the US market ?
- Internet commerce and what does it mean for lobster



Mr Leith Pritchard
2.00pm
Friday

Markets – Exporters View

Australasian Lobsters – Managing your Destiny

OR

How can chooks with their heads cut off find their way through continually closing windows of opportunity?

In the past 8 years Leith Pritchard has been directly responsible for the strategic marketing of approximately 2700 tonnes of WA lobsters per year.

The presentation will examine the positive and negative aspects of all Australian and New Zealand lobster producers combining to devise a long term International Marketing Strategy which would potentially benefit all sectors of the Industry.

Included also will be an overview of the global situation, the relevance of the Australasian market in context, current impediments to effective marketing and an attempt to predict future changes with a view to being prepared for change rather than reactive to it after the event!

Dr Gary Morgan
3.00pm
Friday

Pulling Together the Threads

Dr Gary Morgan will summarise the outcomes of the Congress in this final presentation.

Special Guests

Food for the Future Species Taste Off

Caroline Schaefer has been member of the State Parliament Legislative Council for 6 years and is the whip for the Government in the upper house. She is a farmer with 30 years' experience, originally from the West Coast of South Australia cereal region, and now is a vigneron in the famous Clare Valley region north of Adelaide.

Caroline is Convenor of the Premiers 'Food For The Future' Council and member of the Social Development Standing Committee. She is passionate about rural issues in particular agricultural and seafood industry development and maintenance of social infra structure.

The Hon Caroline Schaefer MLA
6.30pm
Friday

Congress Dinner speaker

John Wamsley will primarily talk about investing in the conservation of wildlife.

Earth Sanctuaries Ltd is the only public company in the world whose core business is conservation. Earth Sanctuaries Ltd 'acquires' land, feral fences it, removes ferals and puts back the wildlife that was there 200 years ago and to do so is restoring the ecosystem or the environment.

Earth Sanctuaries Ltd will list on the Australian Stock Exchange at the end of this year which will complete a 30 year experiment of raising capital in the market place to conserve wildlife and habitat.

The sustainability of marine biodiversity will be a feature of Earth Sanctuaries Ltd's first marine/terrestrial sanctuary called Tiparra at Cape Elizabeth.

Dr John Wamsley
7.00pm
Friday

Congress Acknowledgements

Kristina Altschwager
Carolyn Anderson
Bob Bayer
Genevieve Booker
Fleur Campbell
Keryn & Allan Campbell
Lionel Carrison
Lara Damiani
Roger Edwards
Louis Evans
Fabris Marine
Andrew Ferguson
Colin Freeman
Ron Hateley
Steve Hinge
Dennis Holder
Patrick Hone
Brian Lawry
Michelle Manno
Paul McShane
Terry Moran
Gary Morgan
Pasquale Portaro
Jim Prescott
Karen Raymond
Kym Redman
SARDI staff
Darren Scott
Jodie Smith
Daryl Spencer
Richard Stevens
Daryl Sykes
Rodney Treloggen
Steve Von Stanke
Howel Williams
Lucia Wyatt

South Australian Southern and Northern Zone Rock Lobster Fisheries Management Committees

Smoked Fish donated by Lake George Seafood

The patisserie items presented on the dessert table at the Fishermen's Frenzy were prepared by the Year 12 Food and Hospitality students of Seymour College.

For further information

South Australian Rock Lobster Advisory Council
web site http://www.rocklobster.org.au
email redwards@gazebo.os.com.au
fax +61 (8) 8272 7767,
phone +61 (8) 8272 7766 or
post SARLAC, 12 Greenhill Road, Wayville, South Australia 5034

Sponsors and Trade Exhibitors

FISHERIES RESEARCH & DEVELOPMENT CORPORATION

Major Sponsor

Fisheries Research & Development Corporation

The FRDC is a national organisation responsible for:

- Planning, funding and managing research & development (R&D) programs; and
- Facilitating the dissemination, adoption and commercialisation of the results of research and development.

FRDC's mission is to increase economic and social benefits for the fishing industry and the people of Australia through planned investment in research and development, in an ecologically sustainable framework.

Programs

Industry Development

Planned outcome – enhancement of the competitiveness and resilience of the Australian fishing industry.

Key areas – aquaculture development, health and safety, information delivery, market development, people development, quality, technology, and value adding.

Resources Sustainability

Planned outcome – development of Australia's wild fisheries resources in an ecologically sustainable manner.

Key areas – resources status and fisheries management improvement.

