South East Fishery
Industry Development Subprogram

South East Fishery Industry Development Subprogram: facilitation, administration and promotion

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South East Fishery Industry Development Subprogram: Facilitation, Administration and Promotion.

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TABLE OF CONTENTS

2004/254 South East Fishery Industry Development Subprogram: Facilitation, administration and promotion.

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OBJECTIVES:

1. Adopt a supply chain approach to R&D for the SESSF to increase the value of the fishery by value-adding to fish products, adopting new technologies and improving utilisation of catches.
2. Determine priority industry development projects for the SESSF and seek a broad range of funding sources to support this R&D.
3. Integrate with other FRDC and externally funded SESSF projects to ensure maximum leverage of industry funds and avoid duplication.
4. Coordinate the FRDC SESSF Industry Development Subprogram (applications, workshops, communication) and facilitate the input from industry members throughout the seafood supply chain.

NON-TECHNICAL SUMMARY

OUTCOMES ACHIEVED TO DATE:

- Increased levels of communication and cooperation between industry members across the SESSF whole of supply chain;
- Development towards a whole of chain R&D strategy for the SESSF;
- Initiation of numerous projects focussing on SESSF industry development;
- Greater than 1:1 leverage of external funds to FRDC funds across SESSF Industry development projects;
- Establishment of ASCo and significant progress towards the commercial utilisation of bulk seafood wastes across south eastern Australia;
- Development and support of new technologies and improved utilisation to add value to the SESSF seafood supply chain;

- Undertaken work on developing a range of efficiencies and alternate fuel sources for the SESSF; and
- Development of a model that may be able to act as a transition for the SEF Industry Development Subprogram, and other fishery sectors, to instigate and develop industry focussed R&D.
- The R&D projects initiated through the SEF Industry Development Subprogram received funding worth over $2.55 million of which about half was accessed from sources outside FRDC.

Much of the recent research on the Southern and Eastern Scalefish and Shark Fishery (SESSF) focussed on the collection of biological data, assessment of the status of fish stocks and the impact of fishing on the environment. There has also been research into the economics of the fishery and the impacts that changing management arrangements and industry adjustments have had on the fishery. These areas of research have been consistent with the legislative requirements of the Australian Fisheries Management Authority (AFMA) and research priorities developed by the South East Trawl Management Advisory Committee (SETMAC) Research Sub-Committee and approved through the Commonwealth Research Advisory Committee (COMFRAB). Although this research has been valuable from a biological / sustainability perspective and in understanding the impacts of management actions on the fishery, it has been largely driven by the State research agencies or CSIRO and most has tended to have a narrow focus in this respect.

For a number of years, many of the economic indicators in the SESSF have been poor. The low profitability in the fisheries was recognised by most operators in the catching sector, and this has had a flow-on effect throughout the supply chain. Recognising that catch levels were unlikely to increase in the future due to management arrangements and stock status, SESSF fishers identified the need to investigate impediments to economic efficiencies in the fishery so as to improve profitability by increasing the value of their catch whilst reducing expenses and complying with ecological and environmental protocols.

This main focus of the South East Fishery Industry Development Subprogram (SEF Industry Development Subprogram) over the last 3 years has been to assist industry to achieve the complementary outcomes of sustainability and economic benefits in the SESSF. By linking groups of people in the seafood industry with expertise in the whole of industry supply chain, the Subprogram sought to deliver successful outcomes for the seafood industry.

During the life of this project there have been a number of issues that to some extent have driven the need for change in the SESSF, but at the same time provided a high level of uncertainty. The uncertainty, mainly focused on the ecological performance and profitability of the SESSF, came to a head during 2006 due to three key announcements. These were the Commonwealth Structural Adjustment Package (SAP), Australian Fisheries Management Authority's (AFMA) 'Future Operating Environment' program and Department of Environment and Heritages (DEH) recommendations for a system of MPAs across the SE Bioregion. The poor financial situation, uncertainty in the fishery, and the exit of over 50% of trawl operators under the SAP had a direct negative impact on some aspects of the Subprogram.

Notwithstanding the above challenges, significant outputs from the Subprogram were achieved, building on the strong foundations established under the previous FRDC project 2001/238 South East Fishery Industry Development Subprogram: facilitation, administration and promotion.. This was reflected in the broad scope and large number of projects that were developed through the Subprogram between 2005 and 2007. Extensive work has been undertaken by the Subprogram on utilising fish waste and lower value species, supporting supply-chain improvements, encouraging energy efficient fishing and improving people development in the SESSF. The through-chain approach attracted interest from a wide range of stakeholders and allowed access to funding that has not traditionally been available to the seafood industry. This allowed the Subprogram to provide a significant return to FRDC on its investment in the SEF Industry Development Subprogram. Major project outcomes for the Subprogram are outlined below.

Utilising Fish Waste

Through the Subprogram, a group of key stakeholders in the seafood industry formed Australian Seafood Co-products (ASCo) in 2000. A major issue for ASCo was to develop ecologically acceptable means to utilise the thousands of tonnes of fish waste that are produced each year. ASCo determined that processing of the fish waste into a valuable fertiliser was the most feasible option to utilise the processing fish waste produced. The challenge was to develop a system that was suitable and cost-effective for an industry spanning south eastern Australia and that produces comparatively low volumes of product.

To facilitate this, ASCo Fertilisers (ASCoF) was formed to produce a fish-based solid phosphate fertiliser, BioPhos™. Results of trials revealed that the fish-based fertilizer was just

as effective as superphosphate in improving yields and may have other ongoing benefits for soil quality. It also had the added benefit of being a product that can be certified for use in the rapidly growing organic farming market.

ASCo Fertilisers commenced working closely with Australia's leading fertiliser companies Incitec-Pivot Limited (IPL) and Yates on the piloting, commercialisation and marketing of the product. As part of this process Georgetown Seafoods began the construction of its fish nutrient plant during late 2004 and it was operational in early 2005 with fish nutrient sold to IPL. IPL has now developed a commercial recipe and commenced manufacturing BioPhos™ at its Geelong facility in autumn 2007. IPL believes there is a significant and future current market for BioPhos™ type products and they have the infrastructure and processes in place to increase production and take an increasing portion of the market share for these types of product over the next five years.

Utilising Low-value species

In 2005 a significant focus for the Subprogram arose when it was identified that substantial commercial opportunities could be gained from businesses collaborating to achieve new market penetration, value adding and consolidation benefits from co-products. A steering group for co-product activities, the Geelong Region Food Co-products Cluster (GRFCC), was formed with the nine lead businesses in the cluster having a total combined annual turnover of around $1.3 billion. Three strategic directions were identified for the GRFCC; develop low value seafood species and byproducts, develop functional foods using co-product ingredient and explore co-product joint export development.

A key objective of the GRFCC was to develop and implement improved management and performance of the fresh seafood category in retail supermarkets by re-engineering the existing supply chain through the catch sector, processors, value-adding companies and retailers using appropriate distribution and logistics alliance partners. To assist in achieving this approximately $0.5 million funding was approved under the Commonwealth's 'Securing our Fishing Futures' program for the GRFCC to develop and commercialise new processing technologies for fish species that have in the past been considered low value in the Industry. The 'Long Life Retail Fish Fillet Commercialisation Project' is an important initiative of the cluster that aimed to .create a new supply chain for Australian fish fillet products which should increase overall seafood consumption and provide a means to compete with cheaper imports.

A project was also developed to utilise low value bycatch and byproduct species. McLaughlin Consolfish (Consolfish), a major buyer and processor of fish from the SESSF, developed a project to process and market silver warehou, a low value species taken in the SESSF. At present silver warehou is one of five main species captured in the SESSF that are not classified as overfished, but it has poor market identification and acceptance, with prices generally low - representing a poor return for fishers. This project sought to develop a new seafood product that will appeal to the consumer and promote and establish markets for this product. This was to be achieved by exporting the fish whole to Thailand, where processing costs are cheaper and turning it into a highly regarded filleted product. This project was supported by FRDC in 2007 and is currently underway.

As well as improved utilisation of catches, means to minimise the take of unwanted catch or bycatch was also a SESSF priority. Given the goals of zero discarding of quota species and halving the bycatch of non-quota species, proven quantitative methods were required to assist industry to achieve these goals. The value of the high lift balloon trawl has been recognised anecdotally by trawl skippers in the SESSF, but there have been no formal trials to demonstrate, or quantify, the effectiveness of these nets at bycatch reduction. A project to quantify the effectiveness of the high lift balloon trawl in reducing bycatch and also improving catch quality was supported by FRDC and is currently underway

Fuel Efficiency

Faced with rising fuel prices, a predicted domestic oil deficit, and a global need to reduce greenhouse gas emissions, the fishing industry is seeking means to improve the energy efficiency of its operations and to find viable and practicable alternative energy sources. To facilitate this, the Subprogram organised an Energy-Efficient Fishing Workshop from which a number of projects were developed and successfully funded. These projects explored potential for alternative energy technologies and energy-efficient design and operation for commercial fishing vessels.

Industry Development

Through the last six years of the SEF Industry Development Subprogram, it became increasingly apparent that the commercial industry and other seafood stakeholders have a range of innovative R&D ideas and capacity, but the current process made it difficult for many of these people to put their ideas into a formal project proposal and to get it submitted and

funded. In many instances it was evident that the research proposals for the SESSF were developed solely by research agencies to meet what they believed to be the research needs of industry. They seldom focused on efficiencies, profitability or people development. Stakeholders needed a mechanism to be able to identify key needs and then take responsibility for R&D for their sectors.

The "Empowering Industry" project was developed under the Subprogram as a one year trial to help participants across industry sectors take their industry based ideas further, including identifying and engaging appropriate R&D providers and funding sources. The process sought to match R&D ideas to a wide source of research providers and funding agencies (not relying solely on FRDC) and to become a catalyst for a change in R&D process for the seafood industry. The Empowering Industry project has proceeded extremely well to date with almost 30 separate projects developed seeking support from seven different funding programs. In addition, a large number of individuals and organisations have received advice through the project and been directed to existing or previously undertaken R&D, or provided with advice on how to best progress their R&D needs without seeking direct financial support from FRDC at this stage.

Future Development

The R&D projects initiated through the SEF Industry Development Subprogram received funding worth over $2.55 million of which about half was accessed from sources outside FRDC. If projects developed under the Empowering Industry project are included, more than $3.75 million of funding was accessed as a direct result of the Subprogram. Even with the outputs from these projects only starting to provide financial returns to the SESSF, many objectives of the Subprogram are being achieved.

With the winding up of the South East Fishery Industry Development Subprogram, the Empowering Industry model may provide an alternative means to identify industry specific R&D, not just for the SESSF, but for the broader Australian seafood and fishing industry.

KEYWORDS: South East Fishery, industry development, value-adding, training, waste utilisation.

ACKNOWLEDGEMENTS

The Subprogram acknowledges the support from each member of the Steering Committee. Their different ideas and the willingness to discuss issues and work together to find a way forward has been a great help to me.

