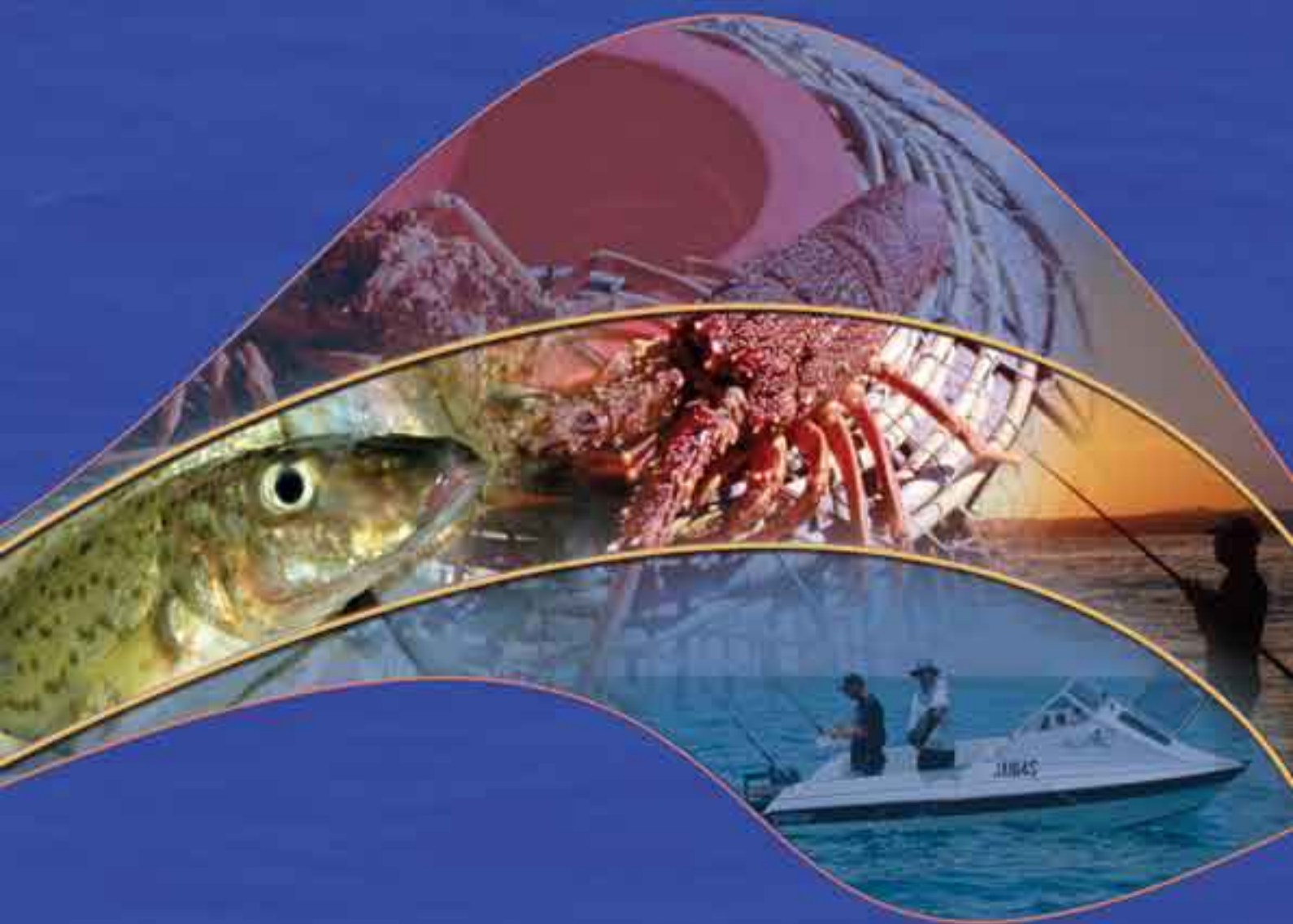


2000–01 National Recreational and Indigenous Fishing Survey

South Australian Regional Information



Paper No 46
July 2005

South Australian
Fisheries Management Series



Government of South Australia
Primary Industries and Resources SA

2000–01 National Recreational and Indigenous Fishing Survey

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Keith Jones and Annette Doonan

**Paper No 46
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Government of South Australia
Primary Industries and Resources SA

PIRSA Fisheries

(A Division of Primary Industries and Resources South Australia)

GPO Box 1625, Adelaide, SA 5001

Phone National (08) 8226 0439

International +61 8 8226 0439

Fax National (08) 8226 0434

International +61 8 8226 0434

Website www.pir.sa.gov.au

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TABLE OF CONTENTS

1	ACKNOWLEDGMENTS	10
2	EXECUTIVE SUMMARY	11
2.1	Resident participation and profiles	11
2.2	Recreational fishing effort.....	11
2.3	Catch (harvested and released)	12
2.4	Fishing effort on key species.....	12
2.5	Expenditure, investment and social factors associated with recreational fishing	12
2.6	Motivations, awareness and opinions on recreational fishing	13
2.7	Interpretation of the results and future use of information	13
3	INTRODUCTION	14
3.1	Background	14
3.2	Objectives.....	14
3.3	Other issues	15
4	SURVEY METHODS AND DEFINITIONS.....	16
4.1	Survey methods	16
4.2	Expansion and analysis of data.....	17
4.3	Scope and key definitions	17
4.4	Households and people in the scope	17
4.5	Activities in scope.....	18
5	RECREATIONAL FISHING PARTICIPATION & BOAT OWNERSHIP	20
5.1	Introduction.....	20
5.2	Participation.....	20
5.3	Fishing participation by economic region	20
5.4	Participation by boat fishers, and details of recreational fishing vessels.....	21
5.5	Housing location by type of boat – trailer, mooring/marina/car topper/shore-based ..	22
5.6	Presence of echo sounder and GPS by type of boat	22
6	FISHING EFFORT BY REGION, WATER BODY AND METHOD OF FISHING	23
6.1	Introduction.....	23
6.2	Annual fishing effort in SA by state of residence	23
6.3	Annual fishing effort – by SA residents in selected states.....	23
6.4	Total fishing effort by recreational fishing block.....	23
6.5	Regional fishing effort by water body	24
6.6	Annual effort by fishing platform	25
6.7	Annual fishing effort by fishing method (gear type)	25
7	TOTAL CATCH, HARVEST AND RELEASED FISH.....	27
7.1	Introduction.....	27
7.2	Annual harvest (numbers and biomass) of all reported species.....	27
7.3	Statewide harvest of key species by method of fishing by fishing platform.....	29
7.4	Regional harvest and released numbers of key species	39
8	FISHING EFFORT ON KEY SPECIES.....	53
8.1	Introduction, including Interpretation of fishing effort.....	53
8.2	Effort on marine and estuarine finfish species.....	53
8.3	Marine crustaceans	57

8.4	Marine molluscs	58
8.5	Inland water native species	59
8.6	Summary	59
9	ATTRIBUTABLE EXPENDITURE AND INVESTMENT BY RECREATIONAL FISHERS ...	61
9.1	Introduction.....	61
9.2	Attributable expenditure by recreational fishers	61
9.3	Attributed expenditure by SA residents outside SA, by state fished.....	62
9.4	Attributed expenditure by SA residents outside SA, by item category	62
9.5	Proportion of expenditure spent in home or “away” economic zone	63
9.6	Estimated expenditure, landing and days fished according to employment status (adapted from Campbell & Murphy, 2004)	63
9.7	Attributable expenditure by waters fished.....	64
10	MOTIVATIONS, AWARENESS AND OPINIONS ON RECREATIONAL FISHING	65
10.1	Introduction.....	65
10.2	Motivation for fishing	65
10.3	Awareness of recreational regulations for the management of the King George whiting, snapper and southern calamary fisheries	66
10.4	Awareness of fisheries information.....	66
10.5	Introduction of a general fishery licence	67
11	DISCUSSION	68
11.1	Uncertainties	68
11.2	Interpretation and future use of the information.....	68
11.3	The recreational fishery in the context of the SA managed fisheries	69
11.4	Spatial and temporal comparison of the King George whiting harvest by recreational fishers in SA	69
12	REFERENCES	73
	APPENDIX 1: HARVEST AND RELEASED NUMBERS OF KEY SPECIES CAUGHT BY RECREATIONAL FISHERS, BY EACH RECREATIONAL FISHING BLOCK.....	75
	APPENDIX 2: TARGET AND NON-TARGET FISHING EFFORT (HRS FISHED) IN KEY SPECIES, FOR EACH RECREATIONAL FISHING BLOCK.....	94
	APPENDIX 3: LIST OF ITEMS COVERED FOR EACH EXPENDITURE CATEGORY (REFER TO CHAPTER 9).....	99

LIST OF FIGURES

Figure 1.	Locations in South Australia of A. economic regions and B. recreational fishing blocks, used in the NRFS survey.	19
Figure 2.	Regional variation in the number of fishing and non-fishing recreational vessels estimated in the NRFS	21
Figure 3.	Regional harvest of King George whiting by fishing platform, expressed as a cumulative percentage of the total harvest for that region and the total numbers harvested.	31
Figure 4.	Regional harvest of snapper by fishing platform, expressed as a cumulative percentage of the total harvest for that region and the total numbers harvested.	31
Figure 5.	Regional harvest of garfish by fishing platform, expressed as a cumulative percentage of the total harvest for that region and the total numbers harvested.	32
Figure 6.	Regional harvest of calamary by fishing platform, expressed as a cumulative percentage of the total harvest for that region and the total numbers harvested.	32
Figure 7.	Regional harvest of Australian salmon by fishing platform, expressed as a cumulative percentage of the total harvest for that region and the total numbers harvested.	33
Figure 8.	Regional harvest of Australian herring (“tommy ruffs”) by fishing platform, expressed as a cumulative percentage of the total harvest for that region and the total number harvested.	33
Figure 9.	Regional harvest of snook by fishing platform, expressed as a cumulative percentage of the total harvest for that region and total number harvested.....	34
Figure 10.	Regional harvest of mulloway by fishing platform, expressed as a cumulative percentage of the total harvest for that region.	34
Figure 11.	Regional harvest of yellow eye mullet by fishing platform, expressed as a cumulative percentage of the total harvest for that region and the total numbers harvested.	35
Figure 12.	Regional harvest of unspecified mullet by fishing platform, expressed as a cumulative percentage of the total harvest for that region and the total numbers harvested.	35
Figure 13.	Regional harvest of whaler sharks by fishing platform, expressed as a cumulative percentage of the total harvest for that region and the total numbers harvested.	36
Figure 14.	Regional harvest of golden perch by fishing platform, expressed as a cumulative percentage of the total harvest for that region and the total numbers harvested.	36
Figure 15.	Regional harvest of Murray cod by fishing platform, expressed as a cumulative percentage of the total harvest for that region and the total numbers harvested.	37
Figure 16.	Regional harvest of rock lobster by fishing platform, expressed as a cumulative percentage of the total harvest for that region.	37
Figure 17.	Regional harvest of sand crabs by fishing platform, expressed as a cumulative percentage of the total harvest for that region and the total harvested.....	38
Figure 18.	Regional harvest of blue crabs by fishing platform, expressed as a cumulative percentage of the total harvest for that region and the total harvested.....	38
Figure 19.	Regional harvest of yabbies by fishing platform, expressed as a cumulative percentage of the total harvest for that region and the total numbers harvested.	39
Figure 20.	Recreational harvest and released catch (numbers) and % of fish released for major regions in SA marine waters for King George whiting.....	43
Figure 21.	Recreational harvest and released catch (numbers) and % of fish released for major regions in SA marine waters for Snapper.	43
Figure 22.	Recreational harvest and released catch (numbers) of garfish and respective %’s released for major regions of SA marine waters.	44

Figure 23. Recreational harvest and released catch (numbers) of southern calamary and respective %'s released for major regions of SA marine waters.	44
Figure 24. Recreational harvest and released numbers of Australian salmon and respective %'s released for major regions of SA marine and estuarine waters.	45
Figure 25. Recreational harvest and released numbers of Australian herring and their respective %'s released for major regions of SA marine and estuarine waters.	45
Figure 26. Recreational harvest and released catch (numbers) of snook with respective % released for the major regions of SA marine waters.	46
Figure 27. Recreational harvest and released catch (numbers) of specified whiting species (other than King George whiting) with respective % released for the major regions of SA marine waters.	46
Figure 28. Recreational harvest and released catch (numbers) of yellow-eye mullet with respective % released for the major regions of SA marine waters.	47
Figure 29. Recreational harvest and released catch (numbers) of unspecified mullet species with their respective % released for the major regions of SA marine waters.	47
Figure 30. Recreational harvest and released catch (numbers) of mulloway with respective % released for the major regions of SA marine waters.	48
Figure 31. Recreational harvest and released catch (numbers) of whaler sharks with their respective % released for the major regions of SA marine waters.	48
Figure 32. Recreational harvest and released catch (numbers) of blue crabs with respective % released for the major regions of SA marine waters.	49
Figure 33. Recreational harvest and released catch (numbers) of sand crabs with respective % released for the major regions of SA marine waters.	49
Figure 34. Recreational harvest and released catch (numbers) of rock lobster with respective % released for the major regions of SA marine waters.	50
Figure 35. Recreational harvest and released catch (numbers) of abalone with respective % released for the major regions of SA marine waters.	50
Figure 36. Recreational harvest and released catch (numbers) of mud cockles with respective % released for the major regions of SA marine and inland waters.	51
Figure 37. Recreational harvest and released catch (numbers) of yabbies with their respective % released for the major regions of SA marine and inland waters.	51
Figure 38. Recreational harvest and released catch (numbers) of Golden Perch with respective % released for the major regions of SA Inland waters.	52
Figure 39. Recreational harvest and released catch (numbers) of Murray Cod with their respective % released for the major regions of SA Inland waters.	52
Figure 40. Spatial variation in regional harvest of King George whiting by recreational fishers in 1978-82, 1994-96 and 2000/01.	70

LIST OF TABLES

Table 1.	Locations of regions, sub-regions and fishing blocks used in the NRFS to estimate regional catch and effort in SA	18
Table 2.	Number of recreational fishers and proportion of resident population by age class and gender for SA (adapted from Campbell & Murphy, 2004).....	20
Table 3.	Number of SA residents undertaking recreational fishing by economic region.	21
Table 4.	Regional information on the number and capital value of recreational fishing boats used by SA residents	22
Table 5.	Proportion of households reporting presence / absence of echo sounders and GPS devices on recreational fishing vessels	22
Table 6.	Annual fishing effort (days, hours and events fished) in SA by state of residence ...	23
Table 7.	Annual fishing effort (no. of fishing events) – by SA residents fishing by state	23
Table 8.	Annual recreational fishing effort, (hrs fished and number of fishing events), by recreational fishing block.....	24
Table 9.	Fishing effort (number of fishing events) by region and by water body fished by recreational fishers in SA.	25
Table 10.	The number of recreational events, according to the fishing platform	25
Table 11.	The number of fishing events (+/- standard error) undertaken by recreational fishers in SA waters, according to method of fishing.	26
Table 12.	Harvested numbers (and accompanying se) for all species and harvest biomass for selected species	28
Table 13.	Harvested numbers (and accompanying standard error) and harvest biomass for Crustaceans.....	29
Table 14.	Harvested numbers (and accompanying standard error) and harvest biomass for Cephalopods & other molluscs	29
Table 15.	Harvested numbers (and accompanying standard error) and harvest biomass for Other Taxa	29
Table 16.	Summary of Harvested numbers and harvest biomass (kg, live wt) for species groups	29
Table 17.	Harvest (no.'s) of key species by gear-type and the proportion (%) by fishing platform	30
Table 18.	Harvested numbers of key marine & estuarine species, ranked according to regions and ranked for combined species	41
Table 19.	Harvested numbers of key inland waters species, ranked according to regions and ranked for combined species	42
Table 20.	Statewide and regional target, non-target and total effort (person-hrs fished) on King George whiting.....	53
Table 21.	Target and total effort (target and non-target hrs fished) on snapper for major regions of SA.....	53
Table 22.	Target and total effort (target and non-target hrs fished) on garfish for major regions of SA.....	54
Table 23.	Target and total effort (target and non-target effort, hrs fished) on Australian salmon for major regions of SA.....	54
Table 24.	Target and total effort (target and non-target effort, hrs fished) on Australian herring for major regions of SA.	55
Table 25.	Target and total effort (target and non-target effort, hrs fished) on snook for major regions of SA.....	55
Table 26.	Target and total effort (target and non-target effort, hrs fished) on “other specified whiting” for major regions of SA.....	55

Table 27.	Target and total effort, hrs fished) on yellow eye mullet for major regions in SA.	56
Table 28.	Target and total effort, hrs fished) on unspecified mullet species for major regions in SA.....	56
Table 29.	Target and total effort, hrs fished) on mulloway for major regions in SA.	56
Table 30.	Target, non-target and total effort (hrs fished) on whaler sharks for major regions of SA.....	57
Table 31.	Target and total fishing effort (hrs fished) on blue swimmer crabs for major regions of SA.....	57
Table 32.	Target and total fishing effort (hrs fished) on sand crabs for major regions of SA.	57
Table 33.	Target and total fishing effort (hrs fished) on rock lobster for major regions of SA.	58
Table 34.	Target and total effort (target and non-target hrs fished) on southern calamary for major regions of SA.	58
Table 35.	Target and total fishing effort (hrs fished) on abalone (greenlip, blacklip and unspecified species combined) for major regions of SA.	58
Table 36.	Target and total fishing effort (hrs fished) on mud cockles for major regions of SA.	59
Table 37.	Target and total effort (hrs fished) on inland waters native species.	59
Table 38.	Target, non-target and total fishing effort (hrs fished) for all key marine species in SA waters.	60
Table 39.	Regional expenditure within SA – Residents & Visitors.	61
Table 40.	Expenditure per year within SA by expenditure category, recreational fishers, aged five years or over – Residents & Visitors.	62
Table 41.	Expenditure on items not covered in scope of the attributable expenditure estimates.....	62
Table 42.	Attributed expenditure by SA residents outside SA, by state fished.	62
Table 43.	Attributable expenditure by SA residents outside SA, by item category.	63
Table 44.	Proportion of expenditure by recreational fishers, at home or “away” from their residence.....	63
Table 45.	Estimated expenditure, landings and days fished, according to employment status for SA recreational fishers.	64
Table 46.	Attributable expenditure by water bodies fished.	64
Table 47.	Importance of factors motivating recreational fishers in SA, aged 15 year or over.	65
Table 48.	Primary reason for recreational fishing by SA respondents.	66
Table 49.	Awareness of King George whiting regulations (% of respondents)	66
Table 50.	Awareness of snapper regulations (% of respondents)	66
Table 51.	Awareness of southern calamary regulations (% of respondents).....	66
Table 52.	% awareness by respondents on recreational fishing information specific to SA. ...	67
Table 53.	Levels of support / non support for the application of a SA general Recreational fishing licence, and associated reasons.....	67
Table 54.	The recreational harvest (numbers) and total fishing effort (hrs fished) in SA waters, according to the managed fisheries.....	69
Table 55.	Proportional regional harvest of King George whiting by recreational fishers, 1978-82 – 2000/01.....	70
Table 56.	Summary of surveys in SA to estimate participation and / or expenditure by recreational fishers.....	71
Table 57.	Summary of surveys in SA to estimate finfish catch and effort by recreational fishers.....	71

Table 58.	Summary of surveys in SA to estimate catch and effort by recreational fishers for crustaceans and molluscs.....	72
Table 59.	Target and non-target fishing effort (hrs fished) on harvested King George whiting, snapper, garfish and southern calamary by fishing block.	94
Table 60.	Target and non-target fishing effort (hrs fished) on harvested Australian salmon, herring (ie tommy ruffs), snook & other specified whiting species by fishing block.	95
Table 61.	Target and non-target fishing effort (hrs fished) on harvested yellow-eye mullet, unspecified mullet species and mulloway by fishing block.....	96
Table 62.	Target and non-target effort on harvested Inland waters species by fishing block.....	97
Table 63.	Target and non-target effort (hrs fished) on retained species of marine crustaceans by fishing block.	97
Table 64.	Target and non-target fishing effort on key marine molluscs by fishing block.....	98

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The table below lists the acronyms used in this report.

