Community perceptions of fishing: implications for industry image, marketing and sustainability

Heather J. Aslin & Ian G. Byron

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RESEARCH &
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CORPORATION

Project No. 2001/309

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Non-technical summary

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Objectives

The overall objective of the study was to conduct a survey of general public perceptions of the fishing industry. More specific objectives were to:

1. Conduct focus groups with selected sub-groups of the Australian public to serve as a basis for developing a structured survey instrument

2. Develop the survey instrument in discussion with the advisory group, conduct a pilot, and administer the survey to a statistically representative sample of the Australian adult population

3. Identify the implications of the survey findings for industry communication, education and marketing activities

4. Identify the implications of survey findings for Ecologically Sustainable Development (ESD) monitoring and reporting frameworks

5. In discussion with the advisory group, develop options and strategies for addressing negative perceptions of the industry

6. Communicate overall survey results to stakeholders in a meaningful and useful form.

NON-TECHNICAL SUMMARY:

OUTCOMES ACHIEVED

A pioneering national study of Australian public perceptions, knowledge and attitudes towards the fishing industry, has been completed. It covers the commercial, recreational and traditional fishing sectors, and also examines seafood consumption and factors likely to affect future consumption. 'Perception' is used to refer to held beliefs or cognitions that may or may not be correct as judged by those with specialised knowledge of the industry. The traditional fishing sector, as used here, refers to subsistence fishing activities by Indigenous people. Indigenous Australians of course also participate in the commercial fishing sector.) The study involved a literature review; seven focus group discussions with a total of 63 members of the Australian public from a range of locations, ages and occupational groups; and a telephone survey of 1,004 Australian adults, 18 years and over, randomly sampled from the electronic white pages. While the final sample was reasonably representative of the general public in age distribution, it was somewhat skewed towards people with higher incomes. It is also acknowledged that voluntary telephone surveys like this one tend to have an over-representation of people who are interested in the subject matter of the survey. In this case, both recreational and commercial fishers and their views may be over-represented. These issues and their possibly influence need to be borne in mind in interpreting survey findings.

Survey findings indicate considerable community knowledge about recreational fishing and high participation, with twice as many men as women participating (survey percentages were 58% of males and 29% of females participating over the year prior to the survey). Very few members of either the focus groups or telephone sample (collectively referred to as 'respondents') had direct experience with the commercial wild-catch sector or traditional fishing, but many focus group members knew about or had visited local aquaculture ventures. Respondents generally viewed recreational and traditional fishing and aquaculture positively, but not commercial wild-catch fishing. The telephone sample rated the sustainability of the different sectors in the order wild-catch (25% said it was sustainable); recreational (56%); traditional (64%), and aquaculture (77%). Respondents' most important source of information about the industry was the mass media, particularly television. Recreational fishers relied more on books, magazines and fishing clubs than non-recreational fishers. Government and industry were very minor sources of information for most respondents and were not viewed as highly credible sources. Poor perceptions of the wild-catch sector suggest that much mass media information about this sector is negative, and there could be advantages in industry taking a more proactive media stance and trying to achieve better coverage of 'good news' stories.

Members of most of the focus groups and the majority of survey respondents rated their knowledge of the industry as relatively low but interest levels higher (only 25% of the survey respondents thought they were 'knowledgeable' but 53% were 'interested'), providing encouragement to those working to improve public understanding and knowledge of the industry. However, like similar surveys, the study concludes that unless they have a special interest, members of the public are unlikely to actively seek information about the industry nor to make much use of the sources they regard as most credible. Specific options for addressing poor public perceptions of the wild-catch sector include developing media campaigns in

consultation with professional communicators; enlisting the support of media personalities to deliver messages; developing and disseminating popular material giving basic facts and figures about the sector and making it available in locations the public regularly uses; supporting production of television documentaries that provide a balanced perspective on wild-catch fishing and its contributions; and developing more integrated fisheries websites, preferably managed and maintained by community-based organisations that the public regards as credible. The industry could also develop more 'on the wharf' links to the public, for example by establishing fishing industry information sources within commercial precincts.

To address low levels of public knowledge about the traditional sector, government and industry need to work with Indigenous organisations to develop communication strategies to raise public awareness of this sector and its economic and cultural contribution to Indigenous community well-being.

Study findings about community judgements of the sustainability of the different sectors, and the reasons for these judgements, could potentially be used in ESD reporting frameworks. In order to do this, ESD frameworks need to be made more meaningful to the community and less dominated by expert judgements and specialised knowledge. There may be particular problems with the meaningfulness of current fisheries' jurisdictional and management boundaries. Better understanding of public perceptions, knowledge and behaviour obtained through social surveys could be a basis for re-working boundaries and reporting frameworks so that they relate better to community and local knowledge. In particular, high levels of participation and interest in recreational fishing justify attention to ways of making fisheries management more meaningful to the public and giving local communities a greater role in near shore fisheries management than they may have had in the past. Many community members appear to be engaged and interested but lack ways of being directly involved in management or monitoring.

In terms of seafood consumption, a high percentage of respondents ate seafood (95% of the telephone sample). For those who did not eat it, their main reason for not doing so was taste, with other factors less important. The amount of seafood respondents purchased was likely to be influenced by price reductions (70% indicated this would influence them); labelling and certification about contamination and health risks (65%); labelling about freshness (59%); and labelling about environmentally friendly production (57%). These findings suggest potential to further influence seafood consumption patterns by expanding labelling and certification schemes.

Ongoing monitoring of social aspects of the industry, based partly on surveys like the one reported here, could provide the industry with important feedback about the success of its communication and information activities, complementing existing economic information about trends in production and consumption.

KEYWORDS: Community perceptions, fishing industry, commercial fishing, recreational fishing, environmental attitudes, seafood consumption, communication, marketing, sustainability

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Background

Overview of fishing sectors

The term 'fishing' covers a wide range of activities involving many different methods, purposes, target species and participants. Many writers use the terms 'fishing' and 'fishing industry' to mean only part of the full range of activities that potentially fall within the ambit of these terms. For this project, 'fishing' and 'fishing industry' have been used in the way defined by FRDC and the Australian recreational fishing peak body, Recfish, to cover three major fishing sectors in Australia:

- the **commercial sector**, comprising enterprises and individuals involved in wild-catch fishing and aquaculture, including both producing and processing fisheries resources or products for sale (this sector is also referred to as the 'seafood industry')
- the **recreational sector**, comprising enterprises and individuals involved in recreational, sport or subsistence fishing activities that do not involve selling the products of these activities
- the **traditional sector**, comprising enterprises and individuals involved in providing fisheries products for Aboriginal and Torres Strait Islander people in accordance with their traditions.

(FRDC 2000: 11).

As used in this way, fishing covers marine and freshwater activities, and target species living in the wild or in captivity. It includes activities involving animals that are not fish in a zoological sense, for example crustaceans like crabs, shrimp and lobsters; shellfish like oysters and mussels; and cephalopods like octopus and squid. These activities provide a range of food and non-food products for sale or subsistence. Examples of major non-food products from the industry are pearls, aquarium fish, and fish-derived fertilisers.

The commercial fishing sector is a substantial contributor to Australia's economy, with an estimated gross value of production of $2.48 billion in 2000–2001 (Macdonald 2002, ABARE 2002). Of this, aquaculture contributed $746 million. Fishing industry exports were estimated to be worth $2.2 billion in 2000–2001, which was a 9% increase on the previous year (ABARE 2002). In the 1996 Census, the Australian Bureau of Statistics (ABS) recorded 22,400 people directly employed in fisheries production and processing in the commercial sector (FRDC 2000). More commercial sector jobs are in the transportation, storage, wholesaling and retailing areas. These jobs will not necessarily be directly associated with the fishing industry in Census figures which therefore are likely to under-estimate employment generated by the industry. Recent FRDC estimates suggest that 80,000 people may be employed in the commercial sector beyond production and processing; and that total employment in the commercial sector, including wild catch, aquaculture and post-harvest processing, may be between 100,000 and 200,00 people (FRDC 2002). Unlike New Zealand, the Australian commercial fishing sector tends not to be dominated by large multi-national corporations, and contains many small family-owned businesses.

There are concerns about the sustainability of some Australian commercial wild-catch fisheries. The latest Bureau of Rural Sciences' (BRS) report on the status of Commonwealth–managed fisheries classified 57 main species caught in these fisheries as follows: 11 were overfished, 11 fully fished, and 35 had an uncertain status (Caton 2002). However, the Australian Fisheries Management Authority (AFMA) has argued that it has recovery plans and effective management regimes in place for all overfished species (AFMA media release, 30 September 2002). Some fisheries stakeholders argue that Australia has very rigorous fisheries management regimes in place, and that these regimes have been further strengthened by requirements for export fisheries at both State and Commonwealth levels to be assessed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* before their export permits can be renewed.

Recreational fishing is a major pastime in Australia, and some estimates put Australia-wide participation at between 25% and 30% of the population (see for example Dovers 1992, 1994; Recfish 2001; Larcombe et al. 2002). An estimate of recreational fishing participation in Victoria in 1996 was 23% of the State's population over 14 years (DNRE 2002); and in Western Australia it has been estimated that since 1987, participation in recreational fishing of all kinds has more than doubled from 284,000 people to about 640,000 people a year — or from 27% to 37% of the population over four years old (see Fisheries Western Australia 2002). The recently completed National Recreational and Indigenous Fishing Survey estimated somewhat lower participation rates (Henry & Lyle, in press 2003). It found that 19.5% of the population had participated in recreational fishing in the period May 2000 to April 2001. Recreational fishing has been claimed to be the second most popular outdoor activity in Australia after swimming. Women typically do not participate nearly as frequently as men. FRDC has estimated annual spending on recreational fishing in Australia at $2.9 billion (FRDC 2002). The National Recreational and Indigenous Fishing Survey estimated that recreational fishers spent more than $1.8 billion on fishing-related items in its survey year (Henry & Lyle, in press 2003). Recreational fishing is extremely widely dispersed around the coastline and in inland waters, and contributes to many other sectors like tourism and retailing (production and sale of boats, gear, bait, tackle, fuel etc.). A 1992 study estimated there were 249 manufacturers, 104 importers and wholesalers, and 2,220 retailers providing fishing tackle in Australia (Patrick & Pepperell 1992). These figures are likely to have increased significantly since that time. More than 250,000 Australians are estimated to be members of fishing clubs, most of which conduct regular fishing competitions (Recfish 2001). The recent National Recreational and Indigenous fishing survey suggests that about 3.4 million Australians participate in these kinds of non-commercial fishing activities (FRDC 2002).

It has been suggested that because of its diffuse, lifestyle nature, recreational fishing does not fit an industry sector model at all well. As a result, it may not have achieved the political or economic recognition it warrants (Dovers 1992, 1994). Several national reviews of the sector have been completed, including a report for the recent Commonwealth Fisheries Policy Review summarising the current situation in Australian recreational fishing and proposing policy and management options for the future (Pepperell Research and Consulting Pty Ltd 2001; McIlgorm & Pepperell 1999).

Traditional fishing by Aborigines and Torres Strait Islanders has a very long history, dating back to the first human settlement of Australia. Indigenous people catch a wide range of marine and freshwater animals, and use many different fishing techniques, both shore- and vessel-based. Indigenous fishing remains very significant to local subsistence economies in northern Australia in particular, and Torres Strait Islander cultures strongly rely on marine resources (Zann 1995). However, coastal Indigenous communities in southern Australia also practice subsistence fishing in the sea and coastal lakes. The 1992 Mabo native title decision officially recognised the rights of Indigenous people to traditional lands. However, native title can also include the right to fish in traditional waters or 'sea country', as was confirmed in a High Court decision on a claim by the Croker Islanders in 2001 (Larcombe et al. 2002). This decision also confirmed that commercial and traditional fishing can co-exist and that no single stakeholder has exclusive rights to use marine resources. Further native title claims covering both land and sea continue to be determined on a case-by-case basis.

Indigenous Australians have some special rights to hunt and fish in accordance with traditional laws and customs that non-Indigenous Australian do not have (Altman & Allen 1992; Collins, Klomp & Birckhead 1997). These rights were confirmed in a 1999 High Court decision (the Yanner decision).

A recent survey of Indigenous fishing in northern Australia found that Indigenous fishers fished mainly in near-coastal waters using lines (54% of trips), hand collecting (25%), cast nets (12%) and spears (12%) as their primary fishing methods (Henry & Lyle, in press 2003). The Indigenous harvest was considered to be a minor proportion of the overall Australian national catch.

Indigenous Australians also participate in wild-catch fishing and aquaculture (FRDC 2000), and several studies investigate ways of increasing their participation in the commercial sector (Tsamenyi & Mfodwo 2000, Lee & Nel 2001).

As outlined in the original project proposal, currently there is relatively little information about public perceptions of the fishing industry on a national basis. Although in this study we did not find any specific research on industry media coverage, this coverage often appears to be negative or alarmist, focusing on adverse environmental impacts of commercial fishing practices — for example by-catch of turtles and albatross, drowning of dolphins in discarded fishing nets, and threats to fish species from overfishing. Stereotypes of the industry tend to focus on the wild-catch sector as a risky male-dominated activity where environmental concerns are not prominent. The public is likely to base its perceptions on these pre-existing stereotypes from the mass media, which may not be accurate. To test these perceptions, and develop baseline data on how the public perceives the industry as a whole, we conducted a national survey of public attitudes and perceptions of the industry.

Issues affecting the fishing industry

On the production side, the fishing industry faces issues around: effective management, policing, monitoring, regulating and licensing of fishing activities; governments' roles and responsibilities versus those of the community, industry and private sectors; resource conservation and sustainability of current activities; by-catch and discarding; accidental drowning of non-target species; and competition between

sectors, or between overseas and Australian fishing vessels, for limited wild stocks. Some of these issues parallel ones in other natural resource sectors like agriculture and mining, while some are unique to the fishing industry and particularly to wild-catch fishing.

The summary of the first Australian State of the Marine Environment Report (Zann 1995) considers marine environmental issues by State and Territory. Among the fishing-related issues it includes are:

- effects of fishing and trawling on the Great Barrier Reef and on the sea floor
- Aboriginal and Torres Strait Islander fishing rights and their lack of involvement in management
- overfishing of some fish stocks
- management of recreational fishing, and catch-sharing conflicts between recreational and commercial fishing
- decline in coastal and inshore fisheries
- competing coastal uses
- development of aquaculture.

In terms of management and jurisdictional responsibilities, the States and Territories manage the great majority of recreational fishing areas in Australia. Many recreational fishers catch species that are also fished commercially in State, Territory or Commonwealth-managed fisheries, and so there are actual or potential resource use conflicts between recreational and commercial fishers. In some fisheries, the recreational catch is larger than the commercial catch (Kearney 1991, 1992; Dovers 1994).

Similarly, the States and Territories are primarily responsible for managing and regulating aquaculture and traditional fishing activities, although the Commonwealth controls international trade and issues export permits. The export power effectively gives the Commonwealth jurisdiction over State and Territory commercial fisheries that have an export market, and makes it responsible for ensuing these fisheries are sustainable.

On the consumption side of the industry, there are issues relating to: quality and freshness of seafood; environmental and health labelling of products; seafood contamination, pollution and possible effects of genetic engineering; and cost factors. Recently there has also been heightened concern about illegal fishing in Australian waters by foreign vessels, partly as a result of well-publicised chases and captures of some offending vessels.

Background literature and previous surveys

The literature examined in this study can be divided into four categories:

- environmental attitude and value surveys covering issues relevant to this project
- specific surveys of fishing behaviour and/or seafood consumption
- surveys of attitudes to industry
- ESD and sustainability literature.

Environmental attitude and value surveys

This is a very large field and is only covered very briefly here, with a focus on Australian surveys of the general public. Very few studies ask specifically about fishing or the fishing industry, but they do provide background on related topics of environmental knowledge, attitudes, perceptions and sources of environmental information.

Lothian (1994) reviews a range of surveys in this area, including the 1992 survey for the Commonwealth Department of Arts, Sport, the Environment and Territories (DASET), and the first of the ABS environmental attitude surveys, conducted in 1992, discussed in more detail here. Lothian's general conclusions are that over the period reviewed, environmental concern in a very general sense peaked in the early 1970s and again in the late 1980s. However, when required to choose between environmental and economic development priorities, Australians consistently tended to strongly favour environmental ones (the average in the surveys examined was 85% 'pro-environment' and 15% 'pro-alternative'). In terms of the nature and extent of environmental concerns, pollution and waste issues, including ocean pollution, tended to be ranked consistently highly; biodiversity issues (including loss of species) also ranked highly; while natural resource issues, including unsustainable practices, tended to be middle ranking ones.

Department of Arts, Sport, the Environment and Territories

A 1991 survey involving 2,700 interviews conducted for DASET in association with the ESD process, revealed considerable pessimism, with 65% of respondents believing that the global environment had been deteriorating over the previous five years (DASET 1992). While there was little understanding of the Commonwealth's powers in environmental issues, there was strong support for more extensive Commonwealth powers. There was a clear demand for more government information about environmental issues. When respondents were asked to nominate their main source of information about the environment, their responses were: television (48%); newspapers (25%); radio (5%); magazines (6%); personal contact (5%); and education institutions (6%). Most sources of information were seen as having vested interests, and when respondents were asked about the credibility of different sources, they rated them as follows:

- high credibility: TV science and nature programs, CSIRO, education institutions
- medium credibility: TV news and current affairs, environmental groups, radio news and comment programs
- lower credibility: newspaper articles, Federal Government, State Government, large companies and industry groups.

(DASET 1992).

NSW Environment Protection Authority

The NSW Environment Protection Authority (EPA) has conducted three surveys of the environmental knowledge, attitudes and behaviour of NSW residents (NSW EPA 1994, 1997, 2000). The 2000 survey involved 1,102 residents aged between 15 and 70. These surveys included questions about beach and ocean pollution, environmental

quality generally, and ecosystem sustainability. The survey results suggest a shift away from acute concerns about specific environmental issues that characterised the early 1990s, with environmental issues now being rated as less important for government than public education and health issues. The percentage of respondents nominating 'environment' from a fixed list as one of the two most important issues for attention by the State Government fell from 23% in 1994 to 10% in 2000. However, respondents in 2000 typically indicated that in the longer term (more than ten years into the future), environmental issues would assume more significance than they had now, and placed considerable stress on concerns for future generations.

When asked about their concern for 'environmental problems' generally, 88% of respondents to the 2000 survey said they were concerned about these problems. When asked what was the single most important environmental initiative for the State Government to take, 17% of respondents nominated 'education', and 12% nominated 'stricter/harsher laws'. While there were no specific questions about the fishing industry, a majority of respondents in 2000 indicated that strong environmental regulations for industry were appropriate and that present regulations were either 'too lax' or 'about right'.

State of the Marine Environment Report

This report and its summary (Zann 1995) refer to a general public opinion poll about marine and environmental issues commissioned as a technical paper for the report. The poll found that three-quarters of respondents were concerned about the environment in general, and that pollution of rivers, beaches, harbours and the sea was their single most serious concern. The summary considers that social and cultural values associated with the coast and sea is little documented in Australia, and are often not adequately considered in management plans and environmental impact studies (Zann 1995).

Victorian Department of Natural Resources and Environment

The former Victorian Department of Natural Resources and Environment (DNRE) commissioned a series of workshops and telephone interviews, conducted in October and November 2000, to examine issues affecting the Victorian coastline, public opinion on coastline management, and changes in attitudes towards the coast since 1996 (DNRE 2000). Major findings of this research were that 'getting away from it all' was the main attraction of the coast; many Victorians wanted better coastal facilities; wanted to have opportunities to make effective input into local coastal issues; saw the marine environment as being threatened; and saw education and enforcement as being major ways to change people's behaviour over time.

Australian Bureau of Statistics

The ABS has conducted seven national surveys on environmental attitudes, behaviour and practices of Australian households (ABS 1992, 1994, 1996, 1998, 1999, 2000, 2001). The surveys conducted since 1997 have been based on people 18 years and older from a multi-stage sample of private and non-private (hotels, motels etc.) dwellings, covering about 0.5% of all Australian dwellings. They cover environmental concerns and a range of other topics related to environment and resource uses. The percentage of respondents stating they were concerned about environmental problems decreased from 75% in 1992 to 62% in 2001. In 2001, environmental concern was found to be highest among people aged 45–54 years, and

among ACT residents. In 2001, environmental concern was lowest among NSW residents.

National Oceans Office
In developing a South-east Regional Marine Plan, the National Oceans Office (NOO) commissioned a telephone survey of the values and aspirations of communities living within about 50 km of the coast of the Region (NOO 2002). (The Region as defined by the NOO includes State and Commonwealth waters offshore from south-eastern Australia to southern New South Wales, including Macquarie Island.) The survey found that 53% of respondents visited the coast at least once a fortnight. Only 29% of respondents were aware of the Commonwealth's management role in the Region. When asked about knowledge levels, 2% thought they 'knew a lot' about the Region; 15% 'knew a moderate amount'; 43% 'knew a little'; and 37% 'knew basically nothing'. When asked to nominate uses of the Region they were aware of, 86% of respondents mentioned commercial fishing; 78% recreational fishing; and 53% mentioned other recreational uses such as SCUBA diving, whale-watching and yachting.

A series of attitudinal statements was read to respondents and they were asked to indicate their extent of agreement or disagreement with each statement on a scale of 1 to 10. Responses were collapsed into categories of 'agree' (1–3), 'neutral' (4–6), and 'disagree' (7–10). Some of these statements were modified for use in this study and in Table 3 responses to the relevant statements in the NOO survey are compared with responses in this study. (It should be noted, however, that we used a slightly different response scale in this study from the one used in the NOO survey.)

Specific surveys of fishing behaviour or seafood consumption

A number of surveys of recreational fishing have been conducted mainly for State and Territory fisheries agencies. Those examined in this study are briefly summarised below.

Fishcount: a survey of recreational fishing in the Northern Territory
This survey was done for the NT Department of Primary Industries and Fisheries (Coleman 1998). It found that more than 42,000 non-Indigenous NT residents (35% of the population) were recreational fishers. Male participation was higher than female (44% versus 25%), and there was also higher participation in younger age groups (39% of those aged 15 to 19 fished versus 15% of those 65 and older). It was also estimated that more than 50,000 visitors to the NT went fishing each year. The survey found low awareness of fisheries' legislation and bag limits, but more than 98% of respondents expressed support for fisheries' regulations in general.

Recreational fishing in Queensland — a survey of Queensland residents
Roy Morgan Research conducted this survey in 1999 (Roy Morgan Research Centre 1999). They found that 33% of Qld households had at least one member aged more than 15 years who had fished for recreation in the last twelve months, and that 26% of the Qld population had been recreational fishing over the same period. There was higher participation among men under 50 years (39.5%), and girls aged 5 to 14 years (32.8%) than among other groups. Women over 50 had the lowest participation rate

(9%). Main reasons for fishing were given as: recreation — 95% of respondents; food — 42%; and competition — 5%.

National Recreational and Indigenous Fishing Survey

The first of these national surveys was recently completed and the report of its findings is currently in press (Henry & Lyle, in press 2003). It was a cooperative activity between the Commonwealth and the State and Territory fisheries agencies. The survey included three components: a National Recreational Fishing Survey; a Northern Australia Indigenous Fishing Survey; and an Overseas Visiting Fisher Survey. Some results of the first two components have already been mentioned. In particular, the first survey involved a combination of an initial telephone screening survey based on a sample of 44,000 telephone numbers, followed by a diary survey of households that intended to go recreational fishing in the next 12 months and which agreed to participate. The diary survey covered the period May 2000 to April 2001 inclusive, and was completed by 17,092 households. The survey found that approximately 19.5% of Australian residents had been recreational fishing at least once in the survey year. Participation rates were highest in the NT (31.6%), Tas. (29.3%), and WA (28.5%). More than twice as many men as women were recreational fishers. Forty-one percent of effort was in coastal waters, fishing from shore was more popular that boat fishing (57% of trips as opposed to 43%). Line fishing was the most popular fishing method.