Ecosystems Protection

Planned outcome – protection of the Australian ecosystems upon which fisheries and aquaculture depend.

Key areas – ecosystems status, ecosystems maintenance and improvement, and ecosystems management improvement.

Infrastructure

FRDC is continuously seeking to improve the existing infrastructure that underpins the quality of research and the industry's development. Achievements to date include the establishment of:

- the National Seafood Centre (NSC) – providing opportunities for the seafood industry to add value to its products (in conjunction with the QLD Dept. Primary Industries);
- SeaQual Australia – increasing awareness and providing information on the benefits of quality management to the seafood industry and, assisting the industry to meet its needs for seafood safety and quality (a joint initiative with the QLD Dept. Primary Industries and Queensland Commercial Fishermen's Organisation); and
- Australian Seafood Extension and Advisory Service (AUSEAS) – providing a comprehensive extension service on post-harvest seafood technology, facilitating the adoption of leading-edge technology (in conjunction with the QLD Dept. Primary Industries)

Further Information

Further information including the downloadable R&D funding application software and non-technical summaries of completed research projects are available through the FRDC web site
http://www.frdc.com.au
or by contacting the FRDC:

PO Box 222, Deakin West, ACT 2600
Telephone: 02 6285 0400
E-mail: frdc@frdc.com.au

Sponsors and Trade Exhibitors (continued)

AUSTRALIA'S FIRST BANK

Major Corporate Sponsor

Westpac Banking Corporation

Westpac Banking Corporation has a long and proud history. Established in 1817 as the Bank of New South Wales, Westpac is Australia's first and oldest bank, and its first and oldest public company. From very humble beginnings it grew to become Australia's largest bank, acquiring other banks along the way and expanding its business to many parts of the world. It is now one of the largest financial services organisations in the country.

The Bank, its staff and customers have played a part in virtually every major development in the nation. As a result, it holds a unique place in the history of Australia, and the history of the nation can truly be said to be the history of the Bank.

It has seen booms and busts across all of Australia's major industries. It has constantly responded to the changing needs of its customers, the financial environments in which it operates, and more recently, the technology revolution and the information age.

The Bank's enviable traditions and values – integrity, trust and confidence; a commitment to customers, staff and the community; and leadership through innovation – have developed over its long history and have endured. They evolved through active participation in the dynamics of a growing country and continue to guide management in decisions, practices and policy making.

From the currency crisis which spawned it to the complex financial services marketplace in which it operates today, Westpac has continually striven to deliver better solutions for its customers. By recognising the imperative of change and fusing this with strong traditions and values, Westpac has survived where others have failed.

Australian Fisheries Academy

The SA Fishing Industry Skills Centre was established in 1991 as the first industry managed training provider in Australia. The growth in stature of the SA Fishing and Seafood Industry Skills Centre over the years soon indicated that it was time for this Centre to be used to enable the industry to be in charge of its own destiny. As a result, in July 1997 the Australian Fisheries Academy was established (incorporating the existing SA Fishing and Seafood Industry Skills Centre) with an industry based Board of Management. Since its establishment the Academy has had more than 1100 students enrolling in its extensive range of industry programs covering the fishing, aquaculture and post harvest sectors.

The Academy's motto "Experientia Docet" translates to "Experience Teaches" and provides the foundation behind the Academy's philosophy. The Academy aims to develop partnerships within each state for the establishment of Academy campuses to deliver quality, accredited training to all sectors of the seafood industry which will assist in industry development and growth at a national level.

Sponsors and Trade Exhibitors (continued)

Australian Maritime College

Australian Maritime College

The Australian Maritime College (AMC) is the national centre for maritime education, training, research and consultancy. It offers a range of TAFE and university level courses from certificates of competency to Doctorate level. Areas of study include fisheries, marine resource management, naval architecture, ocean engineering, marine engineering, maritime operations (nautical studies and navigation) and maritime business.

The Faculty of Fisheries and Marine Environment offers a range of services tailored to the needs of the seafood industry including programs in:

- Seafood safety
- Seafood post-harvest technology
- Seafood product development and value adding
- HACCP familiarisation
- HACCP accreditation

Facilities include a 35m fisheries research vessel, a 14m prawn trawler, a modern fish processing 'factory'/laboratory, a fisheries biology and ageing laboratory, and a flume tank for the study of fishing gear.

From Year 2000, two new courses will be introduced that focus on the issues underpinning marine resource management – the Bachelor of Administration (Marine Resources) and the Master of Business Administration (Marine Resource Management).