The Subprogram has sought external grants and investment to match the funding received from FRDC for the Subprogram. This has been achieved in each year since the inception of the Subprogram and I gratefully acknowledge the people and organisations that have funded various Subprogram projects including: Ted Loveday, Jayne Gallagher and Seafood Services Australia's Seafood Industry Development Fund, Bruce Green and Victoria's Department of Innovation, Industry and Regional Development, NSW EPA's Profiting from Cleaner Production Industry Partnership Program, Dr Aravind Surapaneni and Victoria's Department of Primary Industry, and Paul Ford and David Gregory from the National Food Industry Strategy's Food Innovations Grants and Food Chains Program respectively. I appreciate the plant feasibility project by Gordon Pender. Special thanks to Wayne Street of Street Ryan and Associates for all of the great work and support he has provided for the initiation of ASCo.

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BACKGROUND

Most of the research undertaken on the Southern and Eastern Scalefish and Shark Fishery (SESSF - formerly called the South East Fishery) over the last decade has focussed on the collection of biological data, assessment of the status of fish stocks and the impact of fishing on the environment. There has also been considerable research into the economics of the fishery and the impacts that changing management arrangements and industry adjustments have had on the fishery.

These areas of research have been consistent with Australian Fisheries Management Authority (AFMA) legislative requirements, and the research priorities have been guided by a five year strategic research plan, developed by the South East Trawl Management Advisory Committee (SETMAC) Research Sub-Committee and approved through the Commonwealth Research Advisory Committee (COMFRAB)..

The Southern and Eastern Scalefish and Shark Fishery Assessment Group (SESSFAG) was developed within this system, to oversee and evaluate stock assessments on the SESSF species using an ecosystem based approach.

A number of assessment groups (eg. Deepwater Assessment Group), which have input from Industry representatives, researchers and managers, have also been established to undertake species assessments. It is acknowledged that this process and the previous individual stock assessment groups have been valuable and improved the quality of research undertaken in the SESSF. Nevertheless, as a result of this process, most of the research has tended to have a narrow focus aimed towards stock assessment and sustainability issues, and were largely driven by the State and Commonwealth research agencies.

In recent years the need for a broader coverage of R&D to address the whole of supply chain needs of the SESSF has been recognised by the seafood industry, the Management Advisory Committees (MACs) and the Fisheries Research and Development Corporation (FRDC).

Following a workshop held in November 1999 (Canberra) it was recommended that FRDC develop a Subprogram to support the industry development component of R&D for the SESSF. As a result the SEF Industry Development Subprogram (SEF Industry Development Subprogram) was established in 2000 to increase the value of the fishery by value-adding to fish products, adopting new technologies and improving utilisation of catches.

Over the life of this and the proceeding project (FRDC 2001-238), the SEF Industry Development Subprogram has directly developed, or assisted in the development of a number of projects to meet the strategic goals identified by FRDC and Industry. Noticeably, this project provided a broader application of the Subprogram to apply to all of the fisheries and the supply chain involved in the SESSF.

Overall the work of the Subprogram proceeded well, with a high level of industry support and with many beneficial outputs emerging.

Due to the recent high level of uncertainty in the SESSF, however, arising from the South East Region Marine Protected Areas (MPA) program, the Commonwealth Structural Adjustment Package (SAP) and AFMA's 'Future Operating Environment' program, there were negative impacts on some projects associated with the Subprogram.

The progress of the Subprogram and the projects developed by the Subprogram over the last three years are covered in this report (see Appendix I for a summary).

NEED

Until the establishment of the SEF Industry Development Subprogram there was a dearth of R&D projects focusing on industry and people development for the SESSF. The Subprogram, established in 2000, has accessed over $2.1 million in funding, to increase the value of the fishery by value-adding to fish products, adopting new technologies and improving utilisation of catches. Importantly, almost half of this funding has come from sources external to FRDC.

At the commencement of the SEF Industry Development Subprogram, R&D in this fishery focused primarily on biology and fishery management, and little R&D was targeted towards innovative ways of adding value to the fishery. SESSF Industry members identified the need to shift the R&D focus solely from biological aspects of the fishery, to areas where industry stakeholder could improve efficiency, profitability and compliance with ecological and environmental protocols.

In the Commonwealth scalefish fisheries in south eastern Australia many of the economic indicators have been poor for a number of years. The low profitability in the fisheries was recognised by most operators in the catching sector, and this has flow-on effects throughout the supply chain. Industry identified the need to investigate impediments to economic efficiency in the fishery. To achieve the complementary outcomes of sustainability and

economic benefits to stakeholders in the SESSF, in accordance with government direction on R&D planning, a whole of chain approach to R&D was required.

Recognising that catch levels were unlikely to increase in the future due to management arrangements, fishers were aware of the need to improve profitability by increasing the value of their catch and reducing expenses. This was a primary goal of the SEF Industry Development Subprogram.

By linking groups of people in the seafood industry with expertise in the whole of industry supply chain, the Subprogram sought to deliver successful outcomes for the seafood industry involved in the SESSF. The through-chain approach adopted by the Subprogram attracted interest from a wide range of stakeholders and allowed access to funding that has not traditionally been available to the seafood industry. This has allowed the Subprogram to provide a significant return to FRDC on its investment in the SEF Industry Development Subprogram.

OBJECTIVES

1. Adopt a supply chain approach to R&D for the SESSF to increase the value of the fishery by value-adding to fish products, adopting new technologies and improving utilisation of catches.

2. Determine priority industry development projects for the SESSF and seek a broad range of funding sources to support this R&D.

3. Integrate with other FRDC and externally funded SESSF projects to ensure maximum leverage of industry funds and avoid duplication.

4. Coordinate the FRDC SEF Industry Development Subprogram applications, workshops, communication and facilitate the input from industry members throughout the seafood supply chain.

METHODS

The methods to enable the facilitation, administration and promotion of the SEF Industry Development Subprogram are outlined below.

Steering Committee

During the initial establishment of the Subprogram an expertise based steering committee was created to oversee the Subprogram's operations. The composition and functioning of this Committee was reviewed during 2003 (FRDC Project 2001/238) with the view to developing a more appropriate mechanism for the future operation of the Subprogram. Unlike most other FRDC Subprograms, the SEF Industry Development Subprogram did not have the driving force of an eager group of researchers vying to obtain research funds for specific projects. In fact, the SEF Industry Development Subprogram began without any projects under its umbrella and had the added requirement of needing to obtain matching funds from agencies other than FRDC. This resulted in the Subprogram Leader having to commit considerable resources to driving project submissions and leading the Subprogram's core projects.

It became apparent over the initial years of the Subprogram's operation that the SEF Industry Development Subprogram would most likely only have one or two major projects running concurrently. As such, there was no need for a large Steering Committee to review and oversee project objectives, milestone reports, final reports etc. In addition, many of the members of the catching sector had difficulties in attending meetings and this lead to inefficiencies in managing the Subprogram.

It was therefore agreed that the Subprogram would be better serviced by a small core of dedicated people who were keen to initiate and drive various industry development projects. Rather than having a permanent place on a steering committee, input from the catching sectors was gained directly from the South East Trawl Fishing Industry Association (SETFIA) and South East Non-Trawl Fishery Association (SENTA). This was facilitated through attendance of the Subprogram Leader at industry meetings, or by having a standing agenda item by which members of the catching sector could provide input and channel ideas to the Subprogram. Input was also invited from Industry or other experts not directly associated with any Subprogram funded projects. Industry was considered in its broadest sense and included representatives from service sectors, environment NGO's and gear suppliers.

Subprogram Leader Roles and Responsibilities

The above change in the Subprogram's operation meant that the Subprogram Leader had to have a much greater role than was initially anticipated in the functioning of the Subprogram. This meant he needed to show independence and have a good understanding of scientific principles, knowledge of the industry (in the broader sense), a track record of project

management, a good understanding of corporate governance, excellent leadership and communication skills, vision, courage and the ability to act in the interests of the whole industry. There was no other staff employed on this Subprogram (Appendix II).

The Subprogram Leader's major tasks were to ensure that the Subprogram's:

- milestone objectives were met on a timely basis;
- projects were coordinated and integrated efficiently to ensure national collaboration of research;
- meetings and workshops were organised efficiently and effectively;
- reporting structures were in place;
- reports and publications were coordinated and delivered;
- developed an approved media policy;
- sought and coordinated new funding applications;
- had a R&D Strategic plan that was relevant and current, to reflect industry's development needs; and
- outcomes were promoted through effective and efficient extension.

Facilitation, Administration and Promotion of the Subprogram

Industry Consultation

The Subprogram leader, Dr Knuckey, has an extensive network of industry connections in the South East Trawl, Great Australian Bight Trawl, Southern Shark and Gillnet Hook and Trap fisheries of the SESSF. Through input from these catching sector associations, and established connections with other key industry members of the supply chain (eg. Sydney and Melbourne Fish Markets and Master Fish Merchants Association) he maintained and developed relevant industry contacts across the whole of the SESSF supply chain.

This network has been used to establish, grow and improve communication flow between seafood industry stakeholders throughout the supply chain, and importantly, outside the traditional industry, especially through the fish waste/fertiliser project.

With the approval in 2007 of the FRDC project 2007/304 'SESSF Industry Development Subprogram: empowering stakeholders to initiate and advance R&D projects in the seafood industry' (Empowering Industry), the level of Industry consultation has been further enhanced.

Priority Setting

The Subprogram Leader, in conjunction with the core Industry participants, utilised research reports and input from SESSF Industry associations to determine and update research priorities for the SESSF and to monitor progress against objectives of agreed research priorities.

Formal reviews of the direction of the Subprogram were undertaken together with the development of longer term research strategies. These were provided to FRDC in the form of written research reports and coordinated research funding applications during the life of the project.

Meeting facilitation

The Subprogram Leader convened all relevant Subprogram meetings and research workshops. This included setting the agenda, inviting participants, organising venues, making travel and accommodation arrangements as required and preparing either minutes or proceedings for distribution.

Liaison with research groups

The Subprogram Leader attended meetings and workshops of relevant research projects. This was to ensure that the Subprogram was fully across the directions and outcomes of similar research being conducted around Australia.

The Subprogram Leader, where possible, met annually with the Principal Investigators of the component Subprogram projects to ensure that their needs were being met by the Subprogram, to identify any problems that could hinder the project outcomes and to resolve any such issues. The recent development of the 'Empowering Industry' project has enhanced the level of liaison with a broad range of research groups and individuals.

Coordination of research proposals and reports

The Subprogram Leader edited and revised all research application associated with SEF Industry Development Subprogram to ensure that they aligned with the Strategic R&D Plan and to optimise the use of resources.

He also co-ordinated the preparation of milestone, final and research reports for review by FRDC.

Promotion of the SEF Industry Development Subprogram

The formal promotions of all results from the Subprogram were via the Subprogram Leader who developed media liaisons and strategies for high impact release of information.

Attendance at Industry and Government meetings was used to promote the benefits of the Subprogram.

He also lobbied organisers or coordinators to feature the Subprogram activities and outcomes at relevant meetings and conferences, including Seafood Directions 2005 and 2007.

Identification and collection of additional research funds

The Subprogram Leader took a lead role in the identification and successful procurement of research funds to enhance the research projects, associated with or developed under the Subprogram.

Funding from a wide range of sources was identified and arrangements made for the preparation and submission of research submissions. This was enhanced and expanded through the fish waste/fertiliser project SSA Project 2002/405.

The Empowering Industry project also lead to the broadening of the funding base for Industry R&D.

Liaison with FRDC

The Subprogram Leader provided a conduit for all communications between FRDC and Subprogram participants. He provided feedback in relation to concerns raised by project leaders, reported on project progress and made recommendations in relation to the future direction of the Subprogram. He also made presentations to the FRDC board and liaised with FRDC Project Managers as required.

