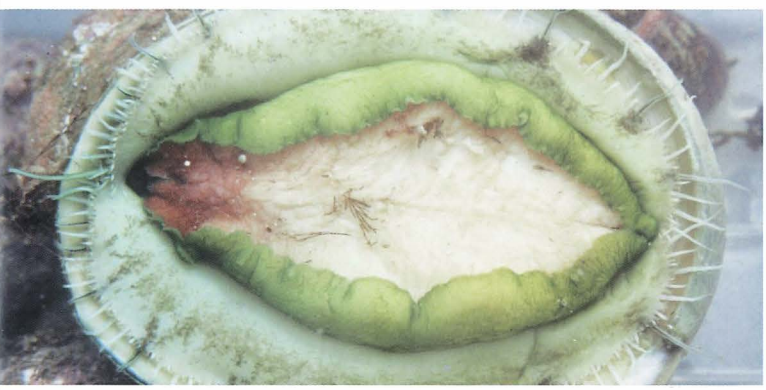
South Australia's **Fisheries** and **Aquaculture** **Research** and **Development Strategy** 2002–2007



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Foreword

Fishing has always been a special interest of mine. My father was a very keen fisher, and when I was a young boy he would take me in May school holidays for trips to Coffin Bay, or we would go catching trout in streams in the Adelaide Hills.

I would like to make sure that future generations have the same opportunities to enjoy fishing as I did when I was young.

That is why we must learn from previous mistakes and ensure the sustainability of our fishing resources through the use of research and scientific monitoring. Each year, researchers gather more and more information about fish stocks and the environment required for their well-being.

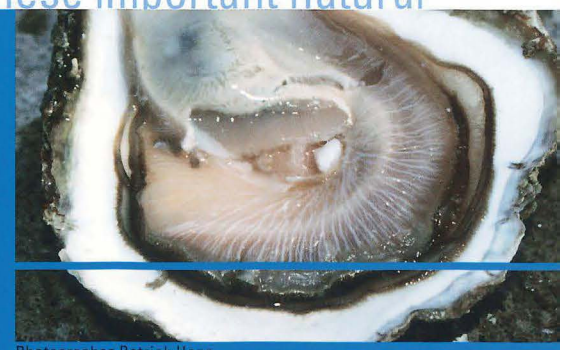
However, it is not just those in the lab who have the scientific knowledge required for fisheries management, those actually engaged in the industry and those who work in conservation itself also have an important role to play.

The bringing together of these groups and government into the South Australia Fisheries Research Advisory Board (SAFRAB) has enabled the development of a strategy for all stakeholders and not just the government.

I am very pleased that SAFRAB has been able to produce this report, as it is only through planning for the future that we will ensure that we preserve our resources for that future.

Hon Paul Holloway
Minister for Agriculture, Food and Fisheries.

Effective research and development programs need to be implemented to ensure the information required to manage these important natural resources is available.



Photographer Patrick Hone

1. Introduction

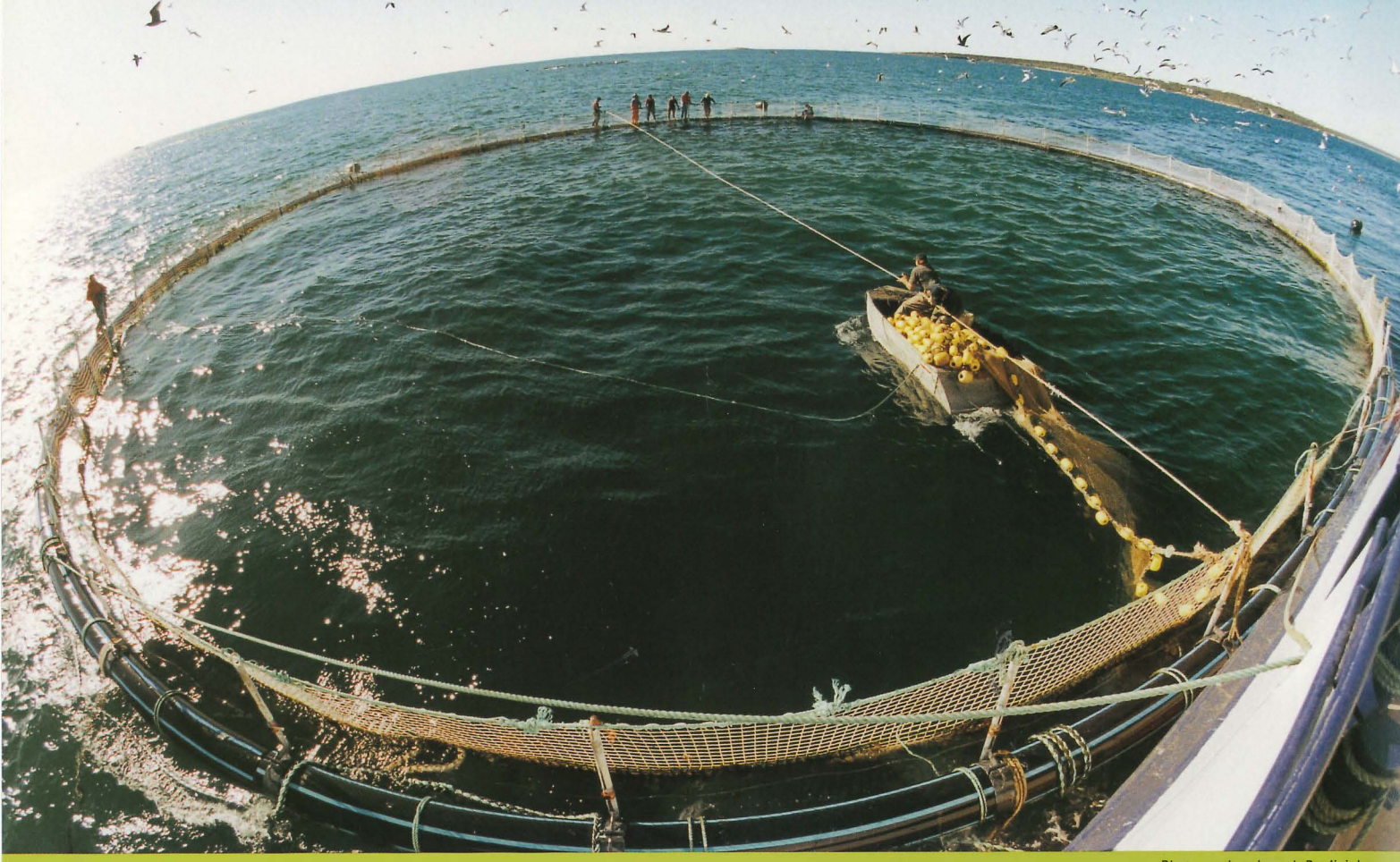
South Australia's seafood industry that includes wild fisheries, farmed seafood and the processing sector has enormous potential for growth. World demand for food is strong and seafood is high on the list of quality food products that are in demand.

