Australian Government

Department of Agriculture, Fisheries and Forestry

THE 2000-01 NATIONAL RECREATIONAL FISHING SURVEY

ECONOMIC REPORT

D. Campbell and J. J. Murphy

Australian Government

Fisheries Research and Development Corporation

Natural Heritage Trust

Helping Communities Helping Australia

An Australian Government Initiative

Australian Government

Department of Agriculture, Fisheries and Forestry

THE 2000-01 NATIONAL RECREATIONAL FISHING SURVEY

ECONOMIC REPORT

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NSW Department of Primary Industries

A Fisheries Action Program Project
(Natural Heritage Trust)

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The 2000-01 National Recreational Fishing Survey Economic Report

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FOREWORD

It gives me great pleasure to introduce to you the second installment of *The National Recreational and Indigenous Fishing Survey.* This Economic Report clearly illustrates the important role angling plays in many coastal communities around Australia.

I am pleased that the Howard Government has been able to support recreational fishing in Australia. I believe that the $2.4 million that the Australian Government provided to this project has been a worthwhile investment. Through it, we have rigorously confirmed – for the first time - that around one in five Australians "wet a line" every year and spend around $1.8 billion on travel, boats and equipment.

As the figures indicate Australia obviously has some great fishing, and I am pleased that the new Recreational Fishing Community Grants Programme will be able to enhance the recreational fishing experience nationwide.

The grants programme consists of $15 million over three years and can be used for a wide variety of projects to improve the recreational fishing experience. This might include resnagging your local creek, adding hand rails or a fish cleaning area to your boat ramp, or even building an artificial reef.

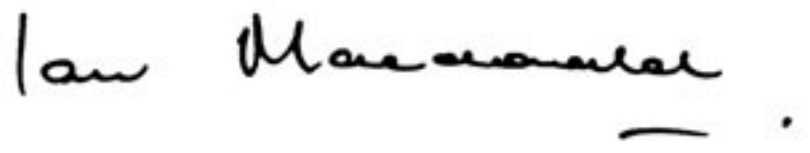
My government is committed to continuing to work with all sectors of Australia's fishing community including the commercial, charter, recreational and indigenous sectors. I am aware that though there are differences between the goals and aspirations of these sectors, there is an important underlying bond that unifies all Australian fishers. That is, the recognised need for sustainable fisheries to underpin all the different kinds of fishing that are undertaken in this vast country of ours.

I am confident the ever-increasing body of knowledge on Australian fisheries and fishers will continue to foster a co-operative and dynamic response to the fisheries management and harvesting challenges that face Australia now and into the future.

The complete Recreational and Indigenous Fishing Survey will play an important part in providing some of the foundation data that is required to base good decision-making on.

I hope everyone who uses this document will find it as useful as I have.

Good fishing and I hope to see you on the water.



Ian Macdonald
Australian Government Minister for Fisheries, Forestry and Conservation

ACKNOWLEDGEMENTS

As acknowledged in *The National Recreational and Indigenous Fishing Survey*, a number of people and organisations were important in bringing the national survey to fruition. These include senior research and management staff from Commonwealth, state and territory government agencies, and representatives from recreational fishing associations. Of particular importance were those respondents who contributed to the study by providing background family information and those fishers who participated in the survey and shared their fishing experience over the duration of the survey.

Of importance to this report were the comments provided by Dana Hanna, Australian Bureau of Agricultural and Resource Economics (ABARE); Jeremy Lyle, Tasmanian Aquaculture and Fisheries Institute; Dennis Reid, New South Wales Department of Primary Industries; and Lyn Brown, Australian Government Department of Agriculture Fisheries and Forestry. The maps used in this report were provided by John Matthews from the New South Wales Department of Primary Industries.

This project received funding from the Fisheries Action Program of the Natural Heritage Trust, the Fisheries Research and Development Corporation and State fisheries agencies. The Australian Government Department of Agriculture, Fisheries and Forestry administered the project.

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This report is a companion to *The National Recreational and Indigenous Fishing Survey*, released in July 2003 (Henry and Lyle), which provides a detailed background for the survey and the methodology used to collect recreational fishing data. The economic results released in July 2003 are examined in more detail in this report and some revisions have been made. This report refers only to the recreational fishing component of the 2003 report. For reasons of completeness, the expenditure information presented in the 2003 report is included in this report.

OBJECTIVES

The primary objective of the recreational fishing component of *The National Recreational and Indigenous Fishing Survey* was to collect nationally consistent and comparable fishery statistics (fish catch, fishing effort, species composition, expenditure) for the non-commercial components of Australian fisheries. The survey also collected information on the number of fishers, their demographic profile, expenditure associated with fishing and the attitude and awareness of fishers to prominent fisheries management issues.

The specific relevant objectives of the project were:

- To determine the participation rate in recreational fishing nationally, by states and territory and regionally, and profile the demographic characteristics of recreational fishers.
- To quantify catch and effort of the recreational fishing sector nationally, by state and territory and, where appropriate, regionally.
- To collect data on expenditure by the recreational fishing sector nationally, by state and territory and regionally.

The survey was a joint initiative of Australian and State governments. Funding from the Natural Heritage Trust, Fisheries Research and Development Corporation, state and territory fisheries agencies supported the project.

RESULTS

The recreational fishing component of *The National Recreational and Indigenous Fishing Survey* monitored fishing and fishing-related expenditure activities between May 2000 and April 2001, and generated a statistically robust set of expenditure and catch data. The results in this report show the level of attributable expenditure on goods and services; the geographic and seasonal distribution of that expenditure; the likely economic activity according to waters fished; the distribution of catch and expenditure according to demographic characteristics, employment; Aboriginal and Torres Strait Islander regional location and an example of applying the data set to a large regional fishery.

Attributable expenditure is the basis of the expenditure estimates. Clearly, not all associated expenditure can be closely linked with fishing. For those expenditure items and services wholly or partly associated with recreational fishing, such as fishing gear, transport and accommodation, respondents were asked to provide an estimate of the proportion attributed to recreational fishing.

The survey results indicate that 3.36 million fishers participated in recreational fishing during these twelve months. Estimated expenditure on services and items that was attributed to recreational fishing was $1.85 billion over the survey period. This involved 20.6 million fisher days of effort and the harvesting of 138 million aquatic animals.

Regional attributable expenditure was generally related to the size of the population and the number of fishers. New South Wales had the largest expenditure ($554 million), followed by Victoria ($396 million) and the Australian Capital Territory the smallest ($19 million). The national average attributable expenditure was $552 per fisher per annum, with the highest per capita expenditures in Victoria ($721) and Western Australia ($706) and the lowest in the Australian Capital Territory ($362).

Attributable expenditure on boats and trailers ($940 million) was the largest individual expense for fishers, accounting for half of all expenditure. Travel associated with fishing ($395 million), fishing gear ($183 million) and camping gear ($134 million) followed in importance. More than 45 separate items of expenditure attributable to recreational fishing were recorded during the survey.

Fifty eight per cent of the estimated attributable expenditure ($1,077 million) was made by residents from capital cities, although they made up only 50 per cent of recreational fishers. The remaining 50 per cent of fishers expended $778 million.

Expenditure by out-of-state residents was estimated at $128 million, or eight per cent of total attributable expenditure. Attributable expenditure by out-of-state residents was particularly important in the Northern Territory, where it accounted for 30 per cent ($8.7 million), and in Queensland, where it accounted for 24 per cent ($78.6 million). However, 60 per cent of attributable expenditure was estimated to have occurred within 40 km of the recreational fisher's residence ($1,123 million).

Monthly attributable expenditure was between $100 million to $150 million per month except for December, when it reached nearly $250 million. Forty eight per cent of expenditure was estimated as being attributed to fishing in marine waters ($897 million), 32 per cent in estuarine areas ($598 million) with only 20 per cent ($360 million) being attributed to fishing in inland waters.

The largest proportion of attributable expenditure ($818 million or 44 per cent) and most of the kept catch was by high avidity fishers. These fishers made up only 15 per cent of the fisher population.

The highest average level of per capita expenditure of $697 was by fishers who were fully employed trades-people. Part time employed had the highest retained catch at an estimated 72 fish during the survey period.

It was estimated that around 186,200 Aboriginal and Torres Strait Islanders (excluding the Torres Strait Islands) participated in non commercial fishing. On a per capita basis, Aboriginal and Torres Strait Islander fishers were estimated to have spent about one sixth, or $120 of the average attributable expenditure that was spent by the remainder of the community.

It is concluded that the national survey achieved the goal of collecting a nationally consistent and comparable fishery statistics data set for the non-commercial component of Australian fisheries. In so doing, recreational fishing was shown to be an important recreational and economic activity.

INTRODUCTION AND METHODOLOGY

1.1: Introduction

In the twelve months May 2000 – April 2001, 3.3 million Australian recreational fishers aged five years and older spent an estimated $1.85 billion attributable to their participation in recreational fishing. This involved 20.6 million fisher days of effort and the harvest of 136 million aquatic animals.

This report is a companion to *The National Recreational and Indigenous Fishing Survey*, released in July 2003 (Henry and Lyle), which provides a detailed background for the survey and the methodology used to collect recreational fishing data and the process by which the data was expanded to the national population (also see Lyle, Coleman, West, Campbell, and Henry 2002). The following survey context and methodology, is a summary of that provided by Henry and Lyle (2003). For reason of completeness, the expenditure information presented in the 2003 report is included in this report.

In addition to providing a summary of expenditure attributable to recreational fishing we demonstrate some of the policy issues to-which the data might be applied. It is worth emphasising the strengths of the data set collected in the National Recreational Fishing Survey. In particular, the care and efforts taken to establish a robust data set including the mitigation of non-statistical error[1]. The survey involved multiple interviews with respondents over a twelve month period, thus making it a unique data set.

1.2: Survey context and methodology

1.2.1: Objective

The objective of the National Recreational Fishing Survey was to collect nationally consistent and comparable recreational fishery statistics (fish catch, fishing effort, species composition and expenditure data) for the non-commercial components of Australian fisheries.

1.2.2: Survey structure

The scope of the survey was the recreational fishing activity for those aged five years and older resident in private dwellings. Recreational fishing was defined as the capture or attempted capture of aquatic animals[2] in Australian waters other than for commercial purposes. The survey included the collection of species caught, fishing behaviour and expenditure data. The population sample of private households was taken from that listed in the white pages telephone directory. The sample was based on a single-stage cluster sampling, where the randomly selected household was the primary sampling unit and those household members expecting to participate in recreational fishing, formed the secondary unit. As a nation wide survey, the data can only be applied to: states, territories, to larger regions/fisheries and to the more common fish species.

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1 Particular acknowledgement must be given to Laurie West and Jeremy Lyle, in this regard.
2 The term ‘fish’ is used in this report in refer to aquatic animals in general in addition to those species having gills and fins. The context in which the term is used will differentiate the intended use.

Approximately 44,000 households were selected. All sampled households were given a structured screening survey prior to inviting those household members likely to participate in recreational fishing in the following 12 months, to participate in the ongoing 'diary' survey. All survey participants were provided with a survey kit including a diary, which was provided as a memory aid, as data was collected by telephone. Telephone interviews were held with co-operating diarists at least once monthly, with more frequent contact made with avid fishers.

A supplementary survey was used to obtain additional expenditure data on food and drink and vehicle expenses (fuel, oil, repairs and maintenance) for fishing related activities that had occurred 'away from home' (greater than 40 km by road). However, without substantial reworking, the data were found to be unsuitable for inclusion in this report.

1.3: Use of recreational fisher expenditure data

1.3.1: The nature of the expenditure data

In providing expenditure information, respondents identified the item or service provided, the price paid, and when and where the expenditure occurred. Apart from private vehicle travel, dollar values were collected for items or services. For practical reasons, distance travelled was employed for private vehicle travel and a rate of $0.50 per kilometre (provided by the National Roads and Motorists Association - NRMA), applied to cover vehicle capital costs and running costs. Consequently, vehicle expenditures, including fuel and oil, have not been identified according to where they occurred.

The survey data set includes attributable expenditure by recreational fisher households, including items and services that may not have been wholly 'consumed' during the reference period (e.g. capital expenditure on a fishing reel used over many years). Conversely, certain items and services that were 'consumed' during the survey period,
but purchased previously, were routinely excluded.

In collecting expenditure data, it was not possible to maintain an explicit link between the expenditure and fishing events (see Section 1.3.3). However, implicit links may be established between expenditure and classes of fishing events. Explicit links exist with the respondent's socio-economic characteristics including age, gender, ethnicity, employment and home location, and location of expenditure on an item or service and time of year in which the expenditure occurred.

Items excluded from the economic analysis include motor vehicle purchases, real estate purchases and communication costs (telephone, postage and internet).

1.3.2: Attribution of expenditure

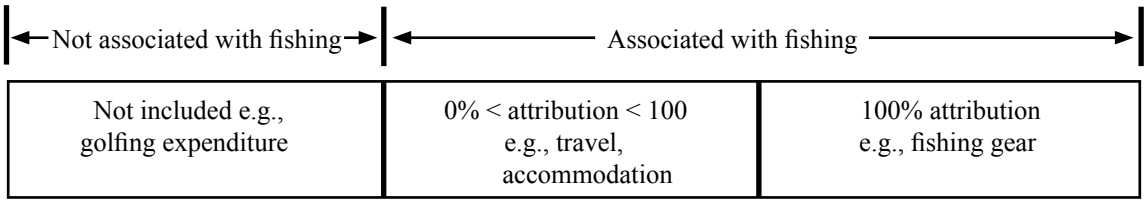
Recreational fishing is a form of activity involving the consumption of publicly, privately and environmentally provided commodities and services by people who travel to destinations away from their normal place of accommodation or work (Corcoran *et al*, 1998). A recreational trip that includes fishing might involve an individual or a group and might be for the sole purpose of recreational fishing or for a range of other activities in addition to recreational activities.

It is important to separate expenditure that occurred as a result of participation in recreational fishing from that which occurred as a result of participation in other activities. To try and allow for this, respondents were asked to provide an estimate of the proportion of their expenditure *associated* with fishing that they thought to be *attributable* to recreational fishing – as against any other activity incurred on the fishing trip or any other future use to be made of the item or service purchased[3].

Attribution of expenditure relates to the recreational choice and to the use made of the expenditure item or service, as assessed by the respondent. For those expenditure items and services wholly or partly associated or explained by participation in recreational fishing, such as fishing gear and transport, respondents were asked to provide an estimate of that proportion of the associated expenditure they attributed to recreational fishing (Figure 1.1).