Liaison with AFMA and members of the SETMAC / Assessment Group Meetings (SEFAG)

The Subprogram Leader is the Industry Liaison Officer for SETMAC, research member of Great Australian Bight Trawl Sector Management Advisory Committee (GABMAC), Chair of the Shelf Assessment Group, a member of the Southern and Eastern Scalefish and Shark Fishery Resource Assessment Group (SESSFAG) and Southern and Eastern Scalefish and Shark Fishery Assessment Group (SESSFEAG).

Through these links with the AFMA process, the Subprogram Leader has ensured that the SEF Industry Development Subprogram maintained strong links with the MAC research priority setting process to ensure complementary consideration of research priorities and to avoid duplication and conflict between the two groups responsible for setting research priorities within the SESSF.

Links with other Subprograms and Infrastructure Projects

This Subprogram developed important synergies and collaborative links with other FRDC and non-FRDC related research such as:

- the Effects of Trawling Subprogram;
- Seafood Services Australia (National Seafood Centre); and
- National Food Industry Strategy.

It was important to ensure there was coordination across these activities to avoid duplication and to maximise benefits from any investment.

RESULTS / DISCUSSION

Sector Progress

Background

During the life of this project there have been a number of issues that to some extent have driven the need for change in the SESSF, but at the same time provided a high level of uncertainty which have made it difficult to maximise the outcomes proposed by the Subprogram. 2006 saw the culmination of the SESSF catching sector‘s uncertainty and this flowed through to the onshore processing and supply chain side of the industry. This uncertainty was primarily due to three announcements which impacted heavily on the Commonwealth fisheries in SE Australia.

In November 2005 the Department of Agriculture Fisheries and Forestry (DAFF) announced a $220 million Commonwealth Structural Adjustment Package (SAP) to buyout Commonwealth licences so as to reduce effort and overcapacity in the fisheries, and to make fisheries more ecologically and economically sustainable. In December the same year, the Australian Fisheries Management Authority (AFMA) outlined a “Future Operating Environment” for the SESSF that detailed significant management changes intended to cease overfishing, rebuild overfished stocks and to manage the broader environmental impacts of fishing. Also in

December, DEH released its recommendations for a system of Marine Protected Areas (MPAs) across the South East Bioregion, with closures proposed for many productive SESSF fishing grounds.

All of these announcements, whilst ultimately endeavouring to improve the ecological sustainability and biodiversity conservation in SE Fisheries, lead to uncertainty in the SESSF that along with the poor financial situation in the fishery and the exit of operators under the SAP had a direct negative impact on the Subprogram.

Ecological performance

Strategic Assessment of the SESSF under the EPBC Act was completed at the end of 2002 and highlighted that the fishery had a number of sustainability issues which needed to be addressed to varying degrees. In addition, the Bureau of Rural Sciences Fishery Status Reports (2004) suggested that seven quota species were either already overfished or currently in the process of overfishing, or both.

The catching sector began to recognise that despite being in a poor economic situation the fishery had to adjust to a stricter fisheries management regime that included:

- reduced quota on a number of species;
- limits on catches of non-quota species;
- general reduction of fishing effort,
- gear modification to reduce bycatch and benthic impacts;
- mitigation controls for protected species; and
- significant areas of spatial closures.

Each of these controls would have some impact on the level of catch that can be taken by each SESSF operator, and therefore the supply chain. There was also an acknowledged need to reduce the levels of waste occurring in the seafood industry. Methods of reducing bycatch through gear modification have been investigated and new methods developed in the processing sector to maximise the use and return on species caught in the fishery.

A major focus of the Subprogram has been to continue to work with Australian Seafood Co-products (ASCo), a company formed to add value to the seafood supply chain through the sustainable utilisation of fish co-products that are not traditionally utilised or marketed. ASCo

was formed with assistance from FRDC and Seafood Services Australia. Shareholders include FRDC and numerous major seafood companies and associations from Queensland, New South Wales, Victoria, Tasmania and South Australia (see Appendix III for shareholders).

Economics of SESSF

It was generally recognised that the SESSF had been in a poor financial situation for a number of years. An ABARE (2004) report – 'Fishery Survey Reports 2003' – indicated that although the trawl sector of the fishery had a GVP of around $70 million, real net returns to the fishery were only $0.5 million. The report highlighted that the trawl fishery was in a poor economic situation and had worsened over the previous five years. A survey of the Gillnet Hook and Trap (GHT) sector showed a GVP of around $24 million in 2003/04, but real net returns of only $0.4 million.

With the costs of fishing continuing to increase, the SETFIA recognised that the trawl fleet which was already in a difficult economic situation would not be in a position to afford any significant reduction in total catch caused by stricter management controls. SETFIA therefore called for a study by economic consultants, Fisheries Economics, Research and Management P/L (FERM), to identify the main factors affecting the profitability of the SESSF trawl fleet and any impediments to autonomous adjustment and investment in the fishery. With funding from the Fisheries Resources Research Fund (FRRF), FERM produced a report in July 2004; 'ITQs, Ageing Boats and The Price of Fish - Profitability and Autonomous Adjustment in the South East Trawl Fishery'. The report stated that "Costs have been increasing, catches have declined and most operators have faced stable or falling real prices of fish". Increasing fuel prices and the cost of repairs and maintenance for the ageing fleet appeared to be major factors, but increased costs of management levies, quota leasing costs and other non-fishing regulatory costs, such as workers compensation and payroll tax, had worsened the situation.

During 2005, the impact of record high (at the time) fuel prices and increasing levels of imported fish on the market further exacerbated the problem and most sectors of the SESSF had a very difficult year financially. Numerous operators reported ongoing operational losses and a significant number of companies either tied up their vessels or sold out of the fishery altogether.

FERM noted that although some level of autonomous adjustment was occurring, it was slow and was likely to remain so. Impediments to autonomous adjustment to the fishery included: a

lack of markets for old trawl vessels; uncertainty about TAC levels and the process; lack of confidence in management arrangements and low expectations of future profitability in the fishery. They explained that the slow rate of adjustment came at some economic cost and this may be acceptable to society, but it would also have an ecological cost if the fishery continued to operate in an unsustainable manner. They therefore suggested that there may have been justification for hastening the rate of adjustment purely on ecological grounds, which may outweigh any economic considerations.

At the time, the poor economic situation amongst many of the operators in the SESSF, especially in the trawl sector, was preventing progress in addressing the ecological improvements needed in the fishery, even though this may have lead to improved economic return in the longer term. For these reasons, in 2005, SETFIA submitted a structural adjustment package to Government proposing short-term economic incentives to enable the SESSF to deliver on the fishery's long-term ecological needs. This was not supported by the Federal Government. However, in November 2005 the Department of Agriculture Fisheries and Forestry (DAFF) announced a $220 million Commonwealth Structural Adjustment Package (SAP) designed to buyout Commonwealth licences and reduce effort and overcapacity in all Commonwealth managed fisheries, including the SESSF, to make them more ecologically and economically sustainable.

The buyout process was delayed by over four months, causing further uncertainty, but in September 2006 it was announced that over 50% of trawl licences and many non-trawl licences had been removed as a result of the buyout. The final outcome of the buyout resulted in the removal of 59 trawl SFRs and 134 non-trawl SFRs from the SESSF, leaving 59 and 106 respectively. The economic outcomes, to the fishery and the supply chain, from this reduction will become evident over the coming years.

Management

The creation of the SESSF provided AFMA with a platform to improve management of all sectors of the fishery, using an ecosystem based approach. The introduction of the SESSF Management Plan highlighted the need for:

- the establishment of harvest strategies;
- identification and implementation of management responses to fishing impacts identified from the ecological risk assessment process;

- implementation of management actions to limit the level of non-quota species catches to ensure catches do not increase above a predetermined range of historical catch landings;
- development and implementation of a system of spatial and temporal management;
- development and implementation of management arrangements to significantly reduce the current total level of quota and non-quota discarded species; and
- an assessment and reduction in the extent of interactions with seals, cetaceans and seabirds across all sectors of the SESSF, and interactions with syngnathids in the trawl sectors, and white sharks in the gillnet and hook sector.

In 2003 AFMA administered a FRDC/NOO (National Oceans Office) funded Alternative Management Strategies (AMS) project that was developed to investigate an appropriate suite of management tools that would enable all sectors within the SESSF to meet their ecological and economic requirements. The project focused on integrated management solutions (i.e. a coordinated combination of management tools), with impacts on the ecology and all other aspects of the fishery with all sectors being considered simultaneously.

Alternative management scenarios were described and defined according to four broad categories of fisheries management measures or controls including: quota management; spatial management; gear controls; and effort controls. Qualitative analysis of some of these scenarios was completed by 2007 and provided information that influenced management of the SESSF.

In the meantime, during 2005, an explicit harvest strategy framework was developed and introduced in the SESSF. This strategy used conservative triggers for biomass depletion and levels of fishing mortality, to set estimates of sustainable total catch levels that accounted for discards.

In December 2006, AFMA responded to a Ministerial Direction by outlining a 'Future Operating Environment' for the SESSF that detailed significant management changes intended to cease overfishing, rebuild overfished stocks and manage the broader environmental impacts of fishing. Each of the controls has some impact on the level of catch that can be taken by each SESSF operator.

Marine Protected Areas (MPA)

The implementation process for Marine Protected Areas (MPA's) across the SE Bioregion was a major issue that affected the fishery during the period 2004 to 2006. An integral part of the plan, put in place under the National Oceans Policy, was the implementation of representative MPAs across the entire region of the fishery.

The process of defining the actual areas of the MPAs commenced in 2004 but stalled during 2005 whilst the government sought to address issues that influenced the security of the fishing industry in the MPA process. These related to:

- defining the permitted fishing activities in multiple use MPAs;
- decision rules for IUCN categorisation;
- worked examples of how the MPA structural adjustment policy will be applied and what method will be used to calculate socio-economic impacts of alternative MPA options;
- ensuring a scientifically rigorous process so that outcomes are both scientifically defensible and endorsed; and
- consideration of management and monitoring arrangements for the system of MPA's.

Initially it was expected that work on establishing the system of representative MPAs would be completed during 2005, but this did not take place. In December 2005, DEH released its recommendations for a system of MPAs across the SE Bioregion. The MPA system initially proposed had potentially large repercussions for SE fisheries, with closures proposed for many productive SESSF fishing grounds.

FRDC supported project 2005/083, titled 'Review and assessment of the impacts of the proposed Broad Areas Of Interest (BAOI) for MPA development in the SE region', which sought to readjust boundaries so as to minimise the impacts on Industry whilst still achieving the ecological outcomes proposed by DEH for the MPA program. This was successful and boundaries were revised.

Summary

The years 2004 to 2007 were unsettled times in the SESSF fishery due to the following:

- uncertainty associated with need for alternative management arrangements that took into account ecological, economic and sustainability issues;

- establishment of the SE Bioregion MPA and defining representative MPAs;
- general unprofitability in the fishery;
- unprecedented high catches in the GAB, good catches in the SEF and the increasing level of imported fish, causing a glut on the market that had a negative impact on prices; and
- impacts of the SAP.