The estimated gross value to South Australia in 2001 from the fisheries and aquaculture industry exceeded $490 million *(ABARE: Australian Fisheries Statistics–2001)* which is double the value recorded in 1997. In addition, there is the annual recurrent expenditure of $350 million by the State's recreational fishers *(Review of Recreational Fishing in South Australia–2001)*. Utilisation of SA's fisheries resources provides significant economic benefits to the State as well as employing about 4500 people *(ABARE: Australian Fisheries Statistics–2001)* directly, or, indirectly through downstream processing and handling. Added to this are the significant flow-on effects in regional communities through the many jobs created both directly and indirectly. The economic viability of these natural resources depends on a healthy and functioning ecosystem.

The South Australian Government recognises the importance of the fishing and aquaculture industries to this State and the need to ensure that the resources are sustainably managed for future generations, that fishing activities are conducted with minimal impact in recognition of the many others users of the marine environment, and that the needs of the marine ecosystem are considered. This, in turn, requires a genuine and committed partnership from all stakeholder groups.

Effective research and development programs need to be implemented to ensure the information required to manage these important natural resources is available. With world-class research facilities in South Australia, the State Government in partnership with industry and other stakeholders[1] aims to conduct vital research and development programs and work in close collaboration with the Fisheries Research and Development Corporation and other funding agencies to maximise the returns on our funding investments.

[1] Industry stakeholders include commercial, recreational, and indigenous fishers, communities, consumers, government, aquaculturists, processors, retailers and a wide range of service providers. Community stakeholders include the conservation sector, local communities and the Australian community as a whole.



Photographer Joseph Puglisi Jnr.

2. The purpose of this report

South Australia is fortunate to have a number of key stakeholder groups committed to effectively managed fisheries and aquaculture, including commercial, recreational, conservation and other groups. Many of these sectors have produced their own R&D strategies, including a vision for development within a framework of sustainability. Overall, the vision for South Australia's fisheries and aquaculture encompasses the ideals of (a) improved fisheries and aquaculture utilisation and management in South Australia; (b) perpetuation and enhancement of the resources; and, (c) increased profitability and equitable distribution underpinning rational access security arrangements.

All who share the benefits of proper use of our natural resources recognise that the most effective use and management of fisheries and aquaculture, both in the short and long term, requires:

- informed advice based on sound scientific studies;
- a sensitivity to current and evolving social, economic and environmental conditions; and,
- a balance between first, the duties of environmental stewardship to future generations, second, the needs of the fishing and aquaculture industry, and third, responsibilities to the community at large.

This purpose of this report is, therefore, to promote a strategy that:

(a) outlines and prioritises the major R&D issues;

(b) explains the process and annual timetable for making R&D funding applications; and,

(c) develops mechanisms that extend the results of R&D and provide a foundation to improve the benefits returned to all South Australians through effective management arising from more focused investment in R&D.

3. Fishing industry overview

South Australia's fisheries resources are owned by the Crown and support significant commercial fishing activity, recreational fishing and some subsistence and traditional fishing. The very nature of fish and their habitats means that fisheries resources are also of direct interest to a range of other stakeholders, including environmental groups, resource managers, researchers, indigenous and community groups.

The fishing industry includes any industry or activity conducted within Australian waters or from an Australian territory concerned with harvesting, culturing, processing, preserving, storing, transporting, marketing, or selling fish or fish products. The three principal fishing industry sectors are the recreational, commercial, and Aboriginal and Torres Strait Islander sectors. The commercial sector includes aquaculture and is sometimes referred to as the seafood industry (See figure 1 below). Additionally, there are non-extractive users and valuers of the marine environment: for example, people associated with tourism, conservation, pleasure boating and non-extractive diving.

Figure1: Components of the Fishing Industry

* The recreational and traditional sectors also use the wild-fish resource

** In addition to fishing and shell-collecting in accordance with their traditions, Aboriginal and Torres Strait Islander people also pursue recreational fishing (that is, not using traditional practices), subsistence fishing (following traditional or recreational practices), and commercial fishing.

Fish, in the broadest sense (which is the only context in this publication), are living aquatic vertebrate and invertebrate organisms, including marine mammals and reptiles, and such organisms after they have been harvested.

Photographer Bruce Miller.

Photographer Patrick Hone.

Sustainable management of marine resources is the responsibility of Primary Industries and Resources South Australia (PIRSA) under *The Fisheries Act (1982)*. The principle objectives of The Act (Section 20) are to:

1. ensure, through proper conservation, preservation, and fisheries management measures, that the living resources of the waters to which this Act applies are not endangered or over-exploited; and
2. achieve the optimum utilisation and equitable distribution of those resources.

Thus, the role of Government, as custodian of the resources, is to:

- ensure it's long term sustainability, and, within this mandate;
- maximise the economic return to the community from the resources; and
- share the resources equitably amongst all user groups.

The production 'end' of South Australia's commercial fishing industry essentially comprises a rapidly growing aquaculture industry and 6 major wild-catch fishing sectors. There is also a significant recreational fishery. A significant factor in the development of the value of South Australia's capture fisheries and aquaculture has been the focus on industry development, market intelligence, post-harvest value-adding and enhanced processing which has occurred in recent years. This has seen a more than doubling of the value of the industry in the period 1997–2001 (*ABARE: Australian Fisheries Statistics–2001*) while catch levels have remained constant. South Australia is the second largest exporter (26% of the market– *ABARE: Australian Fisheries Statistics–2001*) of seafood and one of the largest importers of seafood nationally.

a. Capture Fisheries

The commercial wild catch fishing sectors comprise:

- Abalone-encompassing the Southern, Western and Central Zone fisheries;
- Blue Swimmer Crab fishery;
- Inland fisheries viz. The Murray River (currently under review), and the Lakes & Coorong fisheries;
- Marine Scalefish (including a specific pilchard fishery sector);
- Prawn fishery, encompassing the Gulf St Vincent, Spencer Gulf and West Coast fisheries; and
- Rock Lobster-encompassing the northern and southern zone fisheries.