SARDI
SOUTH AUSTRALIAN RESEARCH AND DEVELOPMENT INSTITUTE

South Australian Research & Development Institute (SARDI)

SARDI Aquatic Sciences is SA's primary aquatic research group conducting research into commercial fisheries, aquaculture and the aquatic environment that supports those industries. SARDI's mission is: "To lead and conduct innovative and practical research that enhances the State's economic growth and enables the conservation of natural resources for the people of South Australia." SARDI is based at the South Australian Aquatic Sciences Centre, one of the most modern and comprehensive research facilities of its type in Australia. The centre is located at West Beach on the shores of Gulf St Vincent, 10 kilometres west of Adelaide and just minutes from the city's airport.

The South Australian Aquatic Sciences Centre is a purpose-built marine and freshwater research laboratory complex supporting more than 80 research scientists and support staff with a diverse range of technical, analytical and specialist skills. SARDI also maintains research stations and specialist staff at Mt Gambier and Port Lincoln, to provide regional support to clients and ready access to facilities for field studies, collection of data on fisheries, aquaculture and the environment.

SARDI is a group of Primary Industries and Resources SA.

Ph (08) 8200 2400 / Fax 8200 2406
PO Box 120, Henley Beach, SA 5022
http://www.sardi.sa.gov.au

Sponsors and Trade Exhibitors (continued)

Primary Industries and Resources SA

Primary Industries and Resources SA (PIRSA) is a key economic development agency within the South Australian Government, supporting industries with a total value in excess of $7 billion.

It is committed to sustainable and responsible development as well as fostering of internationally competitive industries across the primary resources sector.

Its business activities include:

- Agricultural and horticultural industry and policy development
- Fisheries and aquaculture management and industry development
- Minerals and petroleum exploration and development
- Sustainable resources management including soil, landcare and productive use of water
- Rural and remote community support services
- Energy policy and regulation

PIRSA has a strong business focus and works in partnership with industry to create and maintain sustainable economic growth.

PIRSA also plays a leading role in research and development through the South Australian Research and Development Institute.

Recent achievements by the department include the formation of a new business unit, PIRSA Rural Solutions, to provide a focus for agricultural services, initiation of five-year management plans for all major fisheries, securing of $5.2 million of funding for the five-year Farmed Seafood Initiative and $23 million for a new four-year mineral, petroleum and groundwater exploration initiative.

PIRSA also has made significant contributions towards developing South Australia's future plans for the food and fibre industries which aim to triple the food industry's contribution to the South Australian economy and double the value of the fibre industry.

The department also has recently embarked on developing a similar plan for the resources industry which will identify ways both Government and industry can work in partnership to create growth in the minerals sector.

For more information, visit the PIRSA website on www.pir.sa.gov.au or Food Online on www.food.sa.gov.au.

West Coast Insurance Brokers Pty Ltd

West Coast Insurance Brokers are leaders in the field of Marine and Aquaculture Insurance. The company was successful in securing pay-outs in excess of $14 million for its Tuna Farming clients following the devastating storm of 1996, which destroyed many fish farms.

The company has been and continues to be instrumental in the development of policies designed specifically for all kinds of marine insurance, although, they remain a force to be reckoned with for all types of insurance.

Kevin Wiebrecht is the Managing Director; he has been in the insurance industry for 30 years. He has attended the World Aquaculture Conference in London and been guest speaker at the Australian Veterinary Association conference on aquaculture risk programs in Hobart.

Tony McBride is the manager; he has also been in the insurance industry for many years. He has worked for insurance companies in London and Australia, joining West Coast Insurance Brokers in 1991.

Sponsors and Trade Exhibitors (continued)

ANSETT AUSTRALIA CARGO

Ansett Australia Cargo

Ansett Australia Cargo has taken giant leaps in the last three months to change our business structure to focus on reliable Airport to Airport service delivery. Our business objectives are to become the leading Australian air cargo provider, and ultimately deliver an operational finesse to increase our capacity everytime, Australia wide. Additionally, beyond this, our Trans Tasman Service and Globally connected airline systems will further increase our networks.

Ansett Australia Cargo has appointed experienced key wholesale personnel nationwide, in an effort to respond to the growing market demands, with our Commercial Groups concentrating on ways to evaluate our service delivery, and ensuring we meet our Quality Assurance Standards.