No data were collected for those expenditure items and services that had no association with recreational fishing, such as golf green fees. At the time of the interview, it was carefully explained to respondents that all activities by all people benefiting from their expenditure needed to be taken into account in making this assessment. Attribution, then, was on the basis of the respondent's assessment of their own expenditure and the use made for recreational fishing of the items and services purchased, by everybody on that trip.

Figure 1.1: **Relationship between associated and attributable expenditure**



Some uncertainties remain in the use of attributable expenditure data. A difficulty in the collection of attribution data within the context of a fishing survey is that respondents are likely to be more aware of recreational fishing than of other activities. Thus there is potential for respondents to provide a higher level of attribution to recreational fishing than would occur were they to provide an estimate in an activity neutral context. The possible impact of such non-sampling error is unknown.

In addition to these concerns, there is a tendency to attribute all expenditure incurred when participating in recreational fishing to the fish catch. Recreational fishing, however, is a compound activity made up of a number of components in addition to the fish catch. All of these components affect the level of enjoyment achieved. An indication of the relative importance that fishers may give to catching fish when participating in recreational fishing is provided in Table 1.1.

3 Consideration was given to asking respondents to attribute expenditure to expected participation in recreational fishing. However, it was considered that actual participation in recreational fishing would be more consistent and easier to replicate.

Table 1.1: **Importance of factors to do with recreational fishing motivation (% of respondents)**

Motivation	Importance of rating			
	Very	Quite	Not very	Not at all
Relax and unwind	63	27	8	2
To be outdoors	58	33	7	2
For solitude	19	23	35	24
To be with family	39	30	19	13
To be with friends	32	41	17	10
Fishing competition	2	3	11	84
Fish for sport	48	34	12	5
Fish for food	33	28	25	14

From Lyle, Henry, West, Campbell, Reid and Murphy (2003, p. 96). Note: Respondents were given the option to give an 'unsure' response. No respondents provided an 'unsure' response.

1.3.3: Economic characteristics

The economic characteristics of the expenditure data will affect how the data can be used and the policy inferences that might be drawn from use of the data. Expenditure on items, such as bait, berley, fuel, and services such as fishing guides and accommodation, vary with fishing effort and the distance of the fishing trip from home. Other expenditure items, such as fishing gear, boats, boat trailers, camping gear and annual fees and licences are constant or fixed regardless of the amount of fishing effort. Accordingly, the amount of expenditure incurred on such items/services cannot be explained by or attributed to a particular fishing trip and are fixed capital costs. Data on expenditure for food and drink was not included as attributable to participation in recreational fishing, as expenditure on such items would have occurred in any case. This is discussed in greater detail below.

The variable/fixed dichotomy is more complex than this dichotomy indicates. For example, if a fisher hires or leases rather than buys a capital item, such as a boat, diving equipment or camping gear, the amount of expenditure varies according to the level of fishing effort or number of days the item is hired. Expenditure in these instances is a variable cost. In addition, the concept of 'user cost' (Keynes, 1936, Scott 1967), which is a measure of the wear-and-tear from the use of a fixed capital item, is used when estimating vehicle cost. That is, vehicle costs involve variable cost inputs such as fuel, oil and repairs and the fixed costs of the vehicle, licences, insurance and holding cost (interest on capital). Vehicle travel expenditure data presented here was estimated on the basis of kilometres travelled multiplied by $0.50, where the kilometre charge includes an allowance for wear-and-tear (user cost) on the basis of distance travelled.

1.3.4: Range of policy issues

Attributable expenditure data, whether used independently or in conjunction with socio-demographic data, species data and fisher behavioural data, may be used to assess a wide range of public and private policy issues and questions. These issues and questions may be separated into two broad groupings:

- Those issues that relate to expenditure that is directly attributable to, or occurred as a result of participating in recreational fishing, regardless of where or when it may have occurred within the survey period. That is, the expenditure, or the amount of expenditure would not have occurred if the respondent had not participated in recreational fishing.

- Expenditure that has occurred at a particular location as a result of participation in recreational fishing, regardless of whether such expenditure would or would not have otherwise occurred. Expenditure on fresh bait and accommodation on the way to or in the vicinity of recreational fishing are both attributable to participating in recreational fishing and occur in a location away from home, as a result of recreational fishing. However, while expenditure on food and drink will occur regardless of whether the respondent is participating in recreational fishing, the location of that expenditure, away from home, will, to some degree, be the result of participating in recreational fishing[4]. The degree to-which such expenditure can be attributed to occurring at a particular site as a result of recreational fishing will be the same as the weighting or attribution given to travel expenditure.

The data presented in this report focuses on expenditure data, providing a summary of the survey results in Chapters 2 and 3, and examples of some of the broad based analysis that might be carried out using the survey data, such as: an assessment of distributional characteristics (Chapter 4) and how the data might be used to assess species and/or regional impacts (Chapter 5). While the economic data can be used to estimate the value placed by recreational fishers on fish catch (see Chapter 6), a summation of expenditure data can not in itself provide a measure of the value that can be placed on recreational fish catch.

4 While expenditure on food and drink when participating in recreational fishing was different to that which would have occurred without having participated in recreational fishing, there is no certainty as to whether difference would have been greater than or less than what would have otherwise occurred. It is likely that accommodation costs does include some expenditure on food and drink. A supplementary survey was used to obtain expenditure data on food and drink and vehicle expenses (fuel, oil, repairs and maintenance) for fishing related activities that occurred ‘away from home’. However, for various reasons, these data were found to be unreliable and is not included in the report.

ATTRIBUTABLE EXPENDITURE ACCORDING TO RESPONDENT'S RESIDENCE

2.1: Attributable expenditure by item and service category

Australian recreational fishers reported attributable expenditure totalling $1.85 billion on more than 45 categories of goods and services. The 45 categories of goods and services, listed in Appendix A, have been grouped into 10 main categories in Table 2.1. At $940 million[5], boats and trailers constituted over half of the estimated total expenditure attributed by respondents to recreational fishing[6]. It was estimated that a third of the total attributable expenditure on boats and trailers was by New South Wales residents, with Western Australia, the next largest, then Victoria and Queensland. On a per fisher basis, the highest attributable expenditure on boats and trailers (derived from Tables 2.1 and 2.2) was by Western Australian residents ($418), followed by Northern Territory residents ($370).

Expenditure on travel associated with fishing ($395 million) was the second highest expenditure grouping. About 95% of all travel expenditure referred to private vehicle travel. At $108 million, the highest level of travel expenditure was by residents of New South Wales. The highest level of per fisher expenditure on travel was by residents of Victoria ($177) and the Australian Capital Territory ($172) (Tables 2.1 and 2.2). Expenditure on fishing gear ranked third at $183 million, which, when added to bait/berley, provides an estimate of direct fishing expenditure of $223 million nationally (Table 2.1).

Table 2.1: **Attributable fishing expenditure by item/service grouping for recreational fishers aged five or older by state or territory of residence**

Category	Attributable expenditure $M								
	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	Total
Accommodation	17.74	13.02	6.26	2.93	8.35	0.69	0.23	1.13	50.33
Camping gear	36.23	30.38	21.38	13.61	26.68	3.27	0.52	1.88	133.97
Bait & berley	11.98	8.33	8.21	3.77	6.98	0.36	0.37	0.56	40.58
Boats & trailers	303.90	158.64	160.58	72.61	200.61	24.35	16.29	2.97	939.97
Clothing	6.51	9.47	4.57	1.78	1.58	1.01	0.12	0.50	25.60
Dive gear	0.65	0.01	0.80	0.53	3.20	0.53	0.00	0.00	5.72
Fees & licences	8.72	8.25	2.74	1.01	3.20	1.60	0.91	0.51	26.93
Fishing gear	56.71	34.39	39.88	11.15	30.95	5.13	2.22	2.47	182.88
Travel	107.52	97.45	64.54	40.15	55.62	14.69	5.84	9.21	395.01
Other	4.23	36.34	10.60	0.94	1.20	0.18	0.20	0.14	53.83
Total	554.20	396.27	319.57	148.48	338.38	51.86	26.70	19.36	1,854.83

5 It was estimated that over 511,000 boats, with an estimated capital value of $3.3 billion, were used for recreational fishing in the 12 months prior to May 2000 (Henry and Lyle 2003, p. 13).
6 The proportion of the expenditure on boats and trailers that was for second-hand equipment was not identified. This is relevant for two reasons. First, the rate of increase in capitalisation by recreational fishers is not as great as the above data implies, and, secondly, when recreational fishers are upgrading, the actual or net expenditure incurred by individual fishers is not as high as the data presented indicate, once the sale of their initially held boat is taken into account.

2.2: Attributable expenditure according to residence

2.2.1: By state and territory

Expenditure was generally consistent with fisher population size, with New South Wales residents accounting for about 30 per cent of the fisher population and 30 per cent of the national expenditure attributed to fishing (Table 2.2). Victoria accounted for 21 per cent of national attributable expenditure, Western Australia 18 per cent and Queensland 17 per cent. On average, Australian recreational fishers spent $552 per fisher per annum with the highest average expenditure by residents of Victoria ($721) followed by Western Australia ($706) and Northern Territory ($608). The highest rates of per capita participation were in Tasmania, Western Australia, Queensland and South Australia. Average per capita expenditure levels below the national average were estimated to have occurred in South Australia ($452), Tasmania ($416), Queensland ($407) and the Australian Capital Territory ($362) (Table 2.2).

Table 2.2: **Estimated total and average expenditure attributable to fishing by state and territory of residence for recreational fishers aged five years or older**

State/ territory	Expenditure				Number of participants		% of national population **b**
	$M (rse) **a**	%	Average/fisher $	Ranking	Number of fishers	%	
NSW	554.20 (11.9%)	30	555	4	998,501	30	33
VIC	396.27 (9.5%)	21	721	1	549,803	16	25
QLD	319.57 (7.3%)	17	407	7	785,045	23	19
SA	148.48 (9.5%)	8	452	5	328,227	10	8
WA	338.38 (13.4%)	18	706	2	479,425	14	10
TAS	51.83 (9.6%)	3	416	6	124,590	4	2
NT	26.70 (12.9%)	2	608	3	43,932	1	1
ACT	19.36 (16.8%)	1	362	8	53,467	2	2
Total	1,854.80 (5.0%)	100	552		3,362,990	100	100

a. rse – relative standard error **b.** Australian Bureau of Statistics (2003b) pp. 3-4.

2.2.2: Capital city or regional residents

Differences in attributable expenditure can be observed between the states and territories and between the capital city and non-capital or regional[7] residents (Tables 2.2

7 The term 'region' includes all state and territory economic zones outside of the respective state or territory capital city.

and 2.3). In terms of intra-state distribution, 58 per cent of attributable fishing expenditure was by fishers who were capital city residents, as compared with the 50 per cent of the total population of recreational fishers resident in capital cities. In Queensland 56 per cent of attributable expenditure was by residents outside of the capital city, Brisbane, while in Tasmania 61 per cent of the attributable expenditure was by residents outside of the capital city, Hobart. At the other extreme, 83 per cent of attributable expenditure by Northern Territory residents was by residents of Darwin, with residents of Perth (Western Australia) and Melbourne (Victoria), at 68 and 67 per cent, having the next highest levels of capital city expenditure (Table 2.3). A comparison of the last two columns of Table 2.3 indicates that the rate of participation in recreational fishing in all capital cities, other than Darwin, was less than that for the state/territory as a whole.

Such differences can occur as the result of a number of factors including individual preference, relative differences in fishing and non-fishing options (competing recreational activities), with regional locations likely to be relatively less access to alternative recreational facilities. Differences in fishing options can also be the result of differences in access or proximity to suitable waters, available transport, boat access, availability of other desirable infrastructure and/or services including food and accommodation, and access to coastal and river bank fishing sites. In addition, simply as a result of the larger population, the concentration of recreational fishers in the capital cities is greater than in regional locations. As a result, comparative catch rates are likely to be less in the capital cities. Conversely, all capital cities, aside from Canberra (Australian Capital Territory), are located on the coast, while capital city residents are likely to have greater access to public transport, access to piers and to boat ramps.

Table 2.3: **Capital city-regional attributable fishing expenditure according to capital city/regional residence**

State or territory of residence	Attributable expenditure			Capital city % of expenditure	% of fishers in capital city	% of population in capital city **b.**
	Total $M (rse)	Capital city ($M)	Regional ($M) **a.**			
New South Wales	554.2 (11.9%)	314.52	239.68	57	45	63
Victoria	396.27 (9.5%)	266.57	129.70	67	52	72
Queensland	319.57 (7.3%)	139.92	179.64	44	41	46
South Australia	148.48 (9.5%)	83.98	64.50	57	61	73
Western Australia	338.38 (13.4%)	229.55	108.83	68	62	73
Tasmania	51.83 (9.6%)	20.21	31.63	39	37	42
Northern Territory	26.70 (12..9%)	22.13	4.57	83	72	54
Australian Capital Territory	19.36 (16.8%)	19.36	NA	NA	NA	NA
Total	1.854.80 (5.0)	1,076.89	777.92	58	50	64

NA. Not Available. **a.** The term 'Regional' is made up of areas outside of the capital city. **b.** Australian Bureau of Statistics (2003b) pp. 3-4.

Preferences can also differ according to age, gender, experience, cultural norms and traditional practice. The higher expenditure by fishers resident in capital cities is also likely to be due to differences in household income, with, on average, capital city resident families receiving a higher income (Table 2.4). The observed differences in recreational fishing behaviour and attributable expenditure indicate there are a number of factors affecting the decisions made by recreational fishers.

Table 2.4: **Gross mean household income July 2000 – June 2001**

	NSW	Vic.	Qld	SA	WA	Tas.	NT**a**	ACT**a**	Aust
Capital city									
$ per week	1,191	1,049	928	856	1,033	796	1,353	1,256	1,062
ANE/H **b.**	1.3	1.2	1.1	1.0	1.2	1.0	1.5	1.4	1.2
ANP/H **c.**	2.8	2.6	2.5	2.4	2.6	2.4	2.6	2.7	2.6
Regional									
$ per week	780	879	846	722	854	686	NA	NA	816
ANE/H **b.**	1.0	1.1	1.0	1.0	1.2	1.0			1.1
ANP/H **c.**	2.5	2.5	2.5	2.5	2.6	2.4			2.5

Source: ABS (2003a) Table 12, pp. 24-25.**a.** Capital city estimates for NT and ACT relate to total NT excluding sparsely settled areas and total ACT respectively. na. Not Available. **b.** Average number of earners per household. **c.** Average number of people per household.