Acronym	Full Title
NRIFS	National Recreational & Indigenous Survey (comprising NRFS, IFSNA & OVFS)
NRFS	National Recreational Fishing Survey (2000/01) of residents in each state
IFSNA	Indigenous Fishing survey of northern Australia
OVFS	Overseas Visitor Fishing Survey
PIRSA	Primary Industries & Resources South Australia
SARDI	South Australian Research & Development Institute
MSF	Marine Scalefish Fishery
FRDC	Fisheries Research & Development Corporation
NHT	National Heritage Trust
ABS	Australian Bureau of Statistics
GPS	Global Positioning System

2 EXECUTIVE SUMMARY

This report presents a summary of all the South Australian (SA) regional data collected as part of the first part of the National Recreational and Indigenous Fishing Survey (NRIFS) carried out in 2000/01. National and state-wide results of the survey are reported elsewhere (Henry & Lyle, 2003; Campbell & Murphy, 2004).

The national survey of residents (NFRS) consisted of three parts:

- i) A telephone interview survey of 4,422 randomly chosen SA households undertaken in March & April 2000, seeking information on recreational fishing participation levels and demographic and boat ownership details during the previous 12 months.
- ii) A 12 month telephone/diary survey of all recreational fishers over 5 years of age, between May 2000 & April 2001 using the same households, and with monthly collection of data on catch, fishing effort and attributable expenditure.
- iii) A telephone interview survey of the same households, but only including fishers over 15 years of age, to assess respondent awareness and opinions on fisheries management issues pertinent to recreational fishing in SA.

The data collected from the first two components were expanded to population estimates, and adjusted for potential biases associated with non-respondents. The main results were as follows:

2.1 Resident participation and profiles

- Over 328,000 (+/- 14,000) or 24.1% of the SA population fished recreationally in the twelve months prior to April 2000. More younger than older residents, and more males than females went fishing.
- The Adelaide region contained the highest number of fishers (65% of the state total, and 20% of all Adelaide residents). However, in most other regions of the state, higher proportions of the resident population went fishing. In the Kangaroo Island and Port Lincoln regions, just over 50% of residents fished.
- Over 38,000 vessels were used for recreational fishing throughout the state, with 18,300 owned by residents in the Adelaide region. Of all recreational fishing vessels 69% were powered, 21% were rowed and 10% were sailing vessels. Most of these vessels were housed on trailers, and smaller numbers moored in marinas, stored as car-toppers or situated at shore-based locations.

2.2 Recreational fishing effort

- A total of 1,944,451 days and 9,767,947 hours, equating to 2,216,041 fishing events, were expended in recreational fishing activities within SA over the period from May 2000 to April 2001.
- SA residents applied over 95% of this effort; interstate residents exerted almost 5% of the effort, with Victorian residents being the most frequently visiting interstate group.
- More than half of the total number of recreational fishing events took place in Gulf St. Vincent and Spencer Gulf, with 33% of the total effort occurring in Gulf St. Vincent. Outside of the gulfs effort was greatest in the River Murray region.
- In marine waters, effort was highest inshore (i.e. less than 5 km from the coastline). In inland waters, not including the River Murray, fishing effort was greatest in dams and lakes (but excluding Lakes Alexandrina & Albert).
- Shore based fishing (including beach, coastal reefs, jetties and wharves) made up 62% of the total fishing effort. Boat fishing made up 38% of the total fishing effort.
- Line fishing (including baited hooks or lures with rods or handlines) was the most popular method of fishing and accounted for 85% of total effort.

2.3 Catch (harvested and released)

- Detailed regional harvest and released catch information on the 21 key species are provided in this report.
- Over 10.2 million finfish were harvested (i.e. retained numbers) by recreational fishers throughout the marine and estuarine waters of SA during 2000/01.
- The combined harvest (numbers) of Australian herring (tommy ruff), King George whiting and garfish comprised just over 66% of the total marine and estuarine harvest. The three species with the highest harvests (biomass) were sharks & rays, King George whiting and Australian salmon.
- Blue crabs were the most commonly harvested marine crustacean (1.1 million crabs; 390 tonnes), followed by rock lobsters (114,000; 95 tonnes) and sand crabs (96,000; 33 tonnes).
- Goolwa cockles, squid/cuttlefish (predominantly southern calamary) and razor fish were the three mollusc species with highest levels of harvest (1.4 million; 1.1 million & 470,000, respectively).
- The estimated harvest numbers for all species was 17,413,466. This equated to a harvest biomass of 5,027,466 kg, live wt.
- The proportion of the regional harvest taken from shore and boat based fishing operations varied considerably for different species, according to the preferred fishery habitat of a particular species.
- In marine waters, the northern Gulf St. Vincent (waters north of a line from central Adelaide metropolitan to Stansbury on Yorke Peninsula) contained the highest number of key species with highest levels of harvest. These included garfish, southern calamary, herring, salmon, mud cockles and sand crabs. The south east of SA was the next most highly ranked region with highest harvest levels for 4 species; rock lobster, abalone, mulloway and whaler sharks.
- For the three key inland native species (yabbies, golden perch, Murray cod), the waters of the upper Murray (Overland Corner to the Vic/NSW border) exhibited the highest ranking of all inland waters regions.
- The numbers of fish released, as a proportion of the whole catch is provided in the report. Species that were released most often included snapper (70–90% in gulfs & Kangaroo Island waters), mulloway (62–100%), and golden perch (57–67% in the River Murray). Species that were rarely released included calamary, garfish, whaler sharks, mud cockles and yabbies. Those with regionally variable release rates included King George whiting, Australian salmon, herring, Murray Cod, rock lobsters and blue crabs.

2.4 Fishing effort on key species

- Target and non-target fishing effort (hrs fished) on the harvested catch were estimated from the diary survey, and this report presents these results for each of the key species. The four marine and estuarine species which exhibited the highest levels of effort included King George whiting, (1.7 million hrs), Australian herring (1.7 million hrs), rock lobster (1.4 million hrs) and calamary (1.2 million hrs). For the three inland waters native species, total effort on golden perch was the highest (740,000 hrs).
- Targeted fishing effort relative to total effort varied both regionally and between species. Inter-specific differences were due to a number of reasons, including whether the species was harvested using a species-specific gear type, and the relative value of the species (high consumption or sporting value). Regional variation for a particular species may have been due to whether specific regions included areas of high recreational fishing value (eg surf beaches for surf fishing for mulloway or Australian salmon).

2.5 Expenditure, investment and social factors associated with recreational fishing

- During 2000/01, over \$148 million (+/- 14,000) in total annual expenditure was directly attributable to recreational fishing within SA, with purchases associated with boats/trailers and car fuel costs accounting for 74% (\$80.9 million) of that expenditure. Costs associated with accommodation and fishing gear accounted for 18% (\$26.9 million) of that total expenditure.

- Car fuel costs were not allocated to any regional area, of the remainder of the expenditure (\$110.2 million), SA residents accounted for 97% and interstate visitors the remaining 3%.
- SA residents spent a total of \$2.2 million on recreational fishing activities in interstate locations, of this 84% was spent in the eastern mainland states.
- The total capital value of recreational fishing vessels is estimated at \$243 million.
- Of the \$148 million expended in SA waters, 75% (\$111 million) was spent in marine waters, 7% (\$10 million) in estuaries and 18% (\$27 million) in inland waters.
- Highest expenditure occurred within the Adelaide statistical region (64%), with the Northern (6.9%), Yorke & Mid north (6.5%) and South east (6.4%) the next highest regions. The South east (64%), Adelaide (10%) and West coast (9%) regions were the three regions where the highest expenditure by interstate visitors occurred.
- Expenditure derived from fishing “locally” or greater than 40 km (“away”) from a fisher’s residence are provided. There was high regional variation, with residents from the Adelaide, Northern and Port Lincoln regions spending more than 62% of their expenditure fishing “away”, and the remainder of the regions less than 36% of their expenditure. Fishers from the Barossa region spent 91% of their expenditure fishing “locally”.
- Full-time professionally employed people expend the highest level of money on recreational fishing in SA, and they also exerted the highest level of fishing effort. On average, each fisher of this group spent \$441 per fisher (average for all fishers: \$452 per fisher). Not fully employed recreational fishers harvested more fish than any other group.

2.6 Motivations, awareness and opinions on recreational fishing

- The NRFS sought the reasons why SA residents, aged 15 years and over, go recreational fishing. Of the eight reasons that fishers were invited to respond to, they considered “to relax and unwind”, “to be outdoors” or “to fish for sport” the most important reasons (“very” and “quite” important factors combined). Slightly less important reasons were “to fish for food”, or “to be with the family”. The least number of respondents regarded fishing competitions as the most important reason to go fishing.
- Approximately 66% of the respondents were aware of King George whiting regulations, under a half for snapper and about one third for calamary.
- In response to whether recreational fishers supported the introduction of a recreational fishing licence, similar to those in NSW and Victoria, 47% supported one, 42% did not support one, and 11% were unsure. The main reasons for the support were for increased funding on research on recreational fishing and additional policing of fishing regulations. The main reasons against the introduction were increased costs for recreational fishing and taking away the spontaneity of recreational fishing.

2.7 Interpretation of the results and future use of information

- The results of the survey were discussed in the context of uncertainties associated with the estimates and the relative size of the recreational fishery with each managed fishery in SA. The SA Marine Scalefish and Inland waters managed fisheries were the two managed fisheries, in which the most significant levels of harvest and fishing effort occurred.
- The report lists all recreational fishing surveys undertaken over the past 30 years in SA, pointing out that the different survey methods used make the interpretation of trends in recreational harvest and fishing effort in this state problematic. An example is provided in explaining the trends in the harvest of King George whiting over the past 30 years.
- Finally, the report recommends the need for developing standard survey methods for future on-going recreational fishing surveys.

3 INTRODUCTION

3.1 Background

In SA, fishing from boats, the natural shore or wharves and jetties has long been an important recreational pursuit by residents and visitors. Stocks of good eating and / or sport species of this state's marine, estuarine and inland waters have provided an incentive for this fishery to develop in some of the key tourist locations of the state.

The National and Indigenous Recreational Fishing Survey (NRIFS) was a joint initiative of the Commonwealth and State / Territory Governments to obtain fisheries statistics to support management of non-commercial fishing. The survey was undertaken in 2000/01, with the funding assistance of NHT/FRDC and State Fisheries agencies.

Catch and effort data have traditionally been collected on the commercial fishery. In SA, for many years, catch and end effort on recreational fishing has often been regional (eg Jones & Retallick, 1990), species- (eg Boxall & Venema, 2001) or fishing platform-specific (eg McGlennon & Kinloch, 1997). Additionally, surveys to estimate participation rates and expenditure by recreational fishers are largely outdated (Philipson et al, 1986), or difficult to compare with the results of previous surveys due to different survey techniques (Ciepecki et al, 1997).

The NRIFS comprised a number of components, including: biological (catch, effort, and species composition), economic (attributable expenditure and capital value of recreational fishing vessels and gear) and social (participation by age, gender, employment status and motivation by fishers). The survey methods have been described in Henry & Lyle (2003), and Campbell & Murphy (2004).

The survey comprised three discrete parts, largely in parallel over a 12-month period:

- The National Recreational Fishing Survey (NRFS), conducted with Australian residents;
- The Indigenous fishing survey of northern Australia (IFSNA) conducted with a sample of aboriginal communities in coastal regions of northern Australia.
- Overseas visitor fishing survey (OVFS), conducted as an exit survey at International airport terminals.

This report presents a summary of the regional data collected from SA residents and visitors to SA, as part of the NRFS. The results from the other surveys (i.e. IFSNA & OVFS) are reported elsewhere (Henry & Lyle, 2003).

3.2 Objectives

The aim of the NRFS was to collect nationally consistent and comparable data on catch, effort, participation rates, demographics, economic activity, attitudes and awareness in "non-commercial" fishing activities. In the SA component, the attitude and awareness section included questions specific to the stock sustainability and management of some of the species highly valued by recreational fishers.

This report will focus on the following sets of data associated with this state, and these data sets will be presented in a series of chapters:

1. Recreational fishing participation (age, gender, economic region), boat ownership and capital value by economic region, and information about boats (including type of boat, GPS & echo-sounders).
2. Fishing effort (hrs fished and fishing events) by regional fishing area, type of water body and main gear types.
3. Total catch, harvest and released numbers of 17 key species by fishing region and fishing platform.
4. Fishing effort (target and non-target) by fishing region on the 17 key species by fishing region.

5. Attributable expenditure (annual) by residents and visitors by economic region and type of water body.
6. Awareness and opinions on recreational fishing in SA, including motivation, levels of support for recreational fishing licences, awareness of regulations on key species and awareness of fisheries information.

The report also provides a summary of the methodology used in the NRFS. More detailed information on the methodology can be obtained from Henry & Lyle (2003) and Lyle *et al* (2002).

3.3 Other issues

This report has summarised the key components of the survey. The database is considered to be a “working” database, and further analyses, reports and queries are available through the South Australian Research and Development Institute (SARDI), Fisheries Information Unit.

4 SURVEY METHODS AND DEFINITIONS

A detailed description of the survey scope, design philosophy, methodology, and data analysis is provided in Henry and Lyle (2003) and summarised here.

4.1 Survey methods

The survey was based on general population sampling using single-stage cluster sampling (Coleman, 2004, Lyle, 2005). The survey initially collected information about recreational fishing from a sample of Australian household residents. The sample size for each state was calculated to provide consistency in the levels of precision for reporting of state estimates of participation, catch and effort. The respondents were selected from a stratified random selection of the Telstra "White Pages" telephone listings for Australia. The telephone numbers for inclusion in the study were chosen at random from a phone list sorted by post-code.

The survey had three distinct phases; a screening survey, diary survey and "wash up" / attitudinal survey.

1. The screening survey assessed participation in recreational fishing and obtained socio-demographic information about the household. Boat ownership (recreational fishing and non-fishing) was also established. This was carried out in March & April 2000, and information on participation was requested for the previous 12-month period. A gross sample of 4,422 households in SA was interviewed with the highest response rate (85.6%) of all states and territories.
2. The diary phase lasted 12 months (May 2000 to April 2001). This collected information about recreational fishing activity (including effort and catches) and related attributable expenditure by the Australian residents interviewed in the initial survey, who intended to fish. Of the respondents eligible to the diary survey, 90% agreed to take part, and amongst these, 94% completed the diary survey, resulting in a "sample take" of 2428 diarists. Fishing activity by respondents irrespective of where in Australia they fished was essential to record, as information on activities of inter-state households who fished in SA, and vice versa, were included. Unlike conventional surveys, information was collected progressively during the period (by telephone) to maximise the response and data quality.
3. The attitudinal interview survey was conducted at the end of the diary phase (May, 2001) to assess respondent awareness and opinions on a number of management issues pertinent to recreational fishing in SA.

Data quality was addressed through a series of calibration surveys to provide adjustments for non-response and to assess the extent of behavioural change (unexpected fishing) during the diary period. A loss of respondents from non-response (i.e. refusals or non-contacts) in a survey has a potential to introduce bias if the non-response group is different to the responding group. The non-response survey found a lower participation rate among the whole of the non-response group and a lower avidity rate among the fishers in the non-response group. An adjustment was made for non-response during data expansion. Also, a survey of unexpected fishing was undertaken on a sample of households not intending to fish in the following 12 months. These respondents were contacted at the end of the diary period to confirm that no fishing took place.

On-site (creel) surveys were also conducted to assess fish identification skills of recreational fishers, to determine the size composition of common species and to provide independent verification of certain recreational activities. Due to the extreme patchiness of the data collected on size composition for most of the fish species, spatially and temporally similar data from surveys of the commercial fishery were made available to allow conversion of numbers of fish to biomass (eg see McGarvey et al 2003; Fowler et al 2003). These figures were then used to estimate the biomass of fish harvested by recreational fishers.

4.2 Expansion and analysis of data

4.2.1 Initial interview data

Expansion factors were applied to the sample to multiply the data up to the SA resident (aged 5 yrs or older) population basis. These factors were applied for households and people for each home region.

4.2.2 Diary data

Using estimates of recreational fishing participation from the initial survey as a benchmark, expansion factors were applied to the sample to multiply the data up to the SA resident recreational fisher population. All data from the diary survey, including fishing effort, catch and fishing-related expenditure, were expanded.

4.2.3 Analysis of data

The full process of the data analysis is provided in Henry & Lyle (2003). The results presented in this report are mostly in the form of expanded population estimates and relative percentages. In some instances, a zero result is presented within a table. However, this does not indicate that a particular event did not occur, but rather, it was a “rare” event that did not occur within the sampling scope of the survey. This also applies to catch figures for a number of the “minor” species, and is why emphasis is made on the species caught by relatively large numbers of fishers. Also, standard errors (+/-) of estimates have been provided for state-wide data only. Where the standard error relative to the estimate is greater than 0.4, (highlighted in bold), caution should be exercised in the interpretation of the estimate. Also, as the information is spatially disaggregated the relative size of the standard errors (i.e. the standard error as a fraction of the parameter estimate) will increase (Lyle, 2005).

4.3 Scope and key definitions

4.3.1 Geographic scope

SA was divided into 10 land-based economic zones to allow reporting of attributable expenditure on a regional basis (Fig. 1). These are the official population statistical blocks used for all census information collected by the Australian Bureau of Statistics (ABS, 2002).

For the purposes of determining the locations of catch and fishing effort by recreational fishers, a total of 35 geographical areas were delineated throughout the state (Fig. 1). Most areas adjacent to the marine coast matched single or amalgamated blocks assigned in the commercial fishery, and data for most of the sub-regions have been amalgamated (Table 1). The recreational fishing blocks for inland waters were assigned to river catchment areas.

Visitor origins have been classified in terms of other states and territories of Australia.