Seafood consumption in Western Australia

The WA Fishing Industry Council has reported on its website the results of a survey of more than 800 Western Australians, conducted by the David Hide Consulting Group (http://www.wafic.com.au/industry/5.html). (When exactly the survey was conducted is not clear from the website.) The survey found that 93% of respondents ate seafood of some kind. Of the respondents who ate fresh seafood, 4% never ate it at home; 28% ate it at home more than once a week; 24% about once a week; 16% about once a fortnight; 16% about once a month; and 12% less than once every two months. The survey found that 83% of WA households bought at least 50% of the fresh seafood that they eat at home from fish retailers, and 61% bought more than 90% of their total seafood purchases eaten at home from this source.

A study of seafood consumption in Perth was conducted by Ruello and Associates in February 1999 (Ruello & Associates 2000). It involved three focus groups, 430 interviews on ‘out of home’ consumption, and 461 interviews on ‘in home’ consumption. It found that seafood consumption had substantially increased (37% increase) in the period since 1991. In home consumption had, however, fallen by 27% over the same period. Restaurants appeared to have lost market share to more casual eateries like cafes and hotels. Price remained a major barrier to increased fish and seafood sales.

National Recreational and Indigenous Fishing Survey

Development and conduct of this survey, intended for repetition at five-yearly intervals, are described by several sources (NSW Fisheries 2000, AFFA 2002, Truss 2002). It is a very large national survey involving approximately 42,000 Australian households, and overseas tourists to Australia as well as residents. Data are being collected on demographics, participation rates and catch details from Indigenous and

non-Indigenous fishers over a twelve-month period. The first survey has recently been completed but results are not yet publicly available.

Released Fish Survival National Survey
Roy Morgan Research (2003) conducted a national survey for FRDC to answer questions about current recreational fishing practices and the perceptions of fishers. The survey was completed as a Computer-Assisted Telephone Interview in November and December 2002. Interviewees were Australians aged 14 years and over. Survey findings were that 19% of the sample had fished in the last two years, and 15% within the last year. Males made up 78% of fishers and females 22%. Information from fishing friends and television shows were the most popular current ways of receiving information about fishing, while television fishing shows, mail or e-mail were the ways fishers would like to receive information about fishing in the future.

New Zealand seafood industry public opinion survey
AC Neilsen conducted a survey for the New Zealand Seafood Industry Council (S. Thomas, pers. comm. 2002). Four focus groups were run in early 2002: a Wellington-based well-informed group (read newspapers and watched TV news regularly); a Wellington-based young voter group (18–23 years); an Auckland-based uninformed group (didn't read newspapers or watch TV news regularly); and an Auckland-based recreational user group (had associations with recreational fishing or diving). General findings were:

- community awareness of the industry was low
- the industry had a low marketing profile both domestically and internationally
- both recreational users and consumers wanted to be assured that the supply of seafood will be maintained for future generations for consumption and in terms of marine reserves and preservation
- people had a strong sense of the need to manage seafood resources in comparison with other industries like agriculture, wine and fruit. The industry was perceived as more vulnerable to depletion than other natural resource-based industries.

A quotation from a recreational user exemplifying the last point was:

> You never think you are going to run out of cows, but you are aware of seafood running out.
>
> (AC Neilsen 2002).

Participants' main source of information was the mass media, but they also saw the mass media as having a vested interest in presenting negative images.

Environmental consumer research for US National Fisheries Institute
The Len Blackstone Ad Group conducted a survey for the United States' National Fisheries Institute, which is a large industry body with many processor and restaurant chain members (Leadbitter, pers. comm. 2001; Blackstone 2001). The survey involved 1,550 telephone interviews across the US, 12 to 15 mins in length and conducted in March and April 2001. It found average seafood consumption was three times per month with, not surprisingly, a tendency towards more frequent consumption in coastal States. Taste was the most frequent reason given for eating

seafood (29% of respondents), followed by health benefits (22%), and convenience and price/value (2%). Reasons for not eating were taste (55%); cost (25%); smell (12%); and don't know how to prepare (8%). When asked about their trends in eating seafood, 62% of respondents said they were eating the same amount as a year ago; 27% said their consumption was increasing; and 11% said it was decreasing. The main environmental issues respondents identified were:

- ocean floor damage
- discarding unwanted fish
- salmon escapement (escape of farmed salmon into the wild)
- overfishing
- by-catch
- overall industry perceptions.

When asked whether these issues affected their consumption, 65% said knowledge of ocean floor damage did affect it; 61% discarding; 51% overfishing; and 41% salmon escapement.

Some attitude statements used in the NFI study are similar to ones used here, and comparisons are shown in Table 4. Many US respondents to the NFI survey felt they did not know enough about commercial fishing to express an opinion.

Nearly half the NFI respondents thought aquaculture was a good alternative to wild-catch fishing and only 4% thought it was a bad alternative. Few respondents were aware of issues associated with aquaculture like feed quality (21% aware), use of antibiotics (16%), or farmed stocks escaping and breeding with wild stocks (14%). When asked about eco-labelling to assure purchasers the product had been harvested sustainably, about one in three respondents claimed they were aware of this kind of labelling.

Surveys of attitudes to industry

Results of three surveys in this area were examined — a series of surveys of WA community attitudes to the mining industry conducted for the Chamber of Minerals and Energy of Western Australia in 1992, 1997 and 1999 (Chamber of Minerals and Energy, WA, 1997; Market Equity 1999).

An initial baseline survey was conducted in 1991–1992 by CSIRO and was followed up with a repeat survey in 1997. Results from the initial survey were used to help develop an industry public affairs strategy, and the second survey was a measure of whether or not the strategy was working. The authors concluded that results of the second survey suggested a 'lessening of contentious issues and confrontation in the public arena resulted in less day to day concern about the industry' (Chamber of Minerals and Energy 1997: 1). In the second survey, more respondents (92%) believed that the industry provided lots of jobs; less (23%) agreed that the industry basically did what it likes, irrespective of government; and more (62%) agreed that the industry was responsible about rehabilitating land. However, both surveys indicated that only about 50% of the general community viewed the mining industry as a credible source of information. Women and educators tended to be most sceptical. Mass media were the major public sources of information about the industry

even though they were rated low in reliability. The 1997 survey suggested even greater reliance on the mass media as an information source than had been the case in 1992. The public showed relatively little understanding of the role of State Government agencies like the Environment Protection Authority and the Department of Conservation and Land Management in regulating mining activities.

For the 1999 survey, the sample was 401 Western Australians, approximately equally split between metropolitan and regional areas (Market Equity 1999). In terms of importance of a range of issues, respondents placed a higher priority on broader social and environmental issues (environment, education, health and safety) than on more economically-oriented ones like employment and taxation. Environment was rated as 'important – high priority' by 76% of respondents. Eighty per cent of respondents rated the mining industry's environmental performance as 'important – high priority', while comparable figures for industry job creation, economic contribution and international competitiveness were 73%, 69% and 60% respectively. Native title was rated as an 'important –high priority' issue by 50% of respondents. When asked about environmental protection, 62% of respondents indicated they thought that current laws did not provide protection (66% of metropolitan residents indicated lack of confidence in current laws as compared with 53% of regional residents). The survey asked about general perceptions of the mining industry, and while the industry's contribution to the economy, job creation and export earnings were rated as 'very strong' or 'strong' by at least 80% of respondents, only 42% rated the industry's environmental responsibility as 'very strong' or 'strong', and only 43% rated its credibility in these same categories. Metropolitan residents, women, and those aged 18–34 were least likely to see the industry as environmentally responsible.

As in the previous surveys, the mass media were the public's major sources of information — 82% of respondents cited newspapers as their main source; 60% television; 33% friends and relatives; 24% radio; and 21% magazines. The most credible information sources were the library (rated as 'somewhat credible' or 'very credible' by 67% of respondents); the Chamber of Minerals and Energy (50%); school (47%); newspapers (42%); and mining companies (41%). Around half the respondents indicated they would like to know more about the industry. They were most interested in broad factual information about what was being mined and where, and what environmental management steps were being taken. The conclusion was that while many respondents were interested in finding out more about the industry, they did not actively seek this information and did not necessarily use the most credible information sources regularly.

ESD and fisheries sustainability

As mentioned earlier, there are concerns about the sustainability of some wild-catch fisheries. For example, the latest status report for Commonwealth-managed fisheries indicates that 11 species caught in these fisheries are currently over-fished (Caton 2002). The Australian Fisheries Management Authority (AFMA) has announced that it has active recovery strategies in place for the 11 over-fished species and has suggested that Australia has a good record in sustainably managing its fish resources (AFMA media release, 30 September 2002). The status report, however, points out that there is a poor international record of recovery once a fish stock becomes

overfished. This emphasises the need to continue to monitor closely the sustainability of these fisheries from an ecological viewpoint.

One of the aims of this project was to discuss how to relate social survey findings to fisheries ESD frameworks and this section discusses some relevant issues in making these links. ESD also requires social and economic sustainability to be considered as well as ecological sustainability. It should be noted that the fishing industry is moving towards a 'triple bottom line' approach to ESD, and is funding other social research related to fisheries (Neal, pers. comm. 2003). An example of applying social data to improve understanding of the social aspects of Australian fisheries is the recently produced *Marine matters: atlas of marine activities and coastal communities in Australia's South East Region* (Larcombe et al. 2002).

ESD and fisheries assessment

The Commonwealth Government released a *National Strategy for Ecologically Sustainable Development* in 1992, following an extended deliberation process involving nine working groups (Commonwealth of Australia 1992). The strategy defines ESD as:

> 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.
>
> (Commonwealth of Australia 1992: 6).

Since the strategy's release, references to ESD and the need to adopt ESD principles have been included in many pieces of State and Commonwealth legislation, including fisheries management legislation. Chesson & Clayton (1998) propose a framework for assessing the sustainability of fisheries, using a form of multi-criterion analysis. While their framework was developed mainly to assess commercial fisheries (where sustainability concerns have generally been most acute), it can also be applied to recreational and traditional fisheries. The framework includes two main components, an 'effects on humans' component and an 'effects on the environment' component. The 'effects on humans' component is subdivided as shown in Figure 1.

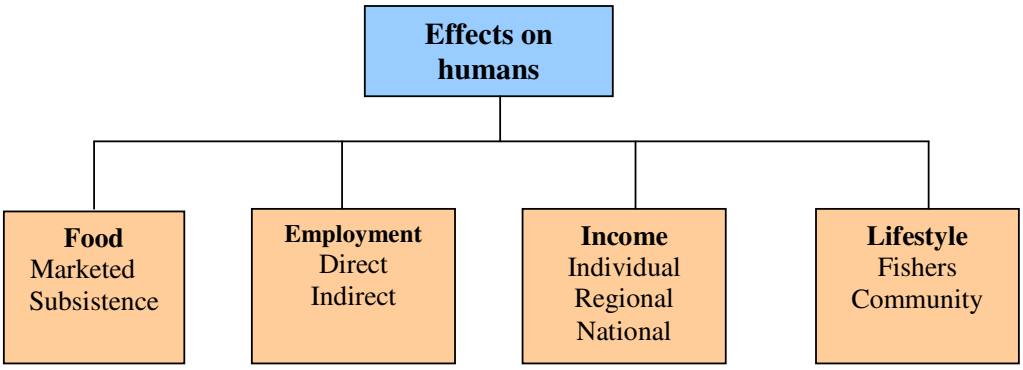

Figure 1 The 'effects on humans' component of the ESD framework developed by Chesson & Clayton (1998)

Applying the framework for a particular fishery requires obtaining measures or indicators of each of the components. The amount of fish marketed from a commercial fishery can be obtained directly from records of landed catches. Recreational and traditional fishing catches may require purpose-designed surveys of catches made by these kinds of fishers operating in the fishery. Direct employment in the commercial side of the fishery can be obtained from records of numbers of boats and their crew, but estimating indirect employment in the commercial side, or indirect employment related to recreational or traditional fishing, is complex. The same applies to income from these sources. It requires better knowledge of the numbers of recreational and traditional fishers, and the types and amount of boats, gear, bait, tackle etc. they use. All these employment and income measures also need to consider multiplier effects, including indirect effects on other sectors like tourism.

The most complex component is perhaps the lifestyle component. In an example of applying the framework to the South East Fishery, Chesson & Clayton (1998) use the number of boats operating in the commercial side of the fishery as a 'crude indication' of the status of the lifestyle component. This is an area where more detailed social survey work examining attitudes and values of fishers and non-fishers could clearly make a contribution to assessing sustainability of particular fisheries.

A subsequent publication provides a 'how to' guide for applying the ESD framework to wild capture fisheries (Fletcher et al. 2002), and proposes a 'component tree' for estimating the contribution a fishery makes to national wellbeing (p.49). Included in the social branch of this tree are items dealing with attitudes to the fishery such as 'existence values' and 'contribution to cultural values'. Measures of these items could be derived from community-based social surveys like the one reported here, but it is not clear how measures could be derived for specific wild-catch fisheries from surveys with a national and industry-wide scope like this one.

Eco-labelling

Eco-labelling is designed to provide consumers with information about the sustainability of the commercial fishery from which particular seafood products are

obtained. Use of the label gives consumers the opportunity to make purchasing choices based on sustainability considerations, and provides market-based incentives for more sustainable fisheries. The Marine Stewardship Council (MSC) was formed in 1996 as part of an initiative by the World Wide Fund for Nature and the Unilever Company to promote sustainable fisheries and develop worldwide eco-labelling of seafood products (Wessells, Johnston & Holger 1999). As these authors point out, the success of eco-labelling is critically dependent on consumers being aware of and recognising the label. It requires a major communication and marketing campaign to promote the label and foster awareness of the link between seafood purchasing decisions and sustainable fisheries. The MSC standard is based on three principles:

Principle 1 The condition of the fish stock
Principle 2 The impact of the fishery of the marine ecosystem
Principle 3 The fishery management system.

(MSC 2002).

The first Australian fishery to achieve MSC certification was the Western Australian rock lobster fishery.

Need

Without baseline understanding of public perceptions of the industry, industry plans, strategies, and communication and extension activities cannot take into account existing public concerns or knowledge levels. Industry documents, websites, conferences and other communication activities cannot be couched in 'user-friendly' language or address the public's priority issues. To be responsive to public interests and concerns, the industry must have basic information about them. To effectively inform, educate and communicate with the public, the industry needs an understanding of what the public currently knows and whether this knowledge is accurate and up-to-date. The industry also needs to know where the public obtains its information so it can target its communication strategies into appropriate communication channels and use appropriate media. Not only this, but the industry needs to find out whether specific 'market segments' can be identified among the public in terms of perceptions and concerns about industry and its practices. If these segments exist, it may indicate a need for purpose-designed communication and marketing strategies aimed at particular segments.

There may be substantial public interest and concern about the sustainability of fishing practices. Questions to test these concerns and their basis are included in the research reported here. Public concerns may be based on inaccurate or selective information (for example relating to only a small part of one industry sector or one type of fishing method), indicating the need for specific, accurate information about these areas of concern and for them to be placed in perspective. The public may lack the information to place issues in perspective in relation to the industry as a whole. Alternatively, public concern about some issues (for example by-catch, discarding at sea, catch levels for particular species), may suggest a real need for industry to direct more effort into improving its practices and communicating these efforts to the public. Questions asked in this project address these issues.

Fishing is a significant natural resource use in Australia, and of interest in its own right in comparison with other natural resource uses. Studies of the social aspects of fishing cover a range of interest areas in natural resource and environmental sociology. Current topics of interest include: the relationship of fishing attitudes, values and behaviour to their environmental counterparts; gender differences; views about Indigenous rights and traditional uses of natural resources in westernised nations; government's role in fisheries' management and in managing common property resources; and community views about fishing industry sustainability and links to sustainability indicators.

Objectives

The overall objective of the study was to conduct a survey of general public perceptions of the fishing industry. More specific objectives were to:

1. Conduct focus groups with selected sub-groups of the Australian public to serve as a basis for developing a structured survey instrument

2. Develop the survey instrument in discussion with the advisory group, conduct a pilot, and administer the survey to a statistically representative sample of the Australian adult population

3. Identify the implications of the survey findings for industry communication, education and marketing activities

4. Identify the implications of survey findings for ESD monitoring and reporting frameworks

5. In discussion with the advisory group, develop options and strategies for addressing negative perceptions of the industry

6. Communicate overall survey results to stakeholders in a meaningful and useful form.

Methods

Literature search
A search was conducted to identify related surveys done in Australia or overseas, and other background material. This was used to inform survey design and survey instrument development. The techniques used for the literature review were: library catalogue searches (National Library of Australia, Australian National University, Environment Australia, Agriculture, Fisheries and Forestry – Australia); searches of databases covering the natural resources and fisheries areas; enquiries to professional colleagues in universities, government agencies and the fishing industry; and Internet searches using relevant keywords. Results of the search have been incorporated in the **Background** section, and are referred to elsewhere in the report where appropriate.

Focus groups
Focus group discussions are a qualitative research technique intended to provide general insights into people's attitudes, perceptions, behaviour, knowledge and knowledge sources not statistically generalisable or quantifiable findings (Morgan 1988). They are used for the following purposes:

- orienting the researcher to a new field
- generating hypotheses based on informants' insights
- evaluating different research sites or study populations
- developing interview schedules and questionnaires
- getting participants' interpretations of results from earlier studies.

(Morgan 1988, 11)

In this study, they served mainly to help orient the researchers to new subject matter, and to develop the survey questions and appropriate categories for responses. They also provided invaluable insights to help interpret survey findings.

While there are always practical constraints on the number and size of focus groups, it is generally agreed that each group should include between six and ten participants (Morgan 1988). In this study, it was specified that each contain at least eight participants. Having a reasonably large group helps ensure that discussions flow readily and that they are productive even if some participants make little contribution.

Seven focus groups were conducted as specified in the original project proposal and content analysis was undertaken to examine language used, themes, knowledge levels and main points emerging from discussions. In this sense the content analysis consisted of summarising the content of responses to each question asked (see **Appendix 3**), and briefly reporting results question by question. In the interests of brevity, responses only to those questions that proved most relevant to the structured survey and to interpreting its findings have been reported here.

Focus groups were stratified on the basis of gender, occupation, and location as shown in Table 1. We also specified that across the seven groups, a minimum of nine

participants should fall into each of the age brackets 18–24, 25–34, 35–44, 45–54, and 55 years and older. This was to ensure a range of ages across the groups overall. Stratifying focus groups is a form of dimensional sampling consistent with grounded theory in social science (Strauss & Corbin 1990). The aim of dimensional sampling is to maximise diversity among research participants to improve chances of identifying important cross-cutting themes, processes or issues that affect a range of people in the larger population from which participants are drawn. In this case the larger population was the Australian adult population aged eighteen years or over.

A private sector social research firm (Colmar Brunton Social Research) assisted in organising and moderating the group discussions. On the basis of BRS specifications, Colmar Brunton recruited participants, in the locations selected, from panel lists containing names, contact details and information on personal characteristics of people willing to participate in these kinds of group discussions. Participants were paid a small fee ('incentive') to cover their time and costs of participating. Where private homes were used as venues, the host or hostess was paid a fee to cover use of their home and for providing refreshments. These are standard practices in the Australian social and market research industry. The researchers developed a discussion guide for the focus groups in consultation with the project's advisory group and Colmar Brunton staff, and it is included as **Appendix 3**.

The principal researcher attended the focus group discussions as an observer and took notes. All discussions were either tape-recorded or video-taped for further analysis. Some self-selection bias may occur among focus group participants. Potential participants may be told the topic of the discussion beforehand if they ask about this, and are probably more likely to attend if the topic interests them. This tendency may be counteracted to some extent by offering them a financial incentive to attend, as was done in this case.

Structured survey

Survey development

Based on findings from the focus groups, the intended scope of the research, and questions used in similar surveys, a survey instrument was developed and circulated to the advisory group for comment. The survey was administered as a Computer Assisted Telephone Interview (CATI) for reasons of speed, efficiency and economy. Colmar Brunton Social Research was also commissioned to undertake the telephone interviews after comparative quotations and details of relevant experience were assessed. The Principal Researcher and Associate Researcher held two meetings with Colmar Brunton staff to discuss survey details and finalise the survey questions. The Associate Researcher also attended an interviewer briefing session on 11 September 2002. A pilot study with 16 community members and government staff was also conducted before the CATI survey began. In addition, Colmar Brunton treated the first 20 telephone interviews in the CATI survey as a pilot. For these pilot interviews, interviewers gathered feedback from respondents about the survey itself, after they had completed it. Respondents were asked:

- how did you feel about the survey overall?
- which questions, if any, were difficult to answer?
- which questions, if any, made you feel uncomfortable?

These processes provided important feedback and resulted in some minor changes to survey questions. The final survey instrument, modified for use as a telephone interview, appears as **Appendix 4**.

Sampling

The target population for the survey was the Australian adult population aged 18 years and over. The Australian electronic white pages telephone directory was used as the sampling frame. This is justified on the basis that a very high proportion of Australian households have at least one listed telephone number. Telephone numbers were randomly sampled from the electronic white pages using *Marketing Pro* software. This software contains all white pages information on CD-ROM and is updated annually. The sample was drawn from this disk and sorted into ascending numbers to enable duplicates to be removed. Quotas were set for all States and Territories, based on the desired final sample size of 1,000 and the need to increase numbers of responses from people in non-metropolitan areas to allow some regional analysis. (This leads to a corresponding need to weight results after sampling is completed.) When telephoning households, the interviewer asked the person initially answering the call to identify the person in the household whose birthday was last, and this person was asked to complete the interview (the 'last birthday' method). This method helps to avoid respondent bias and ensure a more representative sample.

Appendix 5 provides further technical details about the methods used and results obtained.

Results/discussion

Focus groups

Group details

A total of 63 people participated in the focus groups (Table 1). Group discussions ran for approximately two hours.

Table 1 Details of focus group discussions

Group number and location	Date conducted	No. of participants	Participants' characteristics
1 Albury, NSW	26 Nov. 2001	10	Women, home duties
2 Melbourne, Vic.	27 Nov. 2001	8	Women, community services sector
3 Sydney, NSW	29 Nov. 2001	8	Men, wholesale and retail sectors
4 Toowoomba, Qld	30 Nov. 2001	9	Mixed gender, full-time students
5 Adelaide, SA	12 Dec. 2001	9	Mixed gender, unemployed
6 Launceston, Tas.	13 Dec. 2001	10	Mixed gender, retirees
7 Perth, WA	13 Dec. 2001	9	Men, manufacturing sector

Group profiles and discussion summaries

Group 1 — Albury, NSW

This was a group of women mainly in the 35–44 year age bracket, with a few older members. They had a range of levels of formal education, and the majority had children at school. Their discussion showed considerable personal knowledge and experience of recreational fishing, particularly in the rivers of the Murray-Darling Basin during school holidays. Catching eels and redfin were mentioned. One member of the group had experience with barramundi fishing in the NT and another in rivers and lakes in the Australian Alps. Their view of recreational fishing was mainly positive, 'it's wonderful', 'the kids loved it', and 'it's so relaxing if you don't have your kids'. But there were also comments that 'it's generally a man thing', one member considered recreational fishing to be 'intrinsically cruel', and there was discussion about safety issues with boating. There was awareness of controls on recreational fishing, but a view that 'people break the rules and get away with it'.

They generally viewed commercial fishing in a negative light, comments including 'they're greedy', 'it is pillaging the seas', and that 'in 100 years there will hardly be anything left'. They also discussed the issue of dolphins being caught in fishing nets. Their view of aquaculture was mainly positive, one member saying 'I think all fishing should be farmed', and another 'it's very natural, no poisons'. These women had personal experience with aquaculture, mentioning visits to trout, silver perch and oyster farms.