Due to the above factors, being involved in industry development projects was a very low priority for many operators in the SESSF during this time as they weighed up theirs, and the fisheries future. The SAP had a direct negative impact on the Subprogram and one specific project, the NFIS Flow-Ice project, had to be cancelled because the industry partner decided to exit the fishery. Other projects were significantly affected, delayed or ceased.

Whilst generally making it difficult for the Subprogram, there are some potential benefits from the above challenges. More stringent management controls will reduce commercial catches, bycatch and discarding and the industry therefore will need to become more resourceful in value-adding available catch through market development and improved catch handling. As this cannot be achieved by the catching sector alone; co-operation and involvement of the whole of the supply chain is required.

The catching and processing sectors now recognise this, and the Subprogram has witnessed an increase in the development of a number of through-chain projects aimed at product development, value-adding, supply chain development and improved catch handling.

Major Research Outputs of the Subprogram

Notwithstanding the above challenges facing the SESSF, the outputs from the Subprogram proceeded extremely well, building on the strong foundations established under the previous FRDC project 2001/238. With a higher level of broad Industry support and input, a number of beneficial outputs emerged. This was reflected in the broad scope and large number of projects that were developed through the Subprogram between 2005 and 2007 (see Appendix I).

The Subprogram has undertaken extensive work on utilising fish wastage and lower value species, support chain improvements, energy efficient fishing and human development. The progress and research outputs of the projects are outlined below.

Utilisation of Fish Processing Waste

The Australian Seafood industry produces thousands of tonnes of fish waste annually. In many instances only the fillets are retained with the balance of the product (head, guts, frame etc), accounting for ~60% of the weight of the fish being discarded, often at a cost to the processor and ending up as land-fill. This practice has come under increasing scrutiny, due to environmental issues, and is becoming an increasing cost burden for the whole industry. With over 80,000t of wild caught fish landed across south eastern Australia alone, there is a conservative estimate that well over 20,000t of fish product waste is produced each year. Utilising this waste would potentially bring millions of dollars into Australia's seafood industry and reduce environmental impacts.

Through the Subprogram, a group of key seafood industry stakeholders formed Australian Seafood Co-products (ASCo) to add value to the seafood supply chain through the sustainable utilisation of fish and fish co-products that are not traditionally utilised or marketed. ASCo has 17 seafood companies as shareholders, spanning the five south eastern Australian states (Appendix III). A shareholder's agreement is in place with elected company directors. Shareholders put forward a total of $85,000 to leverage over $900,000 from a variety of government agencies to support getting the company off the ground, with different aspects of the project funded by different sources.

A major issue for ASCo was to develop ecologically acceptable means to develop processes and infrastructure to utilise the many thousands of tonnes of fish waste that are produced each year. ASCo determined that processing of the fish waste into a valuable fertiliser was the most feasible option. The challenge was to develop a system that was suitable and cost-effective for an industry spanning south eastern Australia, and that produces comparatively low volumes of product.

To facilitate this, ASCo Fertilisers (ASCoF) was formed – a partnership between ASCo and Sieber, a New Zealand company that has the proven technology and experience in processing fish wastes into organic fertilisers. Sieber maintains a 33% shareholding in the company. Through this partnership, ASCo Fertilisers utilised fish wastes to produce a fish-based solid phosphate fertiliser, BioPhos™, a product with benefits to agricultural crops that can be certified for use in the rapidly growing organic farming market.

To further develop production and marketing within Australia and for the on-going success of the project, a suitable alliance with an Australian based fertiliser manufacturer was considered

critical. Negotiations took place with Australia's largest fertiliser company IPL and this lead to the development of an MOU between ASCoF and IPL. The MOU sought to leverage their combined intellectual property and operational capacity to create significant business opportunities through the commercialisation and marketing of BioPhos. As outlined in FRDC Project 2001/238 Final Report, the venture would be considered successful if;

- BioPhos and derivative products could be shown to be as effective as conventional phosphatic pasture products in field trials;
- it could be determined that marketable product(s) can be economically manufactured and distributed in Australia; and
- a mutually agreed volume of BioPhos and/or derivative products could be sold to the Australian market place annually, within a specified time period.

Subject to satisfaction of the success factors, the business to be conducted by ASCoF and IPL would consist of:

- exclusive rights to IPL to market the jointly developed product(s) in Australia;
- access to the liquid fish nutrient resources of ASCoF with first right of refusal over supply;
- access to the IPL national distribution network; and
- establishment of mutually agreed sales targets for any products developed as part of the program.

Much of the work ASCo Fertilisers commissioned during this project centred on achieving the above and developing a business plan. The results of this work are summarised below.

Based on the success of FRDC project 2002/250 "Agricultural trials of a fish-based fertilizer" undertaken by Dr Aravind Surapaneni from the Department of Primary Industries, Victoria (DPI Vic), IPL approached DPI Vic to continue with agriculture trials of BioPhos. IPL subsequently provided funding of around $71,000, which was matched by FRDC, for the 3rd season pasture trials to take place as a commercial project. The objectives of the project were to compare the agronomic effectiveness of BioPhos with triple superphosphate in the irrigated dairy industry and semi-quantify water borne losses of soluble phosphorus in irrigation water for the two products.

The results revealed that the fish-based fertilizer was just as effective as superphosphate in improving yields and may have other ongoing benefits for soil quality. It had the added benefit of being an organic compound. This project marked the end of the field trials undertaken to support the use of BioPhos. IPL indicated they were satisfied with the results and were in a position to move on to the commercialisation and marketing of the product.

ASCo Fertilisers commenced working closely with Australia's leading fertiliser companies IPL and Yates on the piloting, commercialisation and marketing of the product. As part of this process Georgetown Seafoods began the construction of its fish nutrient plant during late 2004 and it was operational in early 2005, with 40,000L of fish nutrient being sold to IPL during 2005 to support the commercial production trials.

Significant work commenced on the commercial trials of BioPhos by both ASCo and IPL. A pilot production facility was established by Yates at Wyee on the central coast of NSW, and about 500t of product was produced for test markets, all of which was sold. The production trial allowed:

- fine tuning of aeration systems;
- establishment of monitoring and testing protocols;
- feedback from customers about the efficacy and handling characteristics of the product; and
- an understanding of the importance of ingredient selection e.g. saw dust sizing.

Unfortunately due to a change in strategic direction at Yates, the pilot manufacturing arrangements fell over, necessitating a change in direction for IPL. This loss set the project back significantly and it took approximately 12 months to settle on a new direction. In the interim, a range of laboratory trials were conducted aimed at product improvement, considering issues such as: species of fungi, sterility of feedstock, source of rock phosphate and carbon source. As a result, IPL developed a commercial recipe and commenced manufacturing BioPhos at its Geelong facility in autumn 2007.

In line with the current status of the ASCo venture, a project has been submitted by IPL for Street Ryan and Associates to provide consultant mentor support and chain management assistance to further formalise and develop the relationship between the major chain partners: IPL and ASCoF, as well as the associated companies including Australian Seafood Co-Products Pty Ltd (ASCo) and its 16 Seafood Industry businesses, FRDC, and Pacific BioFert

Ltd (the company that replaced Sieber). The project, 'SESSF Industry Development Subprogram: Commercialisation and Joint Venture Manufacturing Plan for ASCo and IPL by Street Ryan and Associates will assist in steering the chain through its next stages, namely:

- establishment and roll-out of further liquid fish nutrient plants at selected ASCo shareholders facilities;
- enactment of ASCoF shareholders agreement and nutrient production agreements;
- completion and enactment of a Commercialisation and joint-venture Manufacturing Plan between ASCoF and IPL;
- facilitation of the ASCoF/IPL joint development team;
- development of manufacture and marketing of BioPhos products; and
- product launch and agreed marketing program.

IPL believe there is a significant current market for BioPhos type products, which is expected to double by 2009. Currently this type of product is largely manufactured and distributed by smaller, regionally based businesses, and growth is held back by poorly coordinated supply chains, ineffective products, lack of QA and the high cost of existing product. IPL believe that they have the infrastructure and processes in place to overcome these impediments to growth and that there is significant potential for its production of BioPhos to take an increasing portion of the market share for these types of products over the next five years.

The other aspect to the Subprogram, which is reflected well in the ASCo suite of projects, is the commitment to leverage FRDC support by seeking a range of alternate funding opportunities. This has included: Seafood Services Australia's Seafood Industry Development Fund; the Victorian Department of Primary Industry's Ecologically Sustainable Agricultural Initiative; Victoria's Department of Innovation, Industry and Regional Development; NSW EPA's Profiting from Cleaner Production Industry Partnership Program and the NFIS. Major highlights from this project have been:

- irrigated pasture and tomato trials completed with positive results;
- completion of a final report on feasibility and a business plan;
- commercial sales of fish nutrient to IPL;
- ASCo winning Seafood Directions R&D award;
- commercial production of BioPhos underway;

- the level of leverage any FRDC support by alternative funding sources; and
- a MOU signed by ASCo and IPL;

The project has progressed well and production is now moving into a commercialisation phase.

Energy Efficiency in the Fishing Industry

Fuel is a vital, but costly, input to seafood production, accounting for up to 30% of the operating costs of a fishing vessel in Australia. An estimated 270 million litres of diesel fuel is currently consumed by Australian fisheries each year, as well as a substantial amount of petrol. Faced with rising fuel prices, a predicted domestic oil deficit by 2015, and a global need to reduce greenhouse gas emissions, the fishing industry is seeking to improve the energy efficiency of its operations and to find viable, practicable and environmentally sound alternative energy sources. To facilitate this, the Subprogram largely tied this aspect of industry development with the Energy-Efficient Fishing Workshop, held in Melbourne on 28-29th November 2005. The workshop was attended by over 30 people from industry, government, and various research agencies, including a number of participants from New Zealand. The participant list is provided as Appendix IV.

Following the Energy Efficient Fishing Workshop, a major priority for the Subprogram during 2006 was to explore the potential for alternative energy technologies and energy-efficient design for commercial fishing operations in Australia, and to develop an R&D agenda for advancing alternative energy use and energy efficiency in Australia's fishing fleet. Outcomes focused on the following key areas:

- alternative energy technologies and fuels for marine vessels;
- alternative power/engine technologies for marine vessels;
- energy efficient vessel and gear design;
- vessel energy budgets and energy conservation practices; and
- developing an R&D agenda for optimising energy use.

Three key project streams were identified to achieve the above.

Firstly there was a three level energy audit of Australian and New Zealand fisheries. Level 1 audit involved a primary assessment of different fisheries' overall performance. This would classify different sectors of the industry based on gear and likely energy uses. Methods developed for energy audits of other primary industries would be adapted for use in the fishing

industry. This process would help to identify similar issues between sectors and prioritises energy issues. Comparison of audits between different fisheries and the influence of regulations could then be made.

The Level 2 audit involved a preliminary audit of vessel machinery and component systems which would investigate three typical example vessels from within each sector for a detailed energy audit.

The Level 3 audit involved a detailed quantitative audit of representative vessels which would include assessing harvest strategies, rules and regulations, operations, fuel usage, engines, hull form and trawl gear.

This project is underway and has already produced an upgraded fuel report. The results of these audits would be presented to industry sectors, managers and governments together with recommendations on the main issues that need to be addressed to improve the energy efficiency of the fishing fleets.