4.4 Households and people in the scope

One category of dwelling was used for sampling. These were private dwellings with a home phone telephone number listed in the Telstra “White Pages.” As the NRFS was nation-wide, respondents were identified in each state. If they visited SA to fish, information about the fishing trip could be collected in their “home” state. This meant that large-scale sampling of non-private dwellings (hotels, motels, caravan parks) were not required. Respondents in the NRFS were benchmarked against the Australian Bureau of Statistics (ABS) census data. International visitors were not included in the NRFS. These are reported in Henry & Lyle (2003).

Residents were defined as having their usual place of residence in SA. Visitors were defined as having their usual place of residence elsewhere in Australia.

Three different age criteria were applied for various survey purposes, namely: (i) all ages (for total population purposes); (ii) those aged 5 or more eligible fishing activity; and (iii) those aged 15 yrs or more for attitudinal questioning.

Table 1. Locations of regions, sub-regions and fishing blocks used in the NRFS to estimate regional catch and effort in SA (see Fig. 1 for a map of these locations).

Region	Sub Region	Rec. Fishing Block number
West Coast	Far West Coast	1, 2
	Mid West Coast	3, 4
	Coffin Bay	5, 6
Spencer Gulf	Southern Spencer Gulf	7, 11, 12
	Northern Spencer Gulf	8, 9, 10
Gulf St. Vincent & Fleurieu	Sthn GSV & Fleurieu Peninsula	13, 14, 15, 19
	Nthn Gulf St. Vincent	16, 17, 18
Kangaroo Island	Nthn KI	20
	Sthn KI	21
South – East SA	Murray Mouth, Coorong Beach, Robe, Beachport, Pt. MacDonnell	22, 23, 24, 25
Coorong Lagoon	Coorong Lagoon	26
Lakes	Lakes Alexandrina, Albert	27
Lower Murray	Wellington – Overland Corner	28
Upper Murray	Overland Corner – Border Vic/NSW	29
Nthn SA	Incl. Cooper Creek, nthn Flinders & Eyre catchments	30
Yorke & Mid North	Inland water bodies associated with this region	31
Nthn Adelaide	Inland water bodies associated with this region	32
Fleurieu Inland waters	Inland water bodies associated with this region including farm dams, streams, and lakes	33
Murray Catchment	Inland water bodies associated with this region, including backwaters separated from the River Murray	34
South East Catchment	Inland water bodies associated with this region, including farm dams, streams, and lakes	35

4.5 Activities in scope

For the purposes of the survey, recreational fishing has been defined as including “prawning, crabbing, spear-fishing collecting mussels or oysters or aquarium fish”. By design, commercial fishing activity was excluded. Also, total catch and effort by indigenous communities in SA was not able to be estimated - the survey provided coverage of fishing activities of indigenous people living in urban areas, where it was believed that high phone ownership rates existed (Henry & Lyle, 2003), however it did not cover remote communities.

Three terms have been applied to catch information: (i) catch – all organisms captured whether harvested or released, (ii) harvest – the retained component of the catch; and (iii) released – the released component of the catch.

The survey sought catch, effort and expenditure data according to types of water bodies fished. The definitions of the types were:

- Lakes/Dams – these include “privately owned” and public dams (including corporately owned with access fees), and natural lakes.
- Rivers – streams and rivers within prescribed catchment areas, but not including estuaries.
- Estuaries – “Brackish” or saltwater, with the boundary between an estuary and inshore ocean waters is defined as a line continuing along the coast and across the “bar” area of the river. For less obvious delineations (eg wider bays and harbours) the line is drawn between the two most seaward headlands. For example, all waters of Coffin Bay, inside Point Longnose are classified as an estuary, and the outer waters of Coffin Bay as coastal waters.
- Inshore waters – refers to ocean waters within a 5 km band of the coastline of Australia (including specified islands). Coastal beach and rock fishing are therefore included in this category.
- Offshore waters – refers to ocean waters extending from 5 km seaward to the boundary of the study area (Australian EEZ).

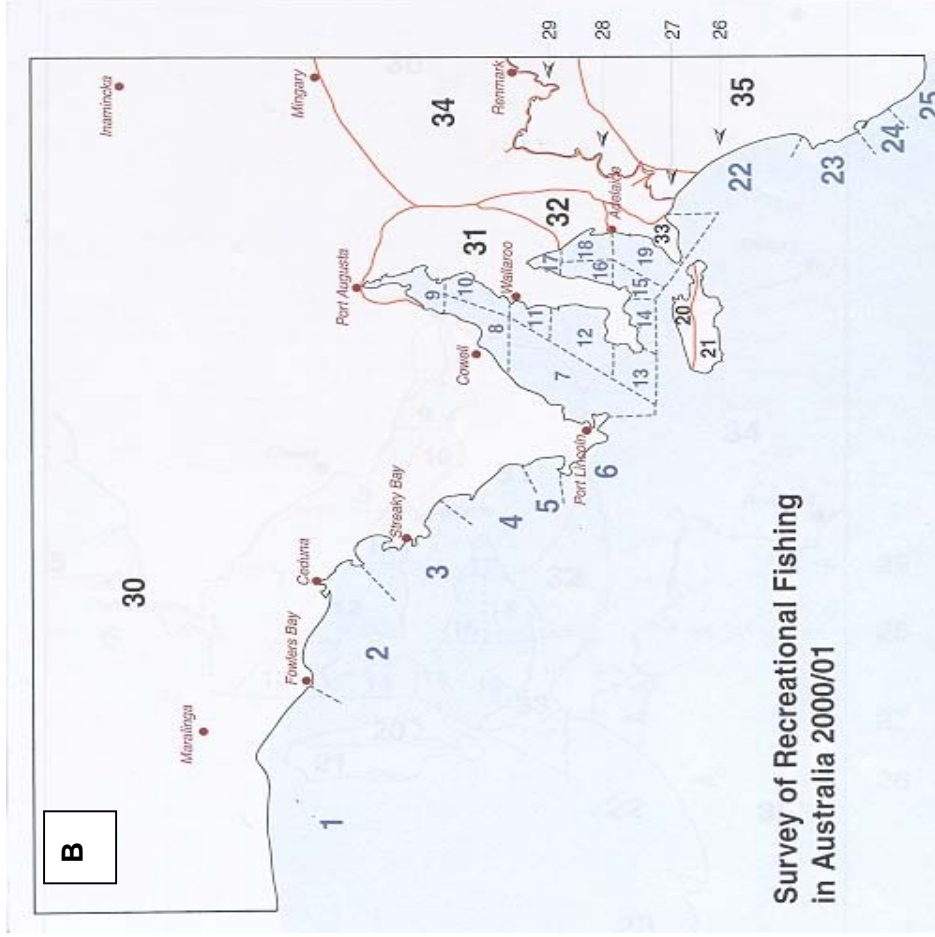
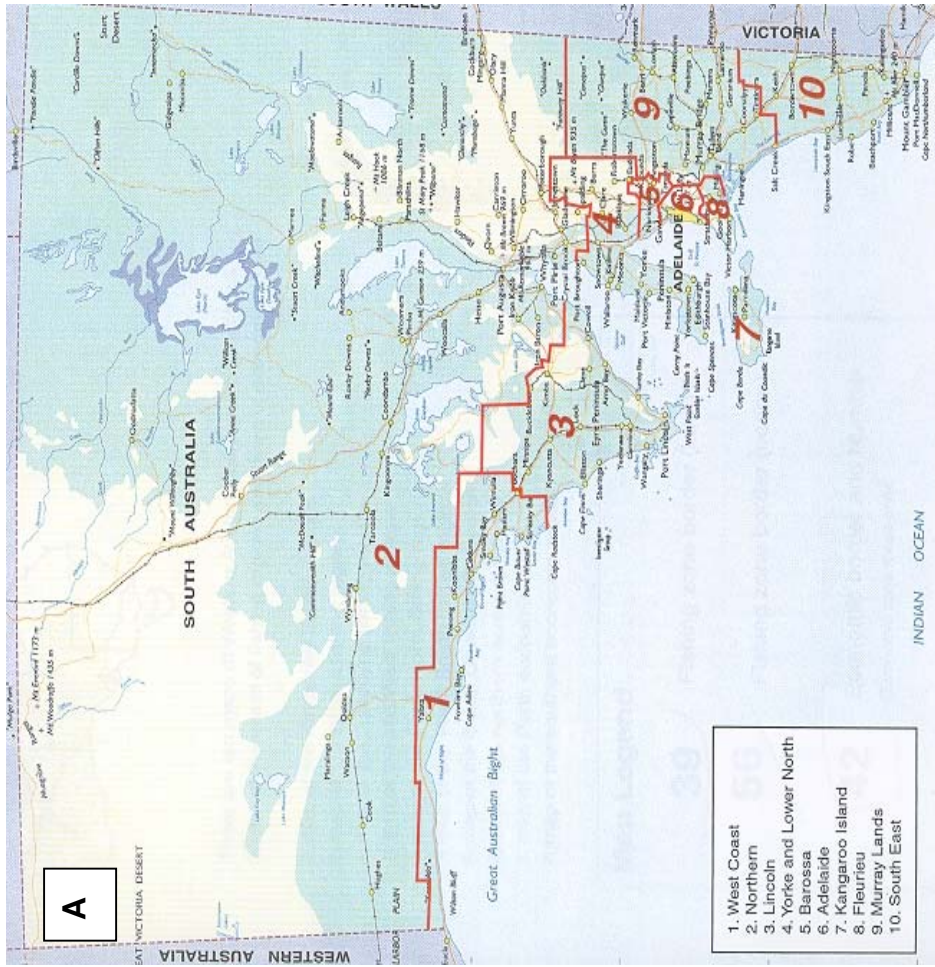


Figure 1. Locations in South Australia of A. economic regions and B. recreational fishing blocks, used in the NRFS survey. See Table 1 for names of regions and sub regions assigned to combined recreational fishing blocks.

5 RECREATIONAL FISHING PARTICIPATION & BOAT OWNERSHIP

5.1 Introduction

This chapter presents the results from the screening survey of SA residents undertaken in March and April 2000, and focuses on the participation levels by recreational fishers and boat ownership details for the 12 months prior to the screening survey.

5.2 Participation

A total of 328,228 (+/- 14,000) SA residents participated in recreational fishing activities (Table 2), representing an average of 24.1% of SA's population greater than 5 years of age. A higher proportion of younger age groups of the population of both genders participated in recreational fishing. Between 30–45% of males and between 12–29% of females aged between 5–59 yrs participated. For the SA population aged over 60 years, on average, 17% of males and 2.6% of females fished recreationally.

Table 2. Number of recreational fishers and proportion of resident population by age class and gender for SA (adapted from Campbell & Murphy, 2004). Standard errors expressed as (+/-).

Age Class	Males	% Pop	Females	% Pop	Total (+/-)	% Pop (+/-)
	45,158	44.5	28,146	29.2	73,304	37.1
15 to 29	44,956	29.8	23,140	15.8	68,096	22.9
30 to 44	71,555	44.2	28,311	17.2	99,866	30.6
45 to 59	46,448	33.7	16,287	11.5	62,735	22.5
60 to 74	18,894	22.4	2,568	2.8	21,462	12.3
75 plus	1,663	4.8	1,102	2.2	2,765	3.3
Total	228,674	34.1	99,554	14.5	328,228 (+/- 14,000)	24.1 (+/- 0.5)

There were 176,000 (+/- 4,000) households in SA that contained at least one recreational fisher, and this represented 28.6% (+/- 0.7%) of the total number of households within the state. Thus, on average, there were 1.9 recreational fishers per household.

In SA, a total of 14,041 recreational fishers owned fishing licences (rock lobster pots and recreational nets). This was 4.39% of all SA recreational fishers. There were 7,447 recreational fishers who belonged to fishing clubs (2.33% of total recreational fishers).

5.3 Fishing participation by economic region

The greatest number of recreational fishers were residents of economic region 6 (i.e. Adelaide, see Fig. 2.1 for the locations of the economic regions), and this represented 61.8% of all SA resident fishers. The next most important regions were the Northern (region 2 – 7.2%) and Murray Lands (region 9 – 7.0%). The West coast (region 1 – 0.5%) was the region with the lowest overall participation level (Table 3). In the Kangaroo Island and Port Lincoln regions, just over 50% of residents went fishing recreationally, and it was only in the Adelaide and Fleurieu regions that recreational fishers as a proportion of the total regional population was lower than the average of 23.9%.

Table 3. Number of SA residents undertaking recreational fishing by economic region. (Locations of regions are seen in Fig. 1).

Economic Region	No. Recreational Fishers > 5 yrs of age	% of Regional Population > 5 yrs of age *	% of total no. of Rec Fishers
1 (West Coast)	1,737	29.2	0.5
2 (Northern)	23,784	31.6	7.2
3 (Port Lincoln)	12,696	51.1	3.9
4 (Yorke & Lower North)	14,758	36.7	4.5
5 (Barossa)	16,659	34.0	5.1
6 (Adelaide)	202,772	20.3	61.8
7 (Kangaroo Island)	3,124	52.6	1.0
8 (Fleurieu)	10,459	24.0	3.2
9 (Murray Lands)	23,037	36.7	7.0
10 (South East SA)	19,201	34.3	5.8
Total	328,227	23.9	100

*: regional population size obtained from 2001 Census (ABS, 2002), undertaken in August 2001.

5.4 Participation by boat fishers, and details of recreational fishing vessels

The total number of boats owned by SA residents was estimated at 74,892, with 38,173 (51%) used for recreational fishing.

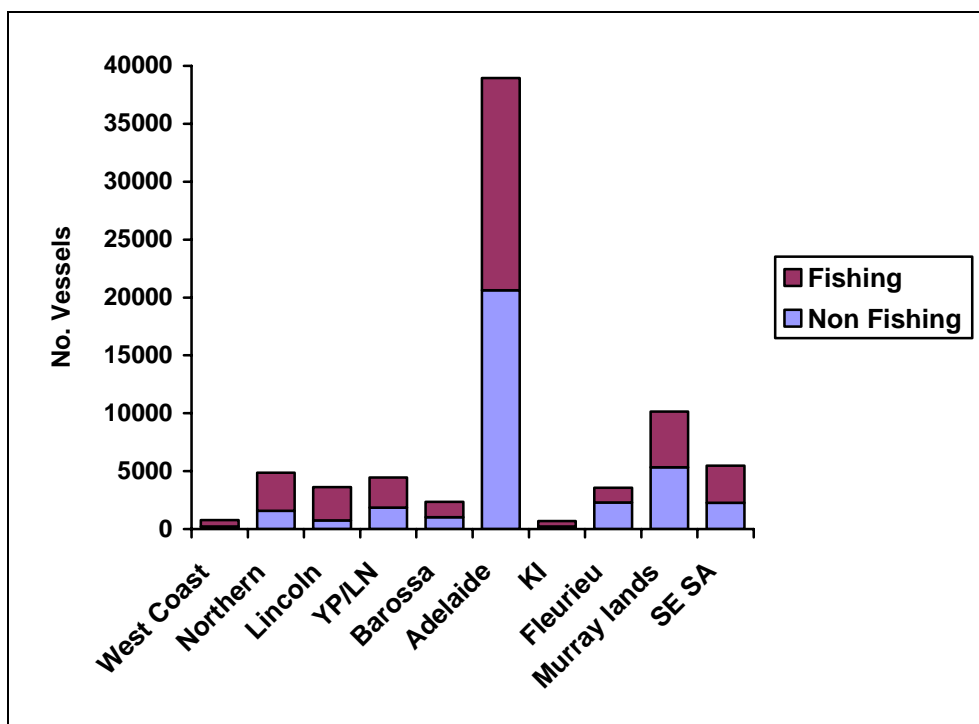


Figure 2. Regional variation in the number of fishing and non-fishing recreational vessels estimated in the NRFS

The economic region encompassing most of the Adelaide metropolitan area, contained just over 50% of the total number of boats (38,940), and this region also contained the highest number of residents who owned recreational fishing vessels (18,315; 47.3% of total fishing boats). With the exception of the Adelaide and Murray Lands (regions 6 & 9), a higher proportion of the vessels in all other regions were used for recreational fishing (50.6–79.5%). Throughout the state, the proportion of recreational fishing vessels with the types of propulsion were 68.8 % powered, 9.6 % sail and 21 % row/paddle vessels.

Table 4. Regional information on the number and capital value of recreational fishing boats used by SA residents

Economic Region	No. Recreational Fishing Boats (% of reg. total)	Estimated Value (\$ x 1000)	% of Total Capital Value
1 (West Coast)	540 (70.9%)	1,630.3	0.7
2 (Northern)	3,289 (67.7%)	17,443.9	7.2
3 (Lincoln)	2,887 (79.5%)	25,124.8	10.3
4 (Yorke & Lower North)	2,600 (58.2%)	17,771.0	5.0
5 (Barossa)	1,328 (56.3%)	12,107.1	5.0
6 (Adelaide)	18,315 (47%)	123,593.6	50.9
7 (KI)	482 (69%)	1,180.0	0.5
8 (Fleurieu)	1,255 (35.3%)	9,123.7	3.8
9 (Murray Lands)	4,828 (47.5%)	20,423.2	8.4
10 (South East SA)	3,188 (58.4%)	19,618.4	8.1
Total	38,713	243,016.7	100

The capital value of all recreational fishing vessels was \$243 million (Table 4), and, regionally, the highest capital value occurred in the Adelaide region (\$A 124 million), with the next highest in the Port Lincoln region (\$25 million). The capital value of recreational fishing vessels owned by Kangaroo Island residents was the lowest of all SA economic regions (\$1.2 million).

5.5 Housing location by type of boat – trailer, mooring/marina/car topper/shore-based

Of all the households interviewed in the screening survey, 42% did not report on the housing location of their recreational fishing vessels. 49.1% reported that their vessels had trailers, 4.2% were moored in marinas, 2.1% were car-toppers and 2.7% were shore-based.

5.6 Presence of echo sounder and GPS by type of boat

Almost 42% of households did not report on whether echo sounders or GPS devices were utilised on their recreational fishing vessels. Of the remaining 58%, more vessels operated without echo sounders and GPS devices (Table 5).

Table 5. Proportion of households reporting presence / absence of echo sounders and GPS devices on recreational fishing vessels

Type of vessel propulsion	With echo sounders	Without echo sounders	With GPS	Without GPS
Powered vessels	25.4%	29.1%	15.6%	38.8%
Sail	0.5%	0.3%	0.5%	0.3%
Rowing / Paddle	0.1%	2.7%	0.0%	2.8%

6 FISHING EFFORT BY REGION, WATER BODY AND METHOD OF FISHING

6.1 Introduction

This chapter comprises summarised data on fishing effort by recreational fishers, both by SA residents, and interstate visitors to SA. These data were collected as part of the diary/telephone survey, and cover the period May 2000 – April 2001.