Their views of traditional fishing were also generally positive – 'they only take what they need, unlike us', and 'I hate to think they would be restricted'. However, there were reservations about use of non-traditional techniques, and 'if they're living off the land, living Koori culture, it's OK', and adverse comments about 'one rule for them, one for us', although they were not clear about what special fishing privileges Aboriginal people had.

There was consensus in the group about the need for better monitoring of commercial and recreational fishing in particular, and the need for better information and education — 'start young, it's amazing what kids remember'. They had learnt very little themselves about the industry at school. Their main sources of information were television, word of mouth and their kids. They considered television to be a reliable information source as well as government, researchers and research publications. They admitted they wouldn't actively seek information about the industry but did watch relevant television documentaries such as 'Blue Planet'.

In relation to seafood consumption, one group member did not eat fish but still went recreational fishing. Seafood they mentioned included oysters, prawns, tuna, flake, calamari, fish fingers, sushi and yabbies. One member wouldn't buy sushi from Sydney because of concern about pollution, and another only ate flake from Victorian waters because she thought mercury levels were too high elsewhere. They were aware of the health benefits of seafood in providing Omega 3 fatty oils and calcium. They also mentioned a range of other products from the seafood industry including fertilisers, fish oils, shells, seaweed, pearls and cuttlefish.

When asked to rate their level of knowledge about the fishing industry on a scale of 1 to 10, this group's average was 2.2. The similar score for their interest level was 4.5.

Group 2 — Melbourne, Victoria

This was a group of mainly younger women in the 18–24 and 25–34 year age brackets, with secondary level education. Several had personal experience with recreational fishing. One member had experience with recreational fishing in Fiji on holiday. Another mentioned fishing as a child and catching nothing but carp in the Darling River. Another went yabbying on her in-laws' property near Nhil, and another had been crabbing at Sorrento but disliked seeing crabs being cooked. They viewed the killing as a negative aspect of recreational fishing. Generally they thought recreational fishing was relaxing, although one said 'a lot of it doesn't appeal, but you can just relax and take it all in'. Socialising with family members was also seen as positive aspect of recreational fishing. They viewed the sustainability of recreational fishing as being better than that of commercial, partly because recreational fishers only fished occasionally.

They admitted to knowing little about the industry as a whole, but were aware of issues of illegal fishing by foreign vessels in Australian waters, and the need for control and monitoring of commercial fishing. One member was aware of spot checks being made on fishing vessels and their catches. They were concerned about the sustainability of commercial fishing — 'it's a worry', and about poaching by foreign

vessels, ‘we don’t have a Coastguard to keep other fishers out; they only catch the occasional one’.

When asked about aquaculture they mentioned pearls, yabbies and shellfish as being farmed, and generally thought farming was ‘a good thing’. One member thought that aquaculture could ‘upset the ecology of the oceans’.

They viewed traditional fishing positively, ‘we’re happy with what they do, they’re not fishing for profit’, and ‘Aboriginal fishing is not that sophisticated’. Traditional fishing was also seen as being sustainable because people only took what they needed and ‘were not into exporting’.

Their information sources included the media (particularly TV fishing personality, Rex Hunt), and ‘the fish and wildlife people’. Some members had researched fishing issues on the Internet for their children. There was a view that the public doesn’t get the truth from the media, only sensationalised versions. One member viewed people in the industry as a reliable source of information.

In terms of seafood and seafood consumption, one member mentioned that her husband had had a heart attack and as a result they ate a lot of fish for its health benefits. Another member was ‘semi-vegetarian’. Seafood they ate included crays, crabs, sushi (‘the only fish the kids will eat’), farmed yabbies, flake, trout and fish fingers. Several were concerned about the costs of seafood and didn’t understand why it was so expensive, ‘it’s not as if they had to make it’. One member thought high prices were an indication of overfishing. Members were aware of gluts and shortages of seafood — ‘at the Prahran Market, some weeks it’s piled high, other weeks there’s nothing’. Several thought they know little about cooking fish and hadn’t learnt about it at cookery classes they had attended. They thought there would be benefits in having TV cooking programs that provided more information about cooking fish and the benefits of eating it. Information could also be provided in supermarkets and on packaging, they thought. Several members were concerned about seafood freshness and thought there were more risks with seafood than other foods. Their main purchase places were the market, fish shops and supermarkets. In terms of food choices, their view was that ‘the family comes first’.

Their average rating (out of 10) of their level of knowledge about the industry was 1.5, and their level of interest was 3.1.

Group 3 — Sydney, NSW

This was a group of men in the 45–54 and 55+ age brackets. Several were very knowledgeable and experienced recreational fishers themselves. Some had relatives or friends who were keen recreational fishers. Benefits of recreational fishing included ‘getting away from the wife’, ‘it’s fresh and healthy’, and ‘it’s a good thing to pass on from generation to generation’. Other benefits were relaxation and opportunities for family get-togethers. Downsides included the fact that it was very time-consuming, could be expensive, and could be dangerous. Several members mentioned cases of recreational fishers drowning. They also discussed damage to riverbanks as a result of backwash from boats.

Overall, they had pessimistic views about commercial fishing — 'it's been cleaned out with nets, there's nothing left'. One thought 'Governments over a period of time have put measures in place, but too late'. There was a view that 'we must keep foreign vessels out', and 'our fishers are not getting a fair go'. They thought that an Australian coastguard (a topical idea at the time), was a good idea. They discussed 'dolphin-free' tuna and the environmental impacts of large commercial trawl nets and longlines. Some members thought that overfishing was a worldwide problem and other nations had already fished their waters out.

They viewed aquaculture positively, and discussed aquaculture facilities like salmon ponds in Tasmania. Aquaculture was seen as ensuring a reliable supply and relieving pressure on other areas. However, problems with viruses and other diseases among farmed stock were recognised.

Traditional fishing was also viewed positively: 'they don't fish out areas, their catches are not great', and 'it's just for themselves', or 'just enough food for dinner'. They pointed out the differences between Aboriginal people living in country versus city, and one expressed the view that non-Indigenous people were being discriminated against.

The group were aware of other products from the fishing industry like arthritis remedies from shark cartilage, fish oil, whale blubber, cosmetics, pet food and fertilisers.

When discussing seafood purchases, one member commented that 'our fish is very, very expensive for a country with all that ocean'. Personally, they ate seafood like tuna, salmon, oysters, lobsters and prawns, mainly from local fish shops or the local market. Members expressed a preference for fresh local seafood — 'if it's local, it's fresh'.

Their sources of information included personal experience, the media, books and magazines. They specifically mentioned television programs like David Attenborough's nature programs, the recreational fishing program 'A river too far', and Rex Hunt's fishing programs; magazines like *National Geographic* and *Australian Geographic*; and Foxtel television. They thought access to a monthly fishing paper, information provided with fishing licences, and web-pages would be good sources of additional information.

Their average rating for their knowledge level was 3.8, and their interest level was 5.2.

Group 4 — Toowoomba, Qld

This was a group of students from local universities or TAFE colleges, all in the 18–24 year age bracket. All members had been recreational fishing. One was from Fiji and had spent time fishing there. Several had been fishing with their grandfathers; one surf and reef fishing near Fraser Island; another crabbing and fishing in the Clarence River; one off a pier in Brisbane; and another fishing with an uncle near Yamba. There were mixed views about recreational fishing. Positives were that it was free time, holidays, social interaction and relaxing. Negatives were the cruelty, getting sunburnt, that you 'can waste a whole day and walk home with nothing', and that we

may ‘be disrupting the ecosystem’. Safety issues were also mentioned. There were concerns about the sustainability of recreational fishing in some locations, and personal examples were given of fish disappearing from popular fishing spots. The problems of policing a long coastline were recognised.

Commercial fishing was seen as being high impact and driven by the profit motive. Its benefits in terms of food and job creation were recognised, however. It was seen as being less sustainable than recreational fishing. One member commented ‘There’s no way [commercial fishing is sustainable], the world’s population is going to double in the next ten years, all the fish will be gone’. There was a view that there was a need for stricter regulations and harsher penalties for commercial fishers, as well as more attention to monitoring and re-stocking.

Aquaculture was seen as having benefits in that ‘they’re not taking from the environment’, and that there is less wastage and damage done to the environment. However, there were doubts about its long-term effects, un-natural character, use of antibiotics, and possibly ‘playing God with species’. Nonetheless, it was seen as ‘the way of the future’.

Traditional fishing was seen as having low impact and being culturally appropriate. Members thought it was only for subsistence and there was little waste. They thought it sustainable as long as monitored.

Seafood that group members ate included prawns, crabs, calamari, lobster and octopus, and they favoured local sources. Two members did not eat seafood at all. Consumption frequencies for those who did eat it were mainly once or twice a month, and they ate it at home, in restaurants, and at the fish-and-chip shop. They mentioned non-food products from the industry such as catfood, oils, emulsions, Chinese medicines, shark cartilage, jewellery and cosmetics.

Members obtained their information mainly from TV and TV documentaries, newspapers, the Internet, personal experience, and from other people. Some members had learnt a little about the industry at school. They were sceptical about information from government, and rated sources like David Attenborough, TV news presenters and researchers as being reliable. Some thought the media were ‘very biased’. They were interested in learning more about matters like: what fish were poisonous; the effects of commercial fishing on other species like dolphins; how numbers of commercial species had decreased and what species were endangered; and how much commercial fishers were allowed to take.

Their average knowledge rating was 4.8 and average interest level 3.7.

Group 5 — Adelaide, SA

This group consisted of unemployed men and women with a range of ages. The majority had no more than secondary educational attainments. They had all been recreational fishing and some went fishing very regularly. Examples of their fishing were catching squid with potato baits; fishing near the warm-water outlet of the local power station; fishing off local jetties once or twice a week; catching flathead at Onkaparinga Beach; and going ‘community’ fishing off Glenelg Jetty. The positives of recreational fishing for them included: being outdoors, the peacefulness of being by

the water; ‘the six-pack’; and being able to see what you want when spearfishing. Problems with discarded fishing lines and other rubbish left by recreational fishers were discussed. They also mentioned cases of recreational fishers taking undersized fish or crabs and ignoring catch limits. One group member had been fined for taking undersized crabs. However, they viewed government as being slack and not having enough staff to police the regulations effectively.

They acknowledged the benefits of commercial fishing in terms of exports, jobs and money, but also considered it was ‘stripping the waters’. There was a view in the group that export markets dictate seafood prices, and Australians pay higher prices as a result. They also thought that the costs of fish that are caught, killed and discarded are not publicised, and also mentioned that commercial fishers accidentally catch many seabirds.

Benefits of aquaculture were identified as: a guaranteed supply; the possibility of improving stocks; faster growth rates and the ability to use hormones; that farmed stock can be released into the wild to re-stock areas; and that aquaculture should cost less once set up. However, the possible problems that use of hormones may produce ‘superfish’, and possible loss of jobs in the wild-catch sector, were acknowledged. So also was possible pollution and ecological damage from fish farms — it ‘clogs up the bottom with crap, they have to move it around’. They thought that aquaculture has been set up partly because commercial fishing is unsustainable and that ‘the oceans can’t sustain the fishing effort’.

Traditional fishing was considered mainly positively, and the skill of traditional fishers was acknowledged. One member thought that traditional fishing had come close to causing extinctions (an example of a turtle species was cited), and there was consensus that those Indigenous people ‘who have lost their heritage should be treated like us’. Members thought that traditional fishing had ‘the potential to do damage’ although in general ‘they don’t take much’.

Main sources of information about the industry were newspapers, media and the Internet. Television fishing personalities like Rex Hunt and Keith Martin were mentioned. Personal experience and word of mouth was an important source of knowledge for most members. Several members had read information at jetties and received booklets from tackle shops. Some had also been exposed to relevant information at school but they considered not enough was taught about Australian issues at school. There was some scepticism about the reliability of the media, and one member considered science journals the most reliable source. Members thought that they would like to know ‘the truth’ about the industry, and mistrusted government information about it. They also thought it was hard to get information from government – ‘you’ve got Buckley’s; they put you through to six different people and then cut you off’. Several members expressed interest in finding out how much was spent on fisheries research and development, and how much of the money that industry earned came back to support research.

Seafood that members ate included crayfish, prawns, squid, calamari and Moreton Bay bugs. One member never ate seafood, but some others ate it as frequently as three times a week. They generally ate it for the taste but also thought there were pollution

problems with some seafood. Other non-food products they were aware of included fertilisers, cosmetics, catfood, caviar, glue, shells and ink.

Average knowledge rating for the group was 1.7, and average interest rating 5.2.

Group 6 — Launceston, Tas.

This group was a group of retirees at a retirement village, including both men and women. They were all aged more than 55. Most had been recreational fishing when younger and some still fished. One member had been an expert recreational fisher when younger, and another had come from King Island where fishing was a livelihood for some residents. A further member had travelled very widely and was familiar with fishing in the North Sea, while another had a daughter who ran a seafood restaurant in Darwin. Fish they had caught locally included king flathead, gummy shark and conger eels. One member born in the UK had 'tickled trout'. The local wharf was a popular fishing spot for those who still fished. Recreational fishing was viewed favourably because of the opportunity it provided to get away by yourself, forget about everything else and relax. Recreational fishing spots were thought to be very accessible in Tasmania. Generally they considered recreational fishing was sustainable as long as rules were in place and were obeyed.

This group talked a good deal about fish poaching and recent local examples of commercial fishing vessels coming across from Victoria to fish in Tasmanian waters. There were also concerns about Japanese and Indonesian fishing vessels fishing in Australian waters. Members were aware of disputes between other commercial fishing nations such as had occurred between Iceland and England in the North Sea. One member commented on the collapse of North Sea fisheries and that 'when Billingsgate closed down, all that was left was a terrible smell'. The dangers of commercial fishing were discussed, including the recent sinking of a local fishing boat. Longline fishing and use of drift nets were regarded with disfavour — 'they catch everything'. Members thought that some commercial fishers made very good money and they were worried that 'we're going to overdo it', although their views were quite moderate.

They knew of a number of local aquaculture ventures in the Tamar, Huon and Derwent Rivers and were generally positive about aquaculture. Members thought there were strict rules and guidelines for it. However, there had been complaints about some local ventures and the way they detracted from people's views of the Tamar River. The possible disease problems in farmed stocks, for example oysters, were mentioned. The advantages of aquaculture in generating employment in Tasmania were acknowledged, and its possible benefits in re-stocking waters.

The group knew little about traditional fishing but the comment was made that 'they're responsible enough and they only get what they want to eat'. One group member thought Aboriginal people would not have anywhere to store fish they could not eat straight away.

This group's main sources of information were the media, including TV and newspapers, and the fisheries department. They mentioned TV programs with Rex Hunt and Malcolm Douglas, who fished for barramundi in the Darwin area and tried

to promote responsible fishing in his program. They had learnt very little about fishing in school but much from parents, grandparents and mates. They thought that the fisheries department, the Internet or libraries were good sources of reliable information.

This group mentioned a wide range of seafood they ate, including crayfish, prawns, barramundi, shrimp, Moreton Bay bugs, crabs, scallops, coral trout, flathead and flounder. One member of this group liked fishing but wouldn't eat the fish because of his distaste about cleaning them. There was only one local fish market members were aware of, and most bought fish at the supermarket. There was also a view in this group that the best seafood was exported and 'we don't get much'. One member ate fish every day, but most of the others tended to eat it once or twice a week. Other non-food products they knew about included shark oil, cod liver oil, green-lipped mussels as an arthritis remedy, fish skin for handbags and shoes, and pearls.

The group's average rating for knowledge level was 1.7, and interest level 5.0.

Group 7 — Perth, WA

This was a group of men mainly in the 35–44 and 45–54 age brackets. The group contained a number of experienced recreational fishers who had very strong views about conflicts between the commercial (the 'professionals' or 'pros') and recreational sectors. Much of the discussion focused on unfair targeting of recreational fishers when commercial fishers were really at fault for overfishing. The group expressed strongly negative attitudes about commercial fishing and what they saw as being its wasteful practices in discarding unwanted catches. A number of members considered commercial fishing practices to be indiscriminate — 'continental fishing brings up everything'. Some commercial fishing was seen as being a short-term money-making venture with little concern for the future. Members discussed overseas examples of fisheries collapses and fishers in the UK 'being paid to stay at home'. However, they thought that some of their State Government's regulatory changes, as in the case of crayfish, had worked and stocks were recovering. There was agreement that government needed to control numbers of commercial licences and cut quotas. But some members also thought it difficult for government to make large enough changes because of the economic significance of some commercial species. The need for State and Commonwealth Government to coordinate their efforts in protecting the coastline was discussed, and the possible role of a Coastguard in protecting Australia's 200–mile limit was supported.

One member believed recreational fishing was the most popular sport in Australia. There was much discussion about the problems of policing recreational catches — in the view of one member, bag limits were not policed and some areas that were popular recreational fishing spots twenty years ago were now fished out. He thought there was not 'much left in the metropolitan area'. Another member had been stopped three times on a fishing trip to have his catch checked. Another claimed to have had his catch checked 'thousands of times' and that surveys had been done on his boat. Several considered that the restrictions 'need to be on the professional side of things', and the recreational catch was insignificant. There was a view that recreational fishing was 'a primal thing from hunter–gatherer days' and was sustainable as long as bag

and size limits stayed in place. Members also discussed the importance of recreational fishing to tourism in WA and its spin off benefits to other sectors.

Several examples of aquaculture were cited — for example abalone farming at Augusta and an attempt at yabby–farming at Gin Gin. The failure of the yabby–farming venture was blamed on government. One member had been to an aquaculture operation near Pemberton where you could pay to catch trout. A positive of aquaculture was seen as the possibility of re-stocking waters. There was also the possibility that if the commercial supply came from aquaculture the natural stocks could be left for recreational fishers. Members discussed genetic engineering and the case of a gene from a tomato being used to increase the growth rate of a fish.

In relation to traditional fishing, there was a strong view that 'there should be one law for everybody' and that Indigenous fishers shouldn't have any special privileges. A case of an Indigenous man 'getting off' a fishing charge by using Indigenous law was cited with disapproval. However, there was a general view that traditional fishing was nomadic and so usually did not have a great impact in any one place.

Their main sources of knowledge were other people, 'especially the locals when you go fishing', and 'mates at ramps'. They watched a number of TV programs such as 'Just add water' and Rex Hunt's programs. They had received brochures from the fisheries department, and these brochures were also widely available at bait and tackle shops. One member obtained information from a fishing club newsletter and another received a regular newsheet from the fisheries department in the mail. However, they were sceptical about the reliability of most of these information sources.

Group members ate a range of seafood including prawns, mussels and abalone. Only two members of the group bought seafood themselves — they generally thought it was too expensive. They expressed resentment at its cost, for example 'dewfish at $30 per kilo', and thought this put it out of the range of most average families. There was also concern about the freshness of fish at fish shops. They considered that the best crayfish were being exported because Australians were not willing to pay enough for them. They were aware of a range of other industry products such as fish fertilisers, pet food, oils, and medicines.

This group's average rating for their knowledge level was 5.6, and interest level 6.1.

Overall summary of focus groups

The focus group discussions showed considerable community knowledge about recreational and commercial fishing, and suggested relatively high levels of participation in recreational fishing, particularly in South Australia and Western Australia. The majority of group members who were knowledgeable about recreational fishing were men, although many women participated in recreational fishing with other family members. Recreational fishing was generally viewed positively and thought of as being sustainable, although many group members were aware of problems with policing regulations and knew examples of the rules being flouted. A small minority disliked recreational fishing and some viewed it as cruel. There was widespread awareness of television fishing shows and nature programs dealing with the marine environment. Competition between commercial and

recreational sectors was a major topic of conversation for one group, and there was strongly expressed support for recreational fishing as opposed to commercial in this group. Safety issues in recreational fishing were a common topic of conversation.

Views about commercial fishing were generally negative, with widespread pessimism about the future of wild-catch fisheries. With the exception of the Western Australian group, much of what group members knew about commercial fishing came from the media. The younger groups tended to express more concerns about environmental issues associated with fishing, particularly commercial fishing. Issues associated with by-catch and discarding were mentioned by many of the groups, although their knowledge of these issues was mainly indirect. There was concern about overseas vessels fishing in Australian waters, and awareness of issues Australia faces in protecting its coastline and policing fishing regulations. There was a fairly widespread opinion that the profit motive dominates commercial fishing. Government's ability to effectively manage and ensure the sustainability of commercial wild-catch fishing was viewed with considerable scepticism particularly in light of knowledge of fisheries collapses overseas.

The traditional sector was viewed mainly positively, with a widespread view that because it is only for subsistence it does not do much harm and is sustainable. However, there was a common view that only Indigenous people who are adhering to their traditional culture should have special rights and privileges that other Australians do not have, and a minority view that no section of the population should have special rights or privileges denied to other sections. There was very little if any direct personal knowledge of traditional fishing among group members.

Participants had a good deal of general knowledge about aquaculture, and many knew of local examples. Aquaculture was generally viewed favourably as the 'way of the future' — providing more reliable supplies, possibly cheaper, having fewer environmental problems, generating employment, and having the advantages of being able to re-stock depleted areas. There was recognition of pollution and disease issues, and concerns about use of hormones or possible genetic engineering. One group discussed aesthetic issues around siting of local facilities.

The most important source of information was the mass media, particularly television. For recreational fishers, family and friends were a main source of local information. Fisheries departments were recognised by recreational fishers as sources of information about species and catch limits. However, there was a good deal of scepticism about most sources of information, although researchers were often recognised as being credible. Most groups rated their interest in obtaining further information more highly than their current knowledge levels, generally rated as relatively low. The group of students from Toowoomba were the only group who indicated they weren't very interested in finding out more about the fishing industry — this was partly because of the pressure on them to further their formal studies.

A large majority of group members ate seafood, although there was a small percentage of vegetarians, semi-vegetarians, or those who found seafood distasteful. Consumption frequency was very variable, and there were some difficulties in obtaining fresh seafood and concerns expressed about freshness or quality. The main place seafood was purchased tended to be the supermarket, although keen recreational

fishers might not buy much seafood at all. There was resentment about how expensive fresh fish was and perceptions that export prices drive the fresh seafood market with the result that many locals can't afford it. The health benefits of seafood were well-recognised. Younger women expressed some lack of confidence in knowing how to cook seafood. When prompted, most group members were aware of a range of non-food products that come from the industry as well as seafood itself.

Structured survey findings

The CATI survey was conducted between 11 and 25 September 2002. On average it took 17.5 mins to complete. A total of 1,004 interviews were completed. Table 2 shows the sample size achieved from each State or Territory based on the quotas set.

Table 2 Sample size by State and Territory

State/Territory	Completed sample (n)	Margin of error
New South Wales	151	+/- 8.0%
Queensland	150	+/- 8.0%
Victoria	150	+/- 8.0%
South Australia	150	+/- 8.0%
Western Australia	153	+/- 8.0%
Tasmania	100	+/- 9.9%
ACT	75	+/- 11.5%
Northern Territory	75	+/- 11.5%
TOTAL	**1004**	**+/- 3.1%**

Using State/Territory quotas made it necessary for sample results to be weighted to ensure results were representative of the overall population. To reflect the population distribution, results were post-weighted to ABS Census data on:

- gender
- location (State/Territory)
- location (capital city/rest of State/Territory).

The sample was verified against ABS Census data on age and income. The verification suggests that the sample closely reflects the general population in age, but has some skew away from the youngest and oldest age groups. The verification also suggests that the sample is skewed towards higher income members of the general public. This income skew is a common feature of general population CATI surveys. There were a small number of statistically significant relationships between income and variables included in the CATI survey, but the size of these relationships was very small.