The other two project streams were to develop a Dynamic Resource Kit for Fuel Efficiency Best Practice and a Guide to Drag Reduction Strategies/Options in Australian Trawl Fisheries**.** Due to resource restrictions these two projects have not been progressed further at this stage.

As a result of the Energy Efficient Fishing Workshop to further progress the matter, an Australian Maritime College (AMC) technical team was assembled, including Laurie Goldsworthy (marine engines) and Giles Thomas (hull design) and a project was submitted 'SESSF Industry Development Subprogram: Improving engine efficiency in the Australian fishing fleet'. This application proposed four subprojects aligned with the research objectives outlined for alternative fuels research priorities. Each subproject was separately costed and could be run independently. Specific project objectives were to:

- demonstrate the feasibility of Marine Gas Oil (MGO) or other lower cost distillates in fishing vessel engines, as a cheaper form of petroleum based diesel fuel.
- investigate the technical feasibility of fish oil as a biofuel source related directly to the activities of the industry.
- evaluate LPG as a relatively user friendly option with an established supply chain, and detail the required technology in the context of fishing vessels.
- evaluate natural gas (LNG and CNG) as a prospect for fuel cost savings, and detail the required technology in the context of fishing vessels.

This project was supported by FRDC and is currently underway.

David Sterling, Laurie Goldsworthy and Kim Klaka conducted a review of Energy Efficient Fishing during 2006. There were two parts to the review: PART A - Alternative Fuels and Efficient Engines; and PART B – Hull Characteristics and Efficiency. The objectives of the review were to:

- examine the degree to which rising fuel costs have impacted on different fisheries;
- examine new and existing technologies developed both within and outside of Australia in the field of increased fishing efficiency through reduced energy usage and innovation;
- examine opportunities for applying innovative solutions and developments which are most likely to produce the best return for the Australian fishing industry;
- develop a publication that scopes potential innovations, whether they be existing or have the potential for development, that reduce energy usage; and
- provide advice on potential R&D that could assist industry in reducing energy usage.

To this end, a project was submitted to FRDC in 2006; 'SESSF Industry Development Subprogram: Development and Implementation of an Energy Audit Process for Australian Fishing Vessels'. FRDC requested further information regarding the project, specifically the NZ involvement. To accommodate FRDC's request, John Wakeford of AMC travelled to NZ to discuss the project with representatives from the NZ fishing industry.

Value-Adding the Catch of the SEF

Unlike a lot of Australia's fisheries, the SESSF does not make its money from single high value species, instead a variety are marketed, commanding a broad range of prices.

The Subprogram has worked on developing ways to improve returns on some of the low values species that are commonly captured. Rather than implementing specific marketing campaigns for each of these species, the focus has been on investigating the possibility of improving the through-chain handling and storage of species so they become suitable for a wider range of processing techniques and expanded target markets.

One method considered to achieve this goal was using anti-bacterial Flow-Ice on board vessels so as to open the possibility of using Modified Atmosphere Packaging (MAP) for SESSF species.

It was also considered important to develop a value chain approach across the catching, transport, processing, retail and marketing sectors. The Subprogram identified substantial commercial opportunities to be gained from businesses collaborating to achieve new market penetration, value adding and consolidation benefits from co-products.

In addition, initial strategies for increasing the value of two of the lower priced species, spotted warehou and redfish, were investigated. Many tonnes of these commonly caught species are not retained each year as they currently do not attract a price that makes it economically viable to market the product.

These initiatives have lead to a number of projects being developed for submission to funding agencies for consideration as outlined below.

Flow – Ice Project

The Flow-Ice project showed a high level of potential as a means to improve the value of product being landed in the SESSF. Funding was provided under a NFIS program to engineer, install and trial a Flow-Ice Plant on a SESSF fishing vessel so as to be able to monitor product quality and assess supply chain benefits.

An Industry partner, Presmint Pty Ltd, agreed to support the project and the slurry ice plant was designed and construction began. Although it was felt that the use of Flow-Ice would enhance the product quality and provide additional processing options, this project folded in May 2005 as the owner of the vessel on which the Flow-Ice equipment was being installed made the decision to exit the fishery under the SAP as it was believed that under the current economics of the fishery, the operation could no longer remain viable.

This was disappointing and the final blow for a project that had already suffered from the withdrawal of another industry partner questioning whether the economics of a single operator improving the quality of the fish would pay off.

Geelong Region Food Co-products Cluster

Arising from a 2005 Regional Development Victoria (RDV) feasibility study under the Regional Innovation Cluster Program, the Subprogram identified substantial commercial opportunities to be gained from businesses collaborating to achieve new market penetration, value adding and consolidation benefits from co-products. A steering group for co-product activities, the Geelong Region Food Co-products Cluster (GRFCC), was formed to assist in this process

Lead businesses in the cluster initiative consist of nine significant companies, which have a combined annual turnover of $1.3 billion (including their non-Geelong based parent and affiliate companies). The estimated annual turnover of their Geelong operations alone is $350 million.

The lead GRFCC companies include Geelong's two largest food businesses (Bartter and MC Herd) as well as ASCo, Barwon Foods, Austrimi Seafoods, Challenge Meats, Mantzaris Seafoods, Hoogwegt Australia and Pastoral Pork.

The Subprogram and GRFCC worked with Wayne Street of Street Ryan and Associates through a Department of Innovation, Industry and Regional Development (DIIRD) funded project. As a result of this project, three strategic directions were identified for the GRFCC:

- to develop low value seafood species and byproducts;
- to develop functional foods using co-product ingredients; and
- investigate co-product joint export development.

This was to be achieved by:

- improving the fresh seafood distribution capacity of the mainstream food retailers;
- enabling catch sector fishing businesses in the chain to improve on-board handling practices, to optimise the value of their catch;
- improving fish quality by enhanced management throughout the chain;
- providing a platform to raise the market image of lower value fish species and the recognition of individual fishing businesses, through product traceability procedures and branding;
- assisting the retail supermarket sector to enhance their market seafood offered, increase per capita consumption of seafood and the size of the domestic seafood market; and
- creating a body of learning about improved retail performance that can be used to support growth in export markets.

A project was developed and submitted to FRDC - 'SESSF Industry Development Subprogram: Low Value Seafood Products Retail Supply Chain'. The objective of this project was to develop and implement improved management and performance of the fresh seafood category in retail supermarkets. This was to be achieved by re-engineering the existing supply

chain through the catch sector, processors, value-adding companies and retailers in Geelong, using appropriate distribution and logistics alliance partners.

This project was not supported by FRDC, but in 2007 resources of approximately $0.5 million were approved under the Commonwealth's 'Securing our Fishing Futures' program so that the GRFCC could develop and commercialise new processing technologies for fish species that have in the past been considered low value. The 'Long Life Retail Fish Fillet Commercialisation Project' is therefore an important initiative of the cluster.

This project will enable many of the fishing communities in south east Australia to offset losses in viability (from reductions in total allowable catch) by targeting 'lower value' species and achieving a viable return. In addition, the processing companies in the Geelong region will be able to replace lost product throughput with the 'lower value' species. This also creates a new supply chain for Australian fish fillet products to retail supermarkets (and potentially to export markets) which will increase overall seafood consumption and provide a means to compete with imports. The project is seeking to:

- establish a company, with Barwon Foods, Austrimi Seafoods, Mantzaris Fisheries, and ASCo as members or shareholders (to share the commercialisation of long life fish fillet products);
- develop new retail markets for lower value/non-targeted fish species (such as silver warehou, redfish, and barracouta);
- commercialise patented long life fish fillet retort technology (which has been developed in association with Food Science Australia);
- acquire retort and packaging equipment to establish the commercialisation venture; and,
- develop a supply chain with retail supermarket outlets, and to trial the sale of long-life fish fillet products in these outlets.

The project is now underway and results are expected to become available from 2008.

A project on functional foods was submitted seeking co-funding from FRDC in 2007 for a project; 'SESSF Industry Development Subprogram: Scholarship on the Development of Functional Seafoods'. Austrimi is the lead firm in the GRFCC for this project. In 2007 suitably qualified students were invited to undertake an honours program in food science,

nutrition or biomedical sciences with the Victoria University's Food Science and Technology group, and to submit an 'Expressions of Interest' to pursue an industry funded honours level research project. The total value of the package was around $12,500 and Austrimi would use a $5,000 contribution from FRDC to assist in financing the scholarship. This project, that investigates issues pertaining to processed seafood, was supported by FRDC, with the successful applicant gaining Austrimi support through cash and in-kind support for five years. Austrimi Seafoods and the GRFCC organised and funded economy class return airfares, accommodation and reasonable living expenses for the successful applicant to visit, and learn from Austrimi's overseas operations at its processing plants in Vietnam, Thailand and Japan.

The proposed project had to address one or more of the following specific research objectives:

- to identify, measure or improve the nutritional, or functional, attributes of existing products;
- to develop new value-added seafood products from bycatch or low value catch;
- to effectively utilise new food additives and colourings in processed seafood;
- to develop seafood based functional ingredients, or
- to develop culturally appropriate products to suit specific export markets.

The successful project was to assess the functional bio-markers for selected seafood species with respect to a range of health conditions, such as obesity, cardio-vascular disease, hypertension and diabetes. A set of preliminary results, relating to hypertension indicators, have shown that the action of Angiotensin-Converting Enzyme (ACE) is an important factor in controlling hypertension. Inhibition of ACE is considered a useful therapeutic approach in the treatment of high blood pressure. Natural ACE inhibitors are preferred because they do not exhibit any known side effects from synthetic sources. The results for GRFCC seafood samples indicate that there is a small amount of inhibition from fresh and frozen silver warehou and fresh salmon.

The GRFCC has commenced work on the export development program. Cluster members have identified the Middle East and a small number of Asian destinations as preferred export targets. Discussions have also been held regarding halal food production under a Brunei private label, and members have provided feedback to the group on market prospects in Dubai, Japan and Singapore. It is proposed that at least one cluster export trade mission will take place in 2008 to further progress this project.

Utilisation of Low Value Bycatch and Byproduct Species.

Two projects were developed through the Subprogram to address the issue of utilisation of low value bycatch and byproduct species.

The first project, to utilise SESSF trawl bycatch, was developed in conjunction with PIR Vic through the Market and Value Chain Development Program under the Agriculture Development Programs and Initiatives. The objectives were to optimise market opportunities from value-added seafood resources by investigating the logistics and value-chain requirements of developing new value-added products, investigating new differentiated value-added products and to analyse the route to market requirements of R&D outputs. This proposal was submitted to the Ag Development Investment Managers and another co-funding agency, the Food Industry Network, under NFIS, but was not successful.

The second project sought to process and market silver warehou, a low value species taken in the SESSF. McLaughlin Consolfish (Consolfish) is a major buyer and processor of fish from the SESSF and they have previously applied an innovative approach to the processing and marketing of flathead and whiting. This process has seen the landed value of these species dramatically increase with the development of new local and export markets.

With this proven track record, Consolfish considered it appropriate to apply a similar approach to the processing of silver warehou. At present silver warehou is one of five main species captured in the SESSF that are not classified as overfished, with the highest global TACs (4400t) in the fishery. The species has poor market identification and acceptance, with the flesh changing to an off-white colour after filleting, due to oxidation. Prices for this fish are generally low and represent a poor return for fishers. In addition, government regulations (Australian Fish Names Standard) stipulates that it can no longer be marketed as trevally, but must be marketed as either silver warehou or spotted warehou, which has even less market recognition.