6.2 Annual fishing effort in SA by state of residence

Table 6 shows the annual SA fishing effort (days, hours and events fished) by all recreational fishers, by their state of residence. Similar results were found for all three measures of fishing effort. A total of 1,944,451 fisher-days, 9,767,947 fisher-hrs or 2,216,041 fishing events were expended throughout SA waters.

Table 6. Annual fishing effort (days, hours and events fished) in SA by state of residence

Fishing effort	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
No. days	13,581	34,964	14,679	1,861,637	12,759	1,886	4,115	830
No. Hours	69,951	254,231	58,660	9,307,735	47,207	10,069	14,452	5,642
No. events	20,295	43,811	19,770	2,108,483	15,781	2,169	4,404	1,328

Clearly the highest effort was from SA residents, and Victoria was the most important state of residence from where interstate visitors fished in SA. Residents from the ACT expended the least fishing effort of all states and territories in SA waters.

6.3 Annual fishing effort – by SA residents in selected states

Table 7. Annual fishing effort (no. of fishing events) – by SA residents fishing by state

Fishing effort	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
No. events	24,853	27,640	71,589	2,108,493	3,499	1,426	21,350	337

When fishing interstate, SA residents expended most effort in Queensland, and least in the ACT (Table 7). Net movement of fishing effort between SA and the other states was calculated by subtracting the effort in each state reported in Table 7 from those in Table 6. There was a net export of effort to NSW, Qld and NT, whereas there was a net import of effort to SA from Victoria, WA, Tas and the ACT. There was an overall net export of effort from SA to all other states (43,146 events; + 2% of the state effort).

6.4 Total fishing effort by recreational fishing block

The combined fishing effort combined for all species, and methods of fishing, according to each recreational fishing block is seen in Table 8. Regional fishing effort levels (combinations of fishing blocks) are highlighted in bold.

Fishing effort, in terms of hours fished and the number of fishing events was at its highest level in Gulf St. Vincent waters (regions 13 – 19) (Table 8). With this region being adjacent to the highest density of human population in SA, the northern Adelaide metro waters (region 18) was the area where the highest fishing effort of all state waters was expended. Spencer Gulf was the second highest region, with region 12 expending the highest effort. The waters of the River Murray and those from the South east of the state shared similar significant levels of effort.

Table 8. Annual recreational fishing effort, (hrs fished and number of fishing events), by recreational fishing block (See Fig. 1 for locations of blocks).

Recreational Fishing Block	No. hours fished	No. fishing events
1	21,263	3,278
2	193,969	59,928
3	211,618	66,447
4	91,948	17,258
5	335,894	109,010
6	36,264	13,387
Total West Coast	890,956 (9.1%)	269,308 (12.2%)
7	342,326	115,974
8	128,260	39,251
9	492,160	124,309
10	344,851	88,128
11	443,363	129,088
12	573,409	74,206
Total Spencer Gulf	2,324,369 (23.8%)	570,956 (25.8%)
13	49,135	10,310
14	164,319	40,845
15	154,273	42,285
16	453,234	128,702
17	122,224	48,469
18	904,948	239,458
19	725,584	226,754
Total Gulf St. Vincent	2,573,717 (26.3%)	736,823 (33.2%)
20	100,572	32,516
21	30,751	10,826
Total Kangaroo Island	131,323 (1.3%)	43,342 (2.0%)
22	188,207	28,735
23	356,079	63,649
24	589,484	43,208
25	512,207	72,450
Total South East SA	1,645,977 (16.9%)	208,042 (9.4%)
26	20,439	4,007
27	10,458	3,380
Total Lakes & Coorong	30,897 (0.3%)	7,387 (0.3%)
28	924,673	146,180
29	914,626	151,315
Total River Murray	1,839,299 (18.8%)	297,495 (13.4%)
30	51,744	11,260
31	27,579	13,815
32	42,254	13,083
33	74,535	21,194
34	65,271	10,221
35	68,669	12,607
Other inland and adjacent coastal waters	330,052 (3.4%)	82,180 (3.7%)
Un-reported fishing blocks	1,356	509
SA Total	9,767,946 (100%)	2,216,042 (100%)

6.5 Regional fishing effort by water body

The inshore water was the water body where recreational fishing effort was most expended (74.2%), with the inshore waters of Gulf St. Vincent and Spencer Gulf being the most significantly fished (Table 9). The waters of the River Murray were the most highly fished of all rivers and streams in the state. In all other inland waters, highest effort was expended by fishing in dams and lakes.

Table 9. Fishing effort (number of fishing events) by region and by water body fished by recreational fishers in SA.

Region	Estuary	Inshore	Offshore	Rivers	Dams / Lakes	Total
West Coast	30,356	229,204	9,748	–	–	269,308
Spencer Gulf	17,527	517,188	36,241	–	–	570,956
Gulf St. Vincent	45,359	671,665	19,720	80	–	736,824
Kangaroo Island	1,298	40,531	1,513	–	–	43,342
SE SA*	17,867	183,583	6,493	99	–	208,042
L & C	7,092	–	–	295	–	7,387
R. Murray	–	–	–	291,504	5,991	297,495
Other Inland & adjacent coastal regions	21,828	1,193	–	24,237	34,920	82,178
Un-reported regions	–	–	–	–	–	509
Total	141,837	1,643,364	73,715	316,215	40,911	2,216,042
% of Total	6.4	74.2	3.3	14.3	1.8	100

* SE SA includes the mouth of the Murray River, which was assigned as an estuary.

6.6 Annual effort by fishing platform

The highest number of recreational fishing events occurred from shore based fishing operations (62.3%), with almost all of the remainder being boat fishing events (37.6%; Table 10). A relatively small number of events were classed as combined shore and boat-based fishing operations (0.1%).

Table 10. The number of recreational events, according to the fishing platform (adapted from Henry & Lyle, 2003).

Platform	Effort (events)	% Total
Boat	832,349	37.6
Shore	1,381,316	62.3
Both	2,377	0.1
TOTAL EVENTS	2,216,042	

6.7 Annual fishing effort by fishing method (gear type)

Line fishing was by far the most highly utilized method of fishing throughout the state with 84.5% of all effort (Table 11). The second most highly utilized type of gear was pots and traps – these included rock lobster pots, crab hoop & drop nets and yabbie pots. Dab netting was the main form of netting in SA, with limited gill net activity. Other methods included rakes and hand gathering, and in SA, these methods included raking for crabs, hand gathering of cockles and digging for worms.

Table 11. The number of fishing events (+/- standard error) undertaken by recreational fishers in SA waters, according to method of fishing.

Fishing Method	Effort (events)	+/-	% Total
LINE			
Bait	1,393,074		
Lure/jig/fly	180,597		
Bait & Lure	293,951		
Set-Line	4,238		
Total	1,871,860	59,781	84.5
POTS & TRAPS			
Pot / trap - passive	120,619		
Pot / trap – active	116,692		
Total	237,311	13,601	10.7
NETS			
Cast net	118		
Drag seine net	540		
Gill Net	1,513		
Scoop / dab net	15,595		
Total	17,766	2,119	0.8
DIVING			
Spearfishing	649		
Surface Spear	1,571		
SCUBA/surface air	10,148		
Snorkel	8,282		
SCUBA / snorkel	85		
Total	20,734	2,937	0.9
OTHER			
Pump / rake / spade	45,670		
Hand collection	22,701		
Total	68,371	4,818	3.1
GRAND TOTAL	2,216,042		100.0

7 TOTAL CATCH, HARVEST AND RELEASED FISH

7.1 Introduction

This chapter describes the information on the state-wide and regional total catch, made up of the harvested (retained) and by-catch (released for any reason). The data were obtained from the diary (2nd) part of the NFRS, and covers the period May 2000 – April 2001. Firstly, the state-wide harvest (numbers and biomass) for each reported species is provided, followed by regional information on the harvest and release rate of key species. Key species are defined here as those that have either: a) estimated high state-wide recreational catches, b) high sporting interest, and/or c) known high commercial value. For a number of the reported species, estimated catches have relatively high standard errors associated with the estimates (i.e. > 0.4 of estimated harvest). These are marked in bold, and we advise that caution should be applied when interpreting the information on these species, as the estimated catches based on relatively small sample sizes.

7.2 Annual harvest (numbers and biomass) of all reported species

The most numerous finfish species harvested in SA waters were herring (tommy ruffs), King George whiting and garfish, and their combined harvest represented almost 66% of the harvest of all marine and estuarine finfish (Table 12). In contrast, by weight, sharks/rays, King George whiting and Australian salmon were the most substantial representing 51% of the harvest biomass for all marine and estuarine finfish. For inland waters finfish species, the most numerous species harvested were European carp, golden perch and redfin perch. In particular, European carp dominated the inland waters finfish harvested numbers (97%). Again, by weight, European carp and golden perch dominated the inland waters finfish harvest, however, because of their relatively high average harvest weight, Murray cod represented the third highest biomass of a species harvested. The estimated harvest biomass of all finfish was estimated at 3,531,312 kg, live wt, and is approximately 200,000 kg greater than the estimate provided in Henry & Lyle (2003). The higher reported estimate is due to more accurate average weights for some of the “other species”, as obtained from the creel surveys of the NRFS, than the average weight assigned to other species (i.e. 0.020 kg) in the National Report.

For crustaceans (Table 13), blue crabs, freshwater shrimps and yabbies were the three most numerous species harvested; however, in terms of biomass harvested, blue crabs, rock lobsters and other crabs (mainly sand crabs) were the three most important. The total estimated harvest of crustaceans was 550,737 kg, live wt.

For molluscs (Table 14), Goolwa cockles (pippis), squid/cuttlefish and razor fish were the three most numerous molluscs harvested, and by biomass were 23 tonnes, 465 tonnes & 470 tonnes, respectively. Total biomass of all molluscs amounted to 944,811 kg, live wt.

For all other taxa (Table 15), worms dominated the harvest; these included both beach and tube worms used as bait for catching marine and estuarine finfish, and tiger worms used as bait for catching inland waters finfish.

For all species other than finfish, the National report estimated the harvest biomass at 900 tonnes Henry & Lyle (2003, p. 86). The estimate provided in this report (1,496 tonnes) is substantially higher due to more accurate information on the average weight of “other molluscs” (viz, razor fish).

The best estimate of the total number of organisms harvested by recreational fishers in SA waters was 17,413,688 and the estimated harvested biomass was 5,027,466 kg, live wt (Table 16).

Table 12. Harvested numbers (and accompanying se) for all species and harvest biomass for selected species

Species Name	Harvest (nos.)	+/-	Average weight (kg)	Harvested Biomass (kg, live wt)
Australian Bass	8,530	3627	0.7	5,971
Australian herring	2,973,402	318,820	0.1	297,340
Australian salmon	715,768	86,057	0.52	372,199
Barracouta	2,411	985	0.2	480
Blue mackerel	45,044	17,394	0.2	9,010
Bream	81,088	16,777	0.394	31,949
Butterfish	< 1,000		3.34	3,340
Catfish (estuary)	2,480	5,107	1.0	2,480
Cod (various) (marine)	13,675	10,338	0.35	6,838
Drummer	<1,000		0.5	500
Eels	< 1,000		0.5	500
European carp	483,310	66,724	0.566	273,553
Flatfish	2,994	647	0.25	249
Flathead	72,105	9,785	0.263	18,964
Garfish	1,511,250	167,024	0.088	132,990
Golden Perch	86,732	12,086	1.05	91,069
Grunters / trumpeters	268,366	50,613	0.125	33,546
King George whiting	2,238,071	202,607	0.271	606,517
Leatherjackets	155,168	19,369	0.259	40,189
Luderick	3,563	2,085	0.45	1,603
Morwong	5,527	1,002	2.0	11,054
Mullet	775,361	109,063	0.107	82,960
Mulloway	27,004	5,156	3.34	90,193
Murray Cod	2,278	1,362	10.0	22,780
Other	87,634	17,037	0.02	1,753
Red Mullet	113,077	29,535	0.15	16,962
Redfin Perch	40,410	12,318	0.25	10,103
Redfish	45,310	9,236	0.89	40,330
Rock Cod / gropers	< 1,000		0.5	500
Scads / mackerel	2,679	1,270	0.2	536
Scorpion fish / gurnard perch	2,674	883	0.2	535
Sharks / rays	30,722	8,428	20.0	614,440
Snapper	115,798	25,067	3.2	370,554
Snook	185,947	34,482	0.5	92,974
Sweep	57,864	16,430	0.2	11,573
Tailor	< 1,000		0.52	520
Trevally	80,620	18,292	0.227	18,301
Trout / Salmon	6,871	3,965	0.5	3,436
Tuna/Bonitos	1,576	636	18.0	28,368
Whiting (other)	499,432	161,608	0.21	104,881
Wrasse	64,672	20,435	0.35	22,635
Kingfish / Sampson Fish	6,160	3,814	10.0	61,600
Small baitfish	1,227		0.02	25
Total Marine & Estuarine finfish	10,200,540			3,127,336
Total inland waters finfish	629,131			403,976

Table 13. Harvested numbers (and accompanying standard error) and harvest biomass for Crustaceans (Crabs, Lobsters, Yabbies)

Species Name	Harvest (nos)	+/-	Average wt (kg)	Harvested biomass (kg, live wt)
Blue crab	1,139,795	148,346	0.342	389,810
Crabs (other)	116,110	26,793	0.25	29,028
Lobsters	113,679	34,509	0.84	95,490
Yabbies	593,113	132,355	0.04	23,725
FW shrimps	1,065,271	263,783	0.01	10,653
FW Prawns	90,740	–	0.02	1,815
Salt water prawns	10,807	–	0.02	216

Table 14. Harvested numbers (and accompanying standard error) and harvest biomass for Cephalopods & other molluscs

Species Name	Harvest (nos)	+/-	Average wt (kg)	Harvested biomass (kg, live wt)
Octopus	< 1,000	195	0.02	200
Squid / cuttlefish	1,047,904	435,903	0.404	423,353
Abalone	17,780	4,994	0.483	8,588
Bivalves (other); incl. mud cockles	300,645	105,391	0.011	3,731
Mussels	14,664	5,604	0.02	293
Other	5,120	1,266	0.02	102
Oysters	< 1,000		0.25	250
Pippi / Goolwa cockle	1,474,859	982,506	0.018	22,900
Razor Fish	470,564	134,412	1.0	470,564
Scallops	59,321	21,874	0.25	5,469

Table 15. Harvested numbers (and accompanying standard error) and harvest biomass for Other Taxa

Other	Harvest (nos)	+/-	Average wt (kg)	Harvested biomass (kg, live wt)
Other	< 1,000	–	–	–
Worms	60,645	20,642	0.01	606

Table 16. Summary of Harvested numbers and harvest biomass (kg, live wt) for species groups

Species groups	Harvest (nos)	Harvest Biomass (kg, live wt)
Marine & estuarine finfish	10,200,540	3,531,312
Inland waters finfish	629,131	403,976
Crustaceans	3,129,515	550,737
Molluscs	3,392,857	944,811
Other taxa	61,645	606
Total	17,413,688	5,027,466

7.3 Statewide harvest of key species by method of fishing by fishing platform

For most finfish species, line fishers harvested the highest numbers (Table 17) . For all key crustacean species, pots/traps were the fishing gears by which highest numbers were harvested, for cockles hand-gathering, and for abalone, diving was the most important.

In terms of the fishing platforms where highest harvested numbers were taken, there was considerable variation between species, probably attributed largely to the life history and habitat requirements of the harvested components of each species. Thus, boat fishing dominated the harvested finfish numbers of King George whiting, snapper, garfish, snook and Murray Cod,

whereas, shore based fishing was the most important platform for harvesting Australian salmon, herring, yellowfin whiting, mullet species, mulloway, and golden perch. Harvesting of calamary and whaler sharks were similar by boat and shore based platforms. For all other species, the rock lobster harvest was dominated by boat based operations, and this platform was more important for blue and sand crabs. However, for most of the other species, shore based harvesting dominated catches (Table 17). Generally, these results are also seen from the regional information on harvests by fishing platform (Figs 3–19). The only regional differences occurred with;

- King George Whiting - South east SA harvested more than other regions from the shore.
- Garfish - The West coast harvested more than other areas from the shore.
- Australian salmon - South east SA harvested more from boats than all other regions.
- Mulloway - Relatively large numbers were harvested from boats in South east SA compared with other regions.
- Mullet (yellow eye and unspecified) - more were harvested from boats in the South east and Coorong than other regions.

Table 17. Harvest (no.'s) of key species by gear-type and the proportion (%) by fishing platform

Species	Lines	Pots/traps	Nets	Dive	Other	Total	% boat	% shore	Both
KG whiting	2,236,795	949	327	–	–	2,238,071	90.6	9.4	
Snapper	115,724	36	–	38	–	115,798	91.8	8.2	
Garfish	1,442,940	2,340	65,822	148	–	1,511,250	81.1	18.9	
Calamary	1,009,747	1,742	3,896	554	6,064	1,022,003	59.7	38.8	1.5
A. salmon	715,768	–	–	–	–	715,768	37.2	62.6	0.2
A. herring	2,971,379	468	863	692	–	2,773,402	37.0	63.0	
Snook	185,756	–	77	114	–	185,947	96.0	4.0	
YFin / silver whiting	352,585	–	–	–	–	352,585	19.7	80.3	
YE mullet	435,101	–	2,916	543	–	438,560	23.7	76.3	
Unspec. mullet	335,167	–	1,635	–	–	336,801	12.7	87.3	
Mulloway	26,954	–	–	51	–	27,004	34.1	65.9	
Whaler sharks	2,890	–	–	–	–	2,890	55.6	44.4	
Golden perch	86,648	–	–	85	–	86,732	33.7	66.3	
Murray cod	2,278	–	–	–	–	2,278	91.4	8.6	
Sand crab	6,002	41,770	–	51	39,711	87,534	73.8	26.2	
Blue crab	27,614	755,693	13,318	2,563	340,606	1,139,794	62.3	37.4	
Rock lobster	624	99,112	159	13,784	–	113,679	85.2	14.9	
Abalone	111	–	–	17,379	290	17,780	28.2	71.8	
Goolwa cockles	–	–	555,299	–	919,560	1,474,859	0	100	
Mud cockles	–	–	–	–	300,645	300,645	0	100	
Yabbies	39,530	511,417	37,260	–	4,915	593,113	10.1	89.9	

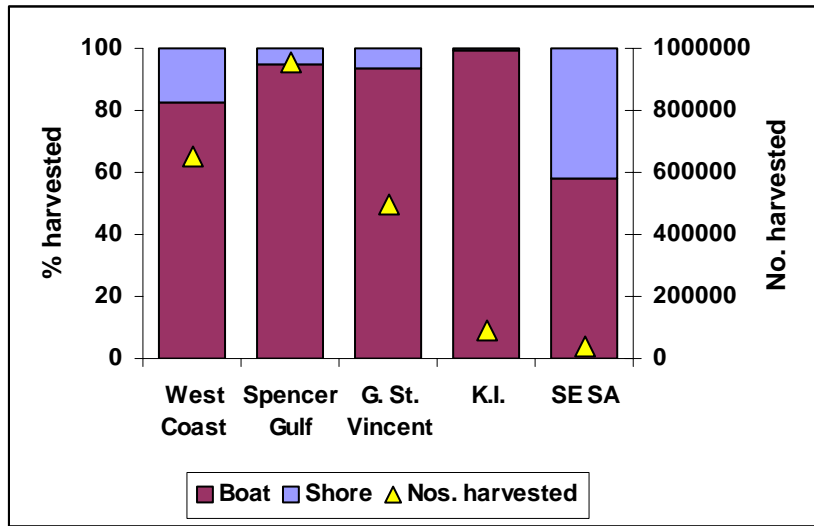


Figure 3. Regional harvest of King George whiting by fishing platform, expressed as a cumulative percentage of the total harvest for that region and the total numbers harvested.