ATTRIBUTABLE EXPENDITURE: WHERE AND WHEN

3.1: Regional distribution of attributable expenditure

Recreational fishing, by attracting people and expenditure to a location, can be important in generating economic activity to a particular location. Such expenditure may be: by residents within an economic zone, but at a location away from home (that is, more than 40 kilometres by road away from the fisher's normal residence[8]); those who are resident in some other economic zone including capital city residents; those who have come into the state or territory from another state or territory; and international travellers.

The proportion of expenditure attributable to recreational fishing and the proportion of expenditure incurred at a particular location need not be the same. This is because expenditure incurred for a particular fishing trip, such as bait, fuel, lures, and boat hire, can occur at a number of locations both at home and away from home. In addition, while expenditure on food and drink will occur regardless of whether the respondent participates in recreational fishing, the location at which the expenditure occurs can be attributable to participation in recreational fishing (Section 1.2.4).

3.1.1: Estimated attributable expenditure by state and territory economic zone

The location of estimated attributable expenditure is provided for each state and territory by economic zone (Table 3.1).

In some instances the sample size in any one economic zone was less than 100, raising questions of reliability[9]. To bring the sample size to 100 or more expenditure events, these low economic activity zones were aggregated with the adjoining economic zone with the most closely shared characteristics.

The allocation of vehicle expenditure is not included in either the home expenditure or the away from home expenditure. Instead, it is included as a separate line item. While most of the expenditure on fuel, oil and repairs is likely to have occurred within the home region, it was not possible to identify what proportion of attributable expenditure occurred outside of the home region.

8 The use of this figure to separate home-and-away expenditure was to ensure consistency with the national surveys carried out by the Australian Tourism Research Institute.
9 An extreme example of this is the Northern Territory Hinterland Economic Zone (Economic Zone 10), which, whilst geographically the second largest economic region in the study, had an estimated attributable expenditure of $80, 000, based on 17 expenditure events. As a result, it is aggregated with the Victoria (River) Economic Zone (Economic Zone 9).

Table 3.1: **Estimated attributable expenditure according to the economic zone in which it occurred**

Econ zone **a.**	NSW $'000 (% of total)	Vic. $'000 (% of total)	Qld $'000 (% of total)	SA $'000 (% of total)	WA $'000 (% of total)	Tas. $'000 (% of total)	NT $'000 (% of total)
1	201,306 (24)	172,778 (68)	40,738 (12)	1,741 (2)	2,323 (1)	15,686 (42)	18,149 (62)
2	33,573 (4)	12,650 (5)	30,379 (9)	7,553 (7)	10,845 (4)	Econ Zones 2&5 1,066 (3)	3,755 (13)
3	19,858 (2)	8,570 (3)	12,758 (4)	4,802 (4)	9,779 (4)	Econ Zones 3&6 1,200 (3)	897 (3)
4	67,565 (17)	9,459 (4)	26,845 (8)	10,060 (9)		2,023 (5)	2,989 (1)
5	13,557 (2)	18,640 (7)	6,286 (2)		22,134 (8)	See above	1,956 (7)
6	8,502 (1)	5,379 (2)	40,007 (12)	70,471 (64)		See above	168 (1)
7	27,235 (3)	7,283 (3)	30,064 (9)	3,188 (3)	15,401 (5)	8,207 (22)	697 (2)
8	12,222 (1)	7,073 (3)	7,080 (2)		181,197 (65)	8,279 (22)	439 (1)
9	3,243 (1)	8,012 (3)	20,996 (6)	5,910 (5)	6,366 (2)		148 (1)
10		4,700 (2)	9,131 (3)	6,870 (6)	6,995 (2)	1,197 (3)	80 (<1)
11	7,243 (1)	-	24,086 (7)	-	5,485 (2)		-
12	4,566 (1)	-	16,586 (5)	-		-	-
13	5,802 (1) ACT **b**	-	22,659 (7)	-	1,542 (1)	-	-
14	3,826 (1)	-	35,066 (11)	-	468 (<1)	-	-
15	See 15-18	-	13,345 (4)	-	15,824 (6)	-	-
16	9,710 (1)	-		-	3 (<1)	-	-
17	12,276 (1)	-	-	-	88 (<1)	-	-
15-18	1,223 (1)	-	-	-	-	-	-
Other	12,230 (1)	155,715 (4)	0	420 (<1)	48,303 (17)	151 (<1)	107 (<1)
Total	825,659	254,546	326,027	109,785	278,499	37,659	29,278

a. The economic zones for the respective states and territories are shown in appendix B. **b**. Attributable expenditure by ACT residents is $19.36m, of which only 30 per cent, or $5.8m was spent within the Territory.

3.1.2: Home and away: expenditure within or beyond 40k of home

Estimated attributable expenditure is presented in Table 3.2 for each state and territory according to whether it occurred at home or at a location away from home.

Table 3.2: **At home expenditure versus away from home expenditure** **a**

Location	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Total **a**
Home region $m	347.20	230.54	159.60	82.78	246.09	32.12	18.92	5.63	1,122.88
%	77	75	62	76	86	86	90		76
Away from $m	103.72	78.40	97.04	26.60	38.54	5.29	2.19	4.64	356.42
%	23	25	38	24	14	14		10	24
Private vehicle expenditure **b**	103.29	87.34	62.92	39.10	53.78	14.43	5.59	9.09	375.55

a The home-and-away values are provided for expenditure for which such designation was provided by the respondents.
b Provided as a separate line item because the location of expenditure on fuel, oil ands repairs was unknown.

In total, 76 per cent, or most of the expenditure attributable to fishing occurred within the home region. As discussed these values take no account of expenditure on food and drink, which would have occurred away from home as a result of recreational fishing. Secondly, the allocation of vehicle expenditure is not included.

3.1.3: Intrastate expenditure: net impact of capital city fishers on adjoining regions

With 58 per cent of total attributable expenditure being by capital city residents (Section 2.2.2), a relevant policy question is the net impact of capital city residents on the regional economic zones within the respective state or territory. The factors likely to affect such distributions include: relative differences in household income; relative differences in the attractiveness of fishing sites, including expected catch; the structure of the market for those goods and services purchased by recreational fishers throughout the state or territory; and the numbers or distribution of capital city resident fishers relative to fishers resident in regional economic zones.

Excluding private vehicle expenditure[10], it was estimated that capital city residents spent $28.7 million more in regional Australia, than what residents in regional locations spent in the capital cities (Table 3.3). The net impact of capital city expenditure, however, differed from jurisdiction to jurisdiction. While expenditure in regional New South Wales by recreational fishers resident in Sydney resulted in a net increase in expenditure of 14 per cent, or $24 million, in regional New South Wales, there was a net loss of 23 per cent or $11 million by regional South Australian recreational fishers to Adelaide.

Table 3.3: **Net non-private vehicle attributable expenditure by capital city residents outside of their home economic zone**

	NSW Sydney $'000	Vic. Melb-ourne $'000	Qld Brisb-ane $'000	SA Adel-aide $'000	WA Perth $'000	Tas. Hob-art $'000	NT Dar-win $'000	Total $'000
Total capital city	223,056	177,450	118,887	59,081	196,751	14,974	17,246	807,445
Capital city regional expenditure	28,799	9,204	5,949	4,974	23,218,	919	531	73,594
Total state regional expenditure	174,525	74,894	128,746	48,092	86,464	21,712	3,430	537,863
Regional expenditure in capital	4,791	3,034	11,492	16,057	7,195	1,566	749	44,884
Net capital city expend. in region (% of regional expenditure)	24,008 (14)	6,170 (8)	-5,527 (4)	-11,082 (23)	16,023 (18)	-647 (30)	-218 (6)	28,710 (5)

Note: The capital city economic zones were Sydney – N1; Melbourne V1; Brisbane Q1 through Q6; Adelaide S6; Perth W8; Hobart T1; and Darwin Y1. Canberra was excluded as it has regional characteristics.

It is important to note that a large proportion of expenditure by recreational fishers resident in capital cities may have occurred outside of their respective state or territory. For instance, 13 per cent of the attributable expenditure by recreational fishers resident in Sydney was spent in regional New South Wales, and 20 per cent spent interstate. For Melbourne, the equivalent values were, respectively five per cent and 26 per cent. That is, for recreational fishers resident in these capital cities, at least, more was spent

10 Private vehicle expenditure has not been included because the location of expenditure on fuel, oil and repairs is unknown.

interstate than regional intrastate. A number of factors might be important in explaining this, one of which is that the further a fisher moves from home, the smaller is the proportion of items and services, on which expenditure has been incurred, that would be brought from home, accommodation being the most obvious example.

3.1.4: Estimated attributable expenditure in northern Australia

While about two fifths of the Australian continent lies above the Tropic of Capricorn, the population is concentrated below the Tropic. Recreation, including recreational fishing, is often seen as being important in attracting economic activity to northern Australia. In keeping with the low population numbers above the Tropic of Capricorn, estimated attributable expenditure above the Tropic, was seven per cent (Table 3.4.)

Table 3.4: **Proportion of attributable expenditure in northern Australia** [a]

	Queensland	Western Australia	Northern Territory	Total
Value $'000 (% state total)	74,311 (23)	21,763 (8)	29,198 (100)	125,273 (7)

a. Location of expenditure is defined by whether the economic zone is primarily north of the Tropic of Capricorn

3.1.5: Interstate expenditure

A consideration for state and territory fishery administrators is the amount of and the relative importance of expenditure by out-of-state recreational fishers. A particular advantage of the national survey is it provides an estimate of interstate as well as intrastate expenditure (Table 3.5).

The estimated attributable expenditure carried out by recreational fishers outside of their resident state or territory was $128 million or eight per cent of the $1,650 million for which the site of expenditure was identified[11]. Also identified is the state or territory having the greatest impact on out-of state expenditure. While 30 per cent of the population are residents of New South Wales, it was estimated that 45 per cent of interstate expenditure was sourced from New South Wales. The only jurisdictions for which expenditure by out-of-state fishers reached double figure percentage values were Queensland, with 24 per cent ($79 m), and the Northern Territory, with 30 per cent ($8.71m). Nearly 60 per cent of the out-of-state expenditure in Queensland came from New South Wales, while Victoria and New South Wales were estimated as providing nearly 90 per cent of the Northern Territory out-of-state expenditure, with Victoria providing a slightly larger proportion than New South Wales[12].

11 Not all expenditure was attributed to where it was spent. As a result this total values are less than the total estimated expenditure attributable to recreational fishing of $1.854 billion.
12 One difficulty with providing an estimate of expenditure of out-of-state visitors is that the definition of out-of-state depends on the respondent's address at the time of the original screening survey. Some respondents moved to a new permanent address, including interstate, following the screening survey.

Table 3.5: **Attributable expenditure by out-of-state/territory residents**

State/territory	Total expenditure for which location was identified $'000	Expenditure by out-of-state residents		Major source of out-of-state attributable expenditure	
		$'000	% of total	Most important State/territory	% accounted for
New South Wales	425,894	28,361	7	Victoria	57
Victoria	425,894	2,341	1	South Australia New South Wales	25 23
Queensland	326,201	78,568	24	New South Wales	59
South Australia	110,205	3,032	3	Victoria	74
Western Australia	289,313	6,097	2	New South Wales	76
Tasmania	37,664	6,097	3	Victoria	55
Northern Territory	29,375	8,710	30	Victoria New South Wales	89
Australian Capital Territory	5,802	174	3	New South Wales	100
Total	1,650,318	128,256	8	New South Wales	45

3.1.6: Expenditure by residents from outside Australia

There were 191,131 or 4.17 per cent of overseas visitors, who included recreational fishing among their activities while in Australia (based on estimates provided by the Bureau of Tourism Research). No information was available on the amount of fishing effort, the species targeted or caught, where fishing occurred or the expenditure attributable to recreational fishing (Henry 2003, p. 128). International visitors comprised about six per cent of the total number of fishers in Australia, but may have been more important to the catch and attributable expenditure incurred for specific fisheries. The game fishery located in the Coral Sea, off Cairns, Queensland, might be such a case.

3.2: Waters fished

Estimated attributable expenditure, on the basis of residence and waters fished, is provided in Table 3.6. This was calculated by allocating expenditure to the different types of waters fished[13], whether inland, estuarine, or marine, according to the

13 For example, assuming a hypothetical household that reported having participated over the duration of the survey in three inland fishing events, five estuarine fishing events and eight marine fishing events, an attributable expenditure of $640, would be allocated according to the following:
Inland 3/16 x $640 = $120
Estuarine 5/16 x $640 = $200
Marine 8/16 x $640 = $320.
This approach is likely to give too large a weighting to inland and estuarine fishing.

proportional number of fishing events carried out by household members in these waters. Consistent with living in the driest continent, nearly half (48 per cent) of the estimated attributable expenditure related to marine fishing, less than a quarter (20 per cent) related to inland fishing, while nearly a third was estimated as being related to estuarine fishing. However, this varied between jurisdictions, with 43 per cent of attributable expenditure being related to estuarine fishing in New South Wales, and fishing in estuarine waters being the most important in Victoria (inland waters were nearly as important in Victoria) and the Northern Territory.