A possible concern about the representativeness of the survey sample relates to its possible over-representation of recreational fishers. Because the survey, like all CATI surveys, required voluntary cooperation to complete a telephone interview, it is likely that recreational fishers (who have an interest in the subject and possibly a desire to influence survey outcomes), were more willing to complete the interview than non-

recreational fishers. Very frequent recreational fishers in particular are likely to have a keen interest in the subject of the survey. Because commercial fishers are a very small proportion of the population, similar concerns for them are less significant than for recreational fishers. On thebasis of previous surveys and estimates we have reason to believe that around 25─30% of the population goes fishing for recreation at least once a year, so their potential to influence survey results is substantial (Dovers 1992, 1994; Recfish 2001; Larcombe et al. 2002). This complication is discussed further in relation to particular questions where the influence of this variable (recreational versus non-recreational fisher) was significant. However, it did not appear to be significant for the majority of survey questions.

Data analysis

Findings in this report have been presented so they can be interpreted without understanding the statistical methods used. However, for those who are interested to know how the analyses were conducted, a brief explanation follows.

Statistical analysis included in this report consists of descriptive statistics, non-parametric chi-square tests, the sign test for two related samples and binary logistic regression. All statistical analyses used the Statistical Package for the Social Sciences (SPSS).

Kruskal–Wallis chi-square tests were used to determine the presence of significant differences across continuous variables for two or more independent groups. For example, the Kruskal–Wallis chi-square was used to determine if there was a significant difference on the frequency of seafood consumption between recreational and non-recreational fishers. While the t-test is considered a more powerful test of these differences, its use can be problematic where the continuous variables are not normally distributed for each of the test populations. Initial screening of the survey data suggested that the continuous variables tested were substantially non-normal thus the Kruskal-Wallis chi-square test was used [Munro (1993) provided a good overview of the advantages and disadvantages of parametric and non-parametric analyses]. The value of the chi-square statistic or χ^2 indicates the strength of the difference between groups on a given variable, with a higher value indicating a larger difference. The Pearson chi-square test was used to determine the presence of differences across ordinal or binomial data for two or more independent groups. For example, the Pearson chi-square test was used to determine if there was significant differences across gender on the perceived sustainability of various sectors of the fishing industry.

Sign tests for two related samples were used to explore the extent of differences between the perceived sustainability of various sectors of the fishing industry. For example, the sign test was used to see if respondents' rating of sustainability on a scale of 1-10 was the same for the recreational and indigenous fishing industries. The sign test evaluates and compares the proportion of positive and negative differences between two variables. The Z statistic indicates the strength of difference (either positive or negative).

Binary logistic regression was used to better determine the extent that a number of predictor variables identified by chi-square tests were linked to a binary criterion variable such as 'do you eat seafood?' Variables found to be significant using non-parametric chi-square tests formed the basis of binary logistic regression models.

Binary logistic regression enables predictor variables to be included and evaluated simultaneously. A stepwise method of variable entry was used where only those variables that significantly improve the explanatory power of the model are retained. Binary logistic regression provides a more powerful indication of meaningful relationships than chi-square tests. The Wald statistic provides a measure of the effect of each predictor variable on the criterion variable, with higher scores reflecting a greater effect. The Exp(B) or odds ratio represents the change in the odds of the criterion variable (e.g. someone saying 'yes') given a unit increase in the predictor variable. Odds ratios above one indicate a positive relationship, while ratios below one represent a negative relationship or decreased likelihood of someone responding 'yes'. Overall model fit can be assessed using the Hosmer & Lemeshow goodness of fit test. It is important to note that when assessing overall fit in this way a good fitting model is signified by a high significance value (that is the distribution does not differ significantly from a chi-square distribution). The Nagelkerke pseudo R^2 is also presented as an estimation of the proportion of variance in the criterion variable explained by the model.

A brief discussion of responses to individual questions follows, organised under the categories used in the survey.

Behaviour questions

'Over the last twelve months, how often have you gone fishing for recreation, either in the sea or in rivers, lakes, dams or billabongs?'

Forty-three percent of respondents said they had been fishing for recreation in the past twelve months. Of those who said they had been fishing for recreation, the median frequency was six times a year or approximately once every two months. Almost a quarter of all respondents (23%) said they had fished recreationally more than 20 times over the last twelve months (Figure 2). Participation in recreational fishing was significantly lower in NSW, the ACT and Vic. than in the other States and Territories (see Table 3).

Our percentage of recreational fishers compares with 35% of the non-Indigenous population of the NT being recreational fishers in the Fishcount survey. Our comparable sample percentage for all NT residents aged 18+ was 55%; and 26.1% of the Queensland population (all household members) having been recreational fishing in the past year in the 1999 survey of Queensland households. Our comparable sample percentage for Queensland residents aged 18+ was 51%.

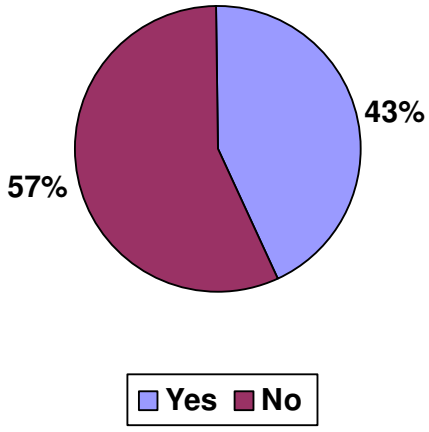

Figure 2 Proportion of respondents who had been fishing for recreation over the last twelve months

'Over the last five years, have you or any members of your immediate family been involved in the commercial sector of the fishing industry, including catching and farming fish, shellfish and other marine or freshwater animals for profit?'

Only a very small minority of respondents (5%) said that they, or their immediate family, had been involved in the commercial fishing sector over the past five years (Figure 3).

Although this is a small percentage, it may be substantially higher than the percentage fitting this category in the Australian adult population as a whole, suggesting over-representation of commercial fishers in our sample. For example, it has been estimated that in the South-East Marine Region overall, less than 1% of the population is directly employed in commercial fishing (Larcombe et al. 2002). This estimate does not of course include members of employees' immediate families who are not employed in the industry, nor does it include involvement over a five year period as asked in our question. However, the high percentage of commercial fishers and their immediate families is particularly striking for our SA respondents, 13% of whom said they fitted this category (see Table 5).

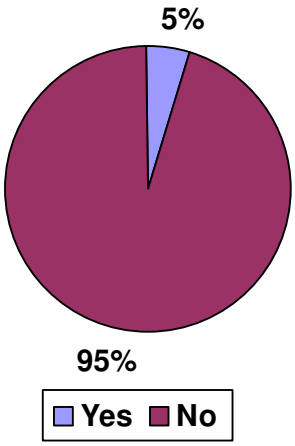

Figure 3 Proportion of respondents involved in the commercial fishing sector over the last five years

'Do you eat seafood?'

A large majority of respondents (95%) said they ate seafood. For those who did, the median frequency of consumption over the last month was five times, or slightly more than once a week (Figure 4). We did not ask for respondents' reasons for eating seafood in the structured survey, although the focus group findings give some insight into people's understanding of the nutritional and other values of seafood.

Our finding that 95% of respondents ate seafood compares with the 93% of respondents who ate seafood in the survey of the WA population reported by the WA Fishing Industry Council. The WA survey focused only on fresh seafood eaten at home and used different categories from ours, so consumption frequencies are not entirely comparable. However, the WA survey found that 28% of respondents ate fresh seafood at home more than once a week; 24% about once a week; 16% about once a fortnight; 16% about once a month; and 12% less than once every two months. The survey conducted for the National Fisheries Institute found average seafood consumption in the US was three times per month (Blackstone 2001), suggesting on the basis of our sample that Australians eat seafood more often than US residents.

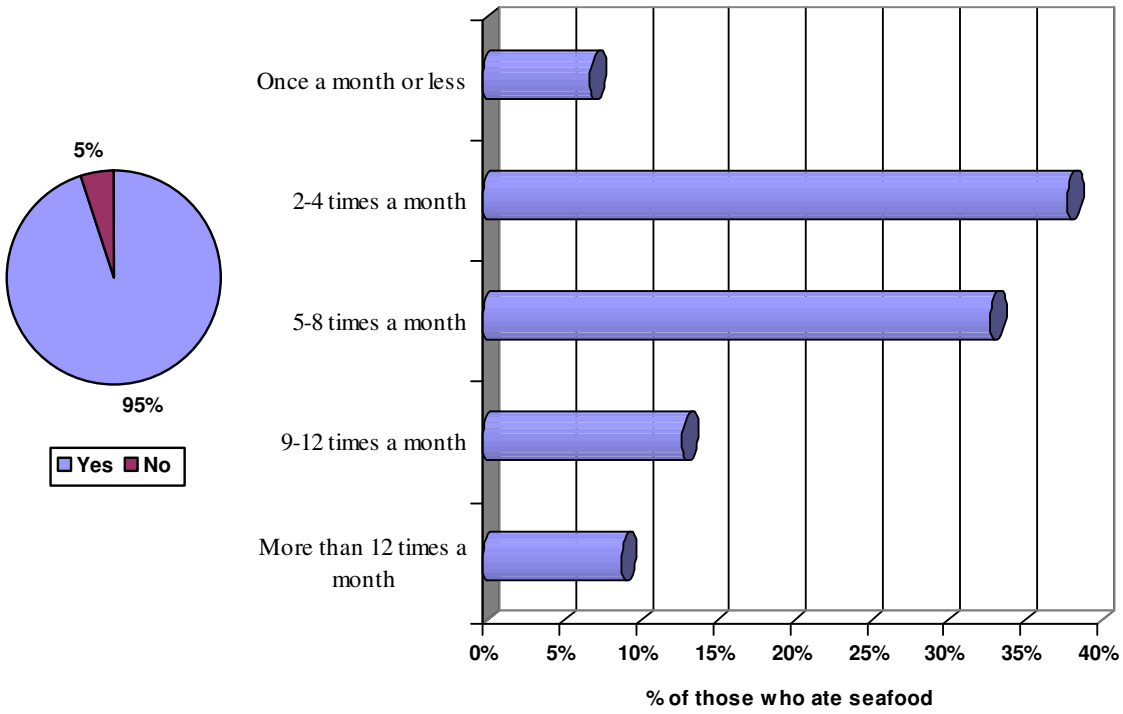

Figure 4 Proportion of respondents who ate seafood, and their frequency of consumption

'What are the main places where you get your seafood?'

Almost half (49%) of all respondents who said they ate seafood reported that the supermarket was the main place they obtained it. Specialist seafood shops (26%) and fresh seafood markets (20%) were also relatively common places of purchase (Figure 5). The results of the WA survey by Hide Consulting are not comparable as they focused only on fresh seafood purchases.

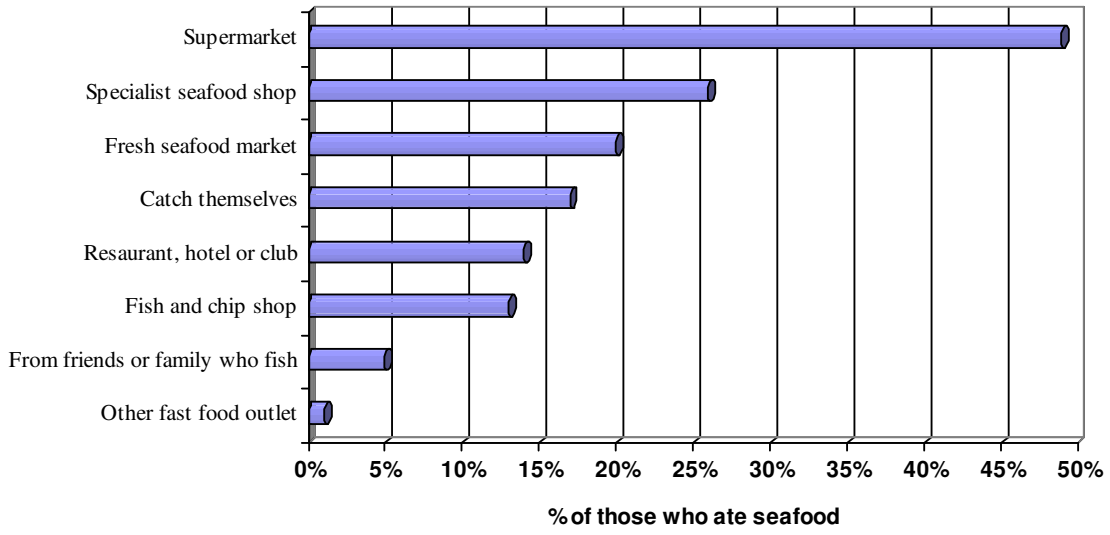

Figure 5 Places where respondents obtained their seafood

'What is the main reason you don't eat seafood?'

Taste was the main reason for not eating seafood cited by those who did not eat it at all. It was the most important reason for just over half these respondents (51%), followed by allergy (24%). No respondents said they did not eat seafood because it was difficult to obtain or because of concerns about freshness (Figure 6). Cost and sustainability were also reasons cited by very few respondents.

In the US study, reasons for not eating seafood were taste (55%); cost (25%); smell (12%); and don't know how to prepare (8%) (Blackstone 2001). Respondents were not asked about allergies or ethical concerns in the US study, but they were given as the main reason by 24% and 12% of our respondents respectively.

Interestingly, 30% of those who said they did not eat seafood in this study still went fishing for fun or recreation.

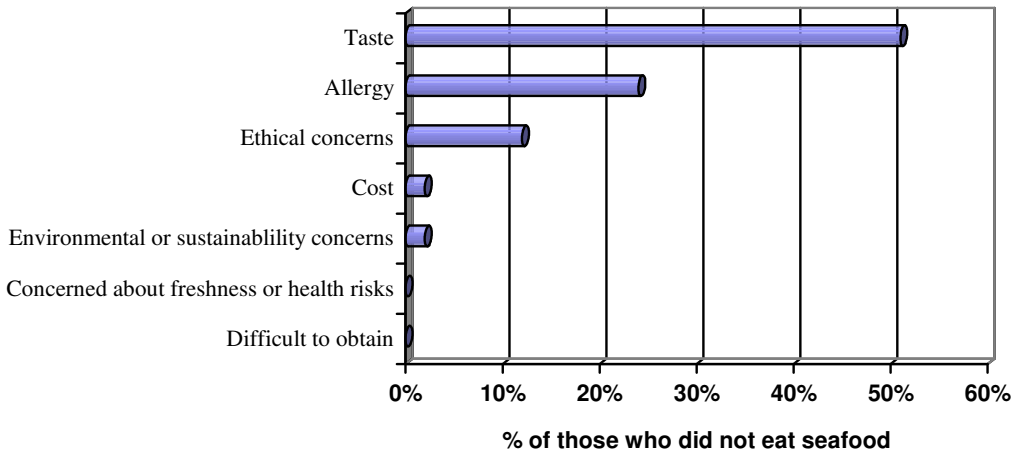

Figure 6 Reasons for not eating seafood

'Thinking ahead to the next twelve months, what do you think is likely to happen to the amount of seafood you buy compared with what you bought over the last twelve months?'

Just over three-quarters of respondents (76%) indicated that the amount of seafood they would buy over the next twelve months was likely to be the same as in the last twelve months. Eighteen percent said their seafood purchases were likely to increase, and only 6% thought a decrease was likely (Figure 7).

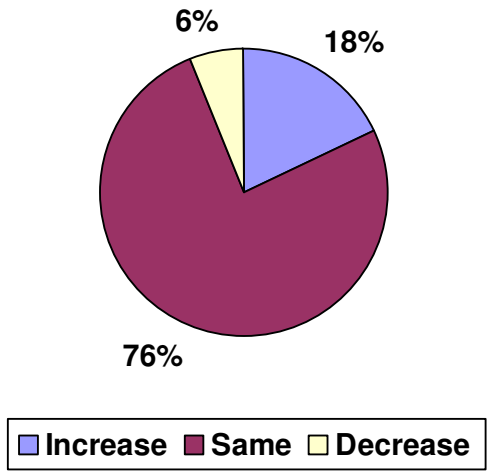

Figure 7 Anticipated seafood purchases over the next twelve months as compared with previous twelve months

The US study of seafood consumption (Blackstone 2001) asked people to cast their minds backwards rather than forwards in relation to seafood consumption, but trend comparisons with our results referring to anticipated purchases (shown in **bold**) are: 62% (**76%**) of respondents said they were eating the same amount as a year ago; 27% (**18%**) said their consumption was increasing; and 11% (**6%**) said it was decreasing. This suggests greater stability (or anticipated stability) in seafood consumption in our Australian sample than in the US sample.

'What factors would influence you to purchase more seafood?'

Respondents who said they ate seafood were asked how likely it was that a range of factors would influence them to buy more seafood in the future, using a scale from 1 to 10 where 1 was 'extremely unlikely' and 10 was 'extremely likely'. To aid interpretation, this scale was collapsed into three categories 'unlikely' (1–4), 'neutral' (5–6) and 'likely' (7–10).

Responses suggested that a broad range of factors might influence people to buy more seafood. Reduction in prices was the factor most likely to do so, with 70% of respondents indicating this would be likely to influence them to buy more. Over half of all respondents indicated that labelling and certification to improve consumer confidence about contamination and health risks (65%), freshness (59%), and environmentally friendly production (57%), were likely to influence them to buy more seafood. The lowest-rated factors were greater information about nutritional benefits (39%), and better advice on how to prepare seafood (40%). While they did not consider the last two factors to be as important as the others listed, more than one in three respondents still said these factors were likely to influence them (Figure 8).

Similarly, the survey by Ruello & Associates (2000) suggested that price is the major barrier to increasing seafood sales, and also found that consumers have concerns about food safety issues in relation to seafood.

Respondents in the US study were asked about the effects of a range of environmental issues on their consumption patterns (Blackstone 2001), so their responses are not directly comparable. However, between 41% and 65% of the US sample said the various environmental issues listed did affect them as compared with the 57% in our sample who said that assurances about environmentally friendly production would be likely to influence them to buy more seafood.

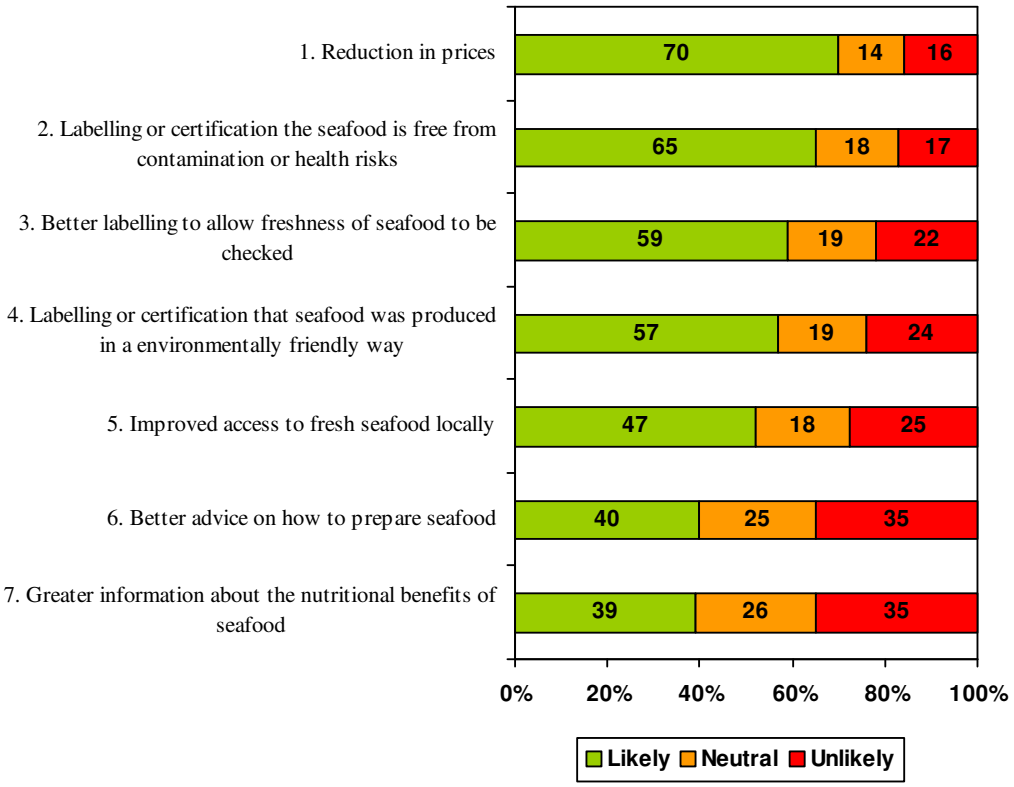

Figure 8 Likelihood that different factors would influence respondents to purchase more seafood

Perception questions

Attitudes towards the fishing industry

The survey asked respondents to indicate whether they agreed or disagreed with a range of statements about the Australian fishing industry. Respondents were asked to rate each statement on a scale of 1 to 10 where 1 was 'strongly disagree' and 10 was 'strongly agree'. For presentation purposes, responses have been collapsed into three groups: 'disagree' (1–4), 'neutral' (5–6) and 'agree' (7–10).

Responses highlighted a high level of concern about management of the fishing industry, particularly about commercial fishing and its potential impacts on the marine environment. Less than half of all respondents (40%) agreed that overall Australia's fishing industry was well managed. Sixty-five percent of respondents agreed that overfishing by commercial fishers was a significant problem. Respondents were significantly more likely to agree that overfishing by commercial fishers was a problem as compared with overfishing by recreational fishers (32%; $Z = 14.773$ $p < 0.001$), or traditional fishing by Indigenous people (13%; $Z = 21.285$, $p < 0.001$). Sixty-five percent of respondents indicated it is important to acknowledge the rights of Indigenous Australians in Australian waters. Only 36% of respondents thought the wild-catch fishing sector did its best to look after the marine environment. Given these findings it is not surprising that 88% of respondents agreed that strong controls

on commercial fishing are needed to protect the environment, and 75% indicated there should be more marine protected areas. There was also strong support for the statement that we should not let any foreign fishing vessels at all into Australian waters (83% agreed).

It appears there is a high level of support for a community role in management. Eighty-seven percent of respondents agreed that it is essential that the community makes sure the government manages the fishing industry well, and 79% indicated that management must include greater consultation with the community (Figure 9).