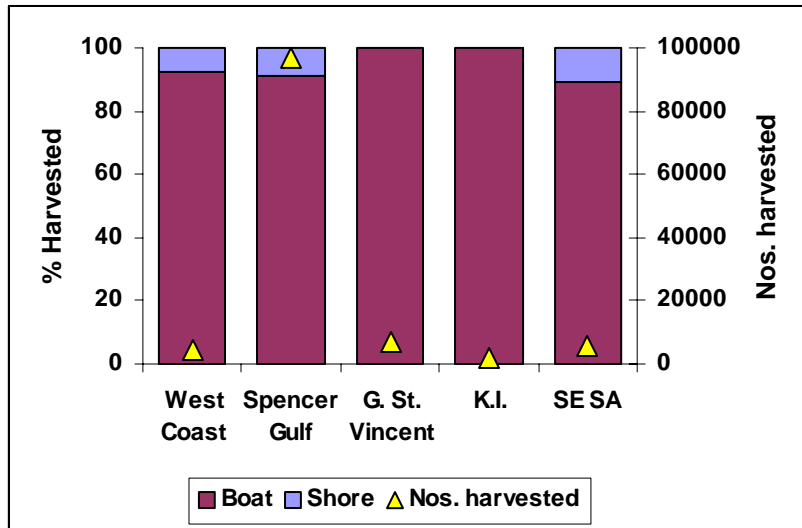


Figure 4. Regional harvest of snapper by fishing platform, expressed as a cumulative percentage of the total harvest for that region and the total numbers harvested.

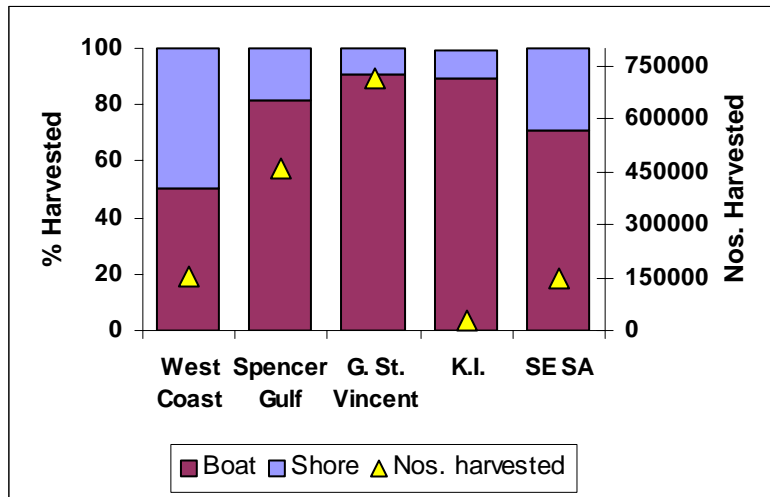


Figure 5. Regional harvest of garfish by fishing platform, expressed as a cumulative percentage of the total harvest for that region and the total numbers harvested.

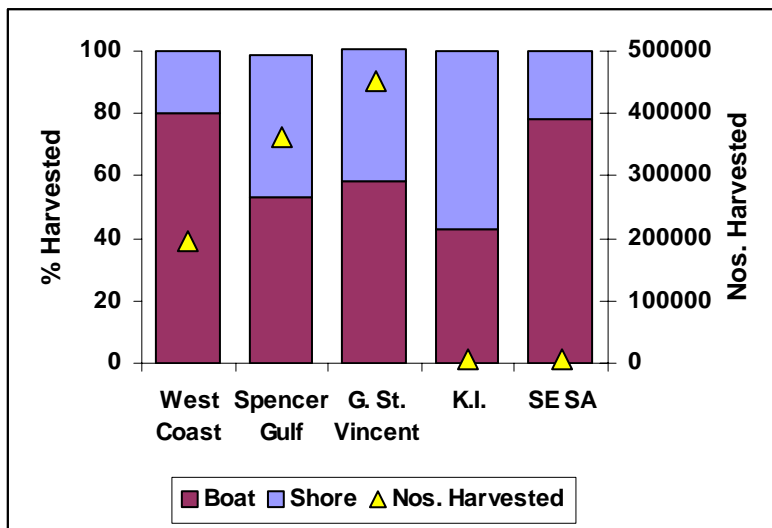


Figure 6. Regional harvest of calamary by fishing platform, expressed as a cumulative percentage of the total harvest for that region and the total numbers harvested.

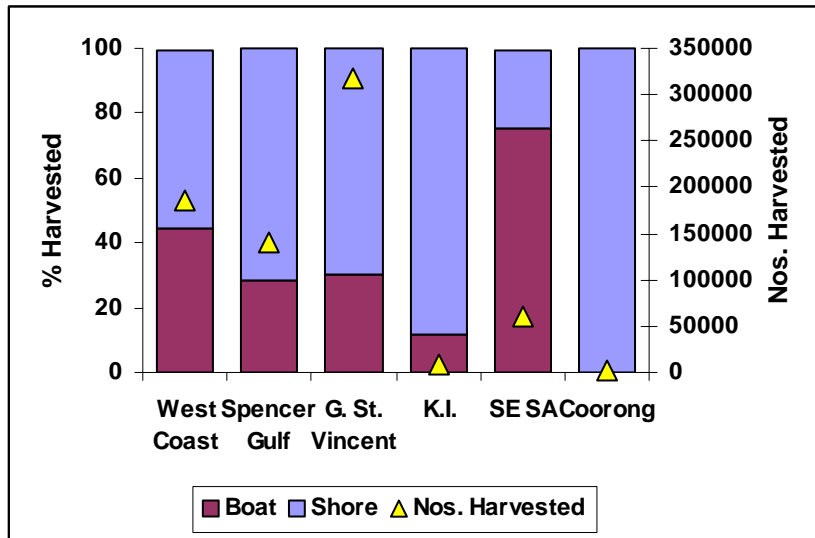


Figure 7. Regional harvest of Australian salmon by fishing platform, expressed as a cumulative percentage of the total harvest for that region and the total numbers harvested.

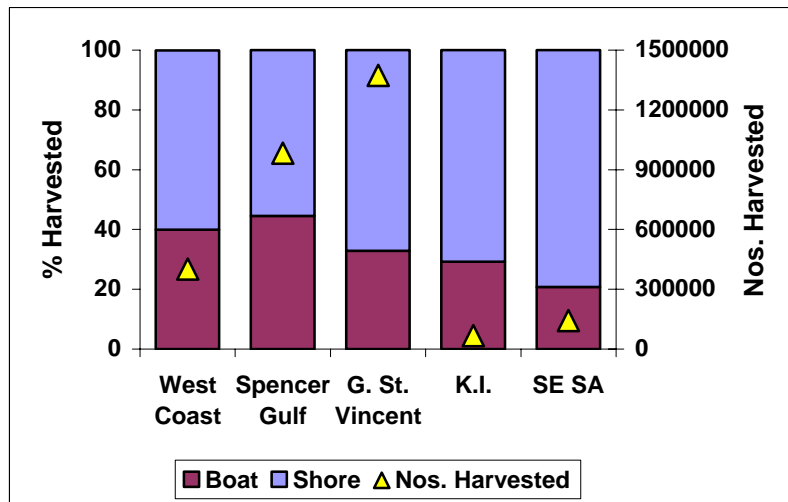


Figure 8. Regional harvest of Australian herring ("tommy ruffs") by fishing platform, expressed as a cumulative percentage of the total harvest for that region and the total number harvested.

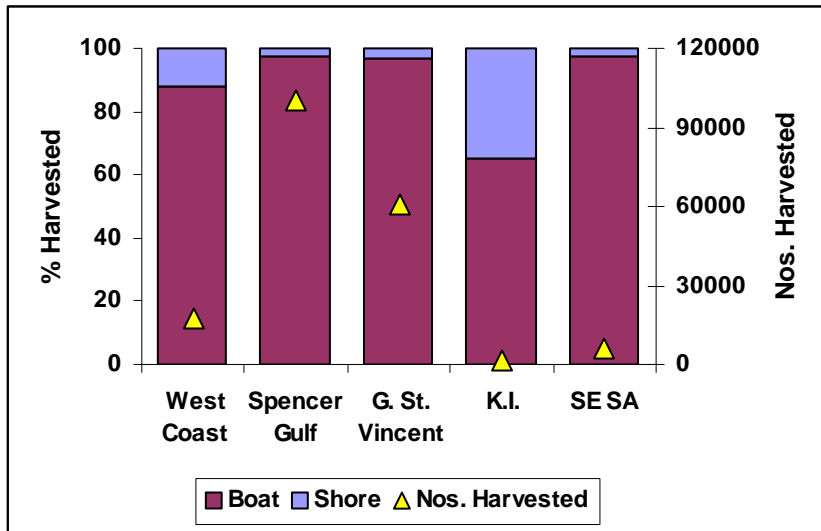


Figure 9. Regional harvest of snook by fishing platform, expressed as a cumulative percentage of the total harvest for that region and total number harvested.

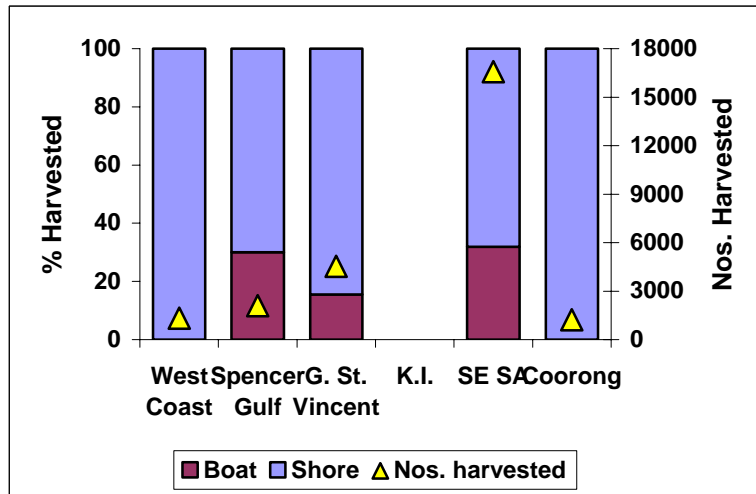


Figure 10. Regional harvest of mulloway by fishing platform, expressed as a cumulative percentage of the total harvest for that region.

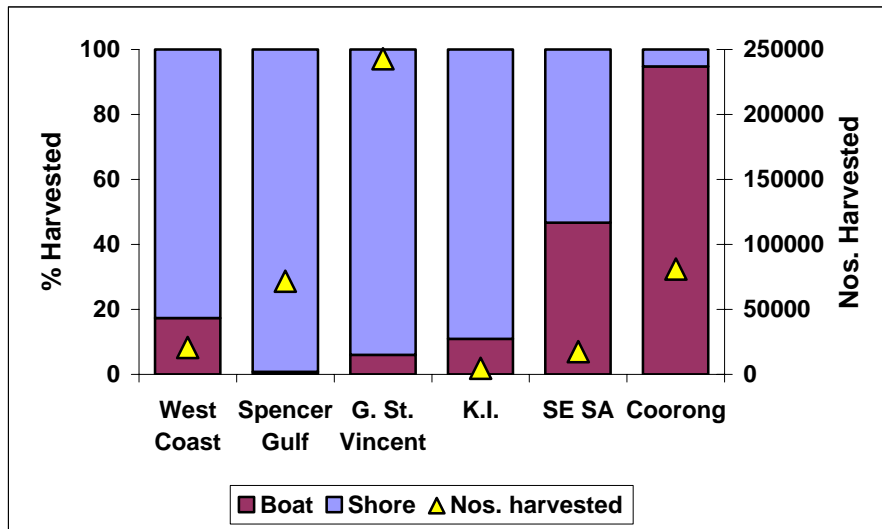


Figure 11. Regional harvest of yellow eye mullet by fishing platform, expressed as a cumulative percentage of the total harvest for that region and the total numbers harvested.

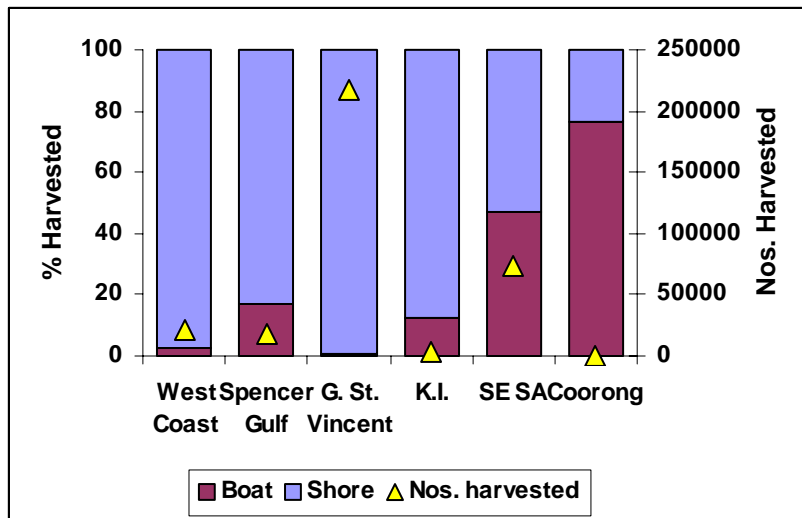


Figure 12. Regional harvest of unspecified mullet by fishing platform, expressed as a cumulative percentage of the total harvest for that region and the total numbers harvested.

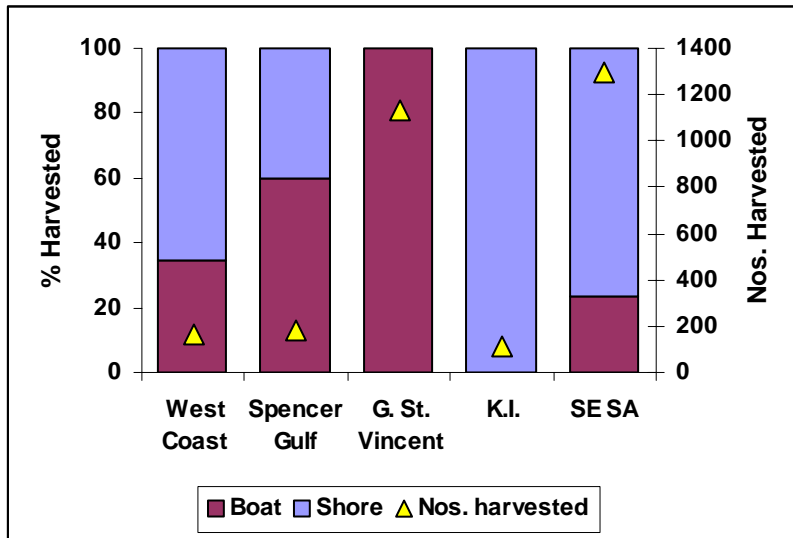


Figure 13. Regional harvest of whaler sharks by fishing platform, expressed as a cumulative percentage of the total harvest for that region and the total numbers harvested.

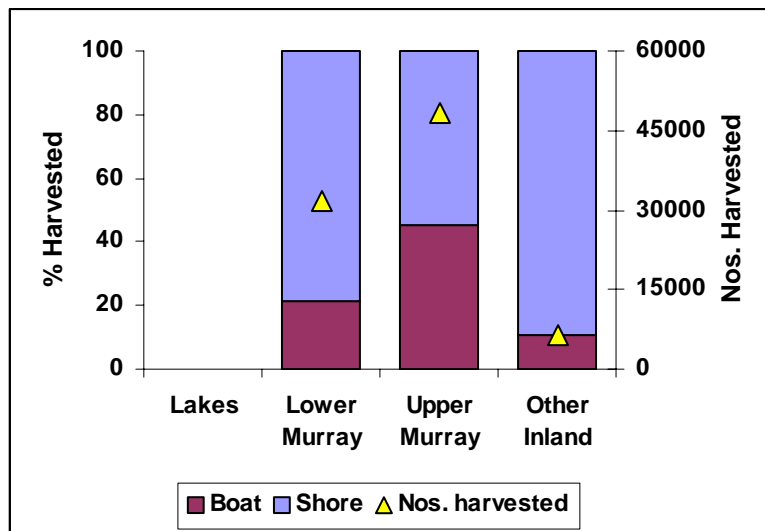


Figure 14. Regional harvest of golden perch by fishing platform, expressed as a cumulative percentage of the total harvest for that region and the total numbers harvested.

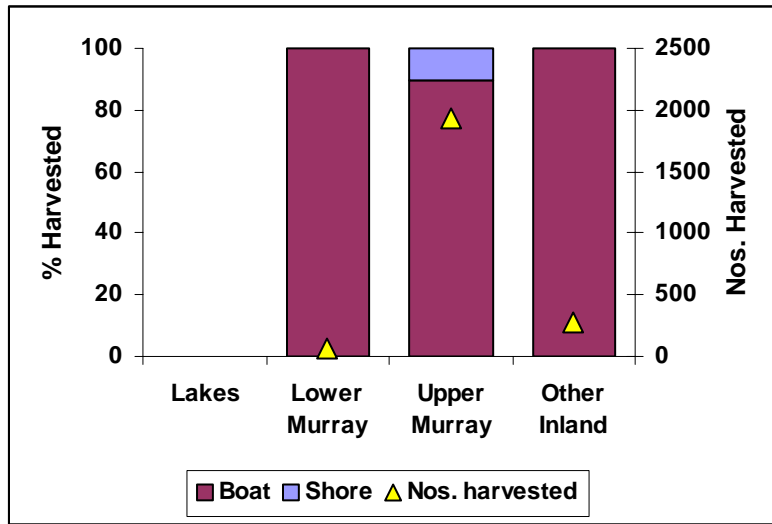


Figure 15. Regional harvest of Murray cod by fishing platform, expressed as a cumulative percentage of the total harvest for that region and the total numbers harvested.