Ansett Australia Cargo operates to all Major Ports within Australia, giving us the flexibility to utilise Ansett Australia's passenger network and encompassing our International connecting flights through our new Membership to Star Alliance.

We would like to take this opportunity to welcome you all to South Australia and hope your time in our State is most enjoyable.

ANSETT AUSTRALIA

Ansett Australia Group

Ansett Australia started domestic airline operations on 17 February, 1936 using a single-engine, open-cockpit Fokker Universal aircraft from Hamilton in western Victoria to Melbourne, the state's capital.

Today, the group founded by the late Sir Reginald Ansett operates a fleet of almost 75 aircraft to more than 70 towns and cities throughout Australia and to an increasing network of Asian cities. The Group's turnover topped $3.7 billion in 1997-98.

On 11 September, 1993, Ansett Australia operated its first international flights in its own right, to the popular Indonesian holiday island of Bali. The airline now flies to a number of Asian cities, with Fiji its newest international destination.

Ansett is jointly owned by the News Corporation and Air New Zealand. Ansett New Zealand, established in 1987, is 100% owned by News, while Ansett International is 51% owned by Australian institutional investors with the balance held equally by News and Air New Zealand.

In 1998 Ansett Australia won its 5th consecutive Airline of the Year Award and its holiday company, Ansett Holidays, which markets a range of more than 1000 Australian holiday choices, won an award as best domestic tour operator in 1994.

Major industry newspaper "Traveltrade", voted Ansett International as offering the world's best Business Class in July 1997 and Ansett International was voted Best Australian Large Business in Asia in the International Business Asia News Magazine Awards. Independent global frequent traveller research has ranked Ansett's international Business Class as the world's best.

From 28 March this year, Ansett Australia and Air New Zealand became members of the global Star Alliance, which also includes United Airlines, Lufthansa, S.A.S. Air Canada, Thai and Varig, offering airline travellers seamless global travel solutions for their global travel needs.

Sponsors and Trade Exhibitors (continued)

Western Australian Fishing Industry Council

WAFIC
Western Australian Fishing Industry Council inc.

The Western Australian commercial fishing industry has developed into the fourth largest primary producer in WA.

Primarily the industry is based on the major fisheries of rock lobster, pearls, prawns, abalone and scallops however there are a further 40 managed fisheries around the WA coast.

Catch value is in the vicinity of $600m per annum with rock lobster alone contributing over $250m and pearls around $180m. The multiplier effect of the WA commercial fishing industry contributes results in well over $1billion per annum to the economy. The capitalised value of the commercial fishing industry is over $1billion.

The Western Rock Lobster fishery contributes over $250m per annum and is the largest single species fishery in Australia with a catch in 98/99 of 13,000 tonnes.

The WA commercial fishing industry employs well over 5000 people on vessels in factories and retail outlets.

The WA Fishing Industry Council (WAFIC) is an independent industry owned organisation that has ensured that industry has a concerted voice on issues and a forum for the development of industry views over 35 years.

WAFIC has 55 member organisations made up from the professional fishermen's associations regionally spread around the state, fishery specific associations, sector based organisations, major export companies, aquaculture and wholesalers/retailers.

Seafood Council (SA) Ltd

SEAFOOD COUNCIL (SA) LTD.

The Seafood Council (SA) Ltd is a voluntarily funded seafood industry company which represents all sectors of the commercial fishing and seafood industry of South Australia. The Council's overriding aim is industry development.

The Seafood Council (SA) has been established to provide development services to South Australian harvesters, sellers and producers of fish and seafood and to work closely with other industry related organisations including training and government agencies for the benefit of the seafood industry and for South Australia.

The Council's main objectives are:

- To obtain secure access arrangements for the South Australian seafood industry
- To increase the profitability of all members of the seafood industry by improving the consumption of fish and seafood
- To support effective fisheries management in South Australia

The Council responds to development opportunities and advice from the SA Seafood Industry Development Board and other bodies that carry an industry development charter.

Sponsors and Trade Exhibitors (continued)

University of Maine

The LOBSTER INSTITUTE has evolved over the years to become the major formal mechanism for communication among harvesters, dealers, pound owners, and processors in North America; and between industry and scientists/resource managers throughout the world.

The LOBSTER INSTITUTE is a cooperative program of research and education with the lobster industry at the University of Maine. Information generated through the Institute about the American lobster *(Homarus americanus)* is intended to help conserve and enhance the resource, thereby ensuring the continuance of a strong and healthy industry in the state and the region.