South Australia also benefits economically from a number of Commonwealth managed fisheries off the coast of the State, including southern bluefin tuna (which is also the major component of the aquaculture sector), southern shark fishery (currently undergoing a major restructure), the Great Australian Bight (GAB) trawl fishery and the South East Trawl Fishery (SETF).

The commercial capture fisheries contribute about $4 million annually under the State Government's cost recovery policy to support 'core' research into stock assessment and to ensure management decisions are based on sound scientific information. The South Australian seafood industry also contributes annually and voluntarily to the FRDC funding base ($766,603.00 in 2001–2002, *FRDC annual report)*. Additionally, the industry purchases R&D services on an independent basis to guide industry development within a sustainable framework.

Management arrangements vary from fishery to fishery and include controls that regulate fishing activity (input controls) or, the amount of fish that may be caught (output controls) and, in some cases, a combination of both. A number of fisheries have undergone major restructures based on ensuring sustainable effort is expended in the industry. These have resulted in substantial reduction of the 'effort' from fisheries, mainly in the form of the number of licences and the amount of fishing gear.

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b. Aquaculture

Aquaculture has developed rapidly from a single species sector, viz. oysters in 1988, to a multi-species sector comprising:

- *Sea cage systems*—southern bluefin tuna, Atlantic salmon, yellowtail kingfish, snapper (and rock lobster);
- *Deep water shellfish*—abalone, mussels;
- *Intertidal shellfish*—oysters; and
- *Landbased systems*—barramundi, marron, freshwater crayfish, algae, abalone.

Although freshwater aquaculture development, mainly barramundi and freshwater crayfish, has had a less spectacular evolution than marine aquaculture. It is, nevertheless, a significant sector of the State industry. Heavy pressure on South Australia's meagre freshwater resources may inhibit growth of freshwater aquaculture in the future unless efficiencies of use can be dramatically improved. However, increased use of recirculating systems and recent advances in the use of saline groundwater resources for the purpose of aquaculture are promising new areas for development.

Overall, South Australia's aquaculture industry has burgeoned in the few years leading into 2002 and the gross value of production from aquaculture exceeds that of the capture fishery (*SARDI Aquatic Sciences—production statistics 2000–01*). Each aquaculture sector has specific requirements for sustainable development and these are elaborated by the respective sectors. Several of the higher value sectors contribute significantly to the funding of R&D, both directly to research providers and through the FRDC funding base. Under *The Aquaculture Act (2001)*, The South Australian Aquaculture Council, comprising key stakeholder membership, advises the South Australian Government on any matter relating to the aquaculture industry.

c. The Recreational Sector

The State's recreational fishery involves in excess of 450,000 individuals over the age of five that fish at least once a year (*Primary Industries Paper No. 25: 1997 Survey*), and contributes about $350 million in recurrent expenditure. (*Review of Recreational Fishing in SA—2001*). In some instances, recreational fishers take a greater proportion of the total catch than the commercial sector. Most effort is concentrated on scalefish species in marine, estuarine and inland waters, although there is considerable effort expended harvesting rock lobster, blue crabs, sand crabs, abalone and yabbies (freshwater).

In addition to direct catch, the resources support a thriving tourism sector in many regions of the State. The recreational fishing sector is seeking greater resource allocation to the community for recreational use. Particular note is made of the confirmation of a small percentage (4%) of the rock lobster quota to recreational use, and the recent developments aimed at removing commercial fishing for native species from the River Murray, except from the Lakes and Coorong Fishery.

A management strategy for sustainable development of recreational fishing in South Australia (a five-year program) was published in April 2001.

d. Traditional (indigenous) fisheries.

Aboriginal and Torres Strait Islander people have developed a close, interdependent relationship with the land, water and living resources of Australia through traditional fishing practices over tens of thousands of years. That relationship includes customary rights and responsibilities of particular indigenous groups to particular areas of land, water and resources. Some of these customary rights and responsibilities are now recognised in Australian common law and through native title legislation.

Commercialisation of fisheries and expansion of recreational fishing across Australia has affected some traditional fishing. However, this effect has been less noticeable in South Australia than in other Australian States and Territories. A policy on indigenous fisheries is to be developed by the State Government. Indigenous people are also involved in a variety of aquaculture enterprises throughout the State.

e. Environmental and conservation interest.

At present, some of the State's waters are included in marine parks, reserves or conservation zones. Many of these areas have been declared for the protection of fish nursery and other sensitive areas, but, extensive areas of the State's marine waters, such as the Great Australia Bight (GAB) also remain protected by their extreme isolation.

In addition, seasonal closures occur in many fisheries as part of sustainable management practices. Environment and conservation interests have an involvement through the South Australian Government which is presently investigating, through a public consultative process, the declaration of areas to establish a representative system of Marine Protected Areas (MPA) under a multiple use framework.

The 1998 State of the Environment Report, released by the Environment Protection Authority acknowledged the lack of progress made since 1993 regarding the marine environment. The key findings of the report are:

- seagrass loss continues;
- condition of mangroves – largely unknown;
- impact of introduced species – largely unknown;
- environmental impact of aquaculture – largely unknown;
- effluent and stormwater discharges – volume remains unchanged but quality has improved;
- less than half of the pre-European settlement wetlands remain and little is known of the condition of remaining wetlands; and
- most fisheries are operating at or above resource capacity.

Our Seas and Coasts: A Marine and Estuarine Strategy for South Australia, was published in 1998 and provides general strategies for sustainable use, improved management and conservation of South Australia's marine and estuarine environment.

Five major areas of commitment are identified, and from each of these a series of priorities, specific strategies, and measures of success are outlined. The 5 major areas of commitments are:

- Clean, healthy seas;
- Sustainable use;
- Conserving biodiversity and heritage;
- Working together; and
- Better understanding.

f. Business environment.

The fishing industry in South Australia has a high degree of input into a range of Government policies and initiatives through Fisheries Management Committees (FMCs). FMCs are statutory bodies established to provide the commercial, and recreational sectors and other stakeholders with the opportunity to participate in a co-management approach in making recommendations to the Minister on matters pursuant to *Section 20 of the Fisheries Act (1982).* The FMCs, in conjunction with the Government, determine the nature and level of services considered necessary to secure the industry's contribution towards ensuring sustainable management of the fisheries resources. It is intended for the FMCs to be autonomous bodies, working in genuine partnership with Government and other key stakeholder groups to identify and determine strategies for management of the resources (including R&D), and to guide the development of the industry within its obligations under the principles of ecologically sustainable development (ESD).