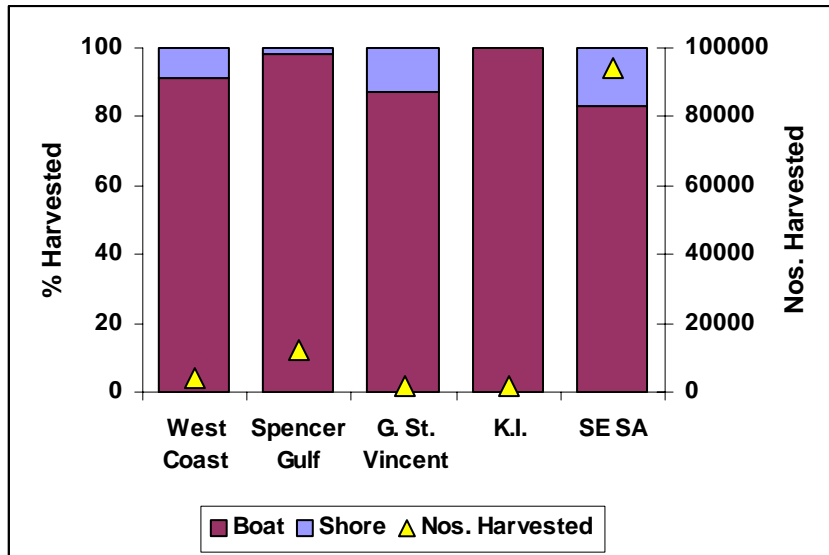


Figure 16. Regional harvest of rock lobster by fishing platform, expressed as a cumulative percentage of the total harvest for that region.

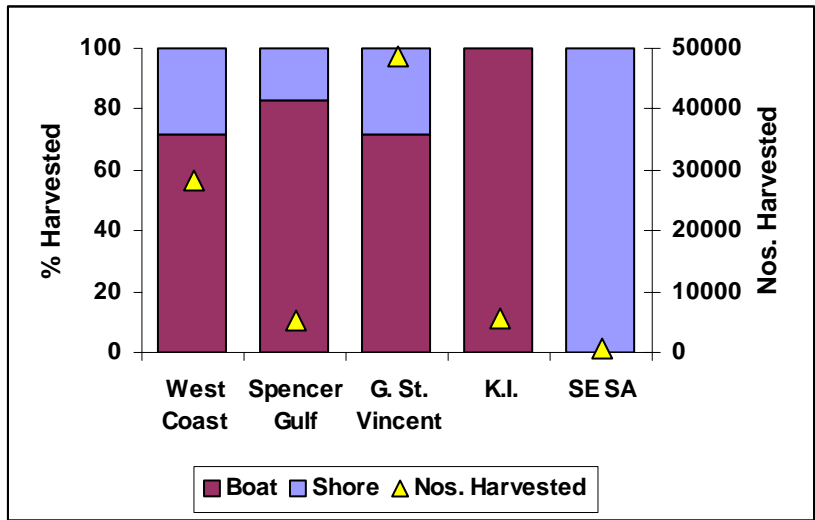


Figure 17. Regional harvest of sand crabs by fishing platform, expressed as a cumulative percentage of the total harvest for that region and the total harvested.

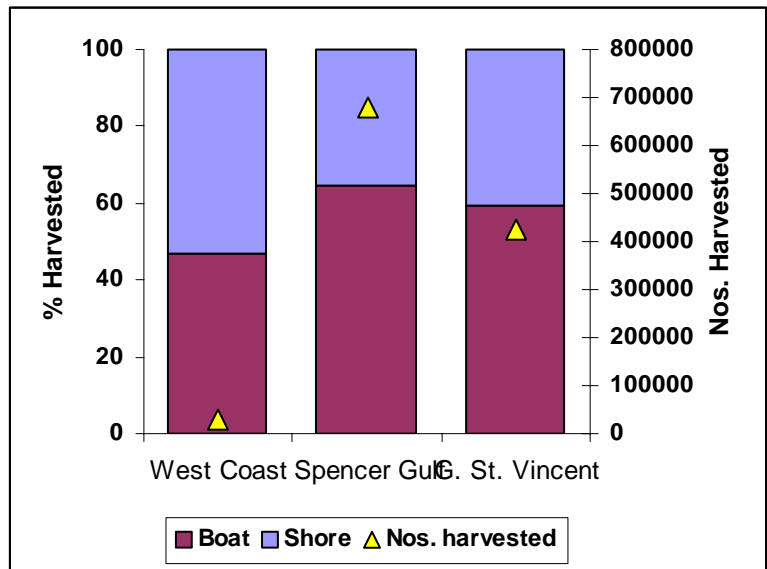


Figure 18. Regional harvest of blue crabs by fishing platform, expressed as a cumulative percentage of the total harvest for that region and the total harvested.

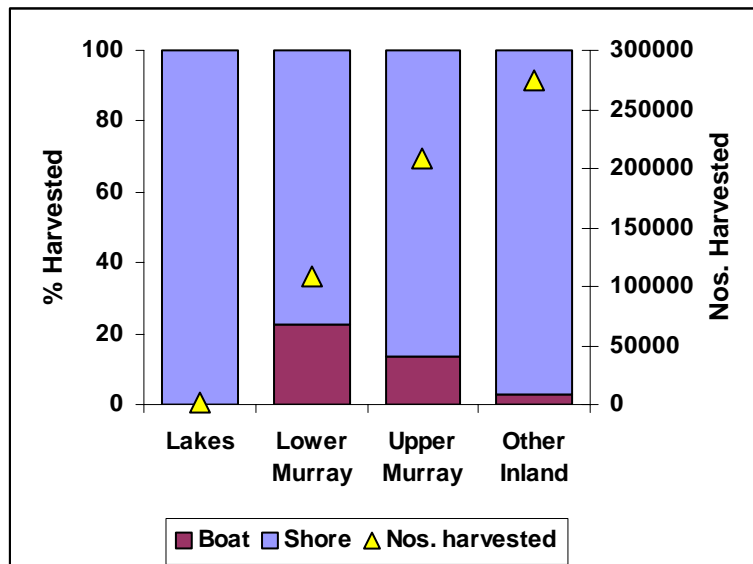


Figure 19. Regional harvest of yabbies by fishing platform, expressed as a cumulative percentage of the total harvest for that region and the total numbers harvested.

7.4 Regional harvest and released numbers of key species

7.4.1 Marine and estuarine species

The catch data estimated for each recreational fishing block for the key species were summarised, and are represented here as regional (combined fishing blocks) data. (The data for each fishing block are available in App. 1.) The regional harvest and released numbers are seen in Figures 20–39. The main points on the regional data for each key species are as follows:

King George Whiting. Highest harvests occurred in Spencer Gulf (955,571), Coffin Bay (425,942), and northern Gulf St. Vincent (338,753) (Fig. 20). The relative numbers released in northern Spencer Gulf and southern Spencer Gulf showed the greatest contrast, with highest numbers released in northern Spencer Gulf (42.6%) and relatively low numbers in southern Spencer Gulf (11.6%). The differences are believed to be partly due to the relatively higher number of juvenile King George whiting occurring in the northern waters of this gulf, compared with its more southern waters, and is a function of the life history of this species (McGarvey et al, 2003).

Snapper. In most areas, the total catch of snapper was dominated by relatively high numbers of released fish (73.8%) (Fig. 21). Highest numbers harvested occurred in Spencer Gulf (northern – 74,900 and southern – 22,203).

Garfish. Highest numbers were harvested in northern Gulf St. Vincent (552,683), the next most important was southern Spencer Gulf (328,640), followed with similar numbers from the remainder of the gulfs, South east SA and Coffin Bay (Fig. 22). The release rate for garfish was relatively low (11.6%) compared with most of the other key species reported here.

Southern Calamary. The release rate for calamary, was one of the lowest for all the key species (1.5%) (Fig. 23). Highest harvests occurred in northern Gulf St. Vincent (321,089) and southern Spencer Gulf (242,351).

Australian salmon. (Fig. 24). The highest numbers were harvested in southern Gulf St. Vincent/Fleurieu region (246,148), and for most other regions, the harvested numbers ranged between 50–130,000 fish. Highest release rates occurred in Far West coast waters (54.5%),

possibly a function of the catch and release fishery of legal sized fish in this region, relative to other regions.

Australian herring (Fig. 25). This species exhibited the highest numbers (2.97 million) harvested of any marine and estuarine species throughout the state, and highest numbers were harvested in gulf waters (2.36 million). The release rate varied greatly between different regions (10–35% of the total catch).

Snook (Fig. 26). Highest harvest occurred in northern Spencer Gulf waters (51,639). Relatively low release rates occurred for all regions (avg: 6.5%), compared with other key species. The high release rate in Kangaroo Island (65.7%) may have been due to the relatively small sample size of recreational fishers surveyed for this area.

Yellowfin and school whiting (Fig. 27). In gulf waters (southern Spencer Gulf – northern Gulf St. Vincent), yellowfin whiting was the main species harvested (313,216), whereas school whiting was the other species of “other whiting” caught in West coast, Kangaroo Island and South east SA waters (39,371). Highest numbers of yellowfin whiting were harvested in northern gulf waters, a function of the life history and habitat requirements for this species (Jones et al, 1990). Kangaroo Island was the only region where substantial numbers of school whiting were harvested (33,200).

Although not reported in Figures 27, an additional 146,845 unspecified whiting were estimated to have been harvested. These whiting would have been made up of unknown numbers of King George, yellowfin and school whiting, however, recreational fishers did not specify the species of whiting caught.

Mullet (yellow-eye & unspecified) (Figs 28, 29). For yellow eye mullet, highest harvested numbers and release rates occurred in Gulf St Vincent & Fleurieu Peninsula (242,767), and the Coorong lagoon (81,142). For unspecified mullet (Fig. 29), highest harvests occurred in southern Gulf St. Vincent/Fleurieu Peninsula (200,543) and the South east (72,785). Release rates were highly variable between regions; however, in regions where highest catches occurred release rates usually varied between 25–45%.

Mulloway (Fig. 30). The South east of SA, which included the mouth of the Murray River was where highest numbers of mulloway were harvested (16,565) and released (44,748), with the southern Gulf St Vincent & Fleurieu region being a distant second most important region (3,264 harvested and 6377 released). Relatively small numbers of mulloway were caught in the remainder of the state. In southern Spencer Gulf release rates were relatively low (25%), and the rest of the SA marine waters, they rose to between 63.5 % (West coast) and 100% (Kangaroo Island). In all marine waters, the minimum legal length of mulloway is 75 cm. The average rate of release in these waters was 71.2%. In the Coorong lagoon, where the min. legal size was 46 cm, the release rate was 76%.

Whaler sharks (Fig. 31). The highest harvest of whaler sharks occurred in the South east (1,299) and northern Gulf St. Vincent (1,134). Overall release rate was low (16%), relative to some other species. In most regions, with the exception of Coffin Bay and the South east, there was no release of whaler sharks.

Blue crabs (Fig. 32). The northern waters of both gulfs were where the highest harvest of blue crabs occurred (622,322 in northern Spencer Gulf; 418,010 in northern Gulf St. Vincent). Catches in West coast waters were relatively low (23,882). Release rates varied between 20–50%, with highest rates of release in northern Gulf St. Vincent.

Sand crabs (Fig. 33). Highest harvest occurred in northern Gulf St. Vincent (44,089), and within this region, the more southern waters were where high harvest numbers occurred (see App. 1). There was a high regional variability in release rates, however, in those regions of high harvests, release rate ranged between 41 and 53%.

Rock Lobster. (Fig. 34). The highest harvest level occurred in waters of the South east (94,375), with southern Spencer Gulf being the second most important (12,066). Release rates varied considerably between regions, with highest rates of release off the coast from Fleurieu Peninsula (50%). In the South east, the release rate was 22%.

Abalone. (Fig. 35). Two regions were the dominant harvesting areas for these species (South east and Mid West coast; 12,367 & 3,858 respectively). The Mid West coast was the only region where gathered abalone was released.

Goolwa cockles. (see App. 1). The only area where Goolwa cockles were harvested was the Fleurieu Peninsula, which covered the coast as far east as the Murray mouth (1.47 million). Release rates in this area were 19%.

Mud cockles. (Fig. 36). The northern Gulf St. Vincent region was the one where highest numbers of these species were harvested (216,767), with smaller numbers in West coast (30,435), southern Spencer Gulf (51,013) and South east (2,430) waters. No released mud cockles were reported.

For comparative purposes, for marine and estuarine species, each region was ranked from 10 to 1 (10: highest; 1: lowest), according to the numbers harvested in each respective region, the average rank for each region calculated, and regions were then ranked for combined species (Table 18).

Table 18. Harvested numbers of key marine & estuarine species, ranked according to regions and ranked for combined species (10: highest numbers harvested; 1: lowest numbers).

Key Species	Far west coast	Mid west coast	Coffin Bay	SSG	NSG	SGSV & FP	NGSV	KI	SE SA	L & C
KG whiting	4	5	9	10	8	6	7	3	2	
Snapper	5	2	3	9	10	7	6	4	8	
Garfish	3	2	6	9	5	8	10	4	7	
Sthn calamary	8	5	4	9	6	7	10	2	3	
A. salmon	3	5	9	8	4	10	7	2	6	1
A. herring	2	6	5	9	8	7	10	3	4	1
Snook	6	4	3	9	10	8	7	2	5	
Other whiting	5	4	2	6	10	7	9	8	3	
YE, unspecified Mullet	2, 3	4, 1	1, 7	7, 4	6, 5	10, 10	9, 8	3, 2	5, 9	8, 6
Mulloway	6			4	7	9	5		10	8
Whaler sharks	7				8		9	6	10	
Rock lobster	4	5	8	9		7		6	10	
Abalone		9	7	8					10	
Blue crabs	7	5		8	10	6	9			
Sand crabs	2	9	8	6	3	5	10	7	4	
Mud cockles		7	8	9			10		6	
Goolwa cockles						10				
Average rank	4.5	4.9	5.7	7.8	7.1	7.8	8.4	4.0	6.5	4.8
Ranked region	9th	7th	6th	equal 2nd	4th	equal 2nd	1st	10th	5th	8th

On average, the SA gulf regions exhibited the 4 highest rankings for the combined marine and estuarine species harvested, with northern Gulf St. Vincent having the highest ranking. Five of the 15 key species achieved highest rankings for this region (i.e. garfish, southern calamary, herring, sand crabs and mud cockles). The next most important region was the South east of SA, where 4 of the key species achieved highest rankings (mulloway, whaler sharks, abalone and rock lobster). The regions where rankings were consistently relatively low included Kangaroo Island, and the Far & Mid West coast regions.

7.4.2 Inland waters native species

The regional harvest and release rates of the three key inland waters native species are presented in Figs 37–39 and the highlights of the harvest and release data are as follows:

Yabbies. (Fig. 37). Yabbies were harvested in all inland waters regions. Highest levels of harvest occurred in the upper Murray (208,819) and northern Adelaide (125,478) regions. Generally, release rates were low, relative to the other native species, and they varied between 0–24%, with rates of 10 & 17% occurring in the two regions of highest harvest.

Golden perch. (Fig. 38). Highest catches occurred in the upper and lower waters of the River Murray (48,732, 31,732, respectively). In these regions release rates were relatively high (58–67%). Relatively small numbers were caught in other regions of the state, and release rates in these areas varied between 0 and 40%.

Murray cod. (Fig. 39). Catches of cod were confined to the River Murray, Murray catchment and northern SA regions. In the latter area, cod were captured and released from dams (Jones, unpublished. data).

In similarity with the key marine and estuarine species, the three key inland waters species were ranked according to their regional harvest levels. Average regional ranks and the ranks for combined species were also calculated (Table 19).

The waters of the upper Murray (Overland corner to the VIC/NSW/SA border) and the lower Murray (Overland corner – Wellington) were where the two highest rankings of harvest for the combined species occurred. The Mid North, Fleurieu and northern Adelaide regions achieved equal fourth rankings, and the Lakes Alexandrina & Albert were where lowest harvested numbers of the three species occurred.

Table 19. Harvested numbers of key inland waters species, ranked according to regions and ranked for combined species (9: highest numbers harvested; 1: lowest numbers).

Species	Lakes	Lower Murray	Upper Murray	NSA & Eyre	MN & YP	Nthn Adelaide	Fleurieu	Murray Catchment	SE Catchment
Golden Perch		8	9	6		4	7	5	
Murray Cod		7	9					8	
Yabbies	1	7	9	4	6	8	5	3	2
Average Rank	1	7.3	9	5	6	6	6	5.3	2
Ranked region	9	2	1	7	4	4	4	6	8

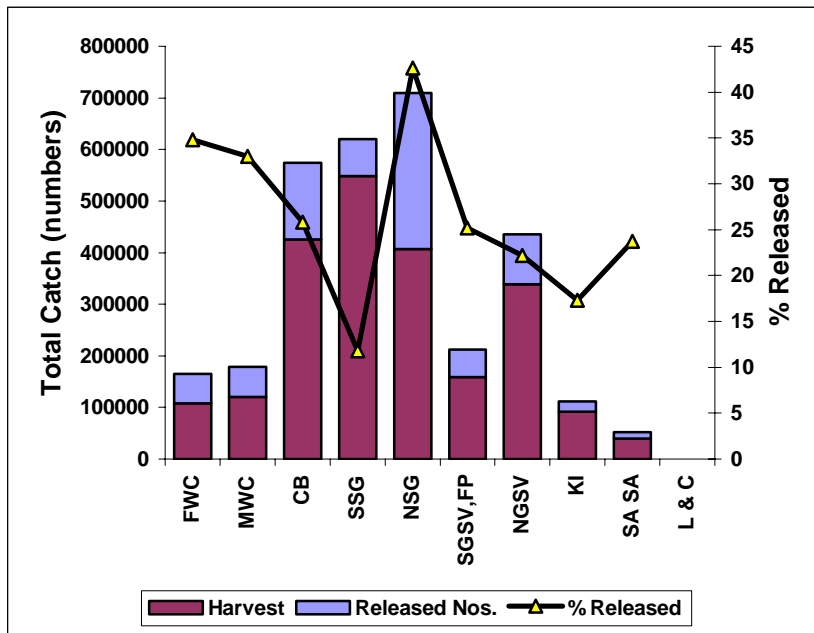


Figure 20. Recreational harvest and released catch (numbers) and % of fish released for major regions in SA marine waters for King George whiting.

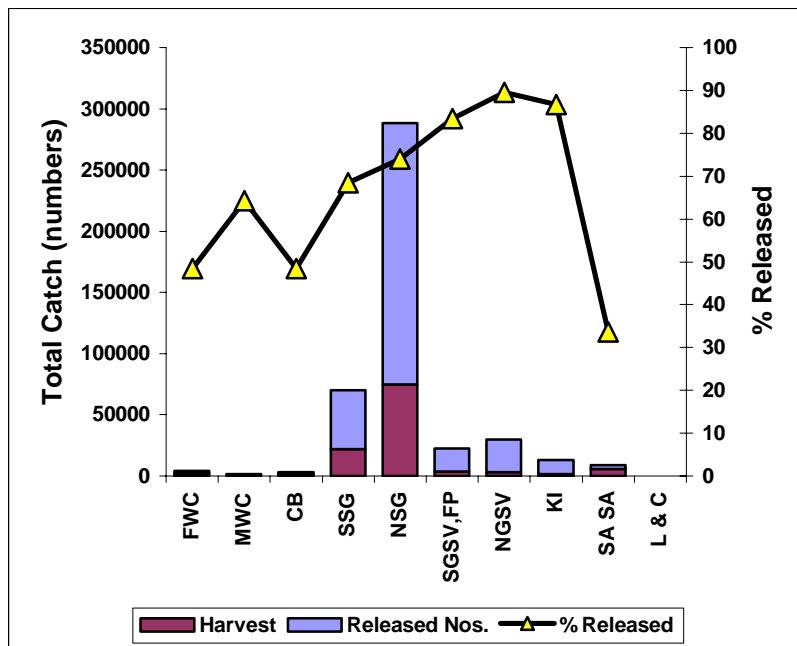


Figure 21. Recreational harvest and released catch (numbers) and % of fish released for major regions in SA marine waters for Snapper.