As part of the University of Maine's Research and Public Service efforts, the Lobster Institute is located on the Orono campus. This location is central to the resource as well as the region served by the Institute, which includes the northeastern coastal states and the Maritime provinces of Canada. The University provides an open, objective setting for the free exchange of ideas by all those interested in the lobster resource and industry.

The LOBSTER INSTITUTE identifies practical problems of concern to the industry and seeks solutions to these problems. Some solutions may be found through quick-response projects, while others require long-term research programs. By indentifying the research priorities of the industry and providing industry assistance to researchers, the Institute links industry expertise with academic resources to promote a better understanding of the lobster and our impact on it.

Some research priorities of the Institute are projects on: lobster ecology, biology, behaviour, and population dynamics larval/juvenile lobster densities, recruitment, and habitat health and disease, hatch and release/enhancement, marketing and economics, new product development

Other research projects have included: V-notch surveys, claw band testing, ghost trap fishing impacts, lobster/fish farm interactions, genetics, industry opinion survey, taste tests on meat, and artificial bait.

The information generated through Institute-sponsored research programs is communicated freely in a variety of ways including outreach education conducted by faculty, students and industry members, as well as conferences, seminars, and workshops.

The Institute is primarily funded by contributions from the industry itself, and through private donations by friends of the industry. Other funds and services are provided by the University of Maine, research granting agencies and institutions, and private foundations.

The Lobster Institute offers a wide range of educational programs.These include seminar programs and workshops for industry members and scientists throughout the region. The Institute also has an extensive lobster library with nearly 400 journal articles, research reports, and informational pamphlets about lobsters.

An industry exchange scholarship program has been established through the Institute which provides opportunities for industry members to visit other regions, states, provinces and countries to encourage communication, understanding, and cooperation among industry factions.

The Lobster Institute seeks to serve the region's lobster industry, and to provide its friends in the general public, who are interested in the industry and its future, with programs and information that are both timely and meaningful.

Sponsors and Trade Exhibitors (continued)

MOUNTADAM

Mountadam Vineyard Mountadam

Adam Wynn is a world renowned winemaker. He is focused, positive and urbane, his technical skills rank with the world's best, but his creative flair and love of music and art give extra dimensions to his wines that are truly exciting.

His family's achievements in Australian wine have been extraordinary. The Wynn wine saga commenced in Poland just after the turn of the century. Samuel Wynn made a yearly pilgrimage to the Black Sea and returned to Poland with dried raisins which he reconstituted and turned into wine. At 21 years of age, he arrived in Australia keen to pursue a career in wine; this began with a wine bar in Bourke Street Melbourne, where he came up with the classic barrel-design Wynns 2 litre flagon. Samuel lived until 90 years of age, a testament to a life tempered by good wine. Adam's late father David truly put the Wynn family on the wine map. In 1950 he purchased the run down old Coonawarra Estate, featuring its famous three-gabled roof on his Wynn's Coonawarra label. The world recognition of this region bears testament to David's greatness, but he did much more. A very talented artist, he was chairman of the Adelaide Festival Trust for many years and created the concept of the highly successful Barossa Music Festival which he served until his death as its founding chairman.

David had enormous vision; his search for the top viticultural region in Australia ended 600 metres above the Barossa and Eden Valleys. A visit to Mountadam is a rare treat, set high on Eden Ridge in rugged rocky country, habitat for the majestic wedgetail eagle, the symbol of the winery, and prominently displayed in the huge granite sculptures on the impressive stone pillared entrance to the vineyard.

The setting just on the lee side of the ridge gives protection to the vines from harsh winds, and provides an ideal frost-free microclimate; the resultant outstanding fruit is the cornerstone of Adam's wines. Adam followed a degree in agricultural science with a postgraduate degree in oenology from Bordeaux in France, where he was dux of the course in 1981.

Rarely would you see so many expensive French oak barrels in any winery, let alone the modestly sized Mountadam. Adam follows a no expense spared philosophy, using French Tronçais oak, tight-grained and with subtle but distinct flavour characteristics.

Barrel fermentation, careful selection and individual treatment of the many hundreds of barrels for the chardonnay and the reds, produces complex wines that shine at the top of Australia's wine tree.

Adam produces a cabernet sauvignon, merlot wine simply called 'The Red', which is simply superb. The cornerstone of the product range is the Mountadam Chardonnay. The David Wynn range of quality Barossa and Eden Valley varietals and the Eden Ridge organic range complements the domain-grown Mountadam wines.