Commercial fishing licence holders are required to meet the agreed attributed costs of all services required in support of the commercial sector, including the necessary Government mandated services of research (biological and economic), management and compliance.

All fishing activities are supervised by a PIRSA Compliance Group whose objectives are to maximize voluntary compliance with fisheries laws and create effective deterrence against illegal activity. Compliance activities are directed by Government and funded by the fishing industry through licencing fees. An additional funding component is contributed by the State Government on behalf of the recreational fishery and the 'public good'.

The overall objectives of the commercial fishing industry are to enhance market penetration, obtain maximum value for the product and produce financial returns that benefit every enterprise in the production chain: all without compromising the environment that sustains production or the ability of future generations to meet their own needs. Clearly, the aim of those utilising the fisheries resources is to operate within the highest achievable standards of social, environmental and economic responsibilities. Importantly, aquaculture, and the wild catch, recreational and traditional fisheries are all concerned with stock enhancement.

There is significant progress towards complying with a national ESD assessment and reporting framework to be progressively applied to all Australian fisheries. This will become an integral part of fisheries management. Although the primary goal is to assist and improve fisheries management, the reporting framework is also intended to address an increasing number of environmental and other requirements set out by legislation, certification schemes, and consumer and community demands.

With a comprehensive, national approach, individual fisheries should be well placed to show how they are performing against ESD objectives. The South Australian seafood industry conforms enthusiastically to this approach.

In terms of other requirements, the State Marine Planning Policy currently being negotiated through a public consultation process will almost certainly result in an expansion of the areas of South Australian waters to be classified as 'multiple',

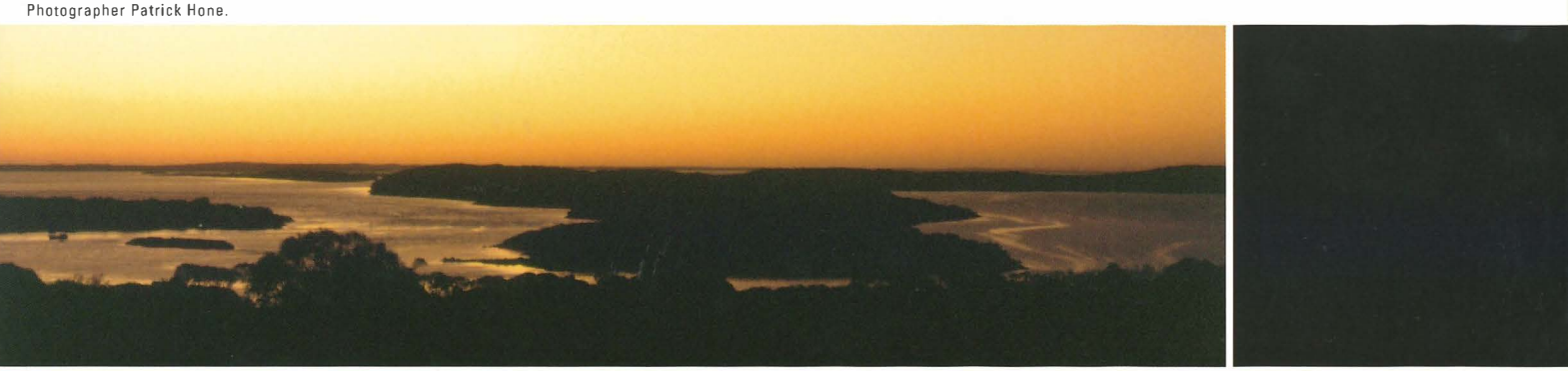
'restricted', or 'excluded' use. The provisions of the *Environment Protection and Biodiversity Conservation Act (1999)* and *Schedule 4* of the *Wildlife Protection (Regulation of Exports and Imports) Act (1982)* are enacted to ensure that harvested species are not threatened by unsustainable practices.

With emphasis firmly on maintaining a sustainable catch, further industry development is reliant upon increasing the value of the catch, and minimising and making more efficient use of bycatch species. Consequently, the demand is for more innovative, value-adding techniques such as expanding product ranges to make better use of bycatch, improving packaging and product differentiation, adopting quality management systems and focusing on premium markets. Research priorities reflect this need. Fishers are also adopting better practices, some of them underpinned by formal codes of practice, to protect fish quality during harvesting. Progress towards the goal fits neatly with the enactment of the *Food Act (2001)* that outlines more stringent food safety requirements. This is leading the industry towards higher quality control and food safety procedures, and, consequently, an enhanced capability to satisfy local and overseas market demands which, in turn, attracts higher commodity prices.

Australian Fisheries Statistics–2001 released by ABARE record that the value of fisheries products exported nationally has doubled from about $1 billion in 1990–1991 to $2.2 billion in 2000–2001. By value, Hong Kong, Japan, Chinese Taipei and the USA imported 95% of Australia's rock lobster, 87% of abalone, 71% of prawn and 65% of finfish exports in 2000–2001. Singapore and China were also important markets for Australian seafood products, importing primarily crustaceans and molluscs. Within Australia, South Australia was the leading exporter of finfish, supplying 57% of all Australian finfish exports by value. Although the total tonnage of exports from Australia rose by only 1%, the value rose by 12%.

Approximately 30% of Australia's seafood production (by weight) is exported and about 60% of commercially sourced seafood consumed in Australia is imported. Australia is, therefore, a net importer of seafood-especially from Southeast Asia, New Zealand, the USA, South Africa and Canada. These products constitute a significant competitive factor for pricing and quality against Australian products.

Photographer Patrick Hone.



4. Fisheries and Aquaculture R&D resources in South Australia

Because all stakeholders need to be committed to the responsible management of the State's publicly owned marine resources, research programs must be properly designed and implemented to encompass the interests of a variety of stakeholders, while simultaneously providing the basis for sound management decisions that ensure ongoing and sustainable production in the industry.

South Australia is fortunate to have a well-resourced fisheries and aquaculture capability through the State-based research agency SARDI (South Australian Research & Development Institute), the CRC for Sustainable Aquaculture of Finfish, the three Adelaide based universities, the Australian Fisheries Academy, and a range of other educational institutions and consulting groups. South Australia also uses research services provided by Commonwealth research agencies and those in other States, including DPIQ's Agency for Food and Fibre and the CSIRO.