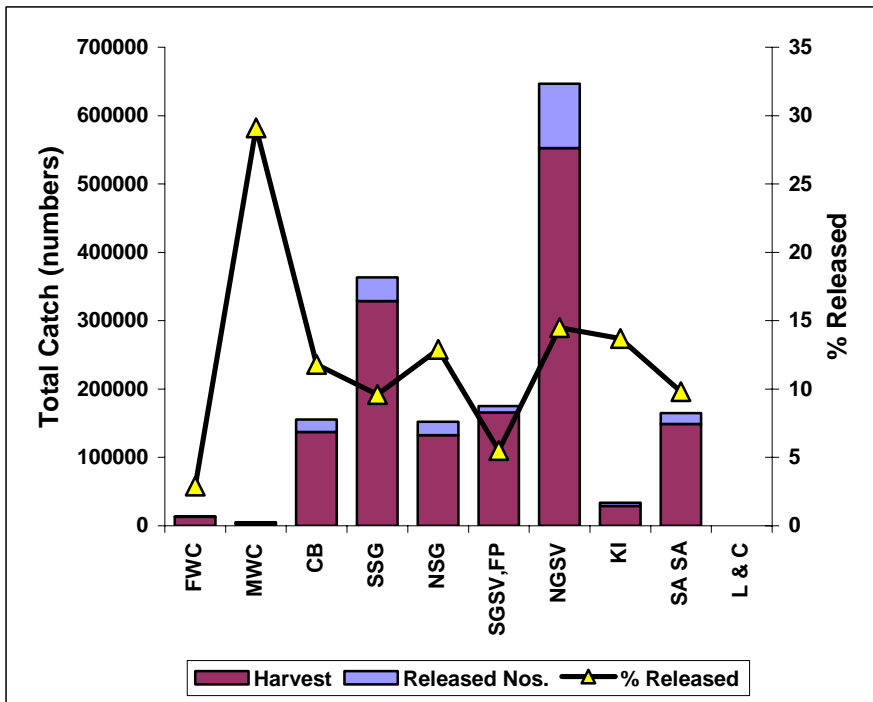


Figure 22. Recreational harvest and released catch (numbers) of garfish and respective %'s released for major regions of SA marine waters.

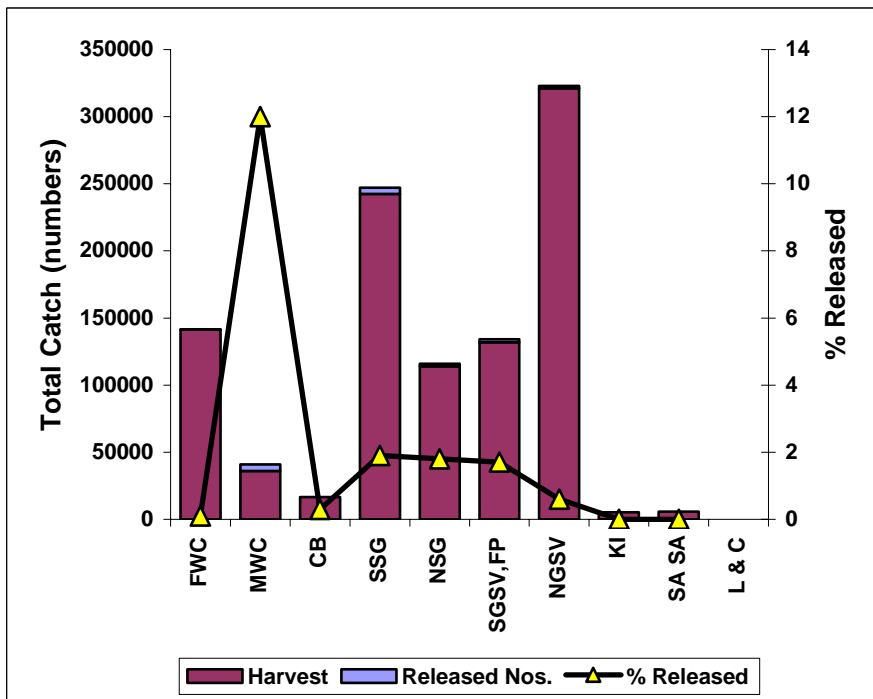


Figure 23. Recreational harvest and released catch (numbers) of southern calamary and respective %'s released for major regions of SA marine waters.

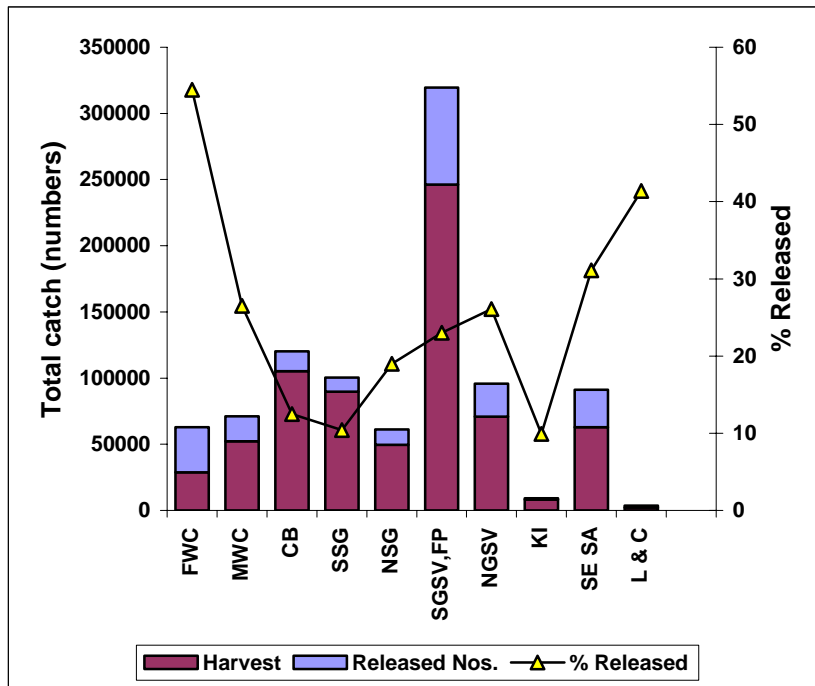


Figure 24. Recreational harvest and released numbers of Australian salmon and respective %'s released for major regions of SA marine and estuarine waters.

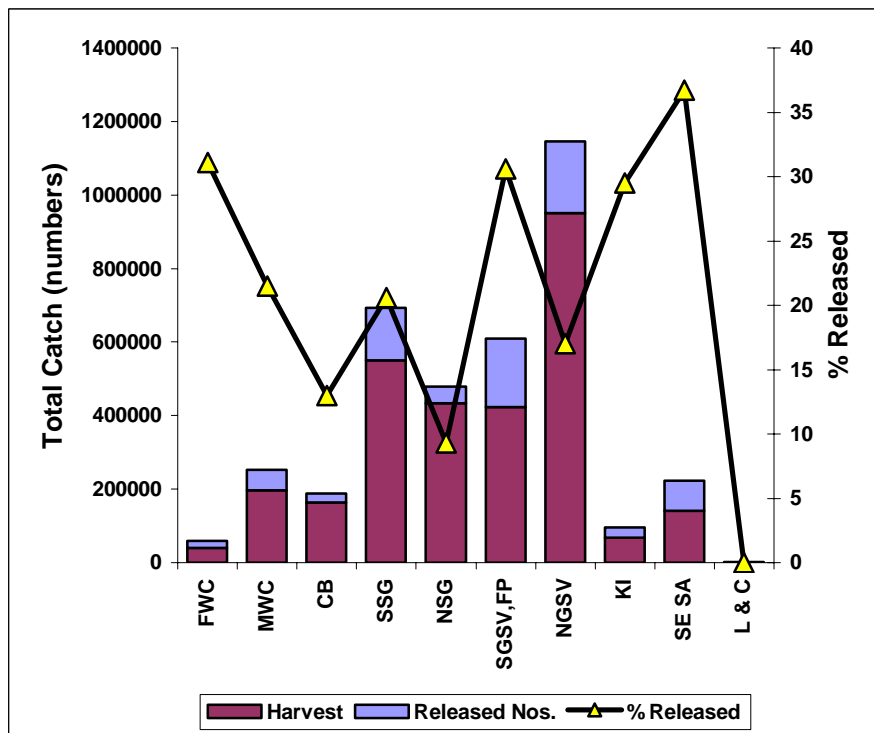


Figure 25. Recreational harvest and released numbers of Australian herring and their respective %'s released for major regions of SA marine and estuarine waters.

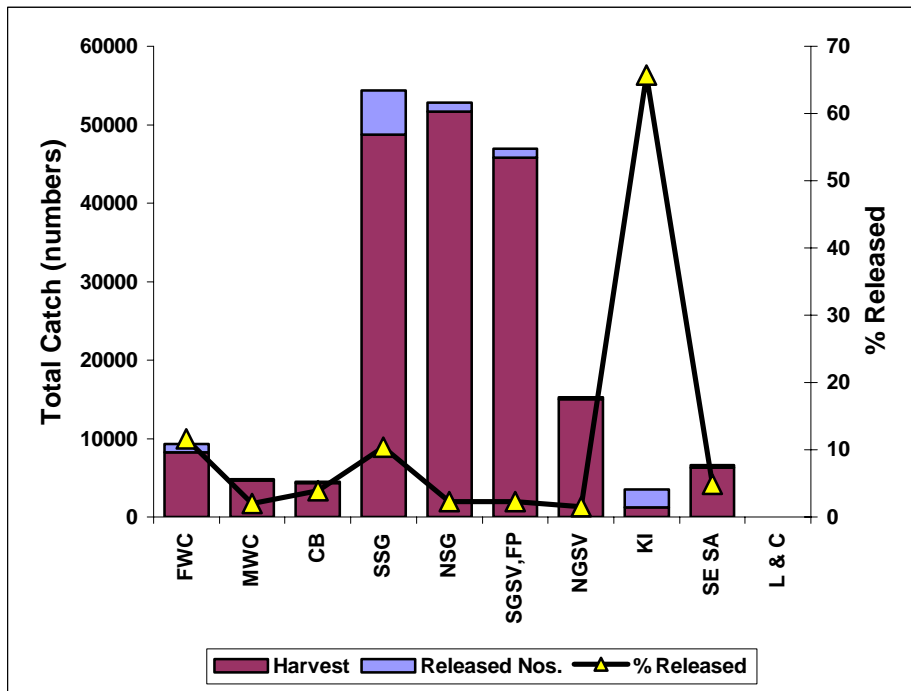


Figure 26. Recreational harvest and released catch (numbers) of snook with respective % released for the major regions of SA marine waters.

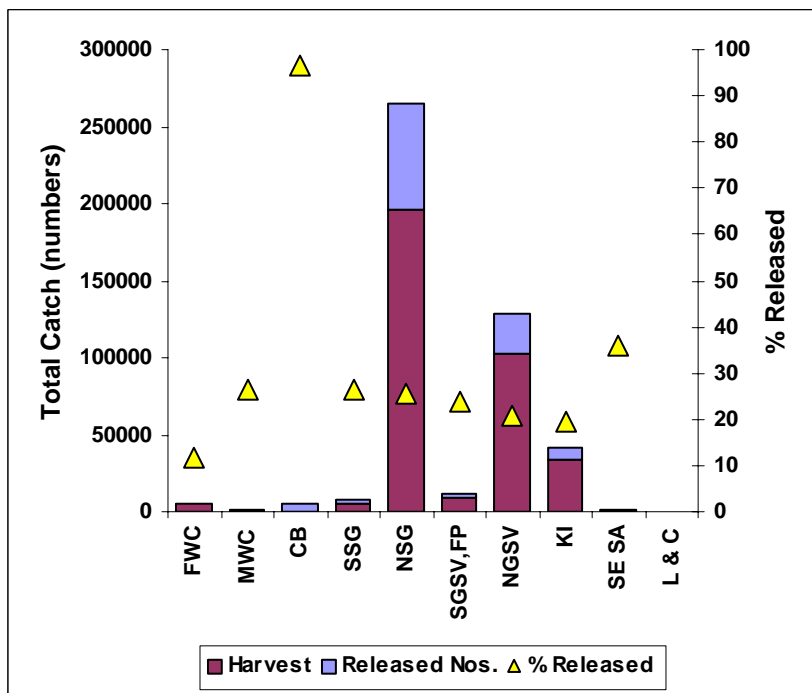


Figure 27. Recreational harvest and released catch (numbers) of specified whiting species (other than King George whiting) with respective % released for the major regions of SA marine waters.

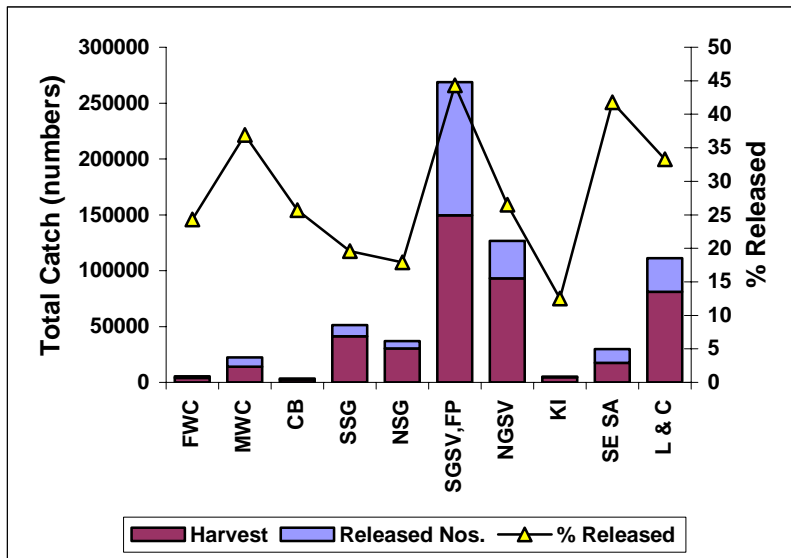


Figure 28. Recreational harvest and released catch (numbers) of yellow-eye mullet with respective % released for the major regions of SA marine waters.

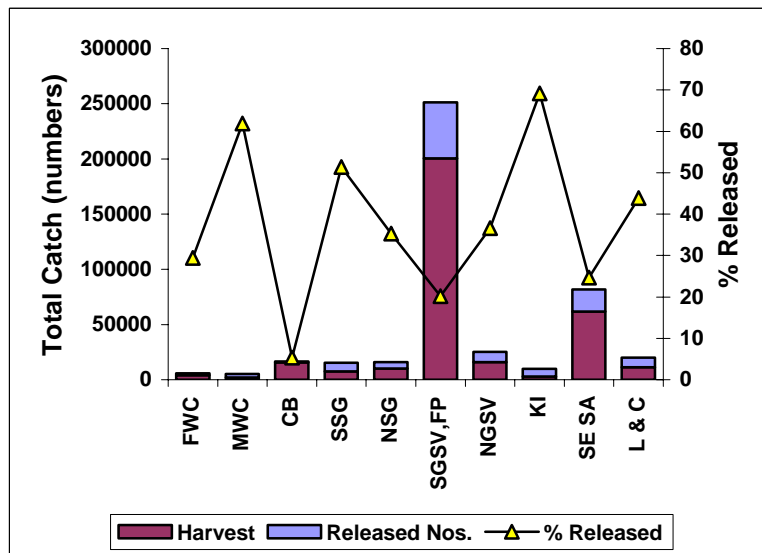


Figure 29. Recreational harvest and released catch (numbers) of unspecified mullet species with their respective % released for the major regions of SA marine waters.

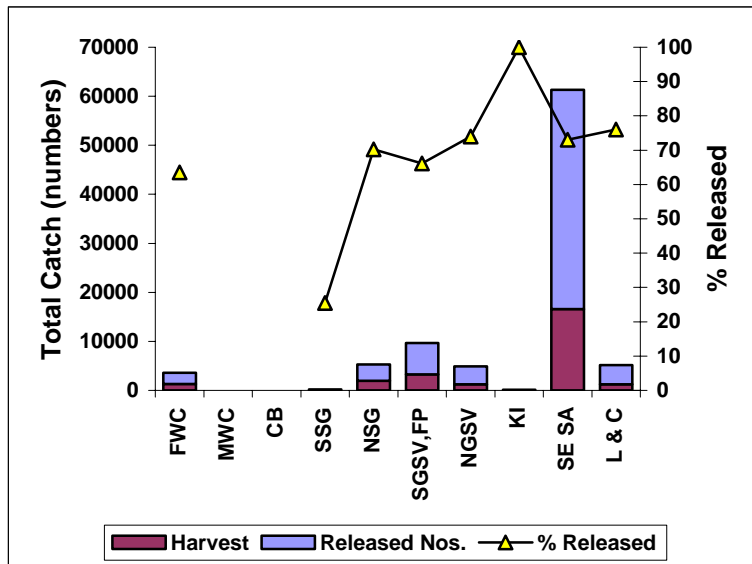


Figure 30. Recreational harvest and released catch (numbers) of mulloway with respective % released for the major regions of SA marine waters.

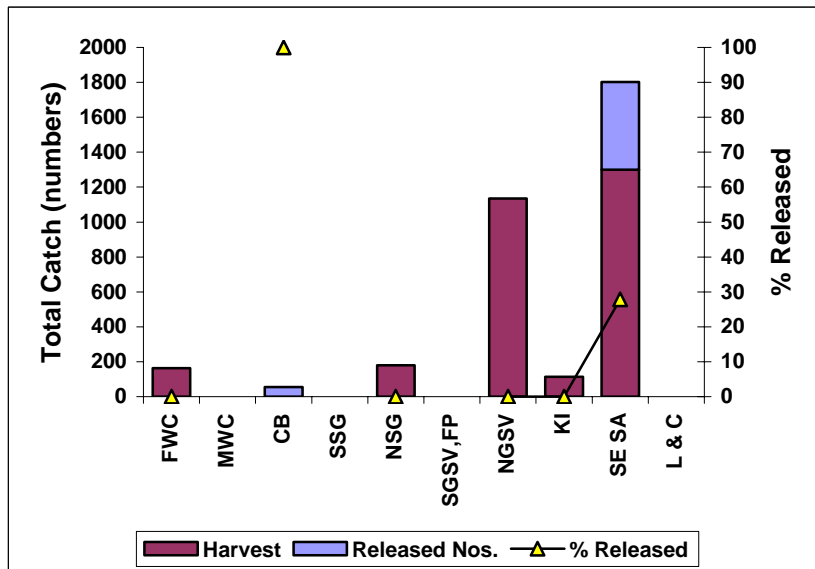


Figure 31. Recreational harvest and released catch (numbers) of whaler sharks with their respective % released for the major regions of SA marine waters.