Adam Wynn has literally taken the high ground of Australian wine.

Address: High Eden Road, Eden Valley, SA 5235
Telephone: (08) 8564 1101
Facsimile: (08) 8564 1064
Email: office@mountadam.com
WWW: http://mountadam.com

Established: 1972
Owner: Adam Wynn
General Manager: Robert Hay
Winemaker: Adam Wynn
Principal varieties grown: Chardonnay, Pinot Noir, Cabernet Sauvignon, Merlot, Shiraz
Principal wines & brands: Cellar Potential

- Mountadam Chardonnay – 2-5 years
- Mountadam The Red – 5-15 years
- Mountadam Merlot – 5-15 years
- Mountadam Pinot Noir – 5-10 years
- Mountadam Cabernet Sauvignon – 5-15 years
- Patriarch Shiraz – 5-15 years

Hours open to public: 11am-4pm, daily
Retail distribution: Bottle Shops and Restaurants Australia Wide.

Sponsors and Trade Exhibitors (continued)

Yalumba

Australia's oldest family owned winery this year celebrates the 150th anniversary of its founding by Dorset brewer, Samuel Smith. The Barossa-based Yalumba (an Aboriginal word meaning 'all the land around') is now owned by Samuel's great-great-grandsons, Robert and Sam Hill-Smith. From modest beginnings and 30 acres of Barossa land, the winery has grown in size and stature and is happily placed among Australia's most successful medium-sized wineries. One of the few wineries with its own on-site cooperage and nursery and with vineyards in Coonawarra, Wrattonbully, Oxford Landing and the Barossa and Eden Valleys, Yalumba makes a range of wines to suit almost everyone – including the winery's flagship reds, The Octavius, The Signature and The Menzies and the Barossa Growers range of varietal wines. Ongoing winemaking and viticultural trials by the Yalumba winemaking team continue to build Yalumba's pioneering reputation and the company's work with the grape variety, Viognier has already been widely applauded.

Bickford's

Bickford's Australia Pty Ltd is a world class beverage producer focusing on individually branded products that fill customers' needs for quality and brand recognition.

The product range includes cordial in glass bottles, carbonated soft drink, prune juice, coffee essence. The Company will continue to develop new products that fit our distribution channels nationally and will in all cases extend these products to other South East Asian markets.

The aim of national and international growth is to control the marketing activities in these regions, paying particular attention to using our peoples' skills in administration, sales, marketing, product knowledge and customer service.

The Bickford's Australia Pty Ltd Head Office and Manufacturing facility are located in Adelaide, South Australia. The Factory is 4,500 square metres, with a production system so flexible that can fill various bottles types at high speed. Bickford's Australia also have four warehouses and three sales offices around Australia.

Horwath (SA) Pty Ltd

Chartered Accountants

Use your experience to catch lobster; use ours to improve your financial security.

Horwath SA Pty Ltd is the South Australian member of Horwath Australia and the Horwath International Association of Accounting and Consulting firms. The Association is the fifth largest accounting firm in Australia. Horwath International has more than 80 member and affiliated firms with over 290 offices throughout the world.

The South Australian firm, established in 1957, has 5 Directors and 47 staff and practices extensively in the area of Business Consultancy, Audit, Taxation advice, Insolvency and Reconstruction services and Mergers and Acquisitions. We are dedicated to one objective – the success of our clients.

Our reputation is founded on attracting and keeping talented Directors and staff who provide personal, prompt and quality service relevant to today's business environment.

Sponsors and Trade Exhibitors (continued)

The University of Adelaide

Department of Soil and Water

The Department of Soil and Water offers expertise in the research and education of the science of soil and water, in particular, to the management of ecosystems and natural resources.

The following lists the departments marine research projects for 1999/2000:

- The Identification and Mitigation of Pollutants Affecting Inshore Marine Ecosystems (Professor David Chittleborough, Dr Megan Lewis, Iain Grierson)
- The Effects of Predation on Pot Caught Southern Rock Lobster by the Maori Octopus (Professor Hugh Possingham, Danny Brock)
- The Development of a Profit Optimisation Decision Support Tool for the Southern Rock Lobster Fisheries (Professor Hugh Possingham, Mike Harte)
- The Effects of Pesticides on the Inshore Marine Habitats (Dr Brian Williams)

The Department prides itself on the close working relationship it has with the South Australian Rock Lobster Industry. This relationship has enabled the department to support the rock lobster industry by liaising at both practical and theoretical levels. For example, in 1998, the industry enlisted the support of 18 second year students to assist the industry survey waste disposal facilities across the state. The information led to support from the Clean Seas program and allowed industry to implement changes leading to clean and environmentally friendly fishing practices.