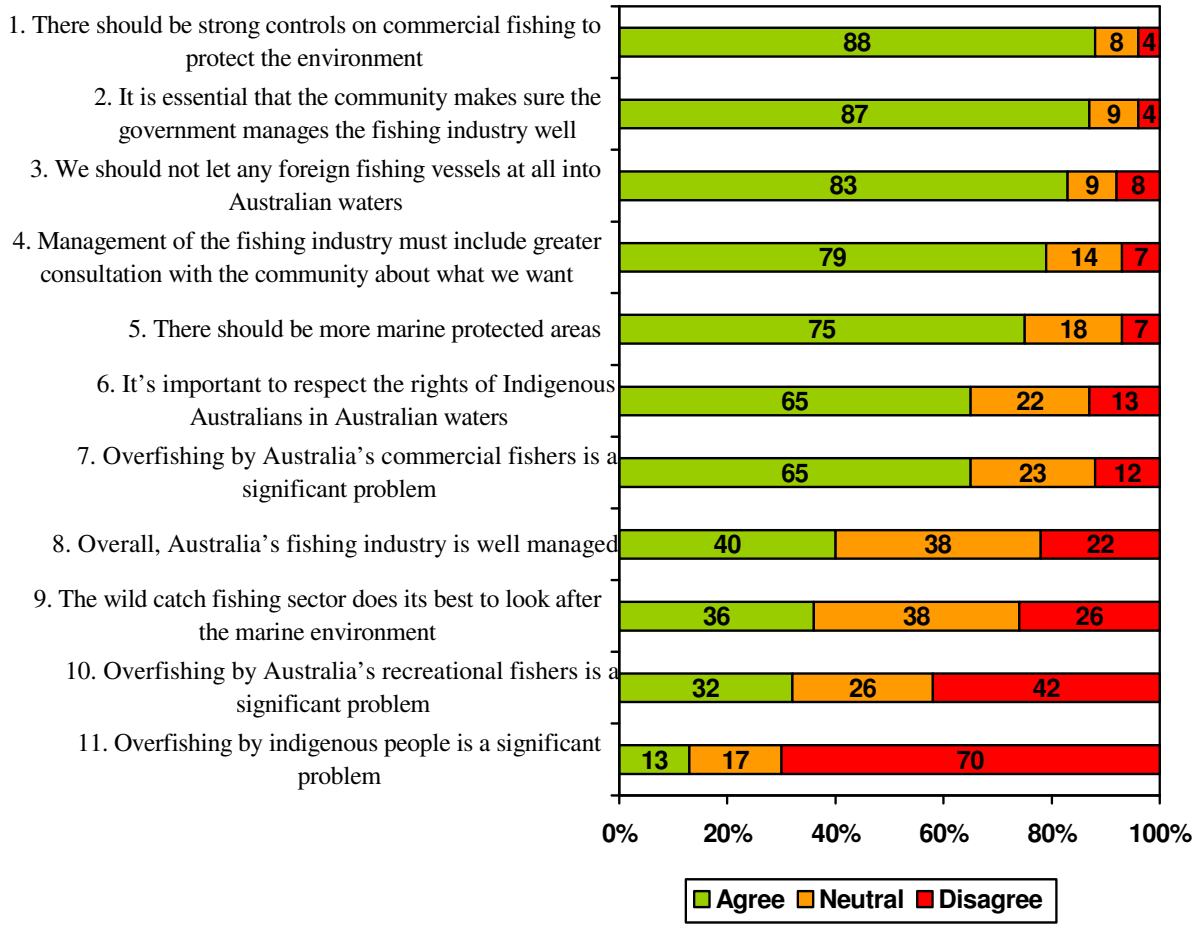

Figure 9 Attitudes towards the fishing industry

Comparisons with similar attitude questions in the NOO community values survey are shown in Table 3. However, the different sampling frames for the two surveys need to be borne in mind, as well as the specific focus of the NOO survey on the South-East Marine Region, and the slight differences in response categories used in the two surveys.

Table 3 Comparisons of responses to corresponding attitude statements in this study and the National Oceans' Office (NOO) community values survey (NOO 2002). The statement used in this study is shown below the corresponding one in the NOO survey

Statement	% of responses		
	Disagree	Neutral	Agree
NOO: It is essential that the community makes sure the government manages *the marine region* well	3	11	85
This study: It is essential that the community makes sure that the government manages *the fishing industry* well	4	9	87
NOO: There should be *severe controls on commercial uses* to protect the marine environment	6	15	79
This study: There should be *strong controls on commercial fishing* to protect the marine environment	4	8	88
NOO: Management must include consultation with the community about what we want	8	16	76
This study: Management *of the fishing industry* must include *greater* consultation with the community about what we want	7	14	79
NOO: We should not let any foreign fishing vessels at all into Australian waters	17	15	69
This study: Identical wording	8	9	83
NOO: *I think* there should be *a lot* more marine protected areas	11	21	68
This study: There should be more marine protected areas	7	18	75
NOO: It's important to respect the rights of Indigenous Australians in *the marine area*	18	24	58
This study: It's important to respect the rights of Indigenous Australians in *Australian waters*	13	22	65
NOO: Overfishing by Australia's recreational fishermen is a huge problem in the area	43	32	25
This study: Overfishing by Australia's recreational *fishers* is a *significant* problem	42	26	32

The comparisons indicate a similar pattern of responses in the two studies, with the exception of the statement about not letting foreign fishing vessels into Australian waters, where agreement was substantially higher in this study than in the NOO one. This can probably be attributed to recent media publicity about poaching by foreign fishing vessels, but perhaps more to generally heightened fears of 'invasion' and terrorism by foreign nationals following intensive coverage of illegal immigrants arriving by boat in northern Australia and overseas terrorist attacks.

Responses in this study that indicate strong support for effective government control of commercial uses are consistent in general terms with the findings of the NSW EPA studies (NSW EPA 1994, 1997, 2000) that indicate a large majority of the community believes that strong environmental regulations for industry are appropriate, and that the community has an important role in ensuring government protects the

environment. In the NT Fishcount study, 98% of respondents expressed support for fisheries' regulations in general (Coleman 1998).

Some indirect comparisons can be made with statements used in the US National Fisheries Institute study as shown in Table 4.

Table 4 Comparisons of responses to attitude statement used in this study and similar ones used in the National Fisheries Institute (NFI) survey (Blackstone 2001)

Statement	% of responses		
	Disagree	Don't know	Agree
NFI: People involved in commercial fishing act responsibly toward fishing related controversies	28	41	31
This study: *The wild-catch fishing sector does its best to look after the marine environment*	26	38	36
NFI: The US commercial fishing industry is well-regulated	24	49	27
This study: *Overall, Australia's* fishing industry is well-*managed*	22	38	40

In addition, just over 40% of respondents in the NFI survey thought that 'Fish/seafood are generally overfished or depleted' and 50% didn't know (the comparable figures in our survey were that 65% agreed that 'Overfishing by Australia's commercial fishers is a significant problem' and 23% were neutral).

These comparisons possibly suggest more community confidence in management of the industry in Australia than in the US, but a similar degree of scepticism or uncertainty about whether the commercial sector behaves responsibly or not.

Fishing industry sustainability

Respondents were also asked to indicate how sustainable they thought the various sectors of the fishing industry were, using a 1 to 10 scale where 1 was 'very unsustainable' and 10 was 'very sustainable'. As in previous sections, these data have been collapsed into three groups, 'unsustainable' (1–4), 'neutral' (5–6), and 'sustainable' (7–10).

While there was considerable concern about the commercial fishing sector, much of this concern appears to be directed at wild-catch fishing. Indeed fish farming or aquaculture was rated as being significantly more sustainable than all other fishing activities ($Z_{indigenous}$= 6.735, $p < 0.001$; $Z_{recreational}$ = 10.461, $p < 0.001$; $Z_{commercial}$ = 19.697, $p < 0.001$). Most respondents also indicated that traditional fishing by Indigenous Australians and recreational fishing were sustainable. Only 25% of respondents said they though commercial wild-catch fishing was sustainable. Commercial wild-catch fishing was rated significantly less sustainable than all other sectors ($Z_{indigenous}$= -15.568, $p < 0.001$; $Z_{recreational}$ = -13.405, $p < 0.001$; $Z_{aquaculturel}$ = -19.697, $p < 0.001$) (Figure 10).

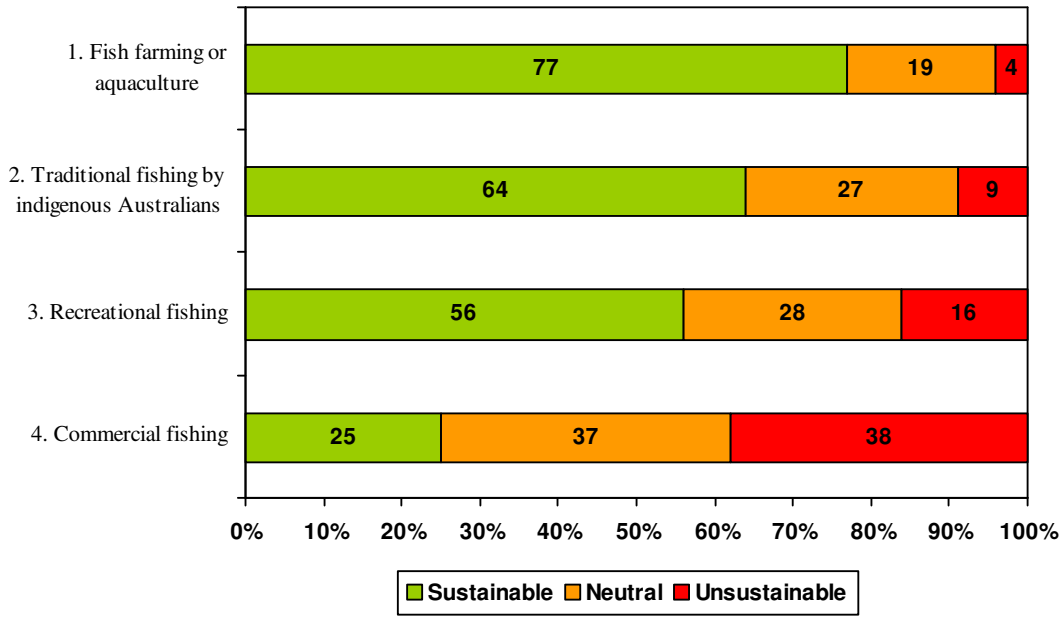

Figure 10 Perceived sustainability of various fishing industry sectors

The percentage of respondents in this survey who thought fish farming or aquaculture was sustainable can be indirectly compared with those in the NFI survey, where 48% of the respondents thought aquaculture was a good alternative to wild-catch fishing; 4% thought it was a bad alternative; 20% thought it was equal; and 28% didn't know (Blackstone 2001). In the NFI survey, just over 40% of respondents thought that fish stocks were generally overfished or depleted, indicating they believed commercial fishing was unsustainable at current levels. Fifty percent indicated that they didn't know whether stocks were overfished or not. In relation to fish farming, 56% of respondents in the NFI survey didn't know whether 'Fish farming has contributed to the ocean's pollution and destruction', suggesting they knew little about fish farming and its sustainability.

Issues affecting the fishing industry

Our survey included a series of statements about possible issues affecting the fishing industry. Respondents were asked to indicate how much they agreed or disagreed with each statement using a 1 to 10 scale of agreement where 1 was 'strongly disagree' and 10 was 'strongly agree'. This scale was collapsed into three groups: 'disagree' (1–4), 'neutral' (5–6), and 'agree' (7–10).

Over three-quarters of all respondents indicated that introduction of foreign organisms (92%) and illegal fishing by vessels from other countries (90%), were important issues that required improved controls. Although 75% of respondents indicated there should be more marine protected areas, there was strong recognition of the importance of considering the impact on commercial and recreational fishers before establishing more protected areas (72% agreed with this statement). Respondents also identified important issues as being a lack of information about the fishing industry

(66%) and about Australian seafood and how it is produced (63%). Over half of all respondents (56%) indicated that most people understand why they shouldn't take undersized or too many fish or other marine animals. At the same time, only 15% thought that dolphins, turtles and other non-target species getting caught in commercial fishing nets and fishing lines was **not** a major problem in Australia (Figure 11).

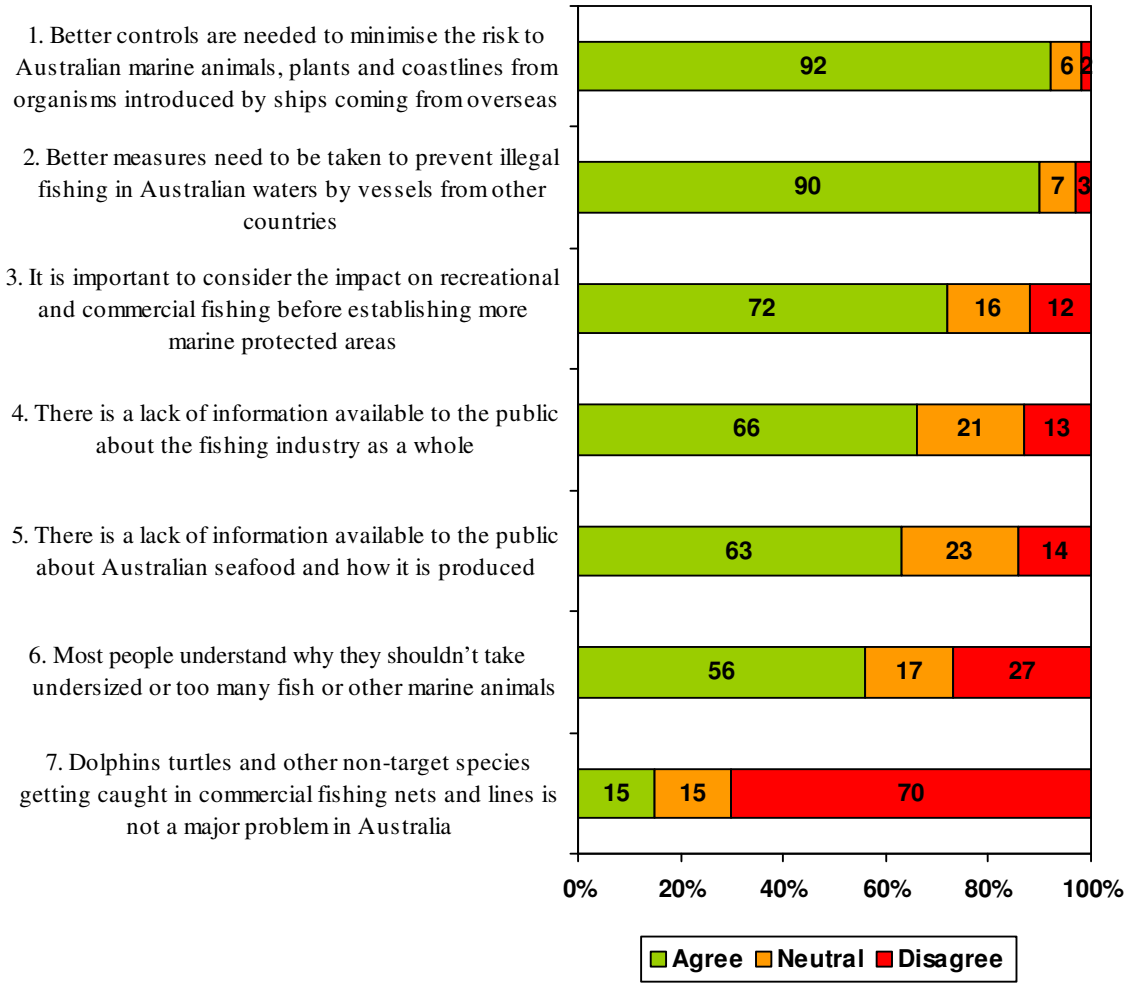

Figure 11 Issues affecting the fishing industry

These statements are not directly comparable to ones used in other surveys examined here. However, high levels of agreement with statements dealing with environmental concerns are consistent with relatively high Australian community concern about environmental issues and support for environment protection measures, as demonstrated in the surveys reviewed earlier (ABS 1992, 1994, 1996, 1998, 1999, 2000, 2001; NSW EPA 1994, 1997, 2000; DASET 1992). High levels of agreement with statements about preventing entry of foreign organisms and stopping illegal fishing by overseas vessels are consistent with responses to the earlier survey statement about not letting overseas vessels into Australian waters. These statements

are possibly tapping into heightened fears of invasion and concerns about protecting Australia's sovereignty.

Knowledge of and interest in the fishing industry

Two questions were included in the survey to provide an indication of respondents' self-assessed knowledge of the fishing industry and their interest in finding out more about it. Both questions used a 1 to 10 scale that ranged from 1 'know very little' to 10 'know a lot'; and 1 'extremely un-interested' to 10 'extremely interested' respectively. These were later collapsed into three groups 'know very little' and 'extremely un-interested' (1–4), 'neutral (5–6)', and 'unknowledgeable' and 'un-interested' (7–10).

Survey data highlight generally low levels of knowledge about the fishing industry, contrasting with an expressed high level of interest in finding out more (Figure 12).

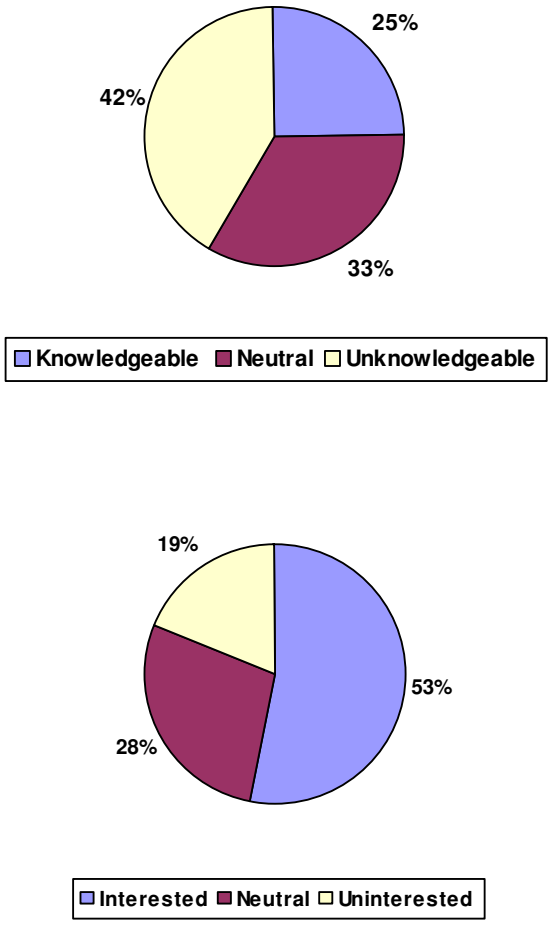

Figure 12 Respondents' knowledge of and interest in the fishing industry

Findings about low levels of knowledge about the fishing industry in this survey are similar to the low levels found in the NFI survey, although in spite of this our respondents tended to be more willing to express their opinions either way on the attitude statements (a lower percentage of our responses generally fell into the 'neutral' category than fell into the 'don't know' category in the NFI survey, although this may be an artefact of the different response categories used).

Expressions of interest in obtaining more information about the industry are encouraging but it needs to be remembered that many community members are not likely to actively seek information about the industry nor, as can be seen from the next section, do they regularly use the more credible sources of information about it. The WA mining industry survey also concluded this was the case (Chamber of Minerals and Energy, WA, 1997; Market Equity 1999).

Sources of information about the industry

The survey asked respondents to indicate their main sources of information about the fishing industry over the last twelve months. Multiple responses were possible. Only 5% of respondents said they did not receive **any** information about the fishing industry in the past twelve months. Television (54% of respondents) and newspapers (45%) were the most common sources of information. The next most commonly cited source was radio, with 17% of respondents indicating this was a source for them over the last year. Less than 10% of respondents indicated they received information from the other sources listed (Figure 13).

These results are consistent with results from many similar questions in other general public surveys e.g. the survey of perceptions of the WA mining industry and ABS environmental attitude surveys (Chamber of Minerals and Energy, WA, 1997; Market Equity 1999; ABS 1992, 1994, 1996, 1998, 1999, 2000, 2001). These surveys invariably find that where the survey topic is not one most respondents have a special interest in, the main way they get their information about it is through incidental exposure to relevant items in the mass media. The very low percentages in this survey that nominated government departments or commercial fishing organisations as being among their main sources of information need to be noted.

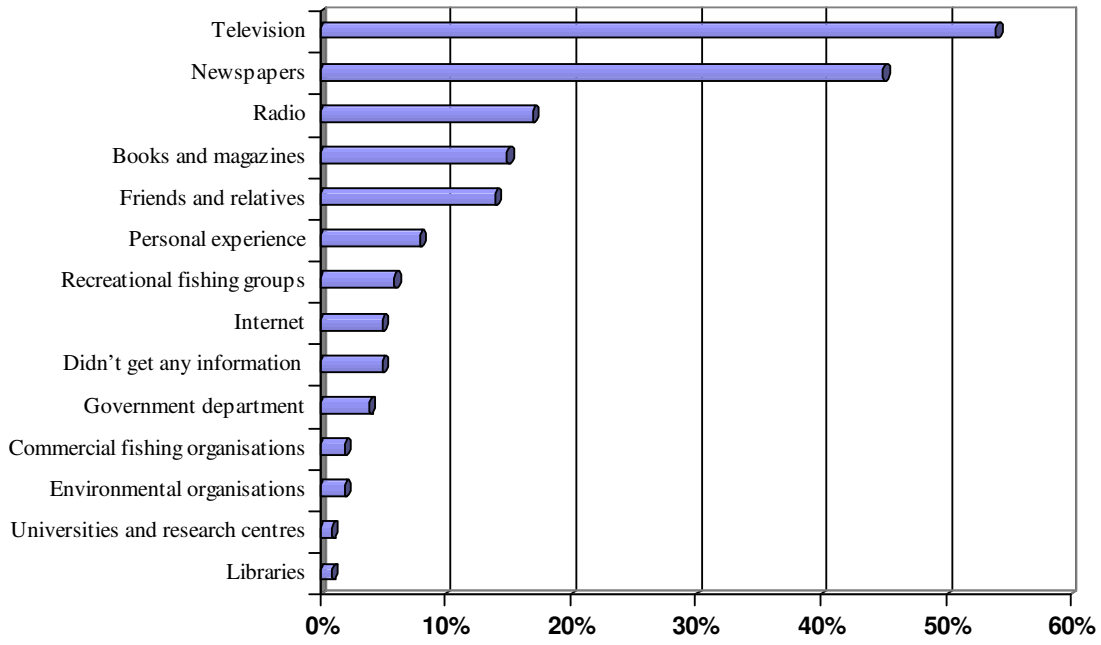

Figure 13 Sources of information about the fishing industry

Reliability of information sources

A question was included asking respondents to indicate how reliable they thought information about the fishing industry was from a range of potential providers. This question used a 1 to 10 reliability scale where 1 was 'very unreliable' and 10 was 'very reliable'. This scale was collapsed into three categories 'unreliable' (1–4), 'neutral' (5–6), and 'reliable' (7–10).

While universities and research centres, environmental organisations, recreational fishing groups and clubs, and government departments were among the least commonly cited sources of information, between about half to three quarters of respondents considered these sources reliable. The majority of respondents (59%) also considered Books or magazines a reliable source of information. Television (44%), the Internet (44%), radio (40%) and newspaper (40%) were rated as moderately reliable sources of information. Commercial (35%) and Indigenous (37%) fishing organisations were considered to be the least reliable sources of information by survey respondents (Figure 14).

Questions about the credibility of information sources have been asked in many previous surveys. For example, this survey's results are similar to those of the DASET (1992) survey in according high credibility to sources perceived as being disinterested or independent like universities, research centres and libraries, and to a

lesser extent, environmental organisations. Respondents typically express concerns about the credibility of the mass media (although documentary programs may be seen as being more credible than news and current affairs). Industry sources are often rated as having low credibility presumably because they are perceived as having vested interests. Similarly, government sources are often viewed with suspicion possibly because they are seen to be susceptible to political influences. The other point that emerges from responses to these kinds of questions is that people do not necessarily make much use of the more credible sources of information unless they have a special interest in the topic in question and are prepared to actively seek information about it. This is relevant to industry communication strategies.