The State Government's research agency, SARDI, has its fisheries headquarters at the South Australian Aquatic Sciences Centre at West Beach. This is a modern complex completed in 1995 featuring laboratories, a conference center,

The long-term goal for the Environment and Ecology program is to provide scientific and technical advice in respect of key issues in the management of aquatic environments.

library, and flow-through seawater and freshwater systems, including a shellfish and finfish hatchery complex, and environmentally controlled broodstock tanks. SARDI's research programs focus in three major discipline areas: *capture fisheries, aquaculture, and environment and ecology.*

The capture fisheries programs were restructured in 2001 to ensure that the research effort better reflects the paradigm shift towards ecosystems based management of fisheries. Two new programs were created:

- *The Great Australian Bight and Shelf Seas Program* that includes research in support of the Rock Lobster, Abalone and Pilchard fisheries; and
- *The Gulfs, Estuaries and Inland Waters Program* including Marine Scalefish, Prawns, Blue Crabs, and Inland Waters, Lakes and Coorong fisheries.

SARDI has significant aquaculture capacity focusing on:

- Industry development (species, sites and technologies);
- environmental sustainability (including reducing risks); and,
- enhancing the aquaculture industry's competitiveness (increased production, reduced costs, optimized products).

A new research program under the banner *Environment and Ecology* was also established in 2001. This program focuses research through two sub-programs:

- *Fisheries Habitat;* and,
- *Environmental Assessment, Mitigation and Rehabilitation.*

The long-term goal for the Environment and Ecology program is to provide scientific and technical advice in respect of key issues in the management of aquatic environments. These include, but are not restricted to, developing our understanding about processes that degrade the environment, and developing tools to assess, mitigate and rehabilitate these environments.

The universities in Adelaide (The University of Adelaide, Flinders University and The University of South Australia) also have considerable capability in marine sciences, particularly in the areas of environmental impact and the effects of fishing (Adelaide, Flinders), aquaculture (Flinders), and environmental modelling and information technology (South Australia). Resources include supercomputers, aquarium systems, and state-of-the-art laboratories that collectively provide essential research infrastructure in molecular, fluid, and biological sciences. The University of Adelaide operates a marine research station for students at Coobowie, on the Yorke Peninsula, and West Island off the Fleurieu Peninsula. Flinders University has similar facilities at Salt Creek on the Coorong and in Port Lincoln.

The Lincoln Marine Science Centre is a research and teaching facility situated in the heart of the aquaculture and fishing industry at Port Lincoln. Completed in 1996–97 at a cost of $2.5 million with support from the University, Federal Government, the fishing & aquaculture industries and the local community, the Lincoln Marine Science Centre provides a major base for teaching and research in marine sciences in South Australia. This facility has two running seawater aquarium systems allowing small-scale R&D, teaching and research laboratories, a lecture hall, a computer suite and office space. Currently housing staff from Flinders University, SARDI, and TAFE, the Lincoln Marine Science Centre provides interdisciplinary and interagency support for fishing and aquaculture research.

The Waite and Roseworthy Campuses of the University of Adelaide have modern, well-equipped laboratories for cell, microbial and molecular biology. The *Australasian Experimental Stockfeed Extrusion Centre* is owned and managed by SARDI, and located at Roseworthy. Facilities for "state-of-the-art" feed analysis are also located on both the Adelaide University campuses at SARDI's Pig and Poultry Production Institute. These facilities include mass spectrometry, NMR and NIR. In addition, both The University of Adelaide and Flinders University have modern electron microscopy units suitable for morphological studies of fish and feed.

The Australian Fisheries Academy, based at Port Adelaide, provides a central training base for state, national and international industry members. Its role is to underpin the development of the seafood industry of South Australia and to assist development at the national level through education and research.

Sound education facilities provide for future researchers and an informed industry participation, and the fishing industry actively promotes the extension of relevant information through schools curricula. A number of South Australian institutions and training centres are supported by Schools of Technical and Further Education (TAFE), and secondary and tertiary educational bodies in the State. These serve to promote greater awareness of the fishing industry and the skills involved.

An important activity of the Board is to commission and assess fisheries R&D applications annually and to submit them to FRDC and other relevant agencies for consideration of funding.

5. The South Australian Fisheries Research Advisory Board (SAFRAB)

The South Australian Fisheries Research Advisory Board is appointed on a skills and expertise membership basis to reflect a broader and more independent representation of interests in the State's fisheries resources. The major responsibilities of the SAFRAB are to:

- provide a forum to advise R&D priorities for both State and Commonwealth funded fisheries research;
- commission R&D applications that address those priorities;
- advise FRDC on the appropriateness and priority of applications attributing benefit to their related fisheries or industry sectors;
- identify and utilise appropriate funding (including from FRDC);
- develop and periodically update a State fisheries/aquaculture 5-year R&D strategy; and
- advise the Minister for Primary Industry as required.

The Chairman and members are appointed by the Chief Executive, PIRSA, for 2-year terms. Expertise-based appointments as of 30th June 2002 were:

- Chairman
  Mr Richard Stevens
- Commercial fishing
  Mr Terry Moran | Mr Bob Pennington
- Recreational fishing
  Mr John Winwood
- Aquaculture
  Ms Tania Kiley
- Fisheries science
  Mr Rodney Grove-Jones
- Fisheries management
  Mr Will Zacharin
- Environmental science/
  Prof Anthony Cheshire
- Conservation
  Ms Margi Prideaux

An Executive Officer (Mr Bob Lewis) is employed part-time to support the activities of the Board.

An important activity of the Board is to commission and assess fisheries R&D applications annually and to submit them to FRDC and other relevant agencies for consideration of funding. This process begins with a public advertisement in late May/early June each year calling for preliminary research proposals (PRP's) on behalf of FRDC to be developed in consultation with industry and to be forwarded initially to the SAFRAB. The brief PRP's (two pages) are assessed by the Board and comprehensive applications in standard format are invited for projects that are considered to have merit and that meet State priorities for fisheries/aquaculture research and development. These detailed applications, and others received from the FRDC Subprograms, are then reviewed and ranked by the SAFRAB before being sent on to FRDC by 1st December each year for consideration of funding. Applications are also referred to other funding agencies where indicated. Applicants for FRDC funding are advised of the final outcome of their application in May.

The SAFRAB encourages close collaboration between researchers, fisheries managers, commercial operators and other fishing industry interests. Such collaboration focuses outcomes, minimises duplication of R&D effort, promotes the sharing of knowledge, and facilitates extension and/or commercialisation of results.