Cooper's

The difference with Cooper's is you can still meet a Cooper. The fact that you can still meet a Cooper at Cooper's Brewery says something about the place. And about the beer we make. The brewing tradition, begun with Thomas Cooper back in 1862, is a story well worth telling.

Thomas never meant to start a brewing business, frankly, because his business back in those early days of South Australia was stone masonry. But his wife asked him to brew up a batch of stout from an old family recipe to help cure an illness. From all accounts it was one heck of a brew.

Word quickly spread around. Soon he found himself brewing the now world-famous Cooper's Sparkling Ale and Extra Stout for a growing band of loyal customers.

As his brewery flourished, Thomas delivered by horse and cart direct to the homes of his customers, a Cooper's tradition which survived until the 1920s.

Thomas Cooper died in 1897 and his sons John, Christopher, Samuel and Stanley enthusiastically volunteered to continue the family tradition.

Today Cooper's is Australia's sole remaining family owned brewery and that's why you can still meet a Cooper at Cooper's. Our Managing Director, Bill is Thomas Cooper's great-grandson. Maxwell Cooper is Chairman. Board members, Glenn, James and Tim, fifth generation Coopers are continuing the family tradition.

Layzell Crash Repairs

Layzell Crash Repairs is a one stop shop. They will pick up and deliver your vehicle from anywhere in South Australia with the latest tilt-tray towing equipment, supply you with a free loan vehicle (either a late model car or a 4WD tray top) and they will also assist you with insurance paperwork.

Layzell Crash Repairs was established in Naracoorte by Gordon Layzell in 1942. Gordon's son, Colin, took over the family business in 1973 and in 1979 Colin bought Keith Crash Repairs. Colin also owns Coorong Crash Repairs in Kingston, and has 16 agents in the surrounding districts. Layzell Crash Repairs is the only appointed MTA motor vehicle inspection station (no 36) in the South-East. Specialising in fleet repairs, Layzell Crash Repairs have the latest chassis and 4WD straightening equipment. They offer a bodyguard warranty on all paintwork, which is a 5 year guarantee, backed by PPG Australia. Layzell offers a lifetime warranty on all repairs, as well as operating a 4WD accessory centre for all your 4WD needs.

Contact Layzell Crash Repairs at Naracoorte on 8762 2544.

Sponsors and Trade Exhibitors (continued)

Taylor Marine

Taylor Marine

Taylor Marine maintains its unrivalled position as Australia's number one supplier to the commercial fishing and boat building industries of Australia. This strength is a blend of strong senior management combined with a wealth of specialist industry knowledge gained from its strategic locations around Australia. Taylor Marine sees its network of offices Australia wide as a key to maintaining its edge in the market.

Taylor Marine is also proud to be associated as a key exhibitor at the 3rd International Lobster Congress. Taylor Marine is equally proud of its ability to be able to source and offer quality products at competitive pricing.

Some of the vast range of products to be exhibited on their stand are:

- Polyform buoys and feeders, in particular the new HL Series for the longline industry
- Amikan netting and twine
- Manho ropes, in particular the new Hitman brand ropes
- Ultraflex gear and throttle controls and cables
- Mayfair pumps and float switches
- Freeman Marine – solutions in hatches
- Texas Instruments – New cost efficient thermal imaging systems
- Saura compass and autopilot solutions
- Trimble – solutions for vessel management
- Fugro- differential position solutions
- Mathers – the best in electrical gear and throttle solutions
- Furuno – Navigation and advantage fishing solutions
- Oceanvision – Electronic P.C. Solutions

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Taylor Marine
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Geraldton Boat Builders

Geraldton Boat Builders

Since its foundation in 1983 Geraldton Boat Builders have been designing and building high performance fishing, work and patrol boats exactly to client specifications. Each vessel ensures each client is always satisfied with not only the high performance of its vessels but also with the exceptional quality and innovative design of the hull, superstructure and fitout.

A skilled team of boatbuilders, engineers and fitout specialists working in a modern complex capable of accommodating up 10 large vessels at any one time ensures there is no compromise on quality for GBB's clients which include not only commercial operators but government agencies such as Australian Navy, Army, Police, Customs and Fisheries.