Consolfish believed the sales and consumption of warehou could be improved by exporting the fish whole to Thailand, where processing costs are cheaper, to turn it into a highly regarded filleted product. The objectives of this project were to develop a new seafood product from silver warehou that will appeal to the consumer and promote and establish markets for this product.

Initially there were some concerns by Consolfish regarding Commercial-In-Confidence issues. This was resolved and the project was submitted to FRDC under the 'SESSF Industry Development Subprogram: Processing and Marketing of Silver Warehou'. This project was supported and is currently underway.

Seafood Industry Cooperative Research Centre (CRC)

The Subprogram worked with the team developing the new Seafood Industry CRC. The CRC's defined overall objective is to enhance the health and well-being of Australian seafood consumers by:

- enhancing and demonstrating nutritional attributes of seafood;
- improving quality, safety and diversity of products; and
- enhancing cost-effective production, supply and processing.

After the initial work the industry associations, working with the Subprogram, did not support ongoing work with the CRC and withdrew their involvement. Uncertainty in the industry relating to access and profitability were the main factors leading to this decision.

Bycatch Reduction and Gear Development

As well as seeking to maximise return to Industry this Subprogram also sought to develop means to minimise the take of unwanted catch or bycatch.

PIRVic, through Mr Ian Leck, approached the Subprogram Leader wishing to submit a project on trialling and demonstrating the value of a high-lift balloon trawl designs (Network TN nets) for bycatch reduction in the SEF Trawl. The reports from trawl skippers in the SESSF regarding the Network TN nets were very positive with respect to improved quality of commercial catch and significant reduction in bycatch. Given the AFMA management goals of zero discarding of quota species and halving the bycatch of non-quota species, proven quantitative methods were required to assist Industry to achieve these goals.

Although the value of the high lift balloon is recognised by skippers anecdotally, there have been no formal trials to demonstrate, or quantify, the effectiveness of these nets in bycatch reduction. A project was therefore developed to address this; 'SESSF Industry Development Subprogram: Industry trials of a highlift balloon demersal trawl net to reduce bycatch'. The objectives of the project were to assess and quantify the effectiveness of the high lift balloon to reduce bycatch and improving catch quality. This project was supported by FRDC and is currently underway.

Human Resource Development

Through the last six years of the SEF Industry Development Subprogram, it became increasingly apparent that the commercial industry and other seafood stakeholders have a range of innovative R&D ideas and capacity, but the current process can make it difficult for many of these people to put their ideas into a formal project proposal and to get it submitted and funded.

In many instances it was evident that the research proposals for the SESSF were developed solely by research agencies to meet what they believed to be the research needs of industry. These projects seldom focused on efficiencies, profitability or human development. Stakeholders needed a mechanism to identify key needs and then take responsibility for R&D in their sectors.

An opportunity to empower stakeholders to better access the existing R&D system was developed which provided a means for the seafood industry to initiate and advance their own R&D projects. To that extent a project, 'SESSF Industry Development Subprogram: empowering stakeholders to initiate and advance R&D projects in the seafood industry' was submitted to FRDC.

The projects aim was to facilitate the development of ideas and initiatives from seafood and fishing stakeholders who may be removed from the usual process of agency-driven research, or not be in a position to follow through with their own R&D. The project sought to help participants across industry sectors take their industry based ideas further, including identifying and engaging appropriate R&D providers and funding sources. The process sought to match R&D ideas to a wide source of research suppliers and funding agencies (not relying solely on FRDC) and to become a catalyst for a change in R&D processes for the seafood industry. The objectives of the project are:

- for stakeholders to be empowered and to develop the necessary skills to prepare, submit and conduct their own R&D projects;
- to increase leverage for existing research resources expended by stakeholders;
- to quantify the need and level of use of the service and identify if the qualitative level of support is corroborated;
- the development of at least 5 stakeholder sponsored applications during 2007; and
- to improve extension and take up of findings through improved stakeholder

ownership of outcomes.

FRDC funded the project, for a one year trial (2007/08), to assist the commercial, recreational and indigenous sectors to initiate their own R&D projects. The project had an early start in 2007 and has proceeded extremely well to date.

During April to July 2007, in all States and the Northern Territory of Australia, numerous meetings were held with industry associations, seafood companies, individuals and other stakeholders. This covered over 40 Industry organisations or groups, and included more than 200 individuals. These discussions formed the basis for the majority of the applications developed under the project.

Apart from wide-ranging discussions with stakeholders to help focus their R&D ideas, the project has already assisted stakeholders from across Australia to develop almost 30 separate projects, seeking support from seven different funding programs. From the 29 project preproposals developed during the initial phase of the project, 17 were developed as full proposals, eight have been deferred to seek further information or alternate funding sources, and four will have no further action taken. Full proposals were directed to the following funding agencies/sources:

FRDC full proposals	5
FRDC large Tactical Research Fund (TRF)	4
National Water Commission (NWC)	1
AFMA bycatch program	1
National Heritage Trust Fund (NHT)	2
DAFF (Industry Stocktakes)	3
DAFF (Action Partnership)	1

Of the 8 deferred projects, the proponents will be looking to funding from State/Territory agencies, AusIndustry, the CRC or FRDC in future rounds.

In addition, an additional 60 people/organisations have received advice through the project and have been directed to existing or previously undertaken R&D, or provided with advice regarding how best to progress their R&D needs, without seeking direct financial support from FRDC at this stage.

The response from stakeholders has been encouraging and very positive and has resulted in industry (especially the recreational and indigenous sectors and those without Subprograms) gaining a broader understanding of the FRDC process and the alternative sources of funding available for research projects. This has given stakeholders the confidence to develop their own ideas and has stimulated further investment in R&D, positioning Australia as a true innovator in the seafood and fishing industry.

The Principal Investigator, Dr Knuckey, made a presentation at the Co-Management session at Seafood Directions 2007, outlining the project's progress to date. The outcomes to date are significantly higher than those proposed as a project objective, which sought the 'development of at least 5 stakeholder sponsored applications during 2007/8'.

The project is continuing to provide assistance to existing projects. Enquiries have continued to be received on an almost weekly basis from Industry; mainly seeking assistance or direction on existing or potential projects. Assistance has been provided where possible.

With the winding up of the SEF Industry Development Subprogram program this model may provide an alternative means to identifying industry specific R&D, including for the SESSF.

Related Projects and Research Linkages

Many of the projects under the Subprogram require close liaison and contact with other projects and research providers. As a result, the Subprogram established a number of beneficial research linkages.

Much of this linkage occurred on the back of the development of ASCo and as such, there have been many linkages outside the typical fisheries sphere of activities. Notably, ASCo has developed a formal partnership with Pacific Biofert – a New Zealand based company and IPL - the largest fertiliser company in Australia – specifically interested in the BioPhos product. This has provided the Subprogram with access to technology and the intellectual property (IP) (see Appendix V) required to process fish wastes into organic fertilisers. It has also allowed access to the considerable R&D that Sieber had conducted in this area.

The other links that have been necessary in the establishment of ASCo are those with potential end users of fertilisers. Australian companies active in the field of biological farming, such as the Independent Quality (IQ) Group of farmers, are interested in a product such as BioPhos. Other links have been established with fertiliser companies such as IPL and Impact Fertilisers.

Links with these large fertiliser companies are crucial to the success of ASCo and these companies contributed to the ongoing field testing and commercialisation of BioPhos. A Memorandum of Understanding to formalise linkages has been established between ASCo and IPL.

The Subprogram has also managed to realise the goal of establishing strategic links with other State and Commonwealth funding agencies, to improve the scope for the funding of seafood industry development projects. Some of the more relevant of these include:

- State and Regional Development Agencies,
- New Industries Development Program, Science Technology and Innovation Initiative (Vic), Reframing the Future;
- NSW EPA's "Profiting from Cleaner Production Industry Partnership Program";
- Victoria's DIIRD, Innovation and Regional Development Program;
- NWC;
- AFMA bycatch program;
- NHT Fund;
- DAFF Industry Stocktakes and Action Partnership programs; and
- State FarmBi$ programs.

During 2006, the SESSF established an important research link with the GRFCC and the significant businesses involved in the cluster including Mantzaris Fisheries, Barwon Seafoods and Austrimi.

Communication and Technology Transfer Activities

Media articles

The Subprogram agreed early on that it would not develop its own newsletter. Rather, communication and extension activities centred on information sheets and publications in the various current and previous fisheries publications (Professional Fisherman, FRDC/AFMA News, Seafood Australia, RecFish communiqué, ProWest magazine, NTSC council newsletter etc). Articles relating to the Subprogram are shown at Appendix VI.

Meetings and Workshops:

Much of the Subprogram's communication activities are through direct meetings with fishers and other people and organisations interested in seafood industry development projects. The Subprogram had numerous meetings to review the progress of current projects and to coordinate annual submissions. A summary of these meetings is included at Appendix VII.

The Empowering Industry project increased the level of attendance of the Subprogram Leader at workshops and Industry meetings around Australia with a wide range of Industry representatives.

BENEFITS AND ADOPTION

The benefits of establishing the SEF Industry Development Subprogram has been realised in the number of initiated projects that are targeted specifically on the Development side of fisheries R&D.

The R&D projects initiated through the SEF Industry Development Subprogram received funding worth over $2.55 million (Appendix I) of which about half (~$1,260,000) was accessed from sources outside FRDC. If projects developed under the Empowering Industry project are included, more than $3.75 million of funding was accessed as a direct result of the Subprogram. Even with the outputs from these projects yet to provide financial returns to the SESSF, many objectives of the Subprogram are being achieved.

Once commercial sales of BioPhos commence in 2008, and beyond, the financial returns from the ASCo project will start to be realised. In doing so, the present costs to the seafood industry in the disposal of fish wastes (anything up to $150/tonne) will be replaced by returns from waste utilisation of up to $800/tonne. This is a starting point to bring millions of dollars back into the seafood industry each year and minimise the creation of unwanted landfill.

The adoption of the work being undertaken by the Subprogram is partially evident in the range of Australian seafood companies involved in ASCo. Never has such a large range of companies and associations from Australia's seafood industry come together in a company for the mutual benefit of through-chain partners in Australia's seafood industry. Other evidence of the adoption of the Subprogram's work is that Australia's largest fertiliser company, IPL, has entered into a MOU with ASCo Fertilisers on the joint intellectual property (see Appendix V), commercialisation and marketing of BioPhos.

The take-up and the introduction of energy efficient vessels and fishing methods and the identification of alternate fuel sources will provide a significant financial saving to Industry and the environment. With the ongoing increase in fuel costs and the need to improve return, the savings attributed to inputs will provide significant financial relief to the Industry.

Utilisation of low value species is essential for the ongoing benefit of the SESSF, as quota and bycatch is reduced. There will be a need for the supply chain to maximise return on all species retained, and this will be achieved through-chain partnerships between the catching, transport, wholesale and retail sectors, to value-add low price species in the SESSF. This requires significant cultural change among members of the catching sector; which will see their roles shift from suppliers of a low value commodity to a supply chain partner in which they adjust their product handling methods to deliver a quality product to meet customer expectations. This is a significant shift for the seafood Industry, which generally lacks the formal supply chains comparable with the agriculture or farming sectors.