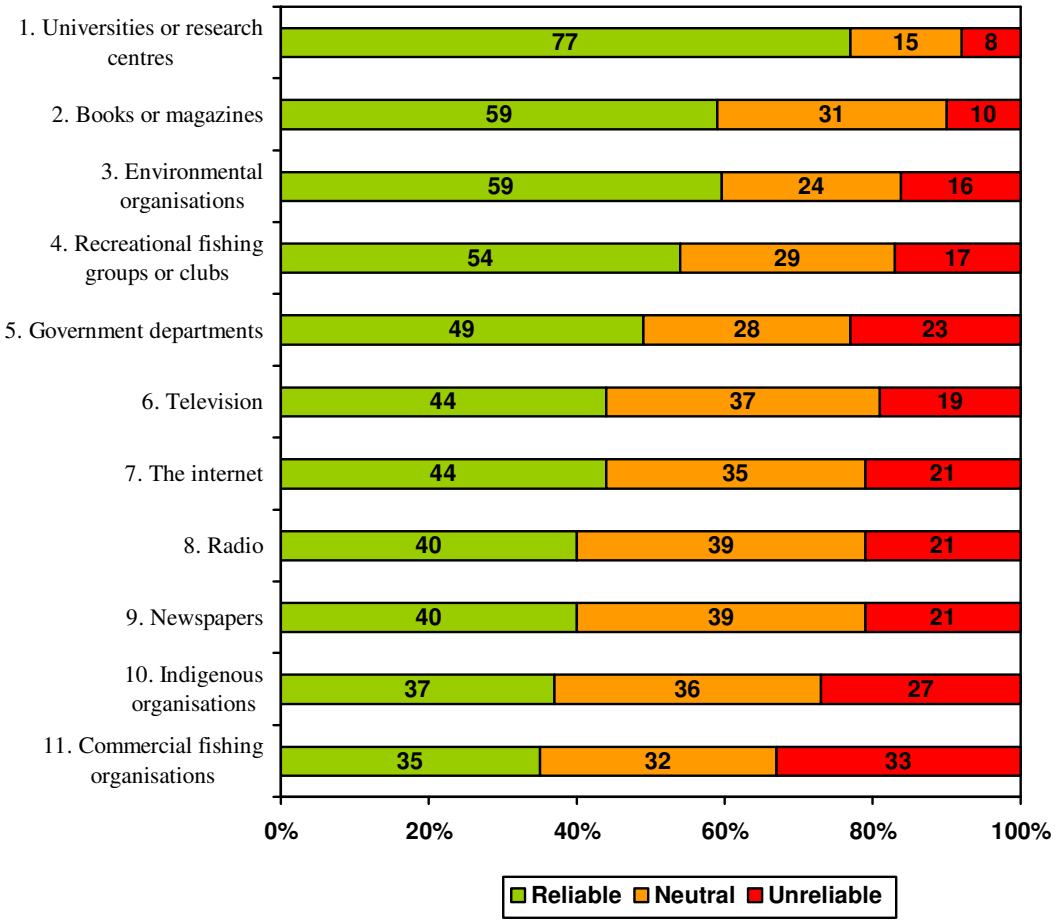

Figure 14 Reliability of sources of information about the fishing industry

Differences between respondent groups

Given the sampling method used and the inclusion of questions exploring respondents' behaviour, analyses were conducted to explore the extent to which behaviour and perceptions about the fishing industry differed across a range of respondent variables including gender, State or Territory of residence, metropolitan or non-metropolitan residence, whether a recreational fisher or not, whether a

commercial fisher or not, and whether the respondent ate seafood or not. These analyses used binary logistic regression with a stepwise method of variable entry.

Gender differences

Nine variables were found to be significant predictors of gender (Hosmer & Lemeshow $\chi^2 = 10.163$, $p = 0.254$). These variables accounted for an estimated 31% of the variation between men and women (Nagelkerke pseudo $R^2 = 0.313$).

Female respondents were significantly **more** likely to report that:

- better advice on how to prepare seafood would be likely to influence them to increase seafood purchases (46% of females said likely; 35% of males said likely) (Wald = 5.702, p = 0.017, Exp(B) = 1.283)
- labelling or certification that seafood was free from contamination and health risks would be likely to influence them to increase seafood purchases (74% of females said likely; 57% of males said likely) (Wald = 9.593, p = 0.002, Exp(B) = 1.435)
- commercial wild-catch fishing was sustainable (45% of females said sustainable; 22% of males said sustainable) (Wald = 18.088, $p < 0.001$, Exp(B) = 1.617)
- most people understand why they shouldn't take undersized or too many fish or marine animals (61% of females agreed; 50% of males agreed) (Wald = 8.488, p = 0.004, Exp(B) = 1.343)
- universities or research centres were a reliable source of information about the fishing industry (81% of females said reliable; 72% of males said reliable) (Wald = 4.764, p = 0.029, Exp(B) = 1.408)
- environmental organisations were a reliable source of information about the fishing industry (67% of females said reliable; 52% of males said reliable) (Wald = 8.306, p = 0.004, Exp(B) = 1.430).

Male respondents were significantly **more** likely to report that:

- fish farming or aquaculture was sustainable (82% of males said sustainable; 73% of females said sustainable) (Wald = 11.324, p = 0.001, Exp(B) = 0.569)
- seafood they caught themselves was a main contributor to the seafood products they consumed (25% of males; 8% of females) (Wald = 10.164, p = 0.001, Exp(B) = 0.388)
- they had been fishing for fun or recreation over the past twelve months (58% of males; 29% of females) (Wald = 23.436, $p < 0.001$, Exp(B) = 0.389).

These findings are consistent with western gender role differentiation that leads us to expect that women will be responsible for most household cooking and food purchases, and therefore will be more likely than men to be influenced to buy more seafood if they have better information about cooking it. Women may be more concerned about food health and safety risks than men, partly because they are likely to be responsible for more household food purchases than men, and therefore their purchasing choices may be more likely to be influenced by health assurances. Women respondents in this study were less sceptical about the reliability of a number of

information sources than men; substantially more positive about the sustainability of commercial wild-catch fishing; and more positive about people's understanding of the need to restrict catches and respect size limits. These differences may be partly attributable to women's much lower fishing participation rates and hence less direct experience of both recreational and commercial wild-catch fishing. The reasons why women rated the sustainability of fish farming lower than men are not clear.

The differences between men's and women's recreational fishing participation rates are in the same direction and roughly of the same order as those suggested by previous studies (twice as many men as women had been recreational fishing in the last twelve months in this study). For example, the survey of non-Indigenous NT residents found that 44% of men were recreational fishers versus 25% of women (Coleman 1998). These differences are also consistent with many international studies in westernised nations that find many more men than women tend to participate in hunting and fishing (see for example Kellert 1993, Hills 1993, DuWors et al. 1999).

Differences between recreational fishers and respondents who were not recreational fishers

Nine variables were found to be significant predictors of fishing for fun or recreation (Hosmer & Lemeshow $\chi^2 = 9.161$, $p = 0.329$). These variables accounted for an estimated 40% of the variation between recreational fishers and respondents who were not recreational fishers (Nagelkerke pseudo $R^2 = 0.398$). Respondents who said they had been fishing for fun or recreation over the past 12 months were significantly **more** likely to report that:

- there should be strong controls on commercial fishing to protect the environment (81% of fishers agreed; 67% of non-fishers agreed) (Wald = 8.598, $p = 0.003$, Exp(B) = 1.829)
- they had higher knowledge about the fishing industry (38% of fishers knowledgeable; 17% of non-fishers knowledgeable) (Wald = 17.542, $p < 0.001$, Exp(B) = 1.706)
- they had higher interest in finding out more about the fishing industry (Wald = 15.966, $p < 0.001$, Exp(B) = 1.745)
- books and magazines were used as a source of information about the fishing industry (22% of fishers said yes; 9% of non-fishers said yes) (Wald = 4.614, $p = 0.032$, Exp(B) = 1.746)
- recreational fishing groups or clubs were used as a source of information about the fishing industry (12% of fishers said yes; 1% of non-fishers said yes) (Wald = 16.923, $p < 0.001$, Exp(B) = 12.393)
- information from recreational fishing groups or clubs was a reliable source of information (67% of fishers said reliable; 43% of non-fishers said reliable) (Wald = 20.787, $p < 0.001$, Exp(B) = 1.770).

Respondents who said they had been fishing for fun or recreation over the past twelve months were significantly **less** likely to report that:

- they were female (34% of females were fishers; 64% of males were fishers) (Wald = 39.195, $p < 0.001$, Exp(B) = 0.309)

- television was used a source of information about the fishing industry (44% of fishers said yes; 61% of non-fishers said yes) (Wald = 4.737, p = 0.030, Exp(B) = 0.657)
- radio was used as a source of information about the fishing industry (11% of fishers said yes; 21% of non-fishers said yes) (Wald = 6.418, p = 0.011, Exp(B) = 0.513).

The significant influence of this variable on a number of responses makes it important to point out the likelihood that recreational fishers, and particularly very frequent recreational fishers, are over-represented in our sample. Accordingly, question responses are likely to be skewed towards their views where these views differ from those of the majority of Australians. This is a significant consideration in extrapolating the results for the questions mentioned above to the wider Australian adult population.

Differences between those involved in the commercial fishing sector and those not involved

Six variables were found to be significant predictors of involvement in the commercial fishing sector (Hosmer & Lemeshow $\chi^2 = 12.477$, p = 0.131). These variables accounted for an estimated 40% of the variation between those involved in the commercial fishing sector and those not involved (Nagelkerke pseudo $R^2 = 0.399$). Respondents who said they were involved in the commercial fishing sector were significantly **more** likely to report that:

- they had higher knowledge about the fishing industry (51% of commercial said knowledgeable; 24% of non-commercial said knowledgeable) (Wald = 4.457, p = 0.035, Exp(B) = 0.631)
- personal experience was used as a source of information about the fishing industry (19% of commercial said yes; 7% of non-commercial said yes) (Wald = 7.999, p = 0.005, Exp(B) = 0.295)
- government departments were used as a source of information about the fishing industry (21% of commercial said yes; 2% of non-commercial said yes) (Wald = 20.272, p < 0.001, Exp(B) = 0.144).

Respondents who said that they were involved in the commercial fishing industry were significantly **less** likely to report that:

- it is important to respect the rights of Indigenous Australians in Australian waters (56% of commercial agreed; 65% of non-commercial agreed) (Wald = 4.704, p = 0.030, Exp(B) = 1.535)
- management of the fishing industry must include greater consultation with the community (66% of commercial agreed; 79% of non-commercial agreed) (Wald = 12.394, p < 0.001, Exp(B) = 2.231)
- most people understand why they shouldn't take undersized or too many fish or other marine animals (35% of commercial agreed; 57% of non-commercial agreed) (Wald = 5.431, p = 0.020, Exp(B) = 1.532).

Some of these response differences reflect the fact that commercial fishers, or respondents with close family ties to commercial fishers, are likely to have much more personal knowledge and experience of the fishing industry than other respondents. These people's much greater use of government departments as sources of information is consistent with their need to obtain commercial licences and permits, and to keep up to date with government regulations.

Differences between those who eat seafood and those who don't

Only one variable was found to be a significant predictor of those who said they eat seafood and those who did not (Hosmer & Lemeshow $\chi^2 = 2.379$, $p = 0.123$). This variable accounted for approximately 3% of the variation between those who ate seafood and those who didn't (Nagelkerke pseudo $R^2 = 0.033$). Respondents who reported that they did not eat seafood were significantly **less** likely to indicate that they were interested in the fishing industry (55% who ate seafood said interested; 26% who did not eat seafood said interested) (Wald = 14.312, $p = 0.003$, Exp(B) = 0.547).

Differences between those living in metropolitan and non-metropolitan areas

Three variables were found to be significant predictors of those living in metropolitan and non-metropolitan areas (Hosmer & Lemeshow $\chi^2 = 8.080$, $p = 0.152$). These variables accounted for an estimated 7% of the variation between those living in metropolitan areas and those not (Nagelkerke pseudo $R^2 = 0.074$). Respondents who lived in metropolitan areas were significantly **more** likely to report that:

- seafood purchased from a specialist fish shop was a major contributor to the seafood products they consumed (30% of metro said yes; 20% of non-metro said yes) (Wald = 5.890, $p = 0.015$, Exp(B) = 1.663)
- environmental organisations were a reliable source of information about the fishing industry (65% of metro said reliable; 49% of non-metro said reliable) (Wald = 19.871, $p < 0.001$, Exp(B) = 1.643).

Respondents who lived in metropolitan areas were significantly **less** likely to report that:

- seafood purchased from a fish-and-chip shop was a major contributor to the seafood products they consumed (10% of metro said yes; 19% of non-metro said yes) (Wald = 6.967, $p = 0.008$, Exp(B) = 0.529).

Differences across States and Territories

As Table 5 shows, there were a number of important differences across States and Territories for a range of variables including:

- involvement in various sectors of the fishing industry
- main sources of seafood products
- knowledge
- main sources of information

- ratings of issues.

The most significant of these differences ($p<0.01$) were for:

- percentages of recreational fishers, with **highest** percentages in Qld, Tas. and the NT
- percentages who said they bought most of their seafood from the supermarket, with percentages **lowest** in NSW, Qld and SA
- percentages of respondents who said seafood they caught themselves was the main seafood they ate, with percentages **highest** in WA, NT and Tas.
- percentages of respondents who said that improved access to seafood locally would be likely to influence them to buy more, with percentages **highest** in the NT, ACT and SA.

Comparable figures from the National Recreational and Indigenous Fishing Survey indicate that participation in recreational fishing is highest in the NT, Tas. and WA (Henry & Lyle, in press 2003). Our sample figure of 36% for participation in recreational fishing in Victoria compares with the 1996 estimate of 23% provided by the Victorian Department of Natural Resources and Environment (DNRE 2002); and our sample figure of 55% in Western Australia compares with the figure of 37% given in the *Fisheries WA Annual Report 2000-2001* (Fisheries WA 2002). These comparisons suggest either a recent rapid increase in recreational fishing participation, or more likely, an over-representation of recreational fishers in our sample due to respondent bias. It appears that there is wide variation in estimates of recreational fishing participation rates, related to survey methods, sampling frames, question wordings, and recall biases that respondents may have.

Overall, the significant differences in these question responses point to differing attractiveness or accessibility of recreational fishing spots in the different States and Territories; differing catch rates for recreational fishing; and differing consumer access to retail outlets where seafood can be purchased.

These response patterns across States and territories can also be interpreted as suggesting a south-eastern versus the rest of Australia 'split', as has been distinguished in other national opinion surveys. South-eastern Australia, consisting of Vic., the ACT, NSW and south-eastern Qld, often exhibits similarities in response patterns as compared with the remainder of Australia. Socio-demographically, south-eastern Australia contains Australia's largest cities, highest population densities, and many of the country's most affluent households. Recreational fishing participation tends to be lower, and self-caught seafood less significant in people's diets in south-eastern Australia than elsewhere.

Table 5 Response differences across States and Territories. 'n' refers to the numbers who answered each question

Variable	n	NSW	Vic.	Qld	Tas.	WA	SA	ACT	NT	Test
Proportion of respondents who had been fishing for fun or recreation over the past 12 months	1002	37%	36%	51%	58%	55%	49%	38%	55%	χ^2=23.759 p=0.001
Proportion of respondents involved in the commercial fishing industry	1004	4%	4%	4%	8%	9%	13%	0%	9%	χ^2=16.847 p=0.018
Proportion of respondents who said seafood purchased from a supermarket was a main contributor to seafood they consumed	1003	43%	57%	47%	50%	56%	38%	63%	55%	χ^2=19.846 p=0.006
Proportion of respondents who said seafood purchased from a sit down restaurant, hotel or club was a main contributor to seafood they consumed	1002	15%	17%	5%	8%	12%	20%	13%	18%	χ^2=18.385 p=0.010
Proportion of respondents who said seafood they caught themselves was a main contributor to seafood they consumed	1004	15%	10%	21%	33%	27%	14%	18%	27%	χ^2=24.914 p=0.001
Proportion of respondents who said that improved access to fresh seafood locally would be likely to influence increased purchase	977	48%	61%	60%	52%	60%	64%	65%	70%	χ^2=45.939 p<0.001
Proportion of respondents who agreed that we should not let any foreign fishing vessels at all into Australian waters	987	84%	76%	93%	83%	83%	77%	82%	90%	χ^2=24.644 p=0.038
Proportion of respondents who said that traditional fishing by Indigenous Australians was sustainable	897	66%	70%	56%	67%	61%	65%	63%	56%	χ^2=25.229 p=0.032
Proportion of respondents who said they were knowledgeable about the fishing industry	1002	25%	21%	30%	29%	26%	32%	19%	20%	χ^2=23.949 p=0.046
Proportion of respondents who said they used television as a source of information about the fishing industry	1002	50%	62%	57%	42%	44%	48%	69%	50%	χ^2=16.035 p=0.025

Benefits

The research reported here is the first example we are aware of in which there has been an attempt to examine perceptions of the fishing industry and its products as a whole on a national basis. As such it gives a wide overview of community attitudes, knowledge and behaviour related to fishing, and about consumption patterns and possible influences on them. It is therefore relevant to all sectors of the industry, but particularly to the commercial sector. Much more information will be available about the recreational and traditional sectors when the results of the first National Recreational and Indigenous Fishing Survey are released. The original research application identified benefits as flowing equally to all industry sectors, but we would suggest that there is justification for suggesting that the major beneficiaries are in the commercial sector and to a lesser extent the recreational sector (the original proposal was modified to exclude any specific focus on traditional fishing and as a result this formed only a small part of the study).

The questions asked here provide a basis for integrating information about perceptions of the fishing industry with a range of studies of related environmental attitudes, and making comparisons with some State- and Territory-based surveys of the industry.

Information about the sources of information that community members use, and their perceptions of the reliability of these sources, provides some direct lessons for industry and government communication about the industry. So also do some of the direct suggestions made by participants in the focus groups, and their indications of what aspects of the industry interested them most. Both the qualitative and quantitative components of the research suggest that many Australians have low levels of industry knowledge but may be interested in learning more. The research findings also suggest that much information about the industry in the mass media is negative and there could be advantages in the industry taking a more proactive media stance and trying to achieve better coverage of ‘good news’ stories.

The potential benefits from applying the research results are an improved industry image, more public support for the commercial sector, and possibly higher seafood consumption. The information obtained about current consumer concerns and factors consumers considered likely to influence future consumption could be applied by the seafood industry and individual producers in their marketing activities.

Information about public perceptions of the industry could potentially be used in ESD reporting frameworks, but in order to do this, these frameworks need to be made more meaningful to community members and less dominated by expert judgements. Better understanding of public perceptions and knowledge could be a basis for this re-working. High levels of participation and interest in recreational fishing justify attention to ways of making fisheries management more meaningful to the public and giving the public a greater role in near-shore fisheries management than it has had in the past. Many of the community are engaged and interested but may lack ways of being directly involved in management.

Ongoing monitoring of social aspects of the industry, possibly based partly on surveys like the one reported here, provides important feedback to the industry about the success of its communication and information activities, complementing economic information about trends in production and consumption.

Further development

Workshop to further develop responses to survey findings
We suggest it would be useful to hold a follow-up workshop with major fisheries stakeholders to discuss and explore the implications of this study. Stakeholders from all industry sectors could be represented at such a workshop. This would provide an opportunity to further identify sectoral and across-industry implications of the findings, further develop targeted communication strategies, and agree on ways of communicating results.

Monitoring trends in community perceptions, knowledge and behaviour
The survey reported here (both focus groups and structured survey) could be repeated at regular intervals to examine trends in public perceptions and knowledge of the fishing industry and seafood consumption patterns. Regular social surveys can build up a detailed picture of community trends comparable to the detailed surveys already conducted by agencies like ABARE that focus on economic values and production levels. Comparable data on other social aspects of fisheries, and on community views about fisheries and the different industry sectors, is very lacking at the moment, particularly at the national scale.

Monitoring media coverage of the industry
We did not locate any studies examining mass media coverage of the fishing industry and its issues. Because the mass media are such an important source of information for the public, particularly those not directly involved in any of the sectors, it would be useful to monitor media coverage of fishing-related stories, and undertake content analysis on items identified. This would give a better basis for conclusions about the apparently negative or alarmist nature of many items about the industry, particularly those dealing with the wild-catch sector. It could also provide a good basis for any future media campaigns and for monitoring their effectiveness.

Coordinating community surveys
The survey's relationship with the National Recreational and Indigenous Fishing Survey needs to be investigated, and national surveys done in a more integrated and complementary way in the future. Similarly, there may be possibilities for further integration of national surveys with State- and Territory-based ones. (This is already happening with the National Recreational and Indigenous Fishing Survey with the cooperation of State/Territory and Commonwealth fisheries agencies.) Fisheries community surveys have often been done in a relatively *ad hoc* and uncoordinated manner across States and Territories in the past, and AFFA and FRDC may have a continuing role in coordinating these activities, ensuring methods are robust and compatible, and that findings are shared to the benefit of the industry as a whole.

The relationship of this research and its findings to the activities and programs of the NOO could be investigated further, and there may be a role for better coordination and sharing of findings of community surveys across a range of Commonwealth agencies with interests in human uses of the marine environment. Cooperation between agencies in design of surveys can serve as a useful starting point. It may be possible to make these surveys more comparable and useful in developing a systems-

wide approach that considers all human uses of the ocean and coastline, not only fishing. This is consistent with a social systems-based approach as a counterpart to an ecosystem-based approach to marine management.

Monitoring success of communication, information and marketing programs
This survey, or modified forms of it, could be repeated as part of monitoring the success of communication, information and marketing programs or strategies carried out by the different industry sectors.

Knowledge of the traditional sector
Traditional fishing was a minor part of this study, and there were indications that most Australians knew little about it and had very little personal experience of it. This concurs with findings of the first State of the Marine Environment Report (Zann 1995), where it was concluded that most non-Indigenous Australians know little about coastal Aboriginal people's use of the sea and marine resources generally. Unlike commercial and recreational fishing, traditional fishing receives little coverage in the mass media. Low levels of knowledge about traditional fishing activities suggest the need for better communication and information to be provided about it. Communication activities of this kind may be relevant to advancing other Commonwealth, State or Territory policy initiatives for Indigenous people and would need the support of Indigenous organisations. These activities would be consistent with acknowledging Indigenous interests in marine and freshwater resource management generally.

ESD reporting and fisheries boundaries
Further work is needed to identify the implications of social survey work like this for national ESD reporting frameworks, and to examine how social data or indicators can be used to monitor sustainability. Items like 'existence values', 'cultural values' and 'lifestyle values' have been included as components of sustainability frameworks. Measures of these items could be derived from community-based social surveys like the one reported here, but it is not clear how meaningful measures could be obtained for specific wild-catch fisheries from surveys with a national and industry-wide scope like this one.

This raises the major issue of the appropriate scale for fisheries' ESD monitoring and reporting. Does this monitoring need be across fishing sectors and across fisheries boundaries as well as at the level of individual State or Commonwealth-managed fisheries? If monitoring is done for many separate fisheries, possibly under different jurisdictions and with overlapping resource bases, how are measures to be aggregated to arrive at higher-level indicators? Relating community survey data to individual fisheries is virtually impossible when many of the public neither know nor care about fisheries' jurisdictional boundaries, nor the responsibilities of different levels of government in managing these fisheries. However, we did find in this project that community members readily accepted and understood what the three major industry sectors were, and also that most appeared to know what aquaculture was (at least in a general sense). So for community members, it is much more meaningful to keep discussion and questions at this sectoral level than to try to discuss individual fisheries whose names and boundaries are unfamiliar to the vast majority.

To effectively apply community-based information to more localised areas or to specific fisheries, we need a framework based on more socially meaningful boundaries, not species or jurisdictional boundaries. Brunckhorst and his colleagues make similar points in their work on land-based bioregional boundaries (Brunckhorst 2000; Brunckhorst & Rollings 1999). This could be a fruitful area for research on 'community' fishing and community use of marine and freshwater resources by both Indigenous and non-Indigenous Australians.

Methodological issues

We concluded that the CATI survey produced a likely over-sampling of recreational fishers and possibly an over-sampling of people with family experience in commercial fishing — although without accurate national figures this cannot be judged with certainty. Sampling issues need to be addressed to reduce possible bias towards people who already have a special interest in fishing. Recreational fishing in particular has large numbers of enthusiastic participants, many of whom are keen to express their views and influence policy and management decisions. Recreational fishers' views need to be balanced against those of the non-participating public and of commercial and traditional fishers, even though the numbers of people directly participating in the last two sectors are much lower.

One possible way of doing this would be to set a quota on the percentage of recreational fishers in the sample using the most reliable population estimates available, and ask a screening question at the beginning of the survey to establish whether or not the potential respondent is a recreational fisher. Another possibility is to examine ways of improving response rates, although this is difficult with national telephone surveys of the general public, which typically have high refusal rates and where follow-up reminders cannot be used.