Provided by SA Rock Lobster Industry.

6. The Fisheries Research and Development Corporation (FRDC)

The Fisheries R&D Corporation (FRDC) is based in Canberra and its mission is *to increase economic and social benefits for the fishing industry and the people of Australia, through planned investment in research and development, within an ecologically sustainable framework.*

FRDC places considerable emphasis on the advice of the State-based FRABs in assessing technical merit, conformity with the State R&D Strategy and the degree of support for project applications not only at the State level, but nationally. All applications that allocate a flow of benefits (FOB) to a particular State or Territory are automatically referred to that State or Territory FRAB for advice.

The FRDC Subprograms have all developed a process to plan and oversee specific R&D programs. Relevant information, including Subprogram structures and R&D priorities, is available from their respective websites. Applications for funding of Subprogram R&D projects are solicited annually and submitted to the state FRABs who assist with coordination of the process and provide advice to the FRDC about overall state priorities for funding. FRDC uses this advice to assess funding applications on a national basis.

The FRDC posts a comprehensive website at www.frdc.com.au, including links to each of the Subprograms and the State FRABs, and strongly encourages all potential applicants to contact the relevant bodies prior to submitting applications.

7. Other R&D Plans

The SAFRAB articulates with all other national and subprogram R&D Strategies. A comprehensive list of the links to many of these strategies is available on the FRDC website. The following R&D plans are relevant and are developed by the organisations or under the following titles:

a. *Southern Bluefin Tuna (SBT) Aquaculture R&D Strategic Plan;*
b. *Cooperative Research Centre (CRC) for Sustainable Aquaculture of Finfish;*
c. *Rock Lobster Post Harvest Subprogram (FRDC);*
d. *Rock Lobster Enhancement and Aquaculture Subprogram (FRDC);*
e. *Fisheries Habitat Review (FRDC);*
f. *Aquatic Animal Health Subprogram (FRDC);*
g. *Abalone Aquaculture Subprogram (FRDC);*
h. *Atlantic Salmon Aquaculture Subprogram (FRDC);*
i. *Seagrass in Australia: Strategic Review and Development of an R&D Plan (FRDC);*
j. *South East Fishery Industry Development Subprogram (FRDC);*
k. *Effects of Trawling Subprogram (FRDC);*
l. *Abalone Aquaculture Subprogram (FRDC);*
m. *Aquaculture Diet Development Subprogram (FRDC);*
n. *Our Seas and Coasts: A Marine and Estuarine Strategy for South Australia; and*
o. *Aboriginal and Torres Strait Islanders Strategic Plan.*

Two Boards also act to guide research and development in the fisheries and aquaculture industries:

Firstly; the South Australian Primary Industries Research & Development Board (SAPIRDB) whose main role is to facilitate Government funded, priority projects for R&D in all primary industry sectors, including marine and freshwater research which is conducted mainly by SARDI at the Aquatic Sciences Centre.

Secondly; The Seafood Industry Development Board (SIDB) advises the South Australian Minister for Agriculture, Food and Fisheries on the long-term, strategic direction for the seafood industry in South Australia. It determines the most effective way to maximize growth by:

- developing an industry management structure that represents the industry from water to waiter;
- facilitating new product and marketing opportunities;
- encouraging whole-of-chain management practices to ensure ultimate market access and success;
- enhancing the professional image and environmentally responsible reputation of the South Australian Seafood Industry;
- enhancing the Seafood Industry's reputation for quality, value, uniqueness and diversity;
- establishing global leadership in specific branded market segments;
- capitalising on market growth opportunities by expanding industry capacity, product diversity and/or value adding;
- extending the scope of industry participation in complementary business sectors; and
- improving profitability across all sectors.

FRDC places considerable emphasis on the advice of the State-based FRABs in assessing technical merit, conformity with the State R&D Strategy and the degree of support for project applications not only at the State level, but nationally.

Photographer Simon Stanbury.

8. The funding application process

Although the Fisheries Research and Development Corporation (FRDC) is the major source of funding for fisheries and aquaculture R&D, there are other sources that the State utilises where appropriate. For example: the Australian Research Council (ARC); AusIndustry; Australian Fisheries, Forestry and Agriculture (AFFA), through Agriculture Advancing Australia (AAA) and its range of programs that include FarmBis; the National Heritage Trust (NHT); Land and Water Australia (LWA); etc.

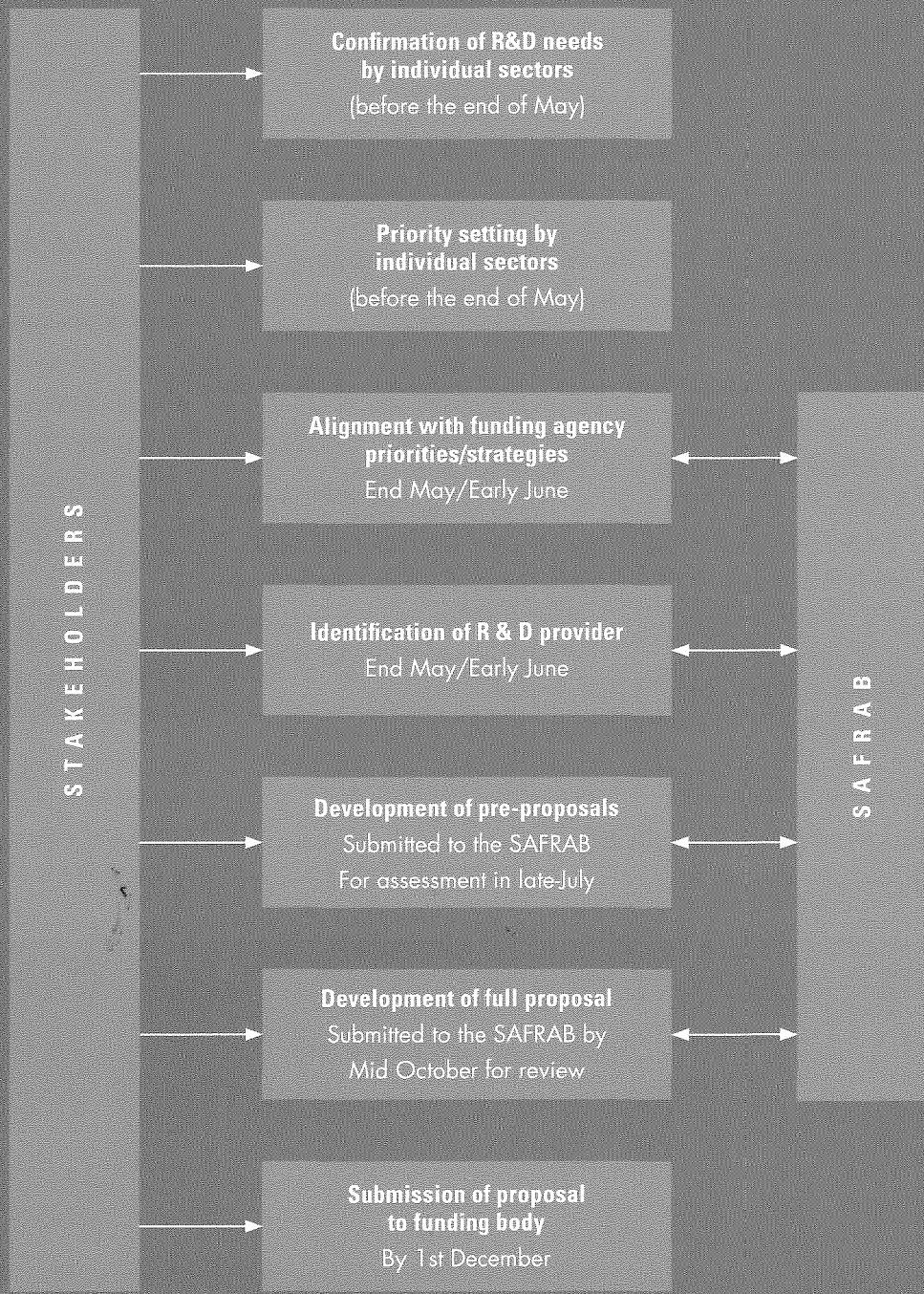
Useful web sites include:

- Australian Competition and Consumer Commission (ACCC): www.accc.gov.au
- Australian Taxation Office (ATO): www.ato.gov.au
- Family Assistance Office: www.familyassist.gov.au
- Goods & Services Tax (GST): www.taxreform.ato.gov.au
- Review of Business Taxation: www.rbt.treasury.gov.au
- Forms and Publications ordering: www.agps.gov.au
- Start up assistance: www.treasury.gov.au/gststartup
- New start up assistance: www.gststartup.gov.au
- Online (Australian Business Number) ABN registration: www.business.gov.au

The Fisheries and Aquaculture R&D Strategy (2002–2007) and funding application process developed in South Australia is expanded in detail for information of stakeholders at www.fishresearch.sa.gov.au.

The R&D priority setting process developed by the SAFRAB is represented by the following diagram (Figure 2).

Figure 2. Research and Development priority setting process



9. Key R&D Priority Areas for Fisheries and Aquaculture in SA

This Strategy identifies three features as particularly important throughout the R&D project development process:

(a) the involvement of all stakeholders;

(b) transparency throughout the process; and

(c) the provision of a useful plan that can be used to determine, guide and assess key R&D proposals by:

- identifying priority R&D needs. (This will lead to the development of R&D projects that meet the needs of stakeholders);
- instilling confidence in R&D funding agencies and sponsors that R&D directions and projects are well-planned and provide value for money;
- offering guidance to R&D providers (the research community) on the types of R&D applications likely to gain support;
- allowing those interested or involved in fisheries and aquaculture to discern what R&D projects are planned and how they relate to their interests and involvement;
- indicating a balance between tactical and strategic (longer term) needs;
- indicating that plans for future contingencies exist; and
- identifying potential management issues.

The early recognition of critical issues and identification of priorities, adequate and timely R&D, and rigorous and comprehensive implementation of outcomes are essential for the proper development of fisheries and aquaculture, indeed, for all of our natural resources.

To focus the R&D effort and manage funds in an effective manner, the following advice is important:

- Each sector of the industry needs to identify specific R&D priorities on an annual basis. These priorities should be translated into research programs that are developed jointly with the research community;
- The research community needs to approach industry in a proactive fashion to develop research programs (and project funding applications) of mutual interest;
- Account needs to be taken of other stakeholders who, whilst not directly benefiting from the natural resource, nevertheless have a legitimate interest in such matters as how the resources are harvested and how the harvesting affects the environment. It is important that this group recognises that it;
  - has an important role to play,
  - understands the need for it to advance R&D programs which address its concerns,
  - and has responsibilities to the wider community in this respect;
- High quality programs are best advanced iteratively with the research community.

The SAFRAB urges all stakeholders to collaborate during the identification and development of R&D programs. Assessment of the merit of R&D proposals for funding is weighted heavily towards this essential requirement.

The overall objective of the process is to develop knowledge and processes to manage fisheries resources in a holistic and ecosystem-based manner.

Photographer Kylie Paulsen.

Photographer Joseph Puglisi Jnr.

Key R&D issues for fisheries and aquaculture

Program 1: Natural Resources Sustainability

Goal: Natural Resources are utilised in a way that can be maintained indefinitely.

Strategic Priorities

Support Projects that:

- Define resources and create objective measures of the health of resources that can then be used as a benchmark against which changes in the health of the resources can be measured.
- Define threats to resources and create objective measures of the magnitude of each threat.
- Develop ways to manage the threats to resources.
- Predict how changing a threat affects the health of the resource.
- Enhance governance arrangements for more innovative, responsive and effective management of the resources.

Targeted Priorities

- Environmental protection (social/economic/environmental interactions).
- Effects/mitigation of pollution on fisheries habitat/ecosystems.
- Stocks assessment/sustainability/management.
- Stock enhancement.
- Accurate measurement of fishing effort.
- Improved environmental monitoring systems.
- Develop codes of environmental bestpractice.

Program 2: Industry Development

Goal: The seafood industry is efficient, profitable and socially and environmentally responsible. Recreational and traditional sectors enjoy their interaction with the resource.

Strategic Priorities

Support projects that:

- Eliminate technical barriers to improved social, economic and environmental efficiency in fisheries and aquaculture production.
- Evaluate the non-biological implications of regulation, including the processes of changing access arrangements.
- Identify the best use and highest economic value for seafood production (thus, maximising the return to the community on extractive production).
- Promote the true value of fisheries and aquaculture to the community-at-large.