The silver warehou project undertaken by Consolfish, the learnings arising from Austrimi's scholarship and the ongoing development of the GRFCC will demonstrate the substantial benefits to the wider seafood industry from this supply chain partnership approach. Future success in raising the economic viability of the SESSF will be a strong endorsement of the approach developed under this Subprogram.

The discarding of low-value species from trawlers in the SESSF and the take of unwanted catch or bycatch is also a critical area that needs to be addressed. As well as seeking to maximise return to Industry, this Subprogram also sought to develop means to minimise the take of unwanted catch or bycatch. A formal assessment of the merits of the high lift balloon trawl will allow SESSF fishers to quantify the positive aspects of this modified net, in respect to improved quality of commercial catch and significant reduction in bycatch, to assist in meeting AFMA's goals of zero discards of quota species and halving the bycatch of non-quota species.

It is believed that the Industry-wide benefits that may accrue from the project seeking to empower industry to initiate, develop and manage R&D that meets their expectations and needs, will provide a major benefit to Industry, in that R&D will have a strong Industry focus. Take up and extension will also be enhanced as Industry will have a major role in the running of the projects.

FURTHER DEVELOPMENT

Although the Subprogram is winding up there are still a number of Industry initiatives or actions which may continue. Examples follow:

Management implications of bycatch utilisation

There are several issues that still need to be addressed with regard to the utilisation of bycatch by the catching sector. It is important to establish whether the retention of all bycatch (rather than returning it to the water) is an ecologically sustainable practice. To this end, an assessment of the ecological impact of retaining bycatch needs to be carried out. Furthermore, conservation groups emphasised that they would only support the concept of bycatch utilisation if industry were making every attempt to minimise bycatch levels.

Some degree of fish processing may need to be undertaken on board vessel, and AFMA highlighted that a number of management issues would need to be addressed before large-scale onboard processing of fish would be allowed to occur in the fishery. The potential for quota species to be processed without being deducted from the quota was of prime concern because it would be extremely difficult to detect. The SESSF Ecological Assessment Group has been requested to consider this issue and it is also being incorporated in a trophodynamics project being run by CSIRO.

Training and skills development

If there is to be a cultural change in the operation of the fishery, a suitable training strategy for the SESSF is required. To meet the supply chain challenges facing the SESSF there is a need for skills development and training across the chain, especially in areas such as product handling, food safety and OH&S. Due to the recent instability and uncertainty in the Industry this is yet to get off the ground.

The significant benefits potentially arising from the Empowering Industry projects developed under the Subprogram are still yet to be realised.

PLANNED OUTCOMES

Outcomes

- Increased levels of communication and cooperation between industry members across the SESSF whole of supply chain;
- Development of a whole of chain R&D strategy for the SESSF;

- Initiation of numerous projects focussing on SESSF industry development;
- Greater than 1:1 leverage of external funds to FRDC funds across SESSF Industry development projects;
- Establishment of ASCo and significant progress towards the commercial utilisation of bulk seafood wastes across south eastern Australia;
- Development and support of new technologies and improved utilisation to add value to the SESSF seafood supply chain;
- Work on developing a rage of efficiencies and alternate fuel sources for the SESSF; and,
- Development of a model that may be able to act as a transition for the SEF Industry Development Subprogram and other fishery sectors to instigate and develop industry focussed R&D.

Beneficiaries

- SESSF catching sector;
- SESSF processors and wholesalers;
- marketers and retailers of SESSF product;
- consumers of SESSF produce;
- suppliers of products and services to the industry; and
- those conducting research and management relating to the SESSF.

CONCLUSION

Over the last three years the main focus of the SEF Industry Development Subprogram has been to assist Industry to achieve the complementary outcomes of sustainability and economic benefit. As catches in the SESSF are unlikely to increase in the near future, this project has sought to improve profitability by increasing the value of catch whilst reducing expenses, and complying with ecological and environmental protocols.

This has been achieved in an environment of high uncertainty which has flowed through to the onshore processing and supply chain side of the SESSF. The uncertainty, mainly focused on the ecological performance and profitability of the SESSF, came to a head during 2006 due to three key announcements. These were the Commonwealth Structural Adjustment Package,

AFMA's "Future Operating Environment" program and recommendations for a system of MPAs across the South East Bioregion. The poor financial situation, uncertainty in the fishery, and the exit of over 50% of trawl operators under the SAP had a direct negative impact on some aspects the Subprogram.

Notwithstanding the above challenges, the significant positive outputs from the Subprogram were built on the strong foundations established under the previous FRDC project 2001/238. In most instances the outcomes have been achieved by linking groups of people in the seafood industry with expertise in the whole of industry supply chain. The varied skills and knowledge of these people has broadened the Industry's perspective and highlighted the importance of working outside their own sector of the fishery and of the whole of supply chain approach.

With the high level of Industry support and input, a number of beneficial outputs emerged and this has been reflected in the broad scope and large number of projects developed through the Subprogram between 2005 and 2007. The long term benefits arising from the Subprogram will become evident to the Industry and the general community as a number of the projects develop further and there is further adoption of their outputs.

An example of this will be when the ASCo fertiliser project moves into full commercialisation and starts to provide a financial return to Industry and beneficial environmental outcomes by reducing landfill.

The GRFCC strategic directions, which focus on utilising low value seafood species, byproducts, developing functional foods and exploring export opportunities, will also provide significant benefits to the community and the SESSF supply chain. Consolfish's project, to process and market silver warehou, will also lead to improved utilisation of a low value species and improve returns to Industry.

The projects arising from the Energy-Efficient Fishing Workshop will allow the seafood industry to explore the potential for alternative energy technologies and efficient design for commercial fishing operations.

The Empowering Industry project has helped participants across industry sectors take their industry-based ideas further, including identifying and engaging appropriate R&D providers and funding sources. The process has been well received and could become a catalyst for a change in R&D process for the seafood industry. With the winding up of the SEF Industry

Development Subprogram this model may provide an alternative means to identify industry specific R&D, including for the SESSF.

This Subprogram has built a number of beneficial research linkages and has been successful in maximising the leverage of industry funds by establishing strategic synergies with State and Commonwealth funding agencies. This has improved the scope of, and access to, funding that has not traditionally been available to the seafood industry. The R&D projects initiated through the SEF Industry Development Subprogram received funding worth over $2.55 million of which about half (~$1,260,000) was accessed from sources outside FRDC. FRDC has therefore received significant returns on its investment in the SEF Industry Development Subprogram over the past six years. If projects developed under "Empowering Industry" are included, more than $3.75 million of funding was accessed as a direct result of the SEF Industry Development Subprogram.

APPENDIX I: PROJECTS DEVELOPED THROUGH THE SUBPROGRAM

ENERGY-EFFICIENT FISHING

SESSF Industry Development Subprogram: Improving Engine Efficiency in the Australian fishing fleet ($137,300).

SESSF Industry Development Subprogram: Development and Implementation of an Energy Audit Process for Australian Fishing Vessels ($302,600).

SESSF Industry Development Subprogram: Energy Efficiency Workshop ($15,000)

WASTE UTILISATION

SESSF Industry Development Subprogram: Assessing the commercial viability of utilising fish processing wastes ($153,000)

SESSF Industry Development Subprogram: Agricultural trials of a fish-based fertiliser (BioPhos) produced from Australian seafood processing wastes ($755,606)

SESSF Industry Development Subprogram: Commercialisation and Joint Venture Manufacturing Plan for ASCo and Incitec Pivot (Not funded).

VALUE-ADDING THE CATCH

SESSF Industry Development Subprogram: ASCo mentor support and chain management project (Not funded)

SESSF Industry Development Subprogram: Engineering, installation and trials of a Flo-Ice plant on a SESSF fishing vessel and monitoring of product quality for supply chain benefits ($98,000).

SESSF Industry Development Subprogram: Low Value Seafood Products Retail Supply Chain ($494,000).

SESSF Industry Development Subprogram: Optimising market opportunities from value-added seafood resources (Not funded).

SESSF Industry Development Subprogram: Processing and Marketing of Silver Warehou ($149,500).

SESSF Industry Development Subprogram: Industry trials of a highlift balloon demersal trawl net ($92,500).

SESSF Industry Development Subprogram: Long Life Retail Fish Fillet Commercialisation Project

PEOPLE DEVELOPMENT

SESSF Industry Development Subprogram: Scholarship on the Development of Functional Seafoods ($12,500).

SESSF Industry Development Subprogram: Empowering stakeholders to initiate and advance R&D projects in the seafood industry ($148,000).

APPENDIX II: PROJECT STAFF

The only person employed on this Subprogram is Dr Ian Knuckey.

APPENDIX III: ASCO MEMBERSHIP

Membership of ASCo (in alphabetical order) as at December 2007:

Angelakis Brothers

Better Choice Fisheries

Capitol Seafoods

Christies Seafoods

De Costi Seafoods

Doyles Seafoods

FRDC

Flemington Market Seafood Stallholders

George Town Seafoods

Master Fish Merchants Association

McLaughlin Consolidated Fishermen

Morgan's Seafoods

Musumeci's Seafoods

Racovolis Amalgamated Fish Merchants

Raptis & Sons

SETFIA

SFM

APPENDIX IV: PARTICIPANT LIST AT ENERGY EFFICIENCY WORKSHOP

Name		Company
David	Alden	Australian Fisheries Management Authority
Crispian	Ashby	FRDC
Andrew	Barton	University of Tasmania
Tom	Bibby	SETFIA
Paul	Brandner	Australian Maritime College
David	Breckenridge	Australian Maritime College
Steve	Colman	i-meet
Peter	Dawson	NZ SeaFIC
Russell	Fisher	i-meet
Laurie	Goldsworthy	Australian Maritime College
Tim	Gourlay	Curtin University
Tony	Hadfield	Seafood Innovations
Terry	Hewitt	MG Kailis Group
Owen	Hoggard	Motueka nets
Vishy	Karri	University of Tasmania
Kim	Klaka	Curtin University
Ian	Knuckey	Fishwell Consulting
Adrian	Lake	Australian Biodiesel Group
Clayton	Nelson	Deepsea Fishing
Lee	Newton	Talleys Fisheries
Angus	Nicholls	OceanFresh
Robert	Olds	Olds Engineering
John	Osborne	Sustainable energy
Stuart	Richey	Richey Fishing
Paul	Schaab	Sealords
David	Sterling	Sterling Trawl Gear Services
Sonia	Talman	DPI Victoria
Giles	Thomas	Australian Maritime College
Steve	Valentine	Newfishing Australia
John	Wakeford	Australian Maritime College

APPENDIX V: INTELLECTUAL PROPERTY (IP)

A range of Intellectual Property (IP) issues have arisen as a result of projects undertaken by the Subprogram. Following is an overview.

February 2005	Intellectual Property issues regarding the ASCo joint venture with Sieber Technology and Kagree Holdings have been formally agreed to. A confidentiality agreement has been signed between ASCoF, Incitec Pivot and Yates.
June 2005	The trademark 'BioPhos' needed to be transferred from the initial owners, company Sieber Technology, to Pacific BioFert the new company that is in partnership with ASCo in ASCo Fertilisers. The application for the transfer of the trademark has been submitted.
December 2005	Intellectual Property issues regarding the ASCo joint venture with Sieber Technology and Kagree Holdings have been re-negotiated following defeat of Australian patent for BioPhos. A subsequent patent has been applied for with respect to the new process of producing a solid phosphate fertiliser with composted fish waste. A revised Intellectual Property Licence Agreement has been signed.
September 2006	Kagree Holdings and Pacific Biofert own the BioPhos trademark in Australia and will make it available to the ASCo / IPL venture. A new patent is in place to protect the BioPhos production method and characteristics.