Communicating findings

To communicate project outcomes, these further steps are proposed:

- this report, when finalised, to be distributed as required by FRDC
- a brief summary of main findings to be prepared in a popular format and mailed to those people and organisations that have expressed interest in the project, and copies of the summary to be supplied to FRDC to enable response to further enquiries
- a brief summary of findings to be supplied to FRDC for incorporation in its *R&D News*
- a brief fact sheet to be prepared for distribution to policy makers in fisheries agencies
- a media release to be prepared and, subject to approval from the steering committee and FRDC, to be distributed to appropriate media outlets
- the researchers to present project findings verbally at appropriate forums, including the BRS seminar series and appropriate scientific conferences
- the researchers to report findings in appropriate scientific journals
- a summary of findings to be incorporated on the FRDC and BRS websites.

In addition, there may be scope for FRDC, BRS and the Australian Seafood Industry Council to discuss further collaborative activities aimed at encouraging fishing industry awareness and adoption of survey findings.

Planned outcomes

Planned outcomes of the project and achievements against them are addressed below.

1. Baseline data on public knowledge, perceptions, attitudes and behaviour to serve as the basis for ongoing monitoring of effectiveness of industry communication, education and marketing strategies, as well providing indicators of need for industry to change its practices

The focus group discussions and CATI survey have provided baseline data as planned. The focus group questions, survey instrument and survey data could be used in ongoing monitoring. The largely negative perceptions about the commercial sector, confirmed in this study, suggest the need for this sector to improve its communication activities. Low levels of knowledge about the industry as a whole, but particularly about traditional fishing, suggest the need for the industry to provide better public information and to make more use of information sources the public attends to on a regular basis, particularly the mass media.

Ongoing monitoring needs to be done on the basis of specific goals and objectives set out in communication, education or marketing programs. This means specifying what is to be achieved, when, and by whom. Many fisheries organisations of course already have these kinds of frameworks in place, but there may be an opportunity to develop them further at the national level using regular social surveys.

Examples of regular social surveys providing trends data that can be used for monitoring purposes include the surveys of environmental attitudes and behaviour conducted by the ABS, the ABS Census, and the environmental surveys done by the NSW EPA. It may be possible to incorporate some fisheries-related questions into existing social survey programs to minimise costs.

2. Better informed government policy and programs, better-designed and targeted government and industry communication, education and marketing campaigns or strategies

The information provided by the focus groups and CATI survey, when disseminated appropriately, could inform government policy and programs related to fisheries and marine and freshwater environments.

Specific points from the survey are that:

- the mass media are a main source of information for a large majority of the public, particularly those without any direct personal involvement in the industry [the most common sources of information cited in the CATI survey were television (54% of respondents) and newspapers (45%)]
- some fishing and marine environment-related television programs and personalities are very widely known and could be used as ‘champions’ in

improving the industry's image and promoting sustainability initiatives, for example eco-labelling schemes (Rex Hunt was mentioned by most of the focus groups for example)

- for those members of the public who have no particular interest in the industry, messages must use familiar information sources and locations so they do not have to make any special efforts to get this information – the mass media are the obvious choice. However, information in supermarkets and at other locations people visit as part of their normal daily routines are worth considering as well
- while people may not rate the mass media as necessarily being highly reliable (television was rated as reliable by 44% of the CATI respondents), mass media messages can be made more credible by using widely respected personalities to deliver them, and authoritative formats like documentaries
- government and industry sources are frequently viewed with suspicion and were among the least-frequently used. This means these bodies need to use the mass media, and enlist the support and partnership of individuals or organisations that are seen as being disinterested and public-spirited, in order to get their messages out
- the Internet was regarded as credible by 44% of survey respondents, so fisheries-related sites and links maintained by sources independent of government and industry could be a good communication medium, particularly for younger people
- for recreational fishers in particular, specialist fishing books and magazines and fishing clubs are good ways of disseminating information, and these fishers tend to regard these sources as credible.

Some specific options for addressing poor public perceptions of the wild-catch sector are to:

- develop media campaigns in consultation with professional communicators — these should focus on good news stories covering items like wild-catch fishers adopting by-catch excluding devices and the success of these devices; recoveries of fish stocks; family fishing business success stories; contributions of fishing to local economies; and actions taken to improve the sustainability of particular fisheries
- enlist the support of media personalities to deliver messages
- develop and disseminate popular material giving basic facts and figures about the commercial sector, and make it widely available in locations the public regularly uses e.g. supermarkets, fish markets, fish-and-chip shops
- develop more 'on the wharf' links to the general public, for example by including commercial fishing information sources within retail precincts where there are fish shops and restaurants (a precinct like this has been established at Coffs Harbour in northern NSW)
- support production of television documentaries that provide a balanced perspective on wild-catch fishing and its contributions to Australian society and economy
- develop more integrated websites dealing with fisheries and providing information about a range of sectors, including wild-catch — these sites preferably need to be managed and maintained by community-based organisations, not government or industry.

To address low levels of public knowledge about the traditional sector:

- work with Indigenous organisations to develop communication strategies for the traditional sector to raise public awareness of this sector and its contribution to maintaining culture
- ensure that all industry-wide communication and educational materials make appropriate reference to traditional uses and acknowledge their cultural significance
- ensure that traditional users are appropriately represented on industry advisory panels and boards together with commercial and recreational users, and in particular that they are involved in making decisions about educational and communication activities for the industry.

Clearer identification of roles and responsibilities for communicating about the traditional sector is needed. Indigenous people may not identify with a sectoral definition as used here, or with a national scale because of their traditional responsibilities for specific and well-defined geographical areas of land and sea. This further highlights difficulties with the meaningfulness of different kinds of fisheries boundaries and the scope for popularising community-based fisheries among Indigenous traditional users and non-Indigenous recreational fishers.

3. Better-informed and justified ESD indicators, data and reporting frameworks, potentially leading to better monitoring of progress towards sustainability in all industry sectors

This research has gathered information about public perceptions of the relative sustainability of different fishing sectors, and responses to a range of attitude statements about fisheries management, environmental impacts and sustainability. This information could be used in developing social indicators of sustainability for different industry sectors. Repeated surveys could provide up-to-date and accurate trends data for ESD monitoring and reporting purposes in these sectors or for the industry as a whole. This could help assess progress towards sustainability as viewed by the community and community-based users, not only by scientific experts.

The study gathered information about how the public views the sustainability of different industry sectors. The commercial wild-catch sector was consistently rated as being least sustainable. (The percentages of the survey sample rating the different sectors as sustainable in the CATI survey were: wild-catch 25%, recreational 56%, traditional 64%, and aquaculture 77%.) There were some interesting insights in the focus groups about the factors people considered and the reasoning behind their judgements about sustainability. Traditional fishing, for example, was considered relatively sustainable for reasons like the small number of people involved, the fact that it was only for subsistence, and that the fishers did not use highly sophisticated techniques. Wild-catch was seen by some as being driven too much by the profit motive, being indiscriminate in its methods, and not being concerned about the future. People's judgements about the wild-catch sector were often strongly influenced by their knowledge of fishery collapses elsewhere in the world. This type of information has messages for the industry in countering negative perceptions, and

also for those who might want to develop ESD frameworks based more on community perceptions and values, and perhaps less on expert judgements. Information about how community members make sustainability judgements and on what basis, could help provide more empirically-based justifications for ESD frameworks and the indicators they use.

4. Improved public knowledge and understanding of the industry and its economic, social and ecological impacts.

Achieving this longer-term outcome depends on applying the research findings to develop better-targeted and more effective communication or education strategies providing information in 'user-friendly' form; using information sources the public attends to regularly and regards as credible; and addressing topics the public is interested in. The findings about the public's current levels of knowledge and understanding, opinions and attitudes, information sources mainly used and rated as credible, and topics of interest to the public, all contribute to achieving this outcome.

To assess whether or not these communication or education strategies are working, regular monitoring of public knowledge and understanding is needed. Some of the questions used in the focus groups and CATI survey could be used in ongoing monitoring. The fact that members of most of the focus groups and the majority of survey respondents rated their knowledge levels relatively low but interest levels higher (only 25% of the survey respondents thought they were 'knowledgeable' but 53% were 'interested'), provides encouragement to those working to improve public understanding and knowledge of the industry.

Conclusion

Table 6 summarises the original project objectives and provides details on achievements against each planned outcome.

Table 6 Summary of project achievements against objectives

Objective	Details of achievements
1 Conduct focus groups with selected sub-groups of the Australian public to serve as a basis for developing a structured survey instrument	Seven focus groups completed in November and December 2001 Results reported on pp.31-41
2 Develop the survey instrument in discussion with the advisory group, conduct a pilot, and administer the survey to a statistically representative sample of the Australian adult population	Survey developed, piloted and administered in September 2002. Statistical representativeness tested by comparison with ABS population statistics on age and income Results discussed on pp.41-65
3 Identify the implications of the survey findings for industry communication, education and marketing activities	Implications discussed on pp.67-71
4 Identify the implications of survey findings for ESD monitoring and reporting frameworks	Implications discussed on pp.70-71
5 In discussion with the advisory group, develop options and strategies for addressing negative perceptions of the industry	Seeking comment and further development of options proposed in draft report, pp.73-76
6 Communicate overall survey results to stakeholders in a meaningful and useful form.	Summary report being prepared for distribution to stakeholders mid-2003

The project achieved its objectives in providing baseline data on community perceptions of the industry and raising many issues that warrant further examination. In particular it provided a number of lessons for industry communication and marketing activities, and confirmed previous impressions that many Australians have a poor image of the wild-catch sector.

The findings raise issues for government and industry communication strategies. These sectors face challenges in better engaging with the mass media and enlisting

support from high profile individuals or organisations to help improve the perceived credibility of their messages and to get these messages out to larger numbers of people.

Survey findings provide indications of the likelihood of influencing seafood purchasing behaviour through reducing prices, and by using a range of types of labelling and certification. These warrant further investigation and use by relevant industry sectors, and provide encouragement for developing and extending eco-labelling schemes like the MSC certification scheme.

Further work is needed to disseminate project findings and see that they are used and applied by government and industry stakeholders.

The project demonstrates the usefulness of undertaking broadly based social survey work to understand community views about natural resource uses and the industries dependent on them. The value of work like this could be enhanced by industry and government commitments to repeat surveys at regular intervals to give insights into ongoing social trends influencing natural resource uses and changing public perceptions of these uses.

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Appendix 1 Intellectual property

Other than the normal copyright protection for this report, no intellectual property issues have been identified.

Appendix 2 Staff

The following BRS scientific staff worked on this project:

Dr Heather Aslin, Senior Scientist
Mr Ian Byron, Scientist.

The principal BRS managers and administrative staff who were involved were:

Dr Allan Curtis, Program Leader, Social Sciences Program
Ms Melanie Fisher, Executive Manager
Ms Anne Maree Casey, Executive Officer, Social Sciences Program
Ms Caroline Makings, Project Support Officer
Ms Tina Ryan, Finance Officer
Ms Jasmine Green, Finance Officer
Mr Peter Ryan, BRS Contracts Manager.

Appendix 3 Focus groups guide

Community perceptions of the fishing industry

Focus groups guide

Thanks for coming this evening.

(Personal introduction from moderator.)

The discussion this evening is to talk about our impressions of the fishing industry and what it produces, and about any fishing we or our family may have done. The discussion will last about two hours.

This discussion group has been convened as part of a research project funded by the Fisheries Research and Development Corporation, which is a joint fishing industry-Commonwealth Government body. The overall research project is being organised by the Bureau of Rural Sciences, which is a research organisation within the Commonwealth Department of Agriculture, Fisheries and Forestry - Australia.

The research is designed to gain a better understanding of how the community views the fishing industry, so that the industry can attend to any concerns the public has, and improve its future communication, education and marketing activities.

We would like permission to tape-record the discussion for future reference. Is that OK with everyone? Someone from the Bureau of Rural Sciences is here to take notes of the discussion. Is that OK with everyone? No names will be used in reporting the results, so our identity will not be revealed in the final research report.

Would anyone like any further background information about the research before we start the discussion?

Introduction and personal behaviour

1. When we hear the words fishing and the fishing industry, what comes to mind?

Prompt: Commercial fishing of wild fish and other freshwater or marine animals like prawns
Aquaculture
Traditional fishing by Aboriginal and Torres Strait Islander people
Recreational fishing

2. Does anyone have a good fishing story?

3. Do we or any members of our family do any fishing? If so, where do we go and what do we catch?

4. What are the good things and bad things about going fishing?

5. When we go fishing what are the benefits or costs involved? We could be talking about financial benefits or costs here, or other aspects like personal enjoyment or time taken away from other activities.

Attitudes and beliefs about the fishing industry

6. What are our impressions of:
   - Commercial fishing of wild fish and other freshwater or marine animals like prawns
   - Aquaculture
   - Traditional fishing by Aboriginal and Torres Strait Islander people
   - Recreational fishing

   Prompt: good things, bad things about each

Now we are going to talk about the benefits and costs of the various aspects of the fishing industry to society generally.

- What kinds of wider benefits come to mind when we talk about fishing? We could be talking about social, economic or environmental benefits, or other types as well.
- What kinds of wider costs come to mind when we talk about fishing? We could be talking about social, economic or environmental costs, or other types as well.

7. How do we feel the various aspects of the fishing industry interact with other activities taking place in the marine and coastal zone, or in rivers and lakes that are fished?

8. There is a lot of talk these days about sustainability and whether we can continue to use resources the way we are doing at present.

- Do we feel the fishing industry's activities are sustainable or not?
- Do we feel the way we are fishing and the quantities of fish we are catching commercially in Australian waters at present will be able to continue as they are into the future, or are they likely to change?
- What about fishing by Aboriginal and Torres Strait Islander people? Will it be able to continue as it is into the future do we feel, or not?
- And recreational fishing? Will it be able to continue as it is into the future do we feel, or not?
- Aquaculture? Will it be able to continue as it is into the future do we feel, or not?

9. Who do we feel is responsible for ensuring that the fishing industry's use of marine and freshwater resources is sustainable?
   Prompt: Government, the Public, the Fishing Industry, recreational fishers?

Knowledge and sources of information

10. Now focussing on our levels of knowledge about the fishing industry, using a scale of 1-10 where 1 means know nothing about the fishing industry and 10 means know everything about the fishing industry how would we rate our level of knowledge about the fishing industry
    Moderator ask each participant to share score and reason they gave that score

11. Where do we get information from about the fishing industry? How did we find out what we do know about the fishing industry?
- Is it from personal experience; talking to friends or relatives; from television, radio or newspapers; or from some other source?

- Did we learn anything about the industry at school, college or university?

12. What do we feel are the most reliable sources of information about the industry?

13. 13.Now focussing on our levels of interest in the fishing industry, using a scale of 1-10 where 1 means extremely uninterested about the fishing industry and 10 means extremely interested in the fishing industry how would we rate our level of interest in the fishing industry

    Moderator ask each participant to share their scores and give reasons why they gave that score

- How relevant or not relevant is the fishing industry?

Seafood and other product use

14. When we hear the term 'seafood' what comes to mind?

15. What sorts of seafood do we or our family eat? And where do we get it? If we buy seafood, do we know where it comes from?

16. What are the benefits or costs that come from using seafood?

17. Do we use any other products that the fishing industry produces?

Prompt: pet food, medicines, food additives, oils, or other kinds of products that come from marine or freshwater animals like pearls for example.

Other comments

18. Are there any other matters related to the fishing industry that we would like to mention that haven't been covered?

Many thanks for taking part in the group tonight.

If anyone would be interested in being sent a summary of the research findings when they are completed please let me know?

(*If yes, record participant's contact details*)

Hand out incentives and business cards

Appendix 4 Survey instrument

Community perceptions of the fishing industry
Questionnaire for telephone interviews

[Preamble]

Good (…), my name is (…) from Colmar Brunton Social Research. Today we are doing a survey about the fishing industry in Australia. We are doing the survey for the Bureau of Rural Sciences. The survey will help us to understand the needs and perceptions of people about fishing in Australia. The interview will only take about 15 minutes.

Could I please speak to the person in the household who is over 18 years and who celebrated the last birthday?

☐1 Yes, that is the current individual **(Continue)**
☐2 Yes, and gets eligible respondent **(repeat preamble and continue)**
☐3 No **(Thank and close)**

In this kind of research there are no right or wrong answers, it is your own opinion and thoughts that matter. Any comments or answers you make are totally confidential and will not be linked to you in any way. At the end of the survey all answers will be put together and reported on in a general way.

Do you have time to talk now?

IF RESPONDENT HAS TIME TO TALK CONTINUE, IF NOT MAKE AN APPOINTMENT

IF RESPONDENT DOES NOT WANT TO PARTICIPATE, THANK AND CLOSE.

CALL BACK DAY: _____ TIME: _____

FIRST NAME: _____

In this survey, we are going to be talking a lot about the 'fishing industry'. Before we begin, we would like to explain to you what we mean by the 'fishing industry'. The fishing industry covers commercial fishing (wild-catch fishing and fish farming or aquaculture (INTERVIEWERS TO PRONOUNCE 'AQUACULTURE' SLOWLY AND CLEARLY, DISTINGUISH IT FROM 'AGRICULTURE'), recreational fishing, and traditional fishing by Indigenous Australians. It covers activities in the sea and in fresh water like rivers, lakes and dams. The commercial sector of the fishing industry involves many activities, including catching and farming fish, shellfish and other marine or freshwater animals; processing fish, shellfish and other products for people to use; and right through to the seafood products you find in shops and restaurants or that are exported to other countries.

Is this definition clear?

- ☐1 Yes
- ☐2 No (REPEAT UNTIL CLEAR)
- ☐9 Don't know (REPEAT UNTIL CLEAR)

[Behaviour]

Over the last twelve months, how often have you gone fishing for recreation, either in the sea or in rivers, lakes, dams or billabongs? (INTERVIEWER RECORD NUMBER)

_____ times over last 12 months

- ☐99 Don't know (VOLUNTEERED)

Over the last five years, have you or any members of your immediate family been involved in the ***commercial*** *sector of the fishing industry,* ***including catching and farming fish, shellfish and other marine or freshwater animals for profit****?*

- ☐1 Yes
- ☐2 No
- ☐9 Don't know (VOLUNTEERED)

Do you eat seafood?

- ☐1 Yes
- ☐2 No [**SKIP TO QUESTON 0**]
- ☐9 Don't know (VOLUNTEERED – SKIP TO QUESTION 0)

[If Yes] *Over the last month, how often did you eat seafood? This could include fresh, frozen, canned or dried fish or other kinds of seafood. (INTERVIEWER RECORD NUMBER. IF RESPONDENTS SAY 'DON'T KNOW', ASK THEM TO ESTIMATE).*

_____ times over last month

- ☐99 Don't know (VOLUNTEERED)

*Where do you **mainly** get the seafood you eat? [DO NOT READ, CODE **ONE** RESPONSE ONLY]*

- ☐1 Buy it at a supermarket
- ☐2 Buy it at a specialist fish shop
- ☐3 Buy it at a fresh fish market
- ☐4 Buy it at a fast food outlet/take-away (other than a fish and chip shop)
- ☐5 Buy it at a fish and chip shop
- ☐6 Buy it at a sit-down restaurant, hotel or club
- ☐7 Catch it yourself
- ☐8 Get it free from friends or family who go fishing
- ☐97 Other (SPECIFY)
- ☐99 Don't know

SKIP TO QUESTION 0

*[**If No**] What is the **main** reason you don't eat seafood? [DO NOT READ, CODE **ONE** RESPONSE ONLY]*

- ☐1 Taste
- ☐2 Concerned about freshness or health risks
- ☐3 Allergy
- ☐4 Difficult to obtain
- ☐5 Cost
- ☐6 Environmental or sustainability concerns
- ☐7 Ethical concerns
- ☐97 Other (PLEASE SPECIFY)
- ☐99 Don't know (VOLUNTEERED)

Thinking ahead to the next twelve months, what do you think is likely to happen to the amount of seafood you buy compared with what you bought over the last twelve months? Do you think it is going to (READ):

- ☐1 Increase
- ☐2 Decrease
- ☐3 Stay about the same
- ☐9 Don't know (VOLUNTEERED)

IF INCREASE OR DECREASE:

Why do you think the amount of seafood you buy over the next twelve months will [AS MENTIONED IN Q0][RECORD RESPONSES VERBATIM. PROBE UNTIL 'NO OTHER REASON']

……..

……..

- ☐99 Don't know (VOLUNTEERED)

ASK ALL

*I am now going to read you a list of things that might influence people to buy more seafood. Using a scale of 1-10, where 1 means 'extremely **unlikely** to influence you' and 10 means 'extremely **likely** to influence you, how likely is it that …READ AND ROTATE ORDER… would influence you to buy more seafood over the next twelve months? (INTERVIEWER READ AND CODE ALL ANSWERS ON 1-10 SCALE)*

	Rating	**Don't know/can't answer (VOLUNTEERED)**
Labelling or certification that seafood is produced in an environmentally friendly way		99
Reduction in prices		99
Improved access to fresh seafood locally		99
Better labelling to allow freshness of seafood to be checked		99
Better advice on how to prepare seafood		99
Labelling or certification that seafood is free from contamination or health risks		99
Greater information about the nutritional benefits of seafood		99

[Attitudes]

Now I am going to read you some statements people have made about the Australian fishing industry. Please remember by 'the fishing industry', we mean commercial wild-catch fishing and fish farming, recreational fishing and traditional fishing. On a scale of 1 to 10 where 1 means 'strongly disagree' and 10 means 'strongly agree', how much do you disagree or agree that…READ AND ROTATE ORDER?

Statement	**Agreement rating**	**Don't know/can't answer (VOLUNTEERED)**
Overall, Australia's fishing industry is well managed		99
There should be strong controls on commercial fishing to protect the environment		99
The wild-catch fishing sector does its best to look after the marine environment		99
There should be more marine protected areas		99
It's important to respect the rights of Indigenous Australians in Australian waters		99

Overfishing by Australia's recreational fishers is a significant problem		99
Overfishing by Australia's commercial fishers is a significant problem		99
Overfishing by indigenous people is a significant problem		99
Management of the fishing industry must include greater consultation with the community about what we want		99
We should not let any foreign fishing vessels at all into Australian waters		99
It is essential that the community makes sure the government manages the fishing industry well		99

I am now going to ask you how sustainable you feel some of the sectors of the fishing industry are. 'Sustainable' means able to continue operating into the future in the way they are now. On a scale from 1 to 10 where 1 means 'very unsustainable' and 10 means 'very sustainable', how sustainable do you think … READ AND ROTATE ORDER…is?

	Sustainability rating	**Don't know/can't answer (VOLUNTEERED)**
Commercial wild-catch fishing		99
Fish farming or aquaculture (INTERVIEWER PRONOUNCE CLEARLY AND SLOWLY, DISTINGUISH FROM 'AGRICULTURE')		99
Recreational fishing		99
Traditional fishing by Indigenous Australians		99

Now I'd like to get an idea of your view about some other things that are likely to affect the fishing industry as a whole. On a scale of 1 to 10 where 1 means 'strongly disagree' and 10 means 'strongly agree', to what extent do you agree that.…READ AND ROTATE ORDER.