The extensive range of Southerly high performance aluminium commercial craft is designed by GBB Director and long time fisherman John Fitzhardinge Jnr and completed to the highest standards.

Sponsors and Trade Exhibitors (continued)

Quin Marine

Quin Marine was established in 1921 and offers a range of quality assured products and services. Quin's are the Australia agent for a wide range of commercial brands of marine electronics. A fully qualified technical department through our Marine Electronics Service Centre offers dealer support for warranties, repairs, maintenance and service for products distributed by Quin Marine. The retails sales and services section markets a range of fibreglass, aluminium and inflatable boats to the South Australian market.

Quin Marine services the professional fishing and aquaculture industry sectors. They market nets and twine, lead and float rope, powerwinches, Wesmar Bow Thrusters, Secmatz, searchlights, Lilley and Gillie Sestrel navigation aids, polyform floats and buoys, Rule and Jabsco pumps, Alden sea safety marine electronics, mooring ropes, anchors, certified chain and ropes. Aquaculture supplies include mussel rope, stainless steel chicken wire and chain, predator netting and stainless steel hardware.

Phone Toll Free 1800 811 303 for Product, Technical and Dealer Advice.

New Zealand Rock Lobster

The New Zealand Rock Lobster Industry Council (NZ RLIC) joins with the National Institute of Water and Atmospheric Research (NIWA) to provide an informative display of science and technology designed to add value to the business of rock lobster fishing.

In addition to detailed information about the NZ RLIC, and the fisheries that support it, the NZ RLIC features a unique rock lobster security tag as currently used in Tasmania and New Zealand. 'No tag, no sale' is a new industry initiative designed to constrain illegal removals from rock lobster fisheries and provide an effective audit of production and distribution.

NIWA features rock lobster research and development projects including collection and ongrowing of puerulus. NIWA stock assessment scientists and biologists have played a fundamental role in the management of New Zealand lobster fisheries and the development of aquaculture opportunities for lobster, fin fish, and shellfish.

K&S Diesel Power

K&S Diesel Power is the flying wings logo of K&S Ampol.

K&S Ampol is the sole franchised distributor of Caltex/Ampol diesel fuel and lubricants for the SA Southern Zone Rock Lobster Fishery. K&S Ampol is a major supporter of the Industry and has been associated as a supplier of fuels and lubricants to fishermen over many years.

In recent years K&S Ampol in consultation with Professional Fishermen's Associations at Southern Zone ports has significantly upgraded fuel facilities to international and Australian safety and environmental standards.

This work is continuing and again, in conjunction with the Industry, K&S Ampol is participating in the Clean Seas and Coast program.

Scania (Australia) Pty Ltd

Scania's Engine History

The Scania history of engine development dates back to 1897, when Gustaf Erikson designed the engine for Sweden's first motor vehicle.

Since then the company has grown to become one of the world's most experienced engine designers and manufacturers – as well as being a leading manufacturer of heavy trucks and buses.

Scania engines are used throughout the world for industrial, marine and generating set applications. In fact, 97% of the production is absorbed by markets outside Sweden and supported by a Scania network with operations in some 100 countries.

Highly respected for long life and excellent economy, a Scania engine is profitable to own and operate. We, and our customers, would not be satisfied with anything less.

Notes

3rd International Lobster Congress

Manage your destiny

We welcome you, the international lobster industry, to the beautiful city of Adelaide for the 3rd International Lobster Congress.

This is a congress for the lobster industry run by the industry. Over the next few days, key issues to be dealt with include:

- marine reserves
- resource sharing and access security
- recreationals
- post harvest handling, culture and health.

Add boats, ropes and floats, great lobster fisheries and pots of the world display, species taste off, side trips to South Australia's famous wine regions, lobster fishing and the Australian Football League Grand Final – this is a must for thinking lobster industry fishers, managers and scientists in 1999.

Contact us on any of the following:

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Welcome to Adelaide!

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Australian Maritime College

Australian Fisheries Academy

Horwath

SCANIA

SARDI South Australian Research and Development Institute

AnsettAustralia

AnsettAustralia Cargo

West Coast Insurance Brokers Pty Ltd

WAPIC Western Australian Fishing Industry Council Inc.

Since 1874 Bickford's Australia

1843 Y 1999 Yalumba Australia's oldest family owned winery

Seafood Council (SA) Ltd.

The University of Adelaide

Diesel K&S Power

Layzell Crash Repairs

Geraldton Boat Builders

Taylor Marine

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NIWA

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Primary Industries and Resources SA