Targeted Priorities

- Resource sharing/access security.
- Compliance/illegal fishing.
- Public perception of the industry.
- Post harvest enhancement/supply chain management.
- Maintain highest standards of integrated technology across the industry.
- Innovative marketing techniques.
- Farm husbandry.
- Nutrition of farmed species.
- Propagation.
- Fish health.

Program 3: Human Capital Development

Goal: To increase the professionalism and effectiveness of people in the industry and those providing support services to the industry.

Strategic Priorities

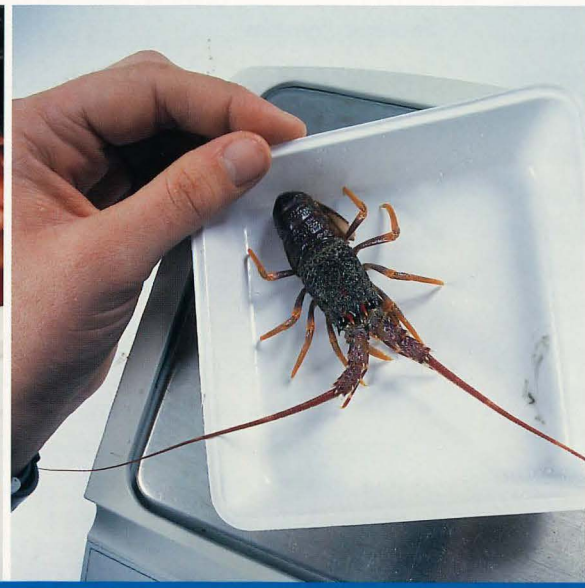
Support projects that:

- Increase communication among and between industry participants and service providers, eg seminars, field days and conferences.
- Develop leadership and communication skills in industry participants (eg. fishers and farmers) and service providers (eg. scientists).
- Enable participatory co-management of resources at the decision making level.

Targeted Priorities

- Leadership skills training for the industry.
- Workplace skills enhancement for industry participants.
- Enhancement of industry communications/information transfer (including effective extension of research results).

The overall objective of the process is to develop knowledge and processes to manage fisheries resources in a holistic and ecosystem-based manner.



Program 4: Management and Accountability

Goal: Extend/promote all benefits to South Australians arising from fishery related Research and Development projects.

Strategic Priorities

- Develop and promote a shared vision among all fishing industry stakeholders of a soundly planned future for South Australia's marine resources.
- Focus the attention of R&D providers on projects that are consistent with that vision.
- Maintain a clear, methodical and transparent system to translate R&D priorities into endorsed projects and have them funded.
- Maintain and enhance linkages to collaborative bodies (such as the FRDC subprograms, SAPIRDB, SIDB, R&D and science policy coordinators and contractors, on a state and national basis) to help identify and fund important R&D programs.

Targeted Priorities

- Raise the profile of the FRAB and generate a value on FRAB endorsement.
- Increase resources available to the FRAB.
- Maintain a long-term (strategic) R&D plan.
- Maintain an effective, all-inclusive and transparent project development protocol.
- Identify, promote and develop links to all possible funding sources.
- Influence all possible funding sources to maximise financial leverage in fullest support of endorsed projects.

10. Glossary

AFMA Australian Fisheries Management Authority: the Commonwealth statutory authority responsible for the management of fisheries under Commonwealth jurisdiction. AFMA manages fisheries within the Australian fishing zone and, in some cases, by agreement with States to the low-water mark.

ASIC The Australian Seafood Industry Council: the peak body representing the commercial sector of the industry.

bycatch Species taken in a fishery that is targeted on other species, or on a different size range of the same species. (The part of the bycatch that has no presently recognised commercial value is discarded and returned to the sea).

CITES Convention on International Trade in Endangered Species.

Corporation, the The Fisheries Research and Development Corporation.

CRC Cooperative Research Centre.

CSIRO The Commonwealth Scientific and Industrial Research Organisation.

ecosystem A community of organisms, interacting with one another, plus the environment in which they live and with which they also interact.

ESD (ecologically sustainable development): Using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained and the total quality of life—now and in the future—can be increased.

fisheries managers Officers of government agencies who manage Commonwealth, State or Northern Territory fisheries.

fishery A class of activities by way of fishing, including activities identified by reference to all or any of:

- a species or type of fish;
- a description of fish by reference to sex or any other characteristic;
- an area of water or seabed;
- a method of fishing;
- a class of boats;
- a class of persons; and/or,
- a purpose of activities, as determined by the relevant management authority.

fishing fishing industry: Includes any industry or activity carried on in or from Australia concerned with: taking, culturing, processing, preserving, storing, transporting, marketing, or selling fish or fish products.

The fishing industry comprises the recreational, commercial, and Aboriginal and Torres Strait Islander sectors. The commercial sector—which for practical reasons includes the pearling sector—is also referred to as the "seafood industry.

FRAB Fisheries Research Advisory Body.

FRDC The Fisheries Research and Development Corporation.

GATT General Agreement on Tariffs and Trade.

GVP (Gross value of production): the average gross value of fisheries production for the three preceding years.

Photographer Patrick Hone.

ISO (International Organization for Standardization).

IUCN International Union for the Conservation of Nature.

Minister, the The State Minister holding portfolio responsibility for fisheries.

PIERD Act Short term for the Primary Industries and Energy Research and Development Act 1989, under which the FRDC is established.

PIRSA Primary Industries and Resources South Australia. The Government agency responsible for the management of fisheries and aquaculture in SA.

R&D Research and development.

R&D Plan The South Australian Fisheries and Aquaculture Five Year Research and Development Strategy.

research, strategic and tactical/applied

- In strategic research, the underlying issues may be fundamental, and the results on economic or practical problems are neither immediate nor direct as are those of tactical research. Projects will be relevant to a broad sector within which it is expected that useful knowledge will emerge.
- Tactical research is research that, if successful, can be used directly and applied in a practical way to meet a government or industry need. (Source: Harden Jones, F.R. Fisheries Ecologically Sustainable Development: Terms and Concepts). Tactical research is often termed "applied research".

researchers Individuals or organisations undertaking R&D activities.

resource A source of supply, support or aid.

SARDI South Australian Research and Development Institute.

seafood, seafood industry "Seafood" includes fish and fish products for human consumption. Includes any industry or activity carried on in or from Australia concerned with: taking, culturing, processing, preserving, storing, transporting, marketing, or selling fish or fish products. The "seafood industry" is the commercial sector of the fishing industry.

stakeholders Commercial, recreational, and indigenous fishers, communities, consumers, government, aquaculturists, processors, retailers and a wide range of service providers.