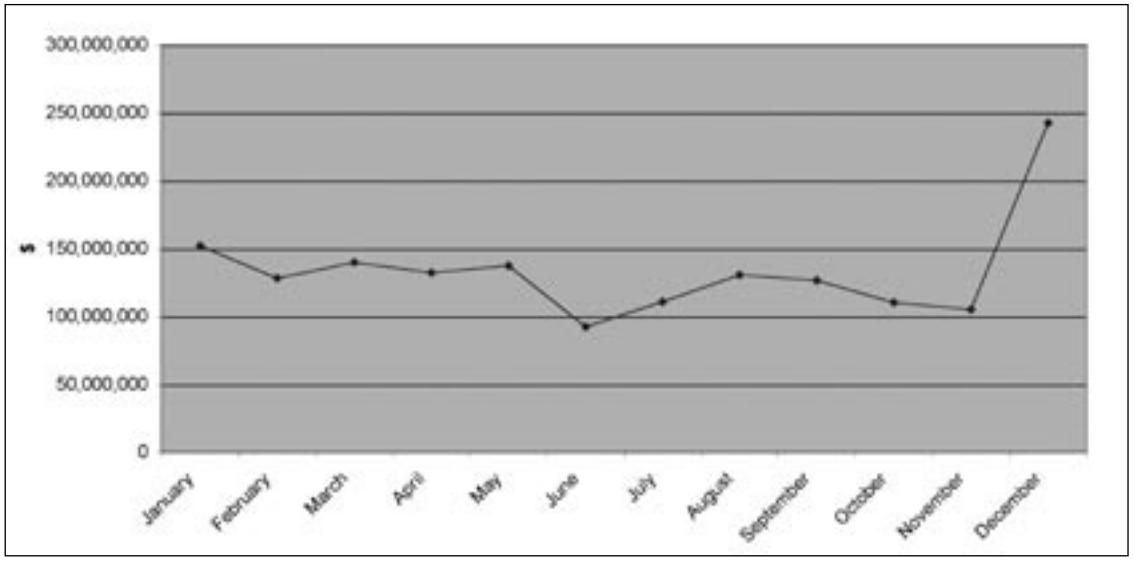
Table 3.6: **Attributable expenditure by waters fished**

State	Families in sample no.	Days effort no. '000	Kept catch no. '000	Expenditure $'000			
				Estuarine	Marine	Inland	Total
NSW	1,315	5,988	30,554	238,396	210,636	105,177	544,204
Vic.	952	3,502	18,738	160,465	78,951	156,853	396,268
Qld	1,312	4,539	39,566	111,113	175,218	33,238	319,568
SA	1,030	2,003	17,732	10,381	111,334	26,770	148,484
WA	1,180	3,326	16,539	53,595	277,181	7,606	338,381
Tas.	714	816	11,481	8,971	27,287	15,577	51,834
NT	343	220	679	9,835	8,891	7,974	26,704
ACT	215	247	621	5,084	7,443	6,832	19,359
Total	7,061	20,640	135,909	597,839 32%	896,941 48%	360,024 20%	1,854,804 100%

3.3: Seasonal distribution of attributable expenditure

Except for December, national monthly attributable expenditure varied throughout the year between $100 million and $150 million, with expenditure of nearly $250 million in December (Figure 3.1). Initially, this was surprising, as the major summer holiday period is late December through January. However, attributable expenditure on boats and trailers increased by around $100 million in December – mostly in New South Wales, and may have been expenditure on Christmas presents and preparation for the holiday season.

Figure 3.1: **National recreational fishing monthly expenditure**



Important seasonal differences in expenditure are observable between states, with attributable expenditure in the winter months being highest in Queensland, while expenditure in Victoria and Tasmania are lowest in the winter months (Table 3.7).

Table 3.7: **Seasonal distribution of attributable expenditure by state and territory for 2000-01**

Year/ month	New South Wales $'000 (% of total)	Victoria $'000 (% of total)	Queens-Land $'000 (% of total)	South Australia $'000 (% of total)	Western Australia $'000 (% of total)	Tasmania $'000 (% of total)	Northern Territory $'000 (% of total)	Australian Capital Ter. $'000 (% of total)
2000 April	24.5 (7)	24.4 (12)	16,915 (6)	7,916 (9)	13,330 (6)	2,082 (6)	2,684 (10)	231,575 (6)
May	19,485 (6)	9,290 (4)	11,695 (4)	7,978 (9)	54,467 (23)	1,292 (40)	2,773 (10)	212,075 (5)
June	14,276 (4)	8,037 (4)	15,406 (5)	12,874 (14)	6,839 (3)	980 (30)	1,676 (6)	788,510 (20)
July	22,114 (6)	6,432 (3)	32,888 (11)	7,366 (8)	10,230 (4)	3,032 (9)	1,341 (5)	146,706 (4)
Aug.	10,086 (3)	26,936 (13)	36,138 (13)	8,434 (9)	18,399 (8)	2,352 (7)	4,332 (15)	255,850 (6)
Sept.	16,326 (5)	10,890 (5)	39,845 (14)	4,407 (5)	22,809 (10)	3,853 (12)	1,620 (6)	399,870 (10)
Oct.	16,626 (5)	17,036 (8)	12,774 (4)	10,382 (12)	23,745 (10)	1,809 (6)	1,535 (5)	337,998 (8)
Nov.	14,121 (4)	19,759 (1)	16,536 (6)	4,625 (5)	16,219 (7)	4,782 (15)	2,269 (8)	170,368 (4)
Dec.	120,325 (34)	28,145 (14)	19,300 (7)	6,399 (7)	28,066 (12)	3,670 (11)	593 (2)	570,820 (14)
2001 Jan.	40,212 (11)	12,509 (6)	26,188 (9)	8,548 (100)	14,840 (6)	2,906 (9)	421 (1)	254,909 (6)
Feb.	29,824 (8)	27,887 (14)	18,491 (6)	6,362 (7)	15,143 (6)	3,876 (12)	1,296 (5)	435,212 (11)
Mar.	25,200 (7)	13,112 (6)	41,556 (14)	4,021 (5)	12,800 (5)	1,781 (5)	7,608 (27)	233,815 (6)
Total	353,099	204,477	287,732	89,313	236,888	32,417	28,148	4,038

3.4: Attributable expenditure according to fisher avidity

Estimated attributable expenditure, fishing effort, kept catch and waters fished according to fisher avidity is provided in Table 3.8. Households were ranked according to the respondent with the highest avidity value. That is, if a household had three fishers, one of whom was a highly avid fisher, while the other two were of medium avidity, the household was identified as being highly avid. Fishers were classified as: low if they participated in one through five days of fishing over the survey period, as medium for six through 15 days of fishing over this period and as high for 16 or more days of fishing over this period.

While highly avid fishing effort was less than 10 per cent of total fishing effort, they took most of the retained catch (58 per cent). This compares with low avidity fishers who were estimated as being responsible for 21 per cent of the total fishing effort, with only 12 per cent of the retained catch. Meanwhile, medium avidity fishers, provided remarkable consistency with 37 per cent of estimated fishing effort, keeping 30 per cent of the retained catch and spending 30 per cent of the total estimated attributable expenditure (Table 3.8).

Highly avid fishers accounted for the largest proportion of the estimated attributable expenditure (44 per cent). Consistent with the lower participation rate, but contrary to the highest daily cost, low avidity fishers, accounted for 26 per cent of the estimated attributable expenditure. The higher total expenditure level by highly avid fishers was observed for all waters, while the estimated attributable expenditure by those grouped as medium avidity fishers was higher than that for low avidity for estuarine and marine waters, but not for inland fishing.

Table 3.8: **Attributable expenditure according to the level of participation or avidity**a

	Days fished '000	Kept catch no. '000	Expenditure $'000			
			Total	Inland	Estuarine	Marine
Low avidity	4,389	16,738	486,672	109,419	170,469	206,684
Per day		3.8	0.11			
%	21	12	26			
Medium avidity	7,668	40,614	549,732	95,885	174,928	278,919
Per day		5.3	0.07			
%	37	30	30			
High avidity	8,588	78,556	818,498	154,720	252,441	411,338
Per day		9.1	0.09			
%	42	58	44			
Total	20,645	135,909	1,854,904	360,024	597,839	896,941
Per day		6.6	0.09			
%	100	100	100			

a. Avidity: low is 1-5 days fished, medium is 6-15 days fished and high is 16 or more days fished.

The highest estimated average attributable expenditure per day fished was for the low avidity group ($110). The lowest average expenditure per day fished was for the medium avidity group ($70), while the highest avidity group averaged $90 per day fished. The different levels of expenditure are unlikely to be directly attributable to the average value each group placed on fish caught, but, rather, to the type of recreational fishing activity they had participated in.

DISTRIBUTION

4.1: Introduction

As well as the distribution of fish resources between different uses (eg, conservation, indigenous, recreational and commercial) is the question of the social and economic (employment) characteristics of those involved in recreational fishing.

4.2: Participation according to age and gender

Estimates for the number of male and female fishers for six age classes, starting from age five to 14 years of age to those 75 years and over, are presented in Table 4.1. The table also provides percentage participation rates for the number of people in the national population for each age class. Thus, the Table provides, for each age class, the number of people participating in recreational fishing and the national rate of participation. While the largest number of fishers is in the 30 to 44 years age class (963,534 participants), the highest participation rate (28 per cent), as a proportion of the national population in that year class, is in the five to 14 years age class.

Overall, it was estimated that 19 per cent of the national population participated at least once in recreational fishing over the 12 months of the survey period, with 27 per cent of males and 12 per cent of females. More males participated in recreational fishing in each age class, with the 30 to 44 male age class showing the highest number of fishers (643,710) and the male five to 14 year age class having the highest participation rate (33 per cent of the male population in that age class). The lowest male participation numbers and participation rate was for those in the 60 to 74 and the 75 and above age classes. Just as for males, the highest number of female participants is for the 30-44 years age class (319,824), with the highest participation rate for the five to 14 years age class. Interestingly, the rate of participation for females and for males drops off in the 15 to 29 years age class, then rose in the 30 to 44 age class.

Table 4.1: **Number of recreational fishers and proportion of the resident population by age class and gender** [a]

Age Class Years	Males no.	% of resident population	Females no.	% of resident population	Total no.	% of resident population
5 to 14	444,675	33	289,026	23	733,702	28
15 to 29	547,232	27	252,560	13	799,792	20
30 to 44	643,710	31	319,824	15	963,534	23
45 to 59	448,380	26	167,359	10	615,740	18
60 to 74	172,677	18	46,628	4	219,306	11
75 plus	26,368	7	4,549	1	30,918	3
Total	2,283,043	27	1,079,947	12	3,362,990	19

From Henry and Lyle (2003, pp. 152-3). **a** See Appendix C for a breakdown of fisher age class and gender by state and territory of residence.

The observed differences between gender and age class indicate, that over a person's life span, a number of factors may affect the choices made in regard to participation in recreational fishing. The data results certainly question the fulfillment of the often stated

intention of fishers to spend more of their time fishing when they retire. Information, such as that provided here, is not only important when considering questions of resource distribution, but, also, in regard to servicing the likely needs of the different user groups[14].

4.3: Employment and fishing expenditure and participation

While income data was not collected, the collection of data on fisher employment status during the screening survey does provide an indication of income. Fisher households were ranked according to the highest employment status of household members. That is, according to the level of employment and type of employment held. While overall, the data does appear to indicate a positive relationship between expenditure and income, the average per fisher kept catch of 72 indicates a very high level of fisher participation for part time employed (Table 4.2). On examination, part time employed were estimated to have had the highest average fishing effort (eight days per year) as compared to the national average of six days per year. Meanwhile, on average, the unemployed had the lowest kept catch and the lowest average effort of four days per year. Data for each state and territory is provided in Appendix D.

Table 4.2: **National estimated expenditure, landing and days fished according to employment status**

Employment status		Fishers no.	Expenditure $'000	Expenditure/ fisher $	Kept catch no. '000	Kept catch/ fisher no.
Fully employed	Professional	1,183,377	702,972	594	34,811	29
	Trade	852,667	594,168	697	30,919	36
	Labour	460,805	186,725	405	14,125	31
	Unknown	2,535	1,827	721	60	24
	Total	2,499,384	1,485,692	594	80,916	32
Part time employed		752,485	344,547	458	54,069	72
Unemployed		111,121	24,565	221	924	8
TOTAL		3,362,990	1,854,804	552	135,909	40

4.4: Aboriginal and Torres Strait Islander peoples

4.4.1: Sample limitations

Data on Aboriginal and Torres Strait Islander peoples participation in non-commercial fishing was collected as part of the national recreational fishing survey[15]. While the national recreational fishing survey did not include the Torres Strait Islands a number of Torres Strait Islanders live on the main land. Data on participation by Aboriginal and Torres Strait Islander peoples in non-commercial fishing was collected from those households in which at least one member of the household had identified him/herself as

14 For instance, the high level of participation by people in the five to 14 year age class raises question of safety for those in this inexperienced age class.

15 Additional non-commercial Aboriginal fishing data was collected during the National Recreational and Indigenous Fishing Survey for a sample of Aborigines living in communities on outstations in northern Australia and who would not have been included in the sampling frame (see Coleman, Henry, Reid, and Murphy 2003).

being of Aboriginal or Torres Strait Islander descent. Data was gathered from 298 families and included 696 respondents who had identified themselves as an Indigenous Australian.

A number of important riders limit the level to which the data can be taken:

- Families selected to participate in the survey were selected from a population identified as owning a telephone. Because Aborigines have on average a lower level of income than the remainder of the population, telephone ownership is lower than that for the population as a whole (Aboriginal and Torres Strait Islander Commission 2002) and, as a result are likely to be under represented in survey frame based on telephone ownership. This is likely to result in data distortions, in-as-far as non-telephone owning Indigenous households differ from those households that own a telephone.
- Because the National Recreational Fishing Survey is a national survey, neither sample selection nor sample size is adequate to provide a detailed assessment of Aboriginal and Torres Strait Islander participation in non-commercial fishing. As a result:
  - catch and expenditure data could not be provided for all states and territories;
  - the classification of expenditure according to item is amalgamated over a smaller range of items and services; and
  - the estimates are provided in Table 4.4 are on the basis of whether the place of residence was rural or in capital city.

While the data has been collected in what is called a survey of recreational fishers, much of the data relating to Aboriginal fishing activities would have been carried out by Aboriginal people in their country and would have involved traditional rather than recreational fishing.

4.4.2: Results

Overall, 78 per cent of the members of those families defined as an Aboriginal or Torres Strait Islander household were Aboriginal or Torres Strait Islander people. A slight difference was observed between capital city (79 per cent) and regional (73 per cent) families. It was estimated that of those Aboriginal and Torres Strait Islander families within the sampling frame, 186,186 Aboriginal or Torres Strait Islander people participated in non-commercial fishing. Of these 26,854 were resident in northern Australia and 159,332 were resident in southern Australia.

An estimated total attributable expenditure of $22.52 million was incurred by Aboriginal and Torres Strait Islander people, with $13.62 million (60 per cent) spent by those who resided outside of a capital city and were regionally based, and $8.90 million (40 per cent), by capital city residents. The level of expenditure by Aboriginal and Torres Strait Islander people resident in northern Australia was $2.35 million, while attributable expenditure by those resident in southern Australia was estimated at $20.16 million (Table 4.3). In line with that for the population as a whole, expenditure on boats and trailers was the largest expenditure classification with expenditure on travel and fishing gear the next most important.

The survey data shows Aborigines and Torres Strait Islanders to have carried out lower levels of per capita expenditure for all expenditure categories. Average per capita catch taken and retained by Aboriginal and Torres Strait Islander people was estimated at 16 animals, while that for non-Aboriginal and Torres Strait Islander people was estimated at 42 animals. The lower per capita expenditure on boats and trailers indicates that Aborigines and Torres Strait Islanders were involved in less marine fishing.