Issue	**Importance Rating**	**Don't know/can't answer (VOLUNTEERED)**
Better controls are needed to minimise the risk to Australian marine animals, plants and coastlines from organisms introduced by ships coming from overseas		99
It is important to consider the impact on recreational and commercial fishing before establishing more marine protected areas		99
Most people understand why they shouldn't take undersized or too many fish or other marine animals		99
Better measures need to be taken to prevent illegal		99

fishing in Australian waters by vessels from other countries		
Dolphins, turtles and other non-target species getting caught in commercial fishing nets and fishing lines is not a major problem in Australia		99
There is a lack of information available to the public about the fishing industry as a whole		99
There is a lack of information available to the public about Australian seafood and how it is produced		99

[Knowledge and information]

*On a scale of 1 to 10, where 1 means 'extremely unknowledgeable' and 10 means 'extremely knowledgeable', how would you rate **your knowledge** of the Australian fishing industry as a whole?*

1	2	3	4	5	6	7	8	9	10
Extremely unknowledgeable									Extremely knowledgeable

*On a scale of 1 to 10, where 1 means 'extremely uninterested' and 10 means 'extremely interested', how would you rate **your interest** in finding out more about the Australian fishing industry as a whole?*

1	2	3	4	5	6	7	8	9	10
Extremely uninterested									Extremely interested

*Over the last twelve months, what would you say has been your **main** source of information about the Australian fishing industry? [DO NOT READ. CODE **ONE** RESPONSE ONLY.]*

- ☐1 Television
- ☐2 Radio
- ☐3 Newspapers
- ☐4 Books and magazines
- ☐5 Internet
- ☐6 Libraries
- ☐7 Friends and relatives
- ☐8 Personal experience
- ☐9 Government departments
- ☐10 Recreational fishing groups or clubs
- ☐11 Commercial fishing organisations
- ☐12 Environmental organisations
- ☐13 Universities and research centres

☐14 Didn't get any information about the industry
☐98 Other (please specify)
☐99 Don't know (VOLUNTEERED)

Now I would like to find out how reliable you think information about the fishing industry would be from a range of possible sources. Using a scale of 1-10 where 1 means 'extremely unreliable' and 10 means 'extremely reliable', how reliable do you think the following sources of information about the fishing industry are…READ AND ROTATE ORDER.

	reliability rating	**Don't know/can't answer (VOLUNTEERED)**
Television		99
Radio		99
Newspapers		99
Books or magazines		99
The internet		99
Universities or research centres		99
Government departments		99
Commercial fishing organisations		99
Recreational fishing groups or clubs		99
Indigenous organisations		99
Environmental organisations		99

[Demographics]

We are nearly finished. The following questions are for classification purposes only.

Which of these <u>best</u> describes the place where you usually live? Is it…READ.

*CODE **<u>ONE</u>** ONLY.*

☐1 Capital city
☐2 Large town or regional centre (over 10,000 people but not a capital city)
☐3 Small town or village (under 10,000 people but not on a farm or in the country)
☐4 On a farm or in the country
☐9 Don't know/refused (VOLUNTEERED)

Approximately how far from the coast do you live? DO NOT READ UNLESS UNSURE THEN READ FOR PROMPT. CODE **<u>ONE</u> ONLY.*

☐1 Within 25 KM
☐2 Between 26 and 50 KM
☐2 Between 51 and 75 KM
☐3 Over 75KM
☐4 Don't know/refused (VOLUNTEERED)

Gender (CODE)

☐1Female
☐2Male

*** What was your age at your last birthday?*

_____ age in years
☐99 Don't know/refused (VOLUNTEERED)

*** Last week, did you have a full time or part time job of any kind?*

☐1 Yes (GO TO Q0)
☐2 No (SKIP TO Q0)

☐9 Refused (SKIP TO Q0)

*** Which of the following best describes what you did last week? Was it…(READ. ACCEPT <u>ONE</u> RESPONSE ONLY).*

☐1 Worked for profit or payment (GO TO QUESTION 0)
☐2 Absent on holidays, on paid leave, on strike or stood down temporally

(GO TO QUESTION 0)

☐3 Unpaid work (GO TO QUESTION 0)

☐9Don't know/refused (VOLUNTEERED, SKIP TO QUESTION 0)

Is your position (READ):

☐1 Full time
☐2 Part time
☐9 Don't know/refused (VOLUNTEERED)

SKIP TO Q0.

*** Last week, were you… (READ. ACCEPT <u>**ONE**</u> RESPONSE ONLY.)*

☐1 Looking for full time work
☐2 Looking for part time work
☐3 Not looking for work
☐9 Don't know/refused (VOLUNTEERED)

*** What is the gross income (including pensions and allowances) that your household usually receives each week from all sources? Gross income is your household's income from all sources <u>**before tax**</u>. Was it… (READ. CODE <u>**ONE**</u> ONLY.)*

☐1 Nill income
☐2$1-$199 per week
☐3$200-$399 per week
☐4$400-$599 per week
☐5$600-799 per week
☐6$800-$999 per week

☐7$1,000-$1,499 per week
☐8More than $1,500 per week
☐9Don't know/refused (VOLUNTEERED)

*** What is the highest level of education or qualification you have completed? Is it…*

[READ. CODE ONE ONLY.]

☐1 Year 9 or below
☐2 Year 10 or equivalent
☐3 Year 11 or equivalent
☐4 Year 12 or equivalent
☐5 Trade certificate or apprenticeship
☐6 Diploma
☐7 Bachelor or Honours degree
☐8 Post graduate degree (eg Masters, PhD)
☐9 Don't know/refused (VOLUNTEERED)

** What is your post code?*

Urban/Rural (INTERVIEWER TO CODE FROM LIST)

INTERVIEWER TO CODE

☐1 Metropolitan
☐2 Non-Metropolitan

State (INTERVIEWER TO CODE FROM LIST)

Interviewer to code

	Code
Sydney	01
Rest of NSW	02
Melbourne	03
Rest of Victoria	04
Brisbane	05
Rest of Queensland	06
Adelaide	07
Rest of SA	08
Perth	09
Rest of WA	10
Hobart	11
Rest of Tasmania	12
Darwin	13
Rest of Northern Territory	14
ACT	15

That is the end of the survey. Thank you very much for taking part.

Interviewer's Signature: I certify that I have conducted this interview in accordance with the guidelines set out in the Market Research Society Code of Practice and in accordance with the instructions from Colmar Brunton Social Research. I have thoroughly checked the questionnaire and it is complete in all respects.

Signature: _____

Appendix 5 Technical appendix

[Supplied by Colmar Brunton Social Research (CBSR) on the basis of BRS specifications]

Sampling

The target audience for this survey was the general population of Australia aged 18 years and over.

The total sample achieved was 1,004 members of the general population.

A stratified random sampling approach was followed. Quotas were set for all States and Territories. Telephone numbers were randomly sampled from the electronic white pages using Marketing Pro software. This software contains all white pages information on CD-Rom and is updated annually. The sample was drawn off this disk and sorted into ascending numbers to enable duplicates to be removed. In order to allow for regional analysis, the sample was disproportionate.
Table 1 shows the achieved sample in each state and territory.

Table 1: Sample achieved by State or Territory

	Completed sample (n =)
New South Wales	n=151
Queensland	n=150
Victoria	n=150
South Australia	n=150
Western Australia	n=153
Tasmania	n=100
ACT	n=75
Northern Territory	n=75
TOTAL	**1,004**

To remove the potential for biased selection within households, the 'most recent birthday' method was used to select the respondent within households.

Response rates

Table 2 shows the response rate data and outcome of all sampled numbers from the research.

Table 2: Call outcomes

Call outcome	No. of calls
Total numbers used	20,683
Refused	9,707
Language barrier	173
Quota failure	286
Answering machine	1,538
No answer	3,146
Engaged	289
Appointment made but not completed	50
Invalid numbers (disconnected, business, mobile)	4,490
Completed	1,004

The response rate is calculated to be 9.8% and was calculated as follows:

$$\frac{\text{Total completed interviews}}{(\text{Total completed interviews} + \text{Refused} + \text{Quota failure} + \text{Language barrier} + \text{Appointment not completed})}$$

Statistical accuracy

Table 3 shows the margin of error at the 95% confidence level for each state and territory and for the sample as a whole.

Table 3: Sampling error

	Completed sample (n=)	Margin of error
New South Wales	n=151	+/- 8.0%
Queensland	n=150	+/- 8.0%
Victoria	n=150	+/- 8.0%
South Australia	n=150	+/- 8.0%
Western Australia	n=153	+/- 8.0%
Tasmania	n=100	+/- 9.9%
ACT	n=75	+/- 11.5%
Northern Territory	n=75	+/- 11.5%
TOTAL	**1,000**	**Margin of error for total sample +/- 3.1%**

Weighting

The introduction of state/territory quotas necessitated that the sample results be weighted to ensure they are representative of the overall population. To reflect the population distribution, results were post-weighted to ABS data on:

- gender;
- location (state/territory); and
- location (capital city/rest of state).

Table 4 shows the weighting factors calculated from ABS Census information and applied to the data set.

Table 4: Sample weighting

18+		Raw Pop Data (Counts)	%-N	Raw Sample Data (Counts)	Weighted sample	Weight
Sydney	**Male**	1452067	0.103318991	37	104	2.804
Sydney	**Female**	1537003	0.109362446	38	110	2.889
NSW Rest of	**Male**	854729	0.060816572	38	61	1.607
NSW Rest of	**Female**	889086	0.063261178	38	64	1.671
Melbourne	**Male**	1227913	0.087369751	38	88	2.308
Melbourne	**Female**	1316953	0.093705218	37	94	2.543
VIC Rest of	**Male**	452961	0.032229555	37	32	0.875
VIC Rest of	**Female**	477370	0.03396633	38	34	0.897
Brisbane	**Male**	577089	0.04106164	37	41	1.114
Brisbane	**Female**	623289	0.044348911	38	45	1.172
QLD Rest of	**Male**	724080	0.051520498	38	52	1.361
QLD Rest of	**Female**	743622	0.052910971	37	53	1.436
Adelaide	**Male**	393276	0.027982786	38	28	0.739
Adelaide	**Female**	427112	0.03039032	37	31	0.825
SA Rest of	**Male**	146423	0.010418443	37	10	0.283
SA Rest of	**Female**	143456	0.010207331	38	10	0.270
Perth	**Male**	477496	0.033975295	37	34	0.922
Perth	**Female**	511641	0.036404816	40	37	0.914
WA Rest of	**Male**	191220	0.013605886	38	14	0.359
WA Rest of	**Female**	175934	0.01251824	38	13	0.331
Hobart	**Male**	67569	0.00480774	25	5	0.193
Hobart	**Female**	74519	0.005302254	25	5	0.213
TAS Rest of	**Male**	95116	0.006767793	25	7	0.272
TAS Rest of	**Female**	99516	0.007080867	25	7	0.284
Darwin	**Male**	40778	0.002901479	19	3	0.153
Darwin	**Female**	37305	0.002654364	19	3	0.140
NT Rest of	**Male**	35557	0.002529989	18	3	0.141
NT Rest of	**Female**	31488	0.002240467	19	2	0.118
Canberra	**Male**	111497	0.007933351	37	8	0.215
Canberra	**Female**	118147	0.008406519	38	8	0.222

Sample verification

The sample was verified against ABS census data on age and income.

Table 5 and Table 6 show comparisons between the sample and ABS census data in terms of age and weekly income. The verification suggests that the sample closely reflects the general population in age, but with some skew away from the youngest and oldest age groups. The verification also suggests that the sample is skewed towards higher socio-economic members of the general public[1]. This skew can be, in part, explained by the fact that the CBSR sample is based on those aged 18 years and older, while the ABS Census data is based on those aged 15 years and older. However, an income skew is a common feature of general population CATI surveys, especially those which use electronic white page sampling, which are by definition skewed towards households with telephones and listed telephone numbers[2].

Table 5: ABS age proportions compared with sample proportions[3]

	Sample	Population
18-24	9	13
25-34	19	19
35-49	32	30
50-64	28	21
65+	13	17

1 A report by the Canadian Fitness and Lifestyle Research Institute found that a general population CATI sample was more likely to be female and to have a university degree, a common occurrence in telephone surveys (Canadian Fitness and Lifestyle Research Institute, 1995 Physical Activity Monitor, 1995, p.2). National Election Studies (NES) conducted in the United States have also found that the surveys, which are conducted in an election year, systematically under-represent those with less than a high school education and low income families (Brehm, John, Technical Report #37: How representative is the 1986 Post-Election Survey?, University of Michigan, May 1987 and Brehm, J, Technical Report #33: Who's missing? An analysis of non-response and under-coverage in the 1986 National Election Studies Post-Election Survey, University of Michigan, December 1987). Despite these systematic biases, the Policing and Reducing Crime Unit of the UK Home Office found that CATI surveys are significantly more representative of the general population than postal surveys (Kershaw, C and Myhill, A., Briefing note 8/01: Conducting Community Surveys: Results of a Feasibility Study, the Policing and Reducing Crime Unit, Home Office, London, July 2001).

2 A study in New Zealand conducted in the early 1990s cited evidence that households without telephones or with unlisted telephone numbers are more likely to be composed of younger people, people who are never married, separated or divorced, people living in rural areas and those with lower socio-economic status (Esslemont, D., Petersen, S., and Selvakumar, K.S., 'Telephone directories as sampling frames', Marketing Bulletin, 1992, Vol.3 (38-46).

3 Weighted figures

Table 6: ABS income proportions compared to current data proportions[4]

	Sample	Population
Nill income	2	7
$1-$199 per week	5	23
$200-$399 per week	18	23
$400-$599 per week	17	17
$600-799 per week	14	12
$800-$999 per week	12	7
$1,000-$1,499 per week	15	7
More than $1,500 per week	18	4

Fieldwork Methodology

Data collection method

Interviews were conducted by telephone using Computer Assisted Telephone Interviewing (CATI) methodology. *OzQuest* software is utilised for all CBSR CATI work.

Time to complete

On average, completion of the survey took 17.49 minutes.

Fieldwork dates

All fieldwork was completed between 11 and 25 September 2002.

Field work procedures

Once the questionnaire was finalised, it was programmed into CATI. The CATI programmer and the CBSR senior researcher then each separately checked the draft CATI script. Any changes that were required were implemented and the checking was repeated until the script was ready for implementation.

The survey was preceded by a briefing, which involved:

- training of the supervisors and interviewers by the CBSR Senior Researcher, of one hour;
- a thorough discussion on the background to the study and the intent of the survey, including concepts and terms surrounding the topic;
- a discussion of each question and details of the intent of these questions;
- briefing on how to handle unusual answers;
- provision of written instructions and reference material; and
- practice interview as an initial familiarisation with the flow and sequence of questions.

[4] ABS census proportions are based on population statistics for individuals aged 15 years and over.

A representative from the Bureau of Rural Sciences, AFFA, attended the briefing, which was held on 11 September 2002.

The survey was continually monitored in field, with:

- initial interviews by CATI with supervisors overseeing any problems with the sample or the questionnaire;
- recognition by all interviewers and supervision of the respondent's right to: confidentiality; not take part in the research and withdraw from the interview at any time;
- on-going reference to interview length, quotas and interviewer achievement rates; and
- CATI controlled call backs at different times of the day and different days of the week to numbers where an initial call did not achieve a contact.

CBSR treated the first 20 interviews in the survey as a pilot. For these pilot interviews, interviewers gathered feedback from respondents about the survey itself, after they had completed it. Respondents were asked:

- How did you feel about the survey overall?
- Which questions, if any, were difficult to answer?
- Which questions, if any, made you feel uncomfortable?

The CBSR senior researcher then scrutinised the verbatim responses to these questions and gathered information from the field team about how the survey worked. The findings from the pilot suggested no significant problems with the questionnaire.

Colmar Brunton has highly trained and experienced fieldwork teams operating in Sydney and Melbourne, as well as Auckland, New Zealand. We operate a Computer Assisted Telephone Interviewing (CATI) facility, using *Surveycraft* software, which provides an integrated microcomputer-based system. For this study, interviews were conducted out of the Sydney facility.

Interviews were conducted during the daytime or evenings, weekdays and weekends For this study, up to 8 call-backs were made before a sample unit was classified 'dead'.

Colmar Brunton has achieved Interviewer Quality Control Australia (IQCA) accreditation in Computer Assisted Telephone Interviewing (CATI). This means detailed procedures and manuals have been put in place for all aspects of survey work:

- IQCA is an industry initiative that ensures that clients buying research from accredited organisations receive quality interviewing;
- fieldwork integrity is the cornerstone of reliable research: if the interview is faulty all subsequent information can be flawed;
- IQCA accreditation represents a significant step towards the broader goal of Quality Assurance under the AS3900 series;

- buyers of market research services from IQCA accredited companies can be assured that the company is bound to observe the International Code of Marketing and Social Research Practice and that the company's procedures for training and supervising interviewers conform to stringent international standards for data collection;
- interviewers are required to have formal and on the job training against a comprehensive curriculum and records are maintained by the company and the individual;
- Identity Cards and an Interviewer Manual are issued to interviewers who are subsequently observed by their supervisors annually. Supervisors themselves are also subject to annual appraisal;
- fieldwork supervisors validate at least 10% of interviews in each survey. Details are recorded in a job summary report which also includes initial information about the survey itself; and
- accredited companies without fieldwork facilities of their own are bound by separate rules to employ IQCA accredited fieldwork companies.

It is a requirement at Colmar Brunton that detailed documentation accompaies all projects that involve fieldwork. This documentation includes:

- briefing notes and instructions for interviewers and supervisors;
- quota sheets; and
- contact sheets that record the outcome of every attempt to contact a particular respondent.

Telephone audits were carried out on at least 10% of each interviewer's work. This involves the auditor:

- confirming that the interview took place;
- confirming the answers to at least three of the questions in the questionnaire;
- checking adherence to respondent selection procedure; and
- gathering feedback on interviewer's manner.

This process is centralised to ensure uniformity of standards and total impartiality of auditors.

Appendix 6 Survey data

Question response data

Frequency of recreational fishing over the last 12 months	n	% of respondents
Once a year	429	15%
Between 2 and 5 times a year		31%
Between 6 and 10 times a year		24%
Between 11 and 20 times a year		17%
More than 20 times a year		23%

Frequency of seafood consumption over the last month	n	% of respondents
Once a month or less	951	7%
Between 2 and 4 times a month		38%
Between 5 and 8 times a month		33%
Between 9 and 12 times a month		13%
More than 12 times a month		9%

Main points of purchase for seafood products	n	% of respondents
Supermarket	1003	49%
Specialist seafood shop	1004	26%
Fresh seafood market	1004	20%
Catch yourself	1004	17%
Restaurant, hotel or club	1004	14%
Fish and chip shop	1004	13%
From friends or family who go fishing	1004	5%
Fast food outlet (other than fish and chip shops)	1004	1%

Main reasons for not eating seafood	n	% of respondents
Taste	1004	51%
Allergy		24%
Ethical concerns		12%
Cost		2%
Environmental or sustainability concerns		2%
Concerned about freshness or health risks		0%
Difficult to obtain		0%

Factors likely to influence increased purchase of seafood	n	Highly likely/Likely	Neutral	Highly unlikely/Unlikely
Reduction in prices	981	70%	14%	16%
Labelling or certification that seafood is free from contamination or health risks	982	65%	18%	17%
Better labelling to allow freshness of seafood to be checked	976	59%	19%	22%
Labelling or certification that seafood was produced in an environmental friendly way	981	57%	19%	24%
Improved access to fresh seafood locally	977	47%	18%	25%
Better advice on how to prepare seafood	988	40%	25%	35%
Greater information about the nutritional benefits of seafood	987	39%	26%	35%

Statement	n	Strongly agree/Agree	Neutral	Strongly disagree/ Disagree
There should be strong controls on commercial fishing to protect the environment	997	88%	8%	4%
It is essential that the community makes sure the government manages the fishing industry well	996	87%	9%	4%
We should not let any foreign fishing vessels at all into Australian waters	986	83%	9%	8%
Management of the fishing industry must include greater consultation with the community about what we want	1000	79%	14%	7%
There should be more marine protected areas	966	75%	18%	7%
It's important to respect the rights of Indigenous Australians in Australian waters	992	65%	22%	13%
Overfishing by Australia's commercial fishers is a significant problem	902	65%	23%	12%
Overall, Australia's fishing industry is well managed	827	40%	38%	22%
The wild-catch fishing sector does its best to look after the marine environment	930	36%	38%	26%
Overfishing by Australia's recreational fishers is a significant problem	938	32%	26%	42%
Overfishing by indigenous people is a significant problem	899	13%	17%	70%

Sustainability of industry sectors	n	Very sustainable/ Sustainable	Neutral	Very unsustainable/ Unsustainable
Fish farming or aquaculture	972	77%	19%	4%
Traditional fishing by indigenous Australians	899	64%	27%	9%
Recreational fishing	953	56%	28%	16%
Commercial wild-catch fishing	884	25%	37%	38%

Issues	n	Strongly agree/ Agree	Neutral	Strongly disagree/ Disagree
Better controls are needed to minimise the risk to Australian marine animals, plants and coastlines from organisms introduced by ships coming from overseas	971	92%	6%	2%
Better measures need to be taken to prevent illegal fishing in Australian waters by vessels from other countries	995	90%	7%	3%
It is important to consider the impact on recreational and commercial fishing before establishing more marine protected areas	979	72%	16%	12%
There is a lack of information available to the public about the fishing industry as a whole	953	66%	21%	13%
There is a lack of information available to the public about Australian seafood and how it is produced	947	63%	23%	14%
Most people understand why they shouldn't take undersized or too many fish or other marine animals	987	56%	17%	27%
Dolphins, turtles and other non-target species getting caught in commercial fishing nets and fishing lines is not a major problem in Australia	938	15%	15%	70%

Main sources of information about the fishing industry utilised by respondents	n	% of respondents
Television	1004	54%
Newspapers		45%
Radio		17%
Books and magazines		15%
Friends and relatives		14%
Personal experience		8%
Recreational fishing groups or clubs		6%
Internet		5%
Didn't get any information		5%
Government departments		4%
Commercial fishing organisations		2%
Environmental organisations		2%
Universities and research centres		1%
Libraries		1%

Reliability of information	n	Very reliable/ reliable	Neutral	Very unreliable/ unreliable
Universities or research centres	894	77%	15%	8%
Books or magazines	920	59%	31%	10%
Environmental organisations	919	59%	24%	16%
Recreational fishing groups or clubs	914	54%	29%	17%
Government departments	929	49%	28%	23%
Television	957	44%	37%	19%
The internet	706	44%	35%	21%
Radio	919	40%	39%	21%
Newspapers	949	40%	39%	21%
Indigenous organisations	817	37%	36%	27%
Commercial fishing organisations	903	35%	32%	33%

Demographic data

Usual place of residence	n	% of respondents
Capital city	1004	53%
Large town/regional centre (over 10,000)		27%
Small town/village (under 10,000 but not farm)		13%
On a farm or in the country		7%

Distance lived from coast	n	% of respondents
Less than 25kms	1002	65%
Between 26-50kms		18%
Between 51-75kms		4%
Over 75kms		13%

Age (years)	n	% of respondents
Under 21	994	5%
21-30		17%
31-40		21%
41-50		20%
51-60		18%
61-70		11%
71-80		6%
Over 80		2%

Highest level of education	n	% of respondents
Year 9 or below	986	7%
Year 10 or equivalent		18%
Year 11 or equivalent		7%
Year 12 or equivalent		19%
Trade certificate or apprenticeship		11%
Diploma		11%
Degree		19%
Post Graduate Degree		8%

Full time/part time job	n	% of respondents
Yes	999	58%
No		42%
Full time	549	64%
Part time		36%

Work done in last week	n	% of respondents
Worked for profit or payment	575	91%
Absent/holidays/strike/stood down		4%
Unpaid work		5%

If not employed	n	% of respondents
Looking for full time work	418	7%
Looking for part time work		5%
Not looking for work		88%

Goss household income	n	% of respondents
Nil income	712	2%
$1-$199 per week		5%
$200-$399 per week		18%
$400-$599 per week		17%
$600-$799 per week		14%
$800-$999 per week		12%
$1000-$1499 per week		15%
Over $1500 per week		17%