APPENDIX VI: SUMMARY OF SUBPROGRAM MEDIA ARTICLES

Article Title	Publication
Improving the bottom line A new fertiliser could hold the key to reducing landfill, helping the environment, boosting crop yields and improving the bottom line of the seafood industry.	Taste of Victoria Winter 2004
Bob Cameron and Aravind Surapaneni talk about fish fertiliser trials at Tatura	Goulburn Murray radio July 2004
Scientists at DPI break new ground	Tatura Guardian September 2004
A fishy waste solution	Shepparton News September 2004
Fish waste – not wasted	Bairnsdale Advertiser Warnambool Standard Warragul Gazette Gippsland Times October 2004
Fertiliser Pilot set to catch on	Geelong Advertiser October 2004
Fish offcuts a fertile answer	Weekly Times
Study pointing to fish fertiliser	Country News
Turning fish waste into dollars – interview with Craig Doumouras and Ian Knuckey regarding silage plant at George Town	TAS Country Hour December 2004
Utilisation of seafood processing waste – challenges and opportunities.	Oral paper at Soil First Conference Sydney Australia December 2004
Soil and Crop Responses (Year 1) from Biosolids Trial at Dookie, Victoria	Oral paper at Soil First Conference Sydney Australia December 2004
The agronomic effectiveness of a fish waste based P fertilizer – Site selection, P variability and pasture responses	Oral paper at Soil First Conference Sydney Australia December 2004
ASCo wins R&D Award	Seafood Directions 2005
Various articles outlining the Empowering Industry project	Seanet Newsletter 2007 ProWest 2007 NTSC council newsletter 2007 FRDC's Fisheries R&D News
Empowering Industry Project outline in the Recfish Australia Communiqué: distributed to 500 addresses and the Recfish Australia Website http://www.recfish.com.au/hot_topics/communique.html	Recfish Australia Communiqué: Issue 8 21/6/07 Issue 11 27/10/07
Speaker at Seafood Directions 2007	Seafood Directions 2007

APPENDIX VII: MEETINGS HELD RELEVANT TO THE SUBPROGRAM

Date	Meeting	Description
06/07/04	NFIS	Meeting with NFIS Through-chain team to discuss potential for project in the SETF.
22/07/04	Flo-ice	Meeting with AFE on Sarriba to discuss installation of Flo-Ice plant.
10/08/04	ASCo	AGM and Board meeting of ASCo and ASCo Fertilisers
01/09/04	FRDC	Meeting with John Susman and marketing people interested in utilisation of low-value SEF species
09/09/04	FRDC	Meeting with Phil Dallimore and FRDC to progress trawl flow-ice project
09/09/04	Seafood Industry Leadership	Mentor dinner for Seafood Industry Leadership Course with Christian Pyke.
28/09/04	NFIS	Meeting with Paul Ford on progress with NFIS Flo-ice project.
25/10/04	VFoods	Met Lou Villella regarding VFoods waste utilisation and involvement with ASCo
8-10/11/04	Observer Conference	Presented a paper on increasing opportunity for industry involvement in observer programs
10/11/04	David Fairweather	Meeting or organise insurance for ASCo directors.
22-26/11/04	Electronic Logbook	Meeting with OLRAC to finalise details for electronic logbook for the GABTF.
06/12/04	NFIS	Meeting with NFIS to discuss SEF domestic chain project.
06/12/04	NFIS	Meeting with NFIS to discuss SEF domestic chain project.
06/12/04	NFIS	Meeting with NFIS to discuss SEF domestic chain project.
14-15/12/04	ASCo	Met at George Town Seafood and made presentation to FRDC Board on the progress of ASCo and waste production facility.
14-15/12/04	ASCo	Met at George Town Seafood and made presentation to FRDC Board on the progress of ASCo and waste production facility.
14-15/12/04	ASCo	Met at George Town Seafood and made presentation to FRDC Board on the progress of ASCo and waste production facility.
12/01/05	Incitec Pivot	Meeting with Charlie Walker to discuss finalisation of ASCo MOU and Confidentiality agreement
12/01/05	Incitec Pivot	Meeting with Charlie Walker to discuss finalisation of ASCo MOU and Confidentiality agreement
12/01/05	Incitec Pivot	Meeting with Charlie Walker to discuss finalisation of ASCo MOU and Confidentiality agreement
11/02/05	ASCo	Meeting with directors of ASCo/F and Incitec Pivot to finalise Confidentiality agreement and MOU.
11/02/05	ASCo	Meeting with directors of ASCo/F and Incitec Pivot to finalise Confidentiality agreement and MOU.
11/02/05	ASCo	Meeting with directors of ASCo/F and Incitec Pivot to finalise Confidentiality agreement and MOU.
23/02/05	FRDC	FRDC workshop to discuss the strategic research plan.
23/02/05	FRDC	FRDC workshop to discuss the strategic research plan.
01/03/05	Incitec Pivot	Meeting with Charlie Walker, Wayne Street and Cameron Naylor to finalise pricing of liquid fish nutrient for trials.
01/03/05	Incitec Pivot	Meeting with Charlie Walker, Wayne Street and Cameron Naylor to

		finalise pricing of liquid fish nutrient for trials.
01/03/05	Incitec Pivot	Meeting with Charlie Walker, Wayne Street and Cameron Naylor to finalise pricing of liquid fish nutrient for trials.
17/03/05	NFIS	Meeting with Paul Ford and Locky Marshall re slurry ice project.
17/03/05	NFIS	Meeting with Paul Ford and Locky Marshall re slurry ice project.
23/05/05	AFMA	Meeting with AFMA to discuss progress and development of new version of electronic logbook.
23/05/05	AFMA	Meeting with AFMA to discuss progress and development of new version of electronic logbook.
25/5 – 7/06/05	ARLP	Attended first Australian Rural Leadership Program workshop
25/5 – 7/06/05	ARLP	Attended first Australian Rural Leadership Program workshop
07/07/05	ASCo	Meeting with Cameron Naylor to discuss IPL requirements and fish nutrient quality and monitoring
07/07/05	ASCo	Meeting with Cameron Naylor to discuss IPL requirements and fish nutrient quality and monitoring
04/08/05	Food Clusters	Met with Wayne Street and Geelong industry to discuss potential of a food cluster in Geelong region.
04/08/05	Food Clusters	Met with Wayne Street and Geelong industry to discuss potential of a food cluster in Geelong region.
14-21/08/05	ARLP	Attended second Australian Rural Leadership Program workshop
14-21/08/05	ARLP	Attended second Australian Rural Leadership Program workshop
25/08/05	ASCo	Met with Doug Martin of the Falklands Is to discuss potential for ASCo IP to be applied to fish waste in Sth America
25/08/05	ASCo	Met with Doug Martin of the Falklands Is to discuss potential for ASCo IP to be applied to fish waste in Sth America
30/08/05	Seafood CRC	Attended a workshop to scope new seafood CRC which will involve the catching sectors.
30/08/05	Seafood CRC	Attended a workshop to scope new seafood CRC which will involve the catching sectors.
14/09/05	Energy Efficiency	Met with FRDC, Dave Sterling, Steve Eayrs to discuss options for energy-efficiency workshop
14/09/05	Energy Efficiency	Met with FRDC, Dave Sterling, Steve Eayrs to discuss options for energy-efficiency workshop
13-15 /09/05	Seafood Directions	Gave presentation on the progress of ASCo.
13-15 /09/05	Seafood Directions	Seafood Directions Awards Dinner – ASCo wins R&D Award! (proudly sponsored by FRDC)
13-15 /09/05	Seafood Directions	Gave presentation on the progress of ASCo.
13-15 /09/05	Seafood Directions	Seafood Directions Awards Dinner – ASCo wins R&D Award (proudly sponsored by FRDC)
30/09/05	ASCo	Meeting with ASCo and Incitec Pivot to decide ongoing partnership and expected product demand during 2005/06.
30/09/05	ASC0	Meeting with ASCo and Incitec Pivot to decide ongoing partnership and expected product demand during 2005/06.

12/10/05	Seafood Industry Leadership	Listened to presentations by graduates of the Seafood Leadership Program. Dinner for Seafood Industry Leadership Course as mentor for Matt Barwick.
12/10/05	Seafood Industry Leadership	Listened to presentations by graduates of the Seafood Leadership Program. Dinner for Seafood Industry Leadership Course as mentor for Matt Barwick.
17/10/05	ASCo	Meeting with Wayne Street and Cameron Naylor to discuss IP issues
17/10/05	ASCo	Meeting with Wayne Street and Cameron Naylor to discuss IP issues
15/11/05	ASCo	ASCo Annual General Meeting
17/11/05	ASCo Fertilisers	Annual General Meeting
18/11/05	Food Clusters	Meeting with food industry members in Geelong region to discuss potential food-cluster projects
22/11/05	Food Clusters	Meeting with food industry members in Geelong region to discuss potential food-cluster projects
22/11/05	FRDC Board	Meeting with FRDC Board in Geelong
28-29/11/05	Energy Efficiency Workshop	Workshop on Energy Efficiency in the fishing industry.
02/12/05	Seafood CRC	Meeting in Adelaide on proposal for a new Seafood CRC bid.
22/12/05	NFIS Slurry ice project	Meeting with Paul Ford about the Slurry Ice project and change of staff at NFIS.
04/01/06	NFIS Slurry ice project	Meeting with Paul Ford, Peter Amy and Locky Marshall about the Slurry Ice project and change of staff at NFIS.
11/01/06	ASIC MPA	Industry members met to discuss SE MPA process and TAFI project
18/01/06	Food Clusters	Meeting with food industry members in Geelong region to discuss potential food-cluster projects
18/01/06	ASCo / IPL	Meeting with Wayne Street and Cameron Naylor to discuss progress with orders and IPL
14/03/06	ASCo	Meeting with Jim Mace and Clive Sinclair
15/03/06	ASCo	Meeting with ASCoF and Incitec Pivot
27/03/06	HSF Workshop	Worksop to discuss policy on Harvest Strategies
23/05/06	ASCo	Meeting with ASCoF and Incitec Pivot
24-25/05/06	SEAFIC Conference	Presented fuel efficiency presentation to NZ Industry
29/08/06	ASFB Conference	Chaired session on cutting edge technologies in fish and fisheries science.
04/09/06	BioPhos	Meeting with Aravind Surapaneni in Bendigo to discuss progress of 2002-250 and the additional trial project extension.
04/09/06	ASCo / IPL	Meeting with Darryl Roe, Charlie Walker and Jamie of IPL with Wayne Street on commercialisation and supply agreements.
24/09/06	Electronic Logbook	Installation of electronic logbook on Ellidi – Seafish Tasmania vessel.
3/10/06	Wayne Street	Phone meeting to discuss ASCo project and low value seafood projects
20/10/06	Geelong Cluster	Meeting to discuss low value seafood projects, developing functional foods and Co-products joint export development
Apr to Jul 2007	Industry organisation meetings and workshop	Range of meetings around Australia to discuss possible projects for empowering industry projects. This covered over 40 Industry organisations and included more than 200 individuals.