Table 4.3: **Aboriginal and Torres Strait Islander household attributable expenditure according to residence and expenditure grouping**

Expenditure category	Aboriginal and Torres Strait Islander people				Non Aboriginal or Torres Strait Islander people	
	City residence $'000 (%)	Rural residence $'000 (%)	Total Expenditure $'000 (%)	Per capita $	Expenditure $'000	Per capita $
Accommodation **a**	142 (2)	1,085 (8)	1,227 (5)	6.59	183,080	57.63
Boat/trailer **b**	4,165 (46)	5,444 (39)	9,608 (42)	51.61	918,619	289.16
Fishing gear **c**	2,746 (31)	1,373 (10)	4,119 (18)	22.12	202,802	63.84
Travel **d**	1,530 (17)	4,448 (32)	5,978 (26)	32.11	408,915	128.72
Other	413 (5)	1,606 (12)	2,019 (9)	10.84	118,436	37.28
Total	8,995	13,956	22,518	120.94	1,832,286	577

a. Includes accommodation, camping gear hire, camping gear maintenance, camping registration and insurance, camping capital **b.** Boat and trailer purchase, boat/trailer charter, boat and trailer maintenance fuel and oil, boat hire. **c.** Bait and burley, club fees, fishing competition fees, fishing licence, fishing tackle hire, fishing tackle purchase, fishing tackle maintenance, fishing tackle terminal. **d.** Fishing related capital, car hire, car expenses based on $0.50 per kilometre travelled and includes capital, maintenance, fuel and oil, insurance and registration.

An estimated catch of 2.95 million animals was retained by Aboriginal and Torres Strait people, with 2.44 million (83 per cent) taken by regionally based fishers and 0.50 million (17 per cent) being taken by capital city based fishers. The estimated retained catch for northern Australia was 0.64 million animals, while for southern Australia the retained catch was estimated at 2.31 million.

CONSIDERING REGION AND/OR FISH SPECIES

5.1: Introduction

Depending on the sample size usable estimates of attributable expenditure may be obtained for a specific region, fishery or fish species targeted or caught. In all cases, data reliability can be improved by aggregating the Economic Zones, or by aggregating the type of fish taken, such as, for example, attributable expenditure on the basis of those targeting trout (Salmonidae) in the Snowy Mountains of south-eastern New South Wales.

5.2: Expenditure by trout fishers in the Snowy Mountains region

5.2.1: Selection of data

The alpine area of New South Wales that makes up the 'Snowies', consists of the southern section of the Cooma-Monaro shire and the Snowy River, Tumut, Tumbarumba and Bombala shires. Because trout are in most part limited to the colder waters, most, if not all trout fishing events in these economic zones are in the elevated areas that make up the Snowy Mountains. All of the Snowy Economic Zone (Zone 14), and the eastern or highland section of the Murrumbidgee Economic Zone (Zone 16) and of the Murray Economic Zone (Zone 17) are included. This consists of the south-eastern corner of the South-West Fishing Zone (Zone 3) (see Appendix E), the upper reaches of the Murray River Fishing Zone (Zone 4), and the Eucumbene dam (Fishing Zone 13) and Jindabyne dam (Fishing Zone 22).

5.2.2: Filtering event data

The steps taken to filter out those targeting trout in the region of the Snowy Mountains were:

- Households were selected on the basis of those who had a primary or secondary target of trout/salmon in the Murray River and South-West fishing Zones (Fishing Zones 3 and 4).
- Households who fished in Eucumbene and/or Jindabyne dams (Fishing Zones 13 and 22).
- The number of fishing events carried out by these households in Zones 3, 4, 13 and 22 were summed (the definition used to define Snowy Mountains fishing).
- The total number of fishing events carried out by these households was summed.
- The proportion of Snowy Fishing events to elsewhere was then determined for each household.

This proportional weighting was used to estimate the proportion of reported annual expenditure attributable to trout fishing in the Snowy Mountains.

Accordingly, the data was screened according to those families with fishing events in Fishing Zones 3 and 4 in which trout was a primary or secondary target. As the Eucumbene and Jindabyne dams are within the Snowies region, all fishing events in these fishing zones are included. The major population centres included in this region are Batlow, Berridale, Bombala, Cooma, Delegate, Jindabyne, Tumbarumba, and Tumut. The estimates provided are on the basis of responses from 148 families and involved 549 fishing events. Although trout are taken in the Southern Tablelands Economic Zone (Zone 12), including Burrinjuck dam and the headwaters of the Goodradigbee River, expenditure by fishers in this area would not extend into the Snowies region[16].

5.2.3 Results

It is estimated that over the period April 2000 through March 2001, recreational trout fishers in the New South Wales Snowy Mountains landed and retained 198,895 animals (Table 5.1), including trout, inland crayfish, Murray cod and Macquarie perch, of which 87 per cent or 173,422 animals were trout. Most, or 80 per cent of the trout catch, were taken from the Eucumbene and Jindabyne impoundments (128,688 fish) and the remaining 20 per cent (52,945) from rivers and streams – including the upper waters of the Murray River. Expenditure in the Snowy Economic Zone (Zone 14), attributable to trout fishing in the New South Wales Snowy Mountains was $40.3 million, of which 23 per cent, was from fishers resident outside of New South Wales, including Victorian and Australian Capital Territory residents.

Table 5.1: **Expenditure in the NSW Snowy Mountains region attributable to trout fishing**

	Total kept catch no.	Kept trout catch according to residence no.			Expenditure according to residence $'000 (% of total expenditure)		
		NSW	Other (mostly Vic. ACT)	Total (% of total catch)	NSW	Other (mostly Vic. ACT)	Total
Dams	145,950			138, 917 (95)			
Rivers	52,945			34,734 (66)			
Total	198,895	132,097	41,554	173,651 (87)	30,880 (77)	9,398 (23)	40,286

16 This is not literally correct as most of those wishing to fish the Goodradigbee River via Blue Waterholes would enter from the south from off the Snowy Mountains Highway.

DISCUSSION AND CONCLUSIONS

6.1: Introduction

The National Recreational Fishing Survey provides a statistically robust set of data on fisher expenditure and catch for Australian non-commercial fish catch from March 2000 through April 2001. The survey results indicate that one in six Australian residents, or 3.36 million fishers, participated in recreational fishing during these twelve months while expenditure during this period of $1.85 billion was attributable to their participation in recreational fishing. All told, it was estimated that this involved 20.6 million fisher days of effort and the harvesting of 138 million aquatic animals.

Consistent with relative population size, 30 per cent and 21 per cent of attributable expenditure was, respectively, by New South Wales and Victorian residents. The highest individual average level of expenditure was for Victorian fishers ($721), with Western Australian fishers having a similar average level of expenditure ($706). Half of attributable expenditure was for boats and trailers ($940 million), with travel ($395 million) the next highest. Interestingly, only 10 per cent ($183 million) was estimated as being spent on fishing gear.

The rate of participation in recreational fishing was less in capital cities, accounting for 50 per cent of recreational fishers, while making up 64 per cent of the population. Capital city residents, however, were estimated as being responsible for 58 per cent of estimated attributable expenditure ($1,077 million versus $778 million). Sixty per cent of attributable expenditure was estimated to have occurred within 40 km of the recreational fisher's residence ($1.123 billion). Expenditure by out-of-state residents was estimated to have accounted for eight per cent of attributable expenditure, and was important in the Northern Territory, where it was estimated to have accounted for 30 per cent of attributable expenditure ($8.7 million), and Queensland, where it accounted for 24 per cent ($78.6 million). Forty eight per cent of expenditure was estimated as being attributed to fishing in marine waters ($897 million), with only 20 per cent ($360 million) being attributed to fishing in inland waters.

Except for December, when attributable expenditure was nearly $250 million, monthly attributable expenditure varied between $100 million to $150 million per month. While high avidity fishers made up only 15 per cent of the fisher population, the largest proportion of attributable expenditure ($818 million or 44 per cent) and most of the kept catch was by high avidity fishers. The highest average level of per capita expenditure of $697 was for fishers who were fully employed in a trade. Interestingly, at an estimated 72 fish, part time employed had the highest retained catch. Aboriginal fishers were estimated to have about one sixth the average estimated per capita attributable expenditure ($120) of the rest of the community.

6.2: Interpretation and use of attributable expenditure data

Care needs to be taken in interpreting the values provided in this report and consideration must be given to ensure that data use is consistent with the policy question being considered. For instance, while the information in this report provides a useful indicator of economic activity and the distribution of both economic activity and access to fish resources, it does not provide an estimate of fish value. This is a particularly strong point given that recreational fishers derive enjoyment from their participation in recreational fishing from a range of factors in addition to fish catch.

The data collected in this survey indicate that a large proportion of the Australian population participated in recreational fishing over the survey period. It is also apparent that recreational fishing involves the delivery of a broad range of items and services by the private and public sectors (see Table 6.1).

Table 6.1: **Application of current survey data to policy issues**

Inputs to recreational fishing according to sector	Attribution (%)	Market (expenditure)/ non-market provided	Policy issues	Relevant non-expenditure data
Private sector Capital inputs eg fishing gear boat & camping gear Variable inputs eg bait, fishing gear fuel, ice Services fishing guide accommodation	100 0<100 0<100 0<100 0<100 100 0<100	Provided through the market. Expenditure and quantity data collected.	Investment in the provision of items and services as per the major items and services and the location of fisher activity.	Behavioural data including fish species targeted & caught, type of fishing, location, distance travelled can be used independently or combined with expenditure data to assess the economic characteristics of publicly provided non-market economic supplied items and services.
Public sector Capital inputs eg fish population environment, roads, & boat ramps Variable inputs Services eg safety, rescue, weather reports, institutional structure (management/licences)	100 0<100 0<100 0<100 0<100 0<100 0<100	Not provided through the market. Some quantity data collected. Partly market/ expenditure data.	Questions of competing use of resources. Impact of spillover effects of recreational fishing on the environment and other activities and the impact of spillover effects of other activities on recreational fishing. The public provision of infrastructure and services. Efficient charging for the provision of infrastructure and services.	

While many of the items and services used in recreational fishing are provided through the market, a wide range of items and services are provided outside of the market. These include the provision of roads and boat ramps by local and state jurisdictions, as well as those items and services enjoyed by fishers that flow from the environment (including fish and fish habitat). The public sector, on behalf of those involved in recreational fishing (and on behalf of those having alternative interests in the environmental and other resources), is also involved in setting up and maintaining the institutional basis in which natural resource based recreation, such as recreational fishing, is managed. Such issues are relevant at the level of local councils to international agreements over migratory fish stocks. The private provision of items and services also has a wide operational scale extending from a part time single operator acting as a guide to trout fishers in the Snowy Mountains to multi-national operations such as those manufacturing and distributing boats.

Table 6.1 shows the economic activity associated with recreational fishing according to the types of inputs used by recreational fishers to the economic sector of the community by which they are provided, the likely policy issue and the application of current survey data to these issues. A number of methodologies might be used in assessing these data, ranging from the descriptive to more complex modelling.

6.3: Strengths of the National Recreational Fishing Survey

This study differs from earlier surveys of non-commercial fishing in several important ways. These include:

- The use of a national sampling frame has provided the basis for the data to be expanded out to the population as a whole with a high degree of confidence (Henry and Lyle 2003).
- The use of an integrated diary and telephone interviewing technique over 12 months of interviews has minimised problems of recall bias while providing an annual (seasonal) recreational fishing data set (Lyle *et al* 2002, Henry and Lyle 2003).
- The use of the attributable expenditure, instead of total expenditure, links expenditure incurred (the dependent variable) with the causative or explanative variable, in regard to:
    - expenditure incurred as a direct result of participation in recreational or non-commercial fishing; and
    - expenditure incurred, at a particular location, as a direct result of participation in recreational or non-commercial fishing.
- The use of quality control and validation measures to minimise non-sampling measures (Lyle *et al* 2002).
- An extensive data set in which a number of links between catch, fishing effort, fisher behaviour, fisher characteristics, location, and fishing related expenditure can be established.
- While funding was not sufficient to provide a complete analysis and writing up of the survey data, funding was more in line with what was required than is often the case for many other such surveys.

6.4: Considerations for future surveys

An important shortcoming of the data set was the failure to include data on that expenditure incurred on food, drink, fuel and vehicle repairs, for inclusion in away from home expenditure. While not important to estimating the value recreational fishers might place on fish catch, such information is important to estimating the possible impact of recreational fishing on regional economic activity. Collection of qualitative information on the factors affecting a fisher's choice of a particular fishing location could have been useful. Given the complexity of factors affecting fisher satisfaction, such information is useful to both the valuation of a fish site and catch and may relate to a number of broad based policy questions including questions of access and publicly and privately provided goods and services.

It is also possible that greater recognition of the links in the data collected between fisher behaviour and expenditure could have been maintained in setting up the data set. In particular, delineation of expenditure data incurred during a fishing trip.
A difficulty facing surveys of recreational fishing is an expectancy they are not expensive to obtain. As a result, surveys have often lacked in fundamentals that would not be tolerated in other areas of research/estimation. It is possible, however, that occasional surveys, such as that reported in this report can provide a benchmark against which local surveys might be assessed.

6.5: Conclusions

The National Recreational Fishing Survey results indicate that nationally, recreational fishing is an important recreational activity involving a large amount of economic activity. In presenting the Survey data from a number of policy perspectives, this report provides a number of insights in regard to recreational fisher behaviour and demonstrates some of the broad based national, state and territory, and larger regional policy issues to which the data set might be put. In particular, the results show the level of expenditure on goods and services; the geographic and seasonal distribution of expenditure; the likely economic activity according to waters fished; the distribution of catch and expenditure according to Aboriginality, demographic characteristics and employment; and expenditure according to large regional fisheries.

Appendix A: **Attributable expenditure by recreational fishers according to purchase ($'000)**

ITEM	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	TOTAL
Accommodation	17,736	13,016	6,265	2,926	8,346	687	231	1,127	50,334
Airfares	3,781	9,324	693	688	1,288	164	241	117	16,294
Bait/berley	11,984	8,335	8,214	3,768	6,984	361	368	563	40,577
Boat ramp fees	87	533	81	289	359	1	27	11	1,389
Boat/trailer insurance.	12,770	8,944	8,727	4,765	10,512	2,022	816	251	48,805
Boat/trailer-registration fees	10,272	5,712	14,577	4,135	5,626	1,246	287	281	42,135
Boat-capital	194,996	78,085	89,741	49,483	116,786	11,476	9,824	1	551,517
Boat-charter	21,257	4,734	3,635	1,290	3,724	225	414	246	35,525
Boat-fuel/oil	13,234	11,858	11,350	4,451	19,794	2,160	1,749	388	64,985
Boat-hire	5,345	10,718	2,019	349	1,370	65	578	267	20,712
Boat-maintenance	38,983	25,515	21,989	4,473	29,664	3,493	1,631	363	126,110
Boat-mooring fees	1,172	1,102	2,865	643	2,127	119	6		8,034
Books/magazines	1,190	1,067	927	510	571	105	21	51	4,442
Camp gear-hire		1			4	14			20
Camp gear-maintenance	2,207	2,155	791	395	6,201	144	10	309	12,212
Camp registration /insurance	3,906	2,921	1,512	812	1,237	233		101	10,723
Camp gear-capital	30,121	25,304	19,079	12,410	19,239	2,883	512	1,470	111,018
Car-capital	10,580	11,618	2,283	569	9,571	1,044	49	466	36,179
Car-hire/charges	307	526	14	28	325				1,200
Car-travel	103,287	87,346	62,919	39,103	53,784	14,432	5,591	9,092	375,553
Car-maintenance	163	119	120	55	172	2	24	54	710
Clothing/apparel-capital	6,509	9,468	4,574	1,782	1,584	1,066	121	497	25,601
Dive-air fills				39	201	36			275
Dive equip. capital	650	7	796	160	2,996	462	1		5,072
Dive equip. hire				61	7	26			95
Dive equip. maintenance				266		8			275
Fees-club	918	567	578	501	954	78	68	41	3,705
Fees-fish competition	367	221	686	91	354	30	748		2,496
Fees-fishing licence	4,783	4,482	768	305	1,410	1,353	19	348	13,469
Fuel-other (not boat or car)			15	1	39	8			62
Ice	256	107	563	101	497	2	84	15	1,625
Information-other	20		20	101	7	25	1	43	218
Other access	271	2,677	246	62	280	73	46	38	3,695
Other private travel	147	255	911	333	223	90	7		1,967
Other	2,700	34,723	8,940	1	17	12	33	10	46,437
Other equip. capital	65	442	136	222	73	26	62	17	1,043
Other equip. hire					1				1
Other equip. maintenance.			2			1			3
Other govt. licence fees	2,383	298	457	54	203	65	28	83	3,571
Safety gear -life jackets	905	1,656	2,310	1,422	1,950	3,178	289	29	11,739
Tackle-hire	1		2	3	1,132				1,137
Tackle-capital	36,662	13,703	29,040	8,202	15,761	3,052	1,373	1,472	109,265
Tackle-maintenance	809	1,041	1,066	235	1,026	49	163	63	4,452
Tackle-terminal	8,658	8,024	7,489	2,138	3,460	981	634	464	31,850
Trailer-capital	2,768	1,998	1,654	605	7,378	223	377	3	15,007
Trailer-maintenance	2,114	7,788	1,633	709	1,319	143	295	7	14,008
TOTAL	554,368	396,387	319,688	148,540	338,554	51,865	26,728	19,413	1,855,542
rse [17]	11.9%	9.5%	7.3%	9.5%	13.4%	9.6%	12.9%	16.7%	5.0%
Sampled Households no.	1,129	919	1,266	989	1,140	683	325	127	6,578

17 rse. relative standard error

APPENDIX B: ECONOMIC ZONES FOR EACH STATE AND TERRITORY

Figure B.1: **New South Wales Economic Zones**

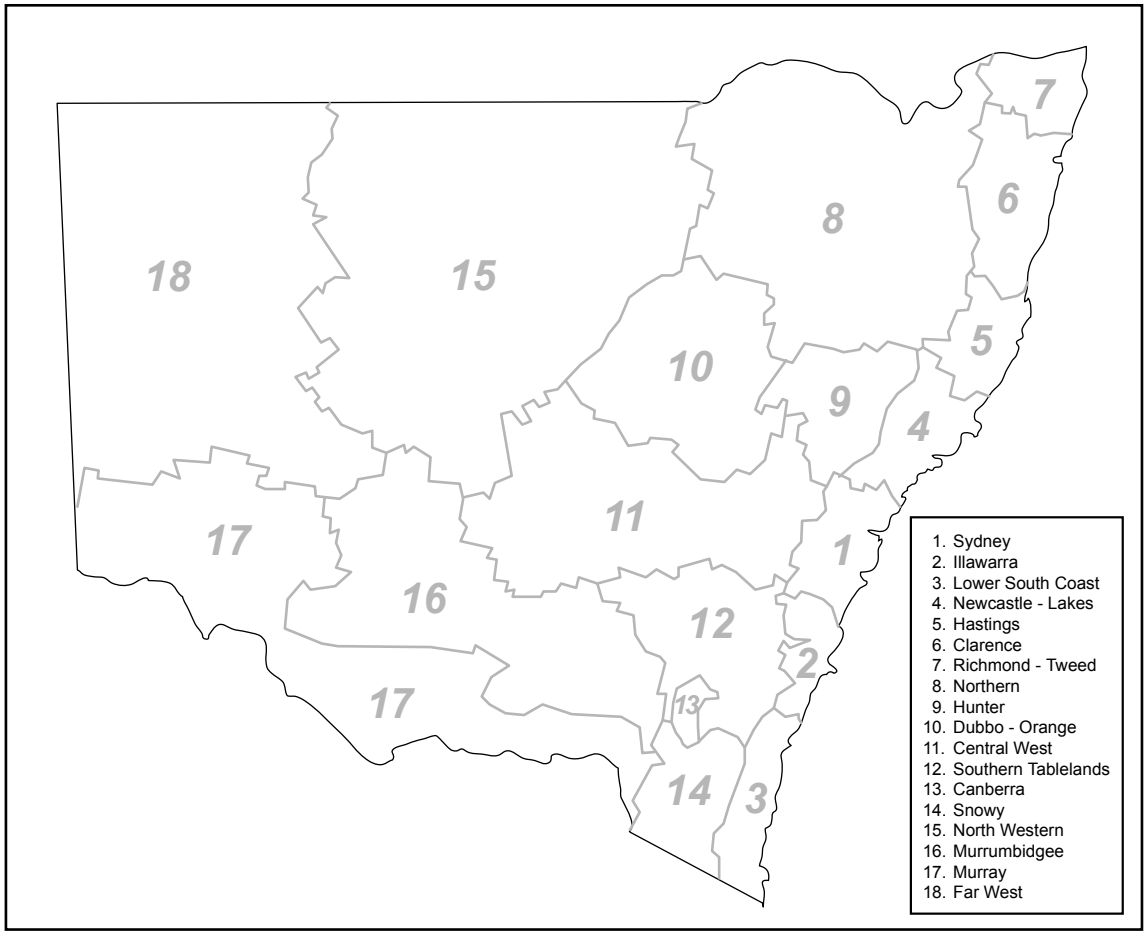


Figure B.2: **Victoria Economic Zones**

Figure B.3.a: **Queensland Economic Zones**

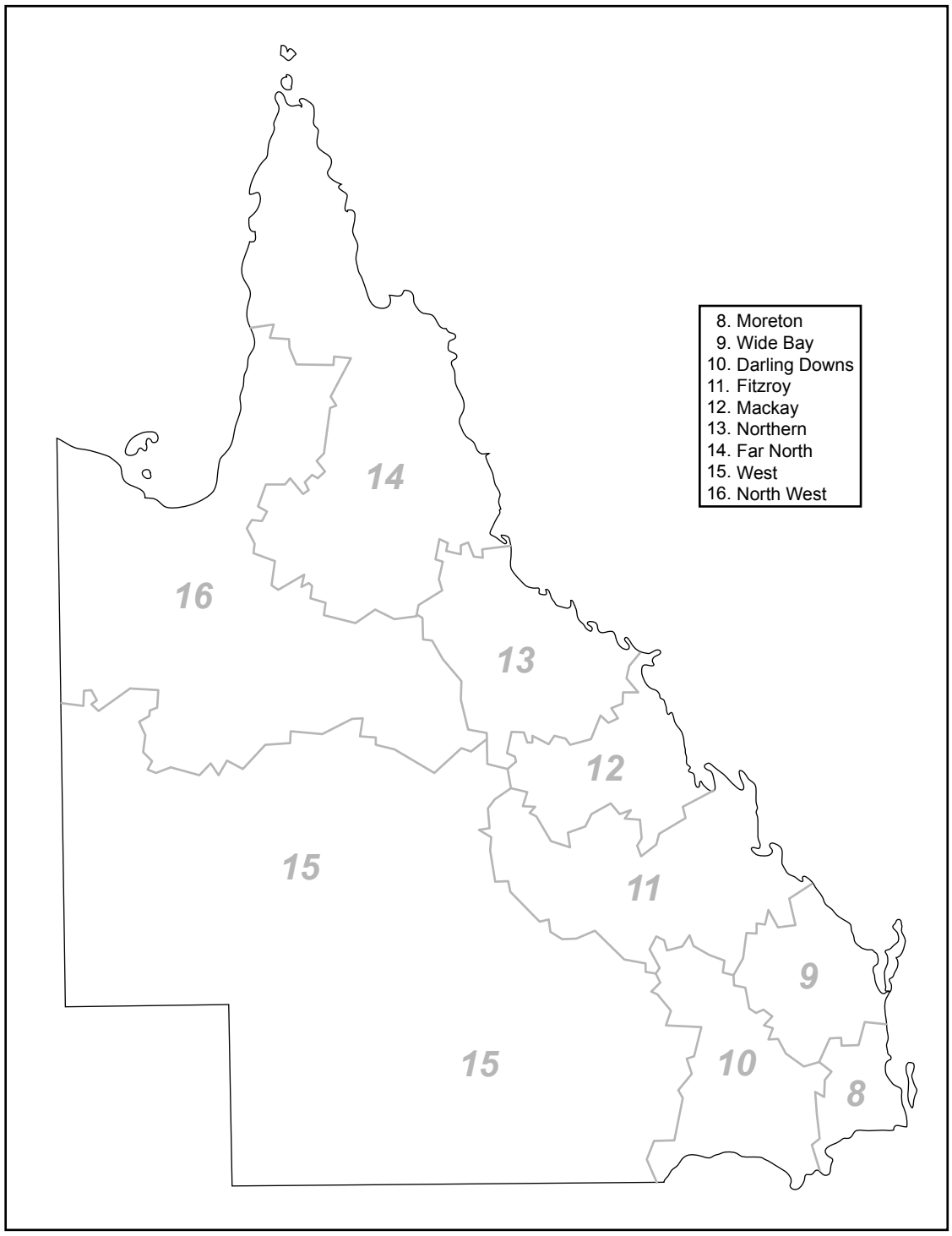


Figure B.3.b: **Brisbane, Queensland Economic Zones**

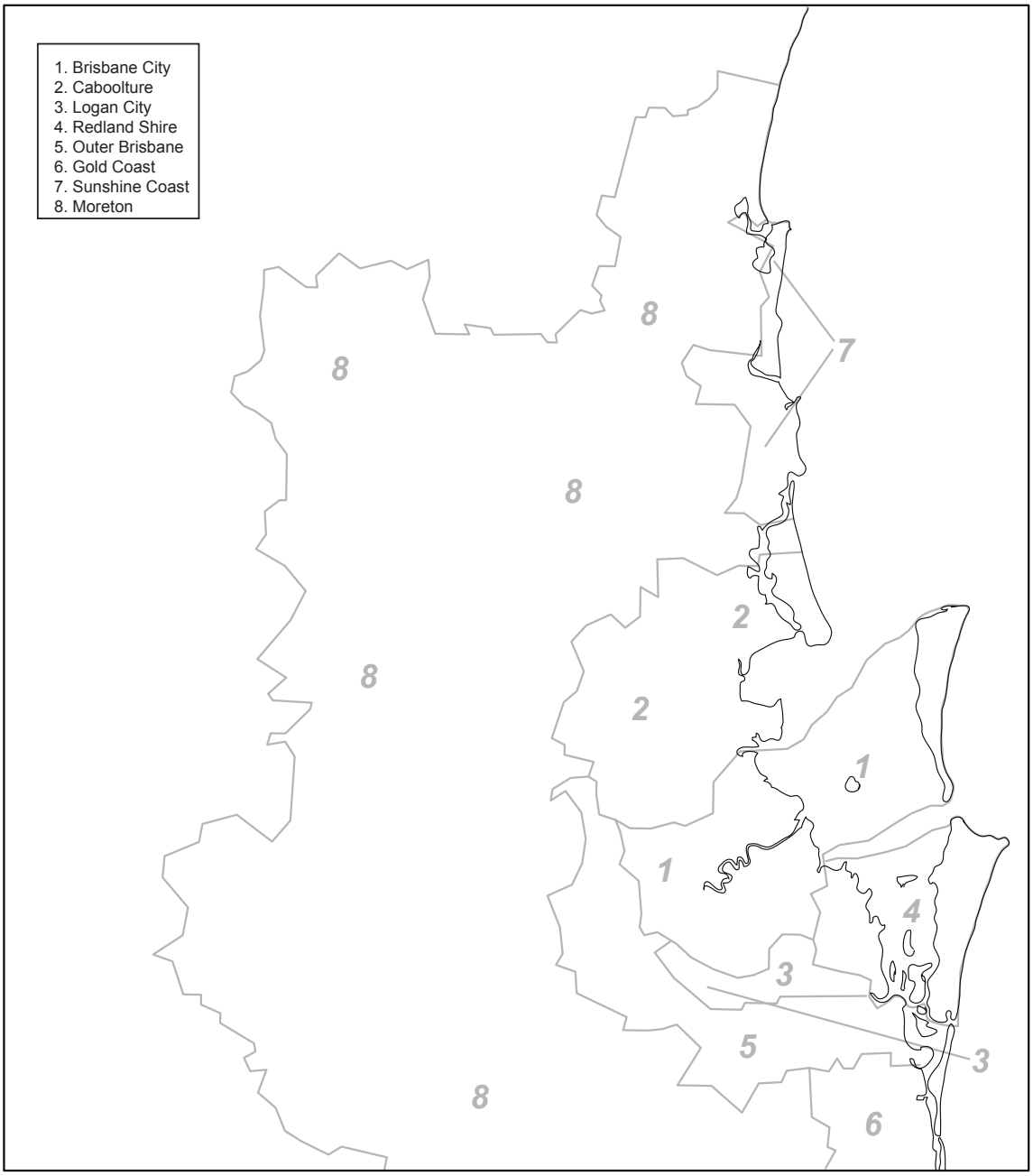


Figure B.4: **South Australia Economic Zones**

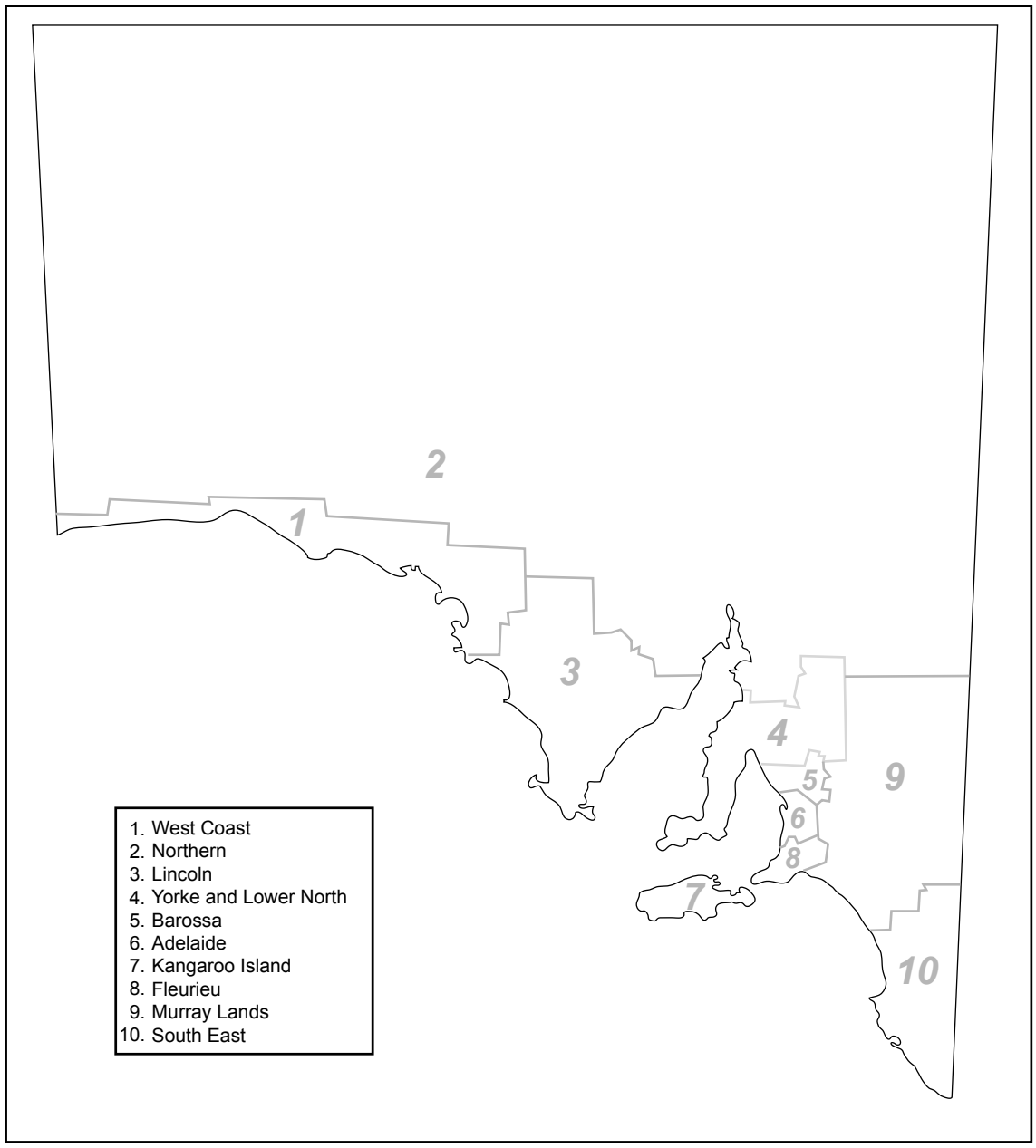


Figure B.5.a: **Northern Western Australia Economic Zones**

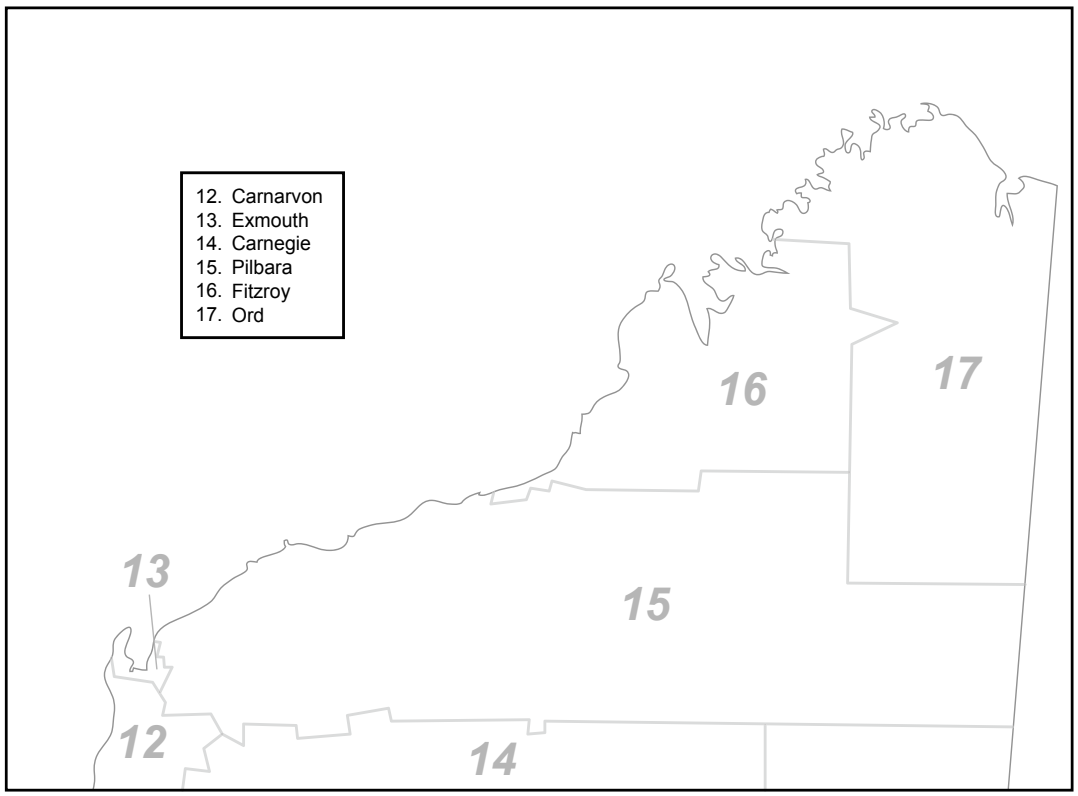


Figure B.5.b: **Southern Western Australia Economic Zones**

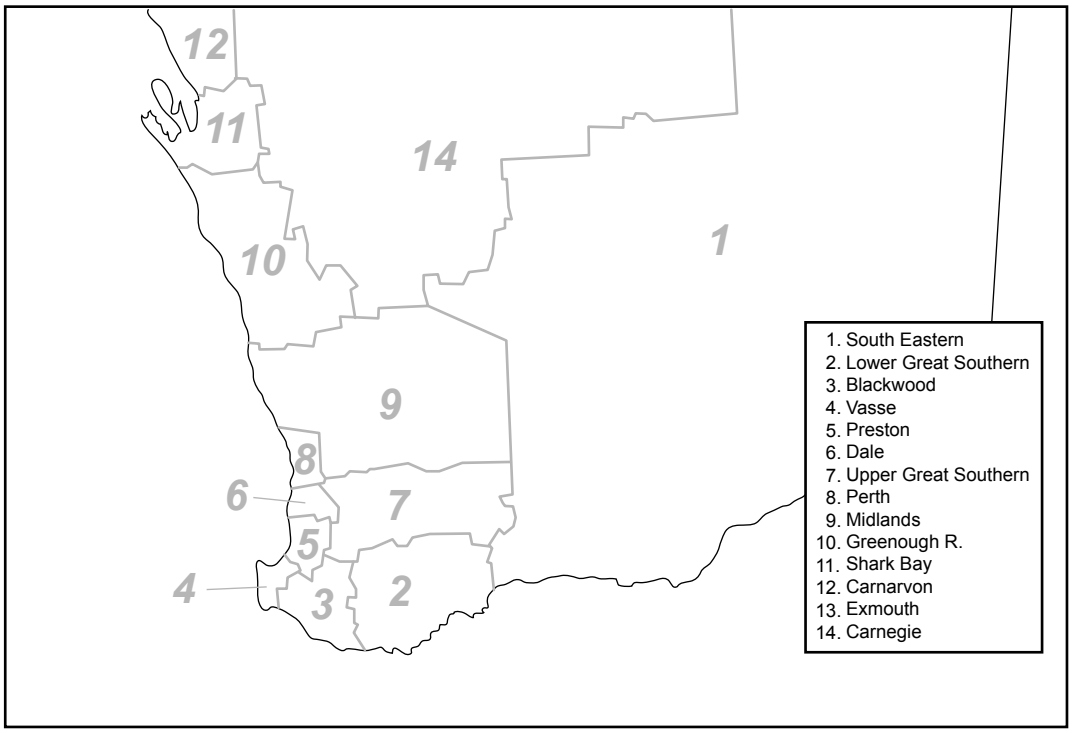


Figure B.6: **Tasmania Economic Zones**

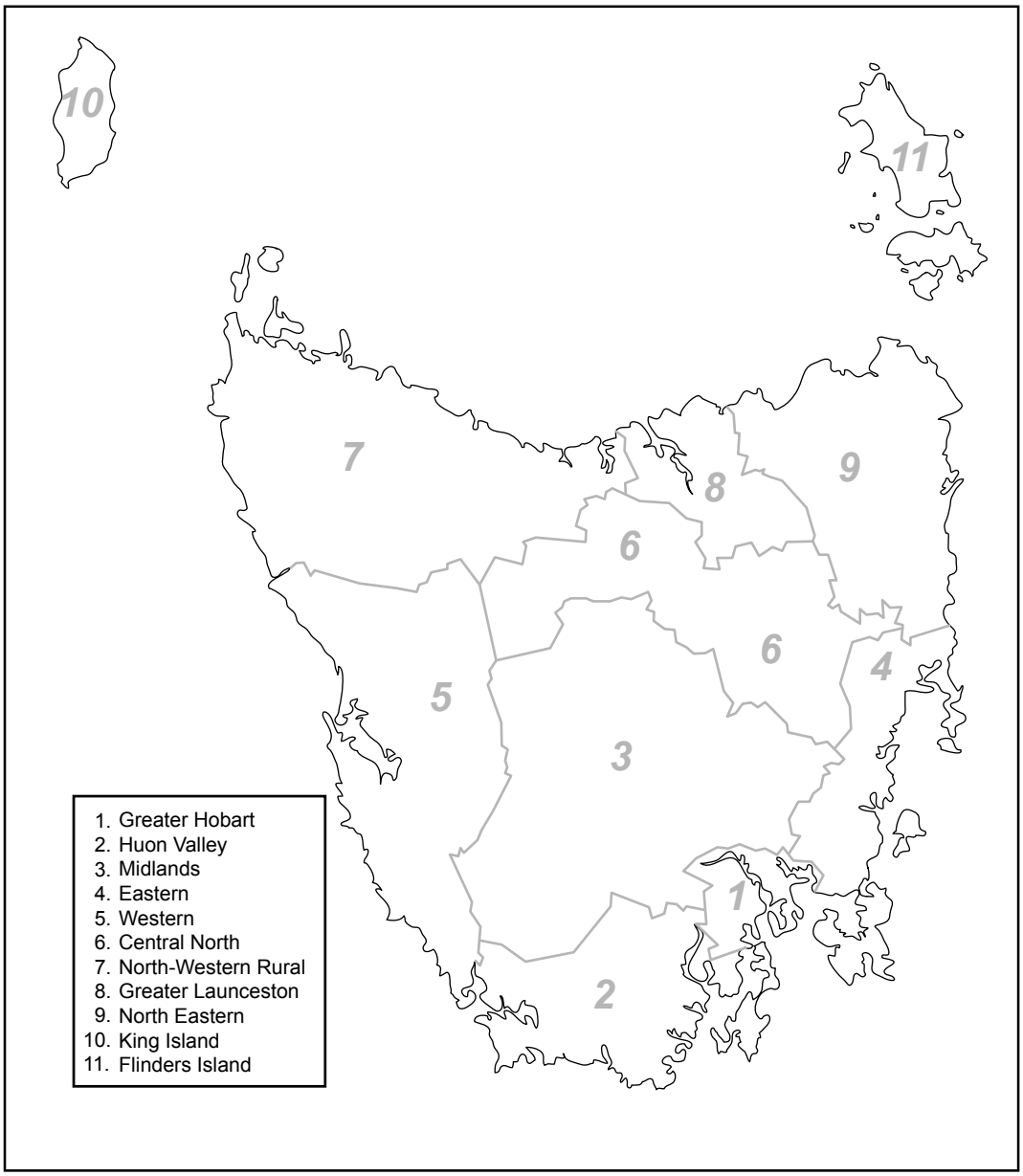
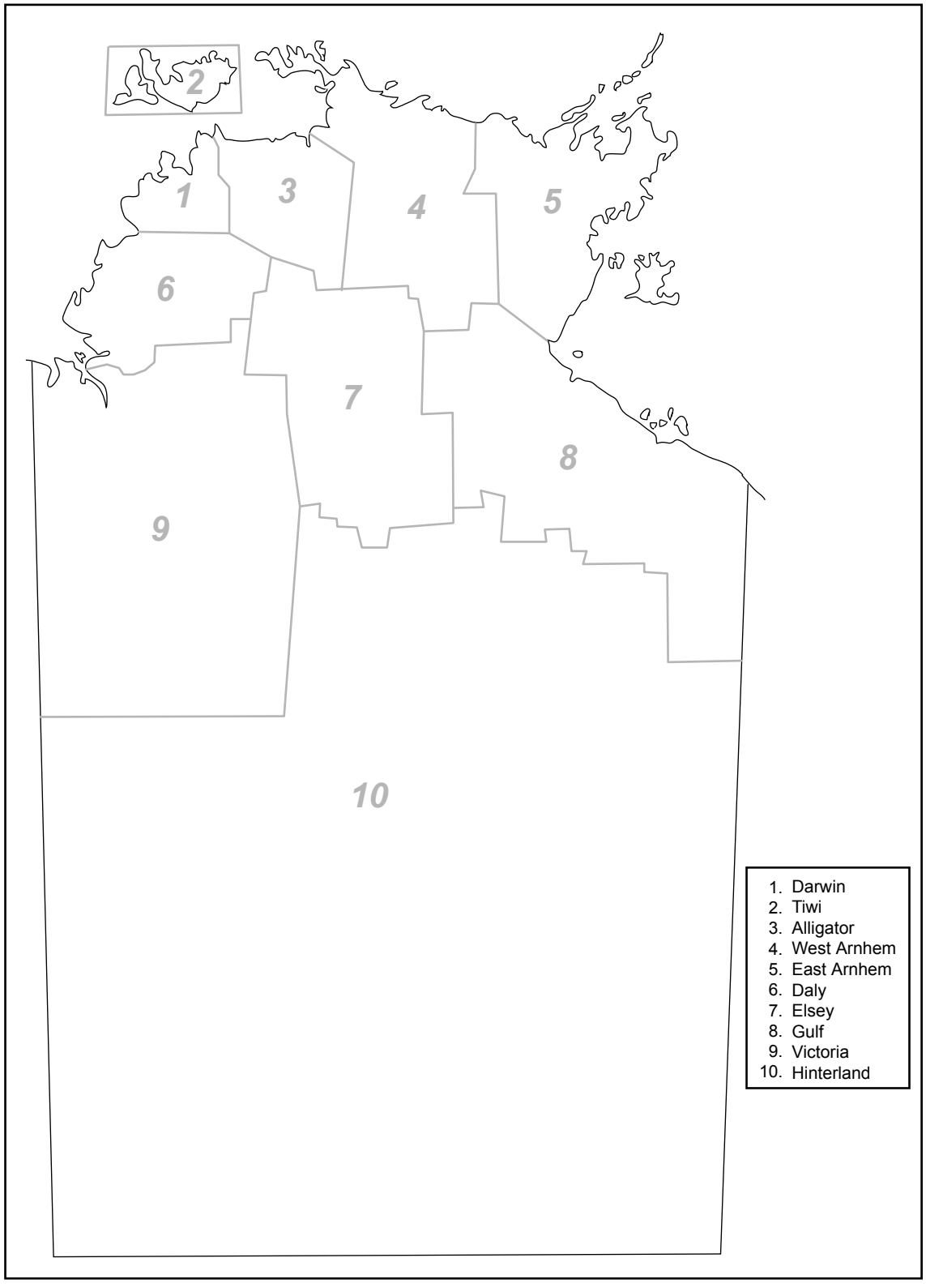


Figure B.7: **Northern Territory Economic Zones**



Appendix C: Number of recreational fishers and proportion of the resident population by age class and gender according to state or territory of residence

State/territory	Age class	Males	% pop	Females	% pop	Total	% pop
NSW	5 to 14	134,437	30.0%	86,813	20.4%	221,251	25.3%
	15 to 29	161,010	23.8%	59,296	8.8%	220,305	16.4%
	30 to 44	193,970	27.2%	95,496	13.3%	289,465	20.2%
	45 to 59	137,662	23.5%	46,358	8.0%	184,020	15.8%
	60 to 74	55,173	16.3%	16,271	4.5%	71,444	10.2%
	75 plus	11,218	8.7%	796	0.4%	12,015	3.8%
	Total	**693,471**	**24.0%**	**305,030**	**10.4%**	**998,501**	**17.1%**
VIC	5 to 14	76,237	23.3%	41,475	13.3%	117,712	18.5%
	15 to 29	89,322	17.3%	37,764	7.5%	127,086	12.5%
	30 to 44	120,161	22.8%	39,642	7.3%	159,804	14.9%
	45 to 59	81,090	19.1%	23,761	5.5%	104,851	12.3%
	60 to 74	30,412	12.3%	4,722	1.8%	35,134	6.9%
	75 plus	4,213	4.5%	1,004	0.7%	5,217	2.3%
	Total	**401,435**	**18.8%**	**148,368**	**6.8%**	**549,803**	**12.7%**
QLD	5 to 14	98,323	38.4%	72,528	30.0%	170,851	34.3%
	15 to 29	132,708	35.2%	67,555	18.1%	200,263	26.7%
	30 to 44	138,098	36.2%	84,941	21.6%	223,039	28.8%
	45 to 59	95,091	29.1%	42,120	13.0%	137,210	21.1%
	60 to 74	37,448	21.4%	11,334	6.4%	48,782	13.8%
	75 plus	3,928	6.0%	972	1.1%	4,900	3.2%
	Total	**505,596**	**32.0%**	**279,449**	**17.5%**	**785,045**	**24.7%**
SA	5 to 14	42,608	42.0%	29,908	31.2%	72,516	36.8%
	15 to 29	53,027	35.1%	26,386	18.1%	79,413	26.7%
	30 to 44	61,628	38.2%	30,039	18.3%	91,668	28.1%
	45 to 59	42,165	30.5%	17,719	12.5%	59,883	21.4%
	60 to 74	17,854	21.3%	3,400	3.8%	21,254	12.2%
	75 plus	2,816	8.1%	677	1.4%	3,492	4.1%
	Total	**220,098**	**32.8%**	**108,129**	**15.7%**	**328,227**	**24.1%**
WA	5 to 14	61,463	45.2%	39,739	30.8%	101,202	38.2%
	15 to 29	75,921	37.0%	41,677	20.8%	117,599	29.0%
	30 to 44	87,671	42.2%	48,253	22.8%	135,924	32.4%
	45 to 59	62,882	36.6%	26,086	15.5%	88,968	26.2%
	60 to 74	22,273	25.3%	9,186	10.1%	31,459	17.6%
	75 plus	3,173	10.3%	1,101	2.5%	4,274	5.8%
	Total	**313,383**	**37.3%**	**166,042**	**19.7%**	**479,425**	**28.5%**
TAS	5 to 14	17,809	51.4%	10,601	32.1%	28,410	42.0%
	15 to 29	18,362	40.0%	11,203	24.4%	29,565	32.2%
	30 to 44	23,332	48.0%	11,434	22.3%	34,767	34.8%
	45 to 59	16,576	37.8%	6,436	14.5%	23,012	26.1%
	60 plus	7,447	20.7%	1,389	3.3%	8,836	11.3%
	Total	**83,526**	**40.0%**	**41,064**	**18.9%**	**124,590**	**29.3%**
NT	5 to 14	5,845	42.1%	3,542	32.5%	9,387	37.9%
	15 to 29	8,315	41.3%	3,673	20.4%	11,989	31.4%
	30 to 44	9,751	44.6%	4,240	22.3%	13,991	34.2%
	45 to 59	5,676	37.3%	1,897	16.9%	7,573	28.6%
	60 plus	839	16.6%	153	4.0%	992	11.1%
	Total	**30,427**	**39.9%**	**13,505**	**21.4%**	**43,932**	**31.6%**
ACT	5 to 14	7,953	36.4%	4,421	21.0%	12,374	28.8%
	15 to 29	8,567	23.3%	5,005	14.1%	13,571	18.8%
	30 to 44	9,098	26.6%	5,778	15.9%	14,876	21.1%
	45 to 59	7,239	25.1%	2,983	10.0%	10,222	17.4%
	60 plus	2,250	14.3%	173	1.0%	2,423	7.2%
	Total	**35,108**	**25.6%**	**18,360**	**13.0%**	**53,467**	**19.2%**

Appendix C (continued)

	Age class	Males	% pop	Females	% pop	Total	% pop
AUSTRALIA	5 to 14	444,675	33.2%	289,026	22.8%	733,702	28.1%
	15 to 29	547,232	27.0%	252,560	12.7%	799,792	19.9%
	30 to 44	643,710	30.7%	319,824	14.9%	963,534	22.8%
	45 to 59	448,380	25.9%	167,359	9.7%	615,740	17.8%
	60 to 74	172,677	17.7%	46,628	4.5%	219,306	11.0%
	75 plus	26,368	7.2%	4,549	0.9%	30,918	3.5%
	Total	**2,283,043**	**26.7%**	**1,079,947**	**12.4%**	**3,362,990**	**19.5%**

From Henry and Lyle (2003, pp. 152-3- as amended).

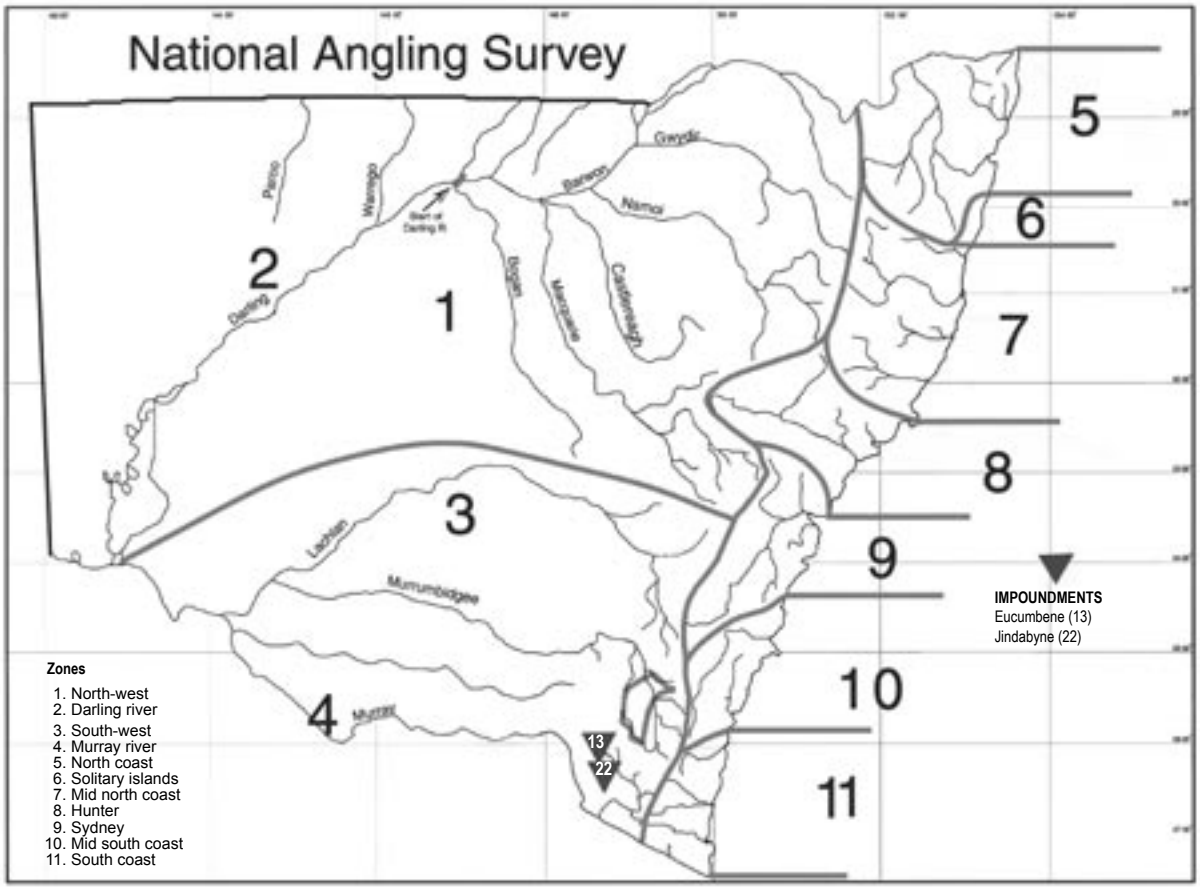
Appendix D: **Estimated attributable expenditure, landing and days fished according to employment status by state and territory**

State of residence	Employment status		Number of people	Estimated attributable expenditure. $'000	Estimated landing (kept catch). no. '000	Number of days fished no. '000
	Job category	Type of work				
New South Wales	Fully employed	Professional	346,123	195,999	6,589	1,961
		Trade	262,970	221,329	5,845	1,513
		Labour	134,458	39,162	2,630	695
		Total	743,550	456,490	15,063	4,169
	Not fully employed		215,334	89,487	15,265	1,634
	Not employed		39,616	8,227	226	184
	TOTAL		998,501	554,204	30,554	5,988
Victoria	Fully employed	Professional	208,881	205,118	5,942	1,262
		Trade	139,348	101,318	4,211	841
		Labour	67,757	26,660	2,467	390
		Total	415,986	333,096	12,620	2,493
	Not fully employed		114,622	62,309	5,988	949
	Not employed		19,196	863	130	66
	TOTAL		549,803	396,268	18,738	3,507
Queensland	Fully employed	Professional	233,211	89,726	9,622	1,306
		Trade	208,321	102,824	12,115	1,266
		Labour	123,667	55,363	5,186	630
		Total	565,198	247,914	26,923	3,202
	Not fully employed		195,976	71,090	12,434	1,273
	Not employed		23,870	564	209	63
	TOTAL		785,045	319,568	39,566	4,539
South Australia	Fully employed	Professional	134,527	59,308	5,639	714
		Trade	70,013	27,649	4,328	449
		Labour	48,189	26,472	1,935	265
		Unknown	84	96	39	1
		Total	252,813	113,526	11,941	1,429
	Not fully employed		66,908	25,320	5,700	544
	Not employed		8,506	9,638	9,638	29
	TOTAL		328,227	148,484	148,484	2,003

Appendix D (continued)

Western Australia	Fully employed	Professional	184,850	115,915	5,223	1,133
		Trade	120,204	119,019	3,483	774
		Labour	54,429	22,548	1,980	397
		Unknown	2,452	1,731	21	16
		Total	361,934	259,214	10,707	2,320
	Not fully employed		103,864	74,234	5,618	926
	Not employed		13,627	4,934	214	79
	TOTAL		479,425	338,381	16,539	3,326
Tasmania	Fully employed	Professional	35,057	18,521	1,257	223
		Trade	30,262	11,618	612	176
		Labour	16,240	5,851	719	95
		Total	81,559	36	2,588	494
	Not fully employed		39,555	15,654	8,804	302
	Not employed		3,477	190	52	20
	TOTAL		124,590	51,834	11,481	816
Northern Territory	Fully employed	Professional	17,661	10,360	280	76
		Trade	11,359	5,895	165	52
		Labour	8,989	7,918	153	63
		Total	38,009	24,173	598	191
	Not fully employed		4,973	2,512	79	26
	Not employed		951	19	1	3
	TOTAL		43,932	26,704	679	220
Australian Capital Territory	Fully employed	Professional	23,068	8,024	258,839	100
		Trade	10,191	4,516	160	48
		Labour	7,077	2,750	56	42
		Total	40,336	15,289	475	191
	Not fully employed		11,253	3,940	144	51
	Not employed		1,879	129	2	4
	TOTAL		53,467	19,359	621	247
Grand total			**3,362,990**	**1,854,804**	**135,909**	**20,363**

Appendix E: **New South Wales Fishing Zones**



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