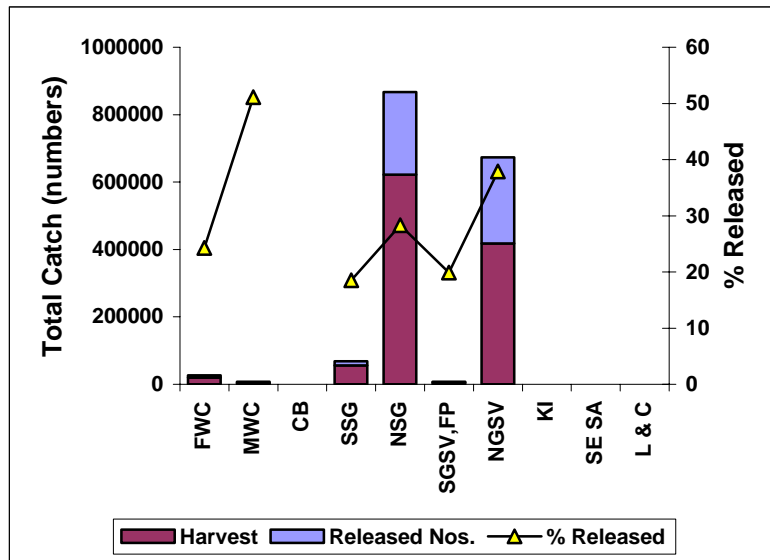


Figure 32. Recreational harvest and released catch (numbers) of blue crabs with respective % released for the major regions of SA marine waters.

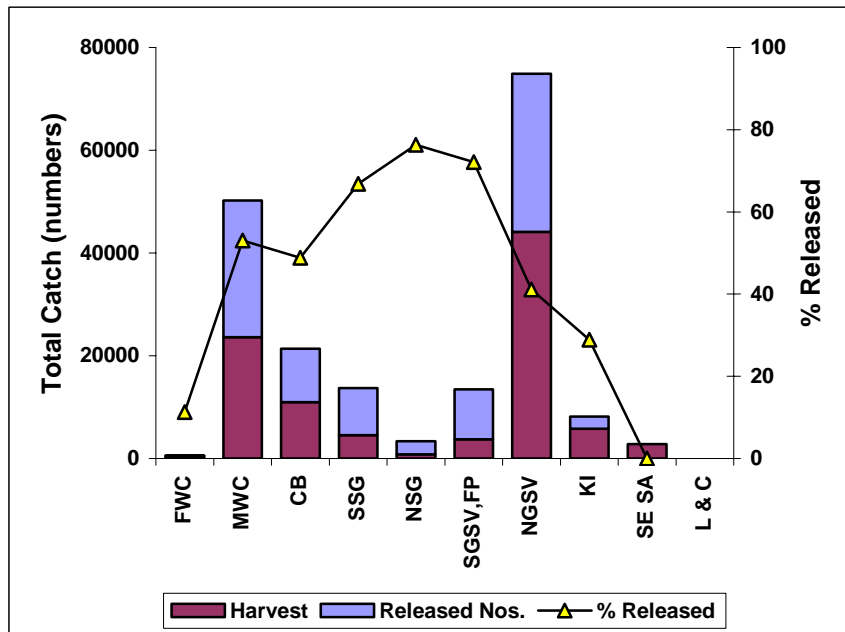


Figure 33. Recreational harvest and released catch (numbers) of sand crabs with respective % released for the major regions of SA marine waters.

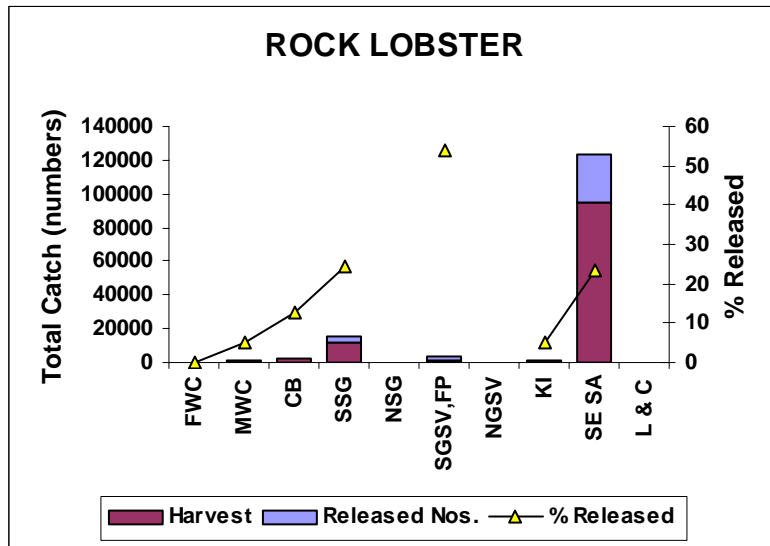


Figure 34. Recreational harvest and released catch (numbers) of rock lobster with respective % released for the major regions of SA marine waters.

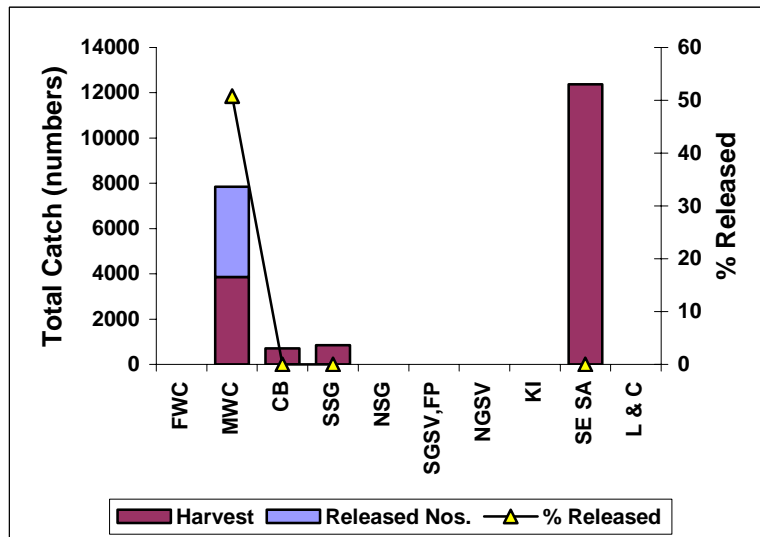


Figure 35. Recreational harvest and released catch (numbers) of abalone with respective % released for the major regions of SA marine waters.

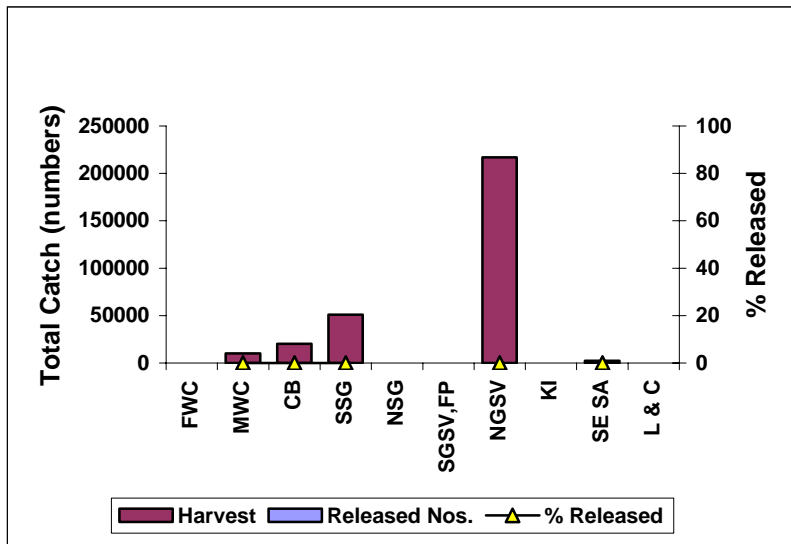


Figure 36. Recreational harvest and released catch (numbers) of mud cockles with respective % released for the major regions of SA marine and inland waters.

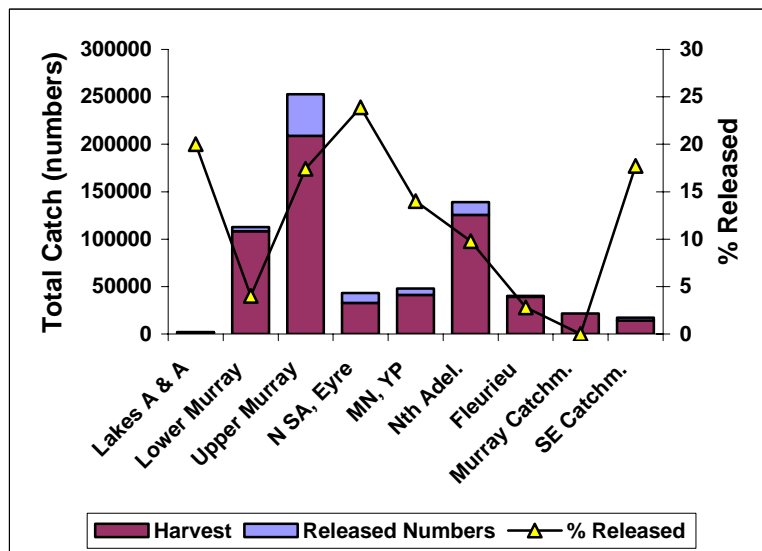


Figure 37. Recreational harvest and released catch (numbers) of yabbies with their respective % released for the major regions of SA marine and inland waters.

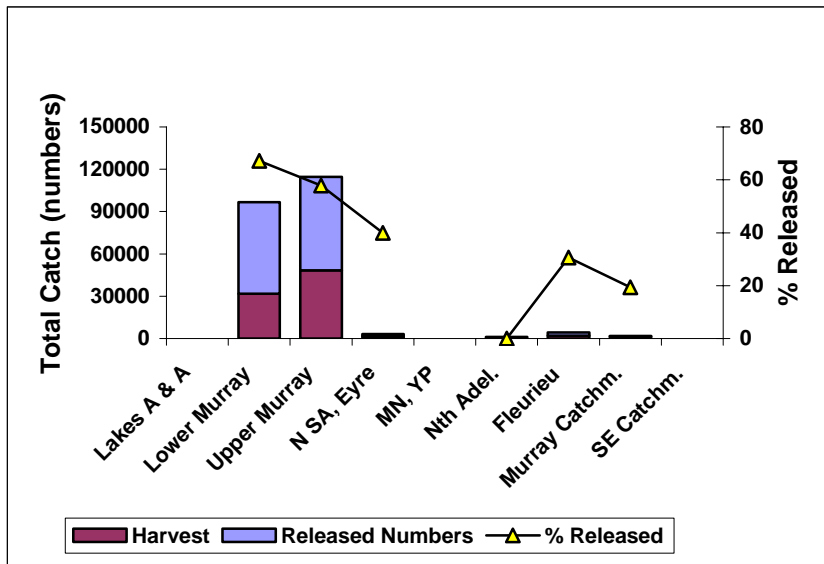


Figure 38. Recreational harvest and released catch (numbers) of Golden Perch with respective % released for the major regions of SA Inland waters.

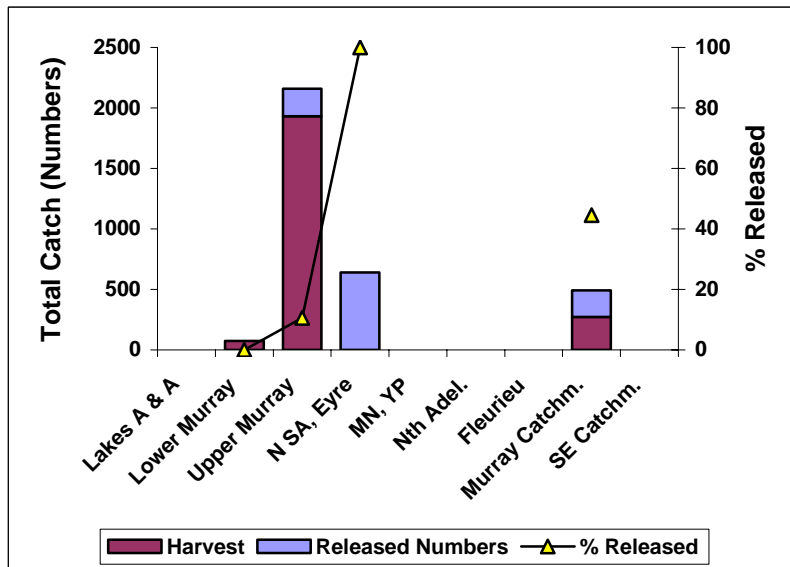


Figure 39. Recreational harvest and released catch (numbers) of Murray Cod with their respective % released for the major regions of SA Inland waters.

8 FISHING EFFORT ON KEY SPECIES

8.1 Introduction, including Interpretation of fishing effort

This chapter provides a summary of the target and non-target effort on the key species, by major regions as estimated from the diary survey. Detailed effort for each recreational fishing block for each of the key species is seen in Appendix 2 (Tables 59–64).

For the purposes of this report and stock assessment reports provided by SARDI, the definition for target species fishing effort is that effort expended by a recreational fisher, when a species is nominated as targeted, and caught during a fishing event. The catch in this case includes both the retained and released component.

Non-target species fishing effort is that effort expended by a recreational fisher, when a species is caught and retained, but is not reported to have been targeted. Non-target effort does not include that effort when a species is released. Total effort is the sum of target and non-target effort.

8.2 Effort on marine and estuarine finfish species

King George whiting. Total effort on King George whiting was the highest of all the species reported here (1,706,571 hrs.). Throughout the State, target effort amounted to 78.5% of the total effort expended on this species, with little regional variation between most areas (Table 20). In the South east, target effort was slightly lower (62.3%) than all other areas. Spencer Gulf was the region of highest targeted, non-targeted and total effort. Within regions, the two fishing blocks where highest total effort occurred was blocks 18 (nthn Adelaide Metropolitan) and 5 (Coffin Bay) (App. 2, Table 59). Coffin Bay was the fishing block with the highest non-target fishing effort.

Table 20. Statewide and regional target, non-target and total effort (person-hrs fished) on King George whiting

Fishing Region	Target effort on caught KG whiting (hrs)	Non-target effort on retained KG whiting (hrs)	Total effort on KG whiting (hrs)	Target effort (% of total effort)
West Coast	317,632	80,404	398,036	79.8
Spencer Gulf	570,716	127,402	698,118	81.8
Gulf St. Vincent	359,487	120,476	479,963	74.9
Kangaroo Island	45,251	10,436	55,687	81.3
South-East of SA	46,574	28,194	74,768	62.3
State Total	1,339,659	366,912	1,706,571	78.5

Snapper. Target effort on snapper was 70% of the total state effort on this species, with Spencer Gulf the region of highest target effort (Table 21). Within Spencer Gulf, Fishing block 9 (upper Spencer Gulf) was the area where target effort was the highest (Table 59). The region where effort was second highest was the South east; however, in contrast to other regions, non-target effort was relatively high. Within Gulf St. Vincent, highest effort was expended in block 19 (southern Adelaide Metropolitan and Fleurieu).

Table 21. Target and total effort (target and non-target hrs fished) on snapper for major regions of SA.

Fishing Region	Target effort on caught snapper (hrs)	Non-target effort on retained snapper (hrs)	Total effort on snapper (hrs)	Target effort (% of total effort)
West Coast	4,884	3,015	7,899	61.8
Spencer Gulf	195,427	33,452	228,879	85.4
Gulf St. Vincent	32,737	16,346	49,083	66.7
Kangaroo Island	2,427	1,603	4,030	60.2
South-East of SA	14,177	55,015	69,192	20.5
State Total	249,652	109,431	359,083	69.5

Garfish. In contrast to most of the other key species, target effort on garfish was relatively low (32%), confirming the well-known adage of garfish as one of the “bread-and-butter” species for recreational fishers in SA (Table 22). There was some regional variation in the relative importance of target effort, with relatively high effort in Spencer Gulf and the South east. These differences may reflect the relative importance of targeted dab net fishing for garfish in these regions, compared with the less targeted line fishing for the species more important in the other regions.

Table 22. Target and total effort (target and non-target hrs fished) on garfish for major regions of SA.

Fishing Region	Target effort on caught garfish (hrs)	Non-target effort on retained garfish (hrs)	Total effort on garfish (hrs)	Target effort (% of total effort)
West Coast	16,408	68,405	84,813	19.3
Spencer Gulf	103,978	137,901	241,879	43.0
Gulf St. Vincent	85,544	257,876	343,420	24.9
Kangaroo Island	5,006	7,948	12,954	38.6
South-East of SA	27,321	31,823	59,144	46.2
Coorong Lagoon	1,526	0	1,526	100.0
State Total	239,783	503,953	743,736	32.2

Australian salmon. Targeted effort on Australian salmon amounted to almost 30% of the total effort in SA (Table 23); however, the proportion varied considerably in different recreational fishing areas, probably due to whether or not a popular shore based fishing beach for sub-adult salmon dominated the fishery for salmon within the particular fishing block. For example, the target sport fishing effort in southern Yorke Peninsula (area 14), south coast of Kangaroo Island (area 21) and Mid West coast (area 4) was 87, 91 and 97% of the total effort, respectively. Within the major fishing regions, highest target and total effort occurred within Gulf St. Vincent. In contrast, lowest target and total effort occurred in Kangaroo Island waters, but here, target effort as a % of total effort was highest (81%).

Table 23. Target and total effort (target and non-target effort, hrs fished) on Australian salmon for major regions of SA.

Fishing region	Target effort on caught Australian salmon (hrs)	Non-target effort on retained Australian salmon (hrs)	Total effort on Australian salmon (hrs)	Target effort (% of total effort)
West Coast	70,184	98,150	168,334	41.7
Spencer Gulf	37,007	79,314	116,321	31.8
Gulf St. Vincent	144,405	208,422	321,267	44.9
Kangaroo Island	14,848	3,439	18,287	81.2
South-east SA	31,510	107,258	138,768	22.7
Total SA	207,954	496,583	704,537	29.5

Australian herring (“tommy ruff”). Of all the key species, total effort on Australian herring was the second highest. Throughout the state, target effort, as a proportion of total effort was relatively low, compared with most other key species (20.5%; Table 24). Highest target and total effort was expended in area 16 (central west Gulf St. Vincent), with target effort at 35.9% of the total effort. Other recreational fishing areas that experienced relatively high proportional target effort included Spencer Gulf (21.5%). In West coast waters target effort as a proportion of the total effort was the lowest of all regions (Table 24).

Table 24. Target and total effort (target and non-target effort, hrs fished) on Australian herring for major regions of SA.

Fishing region	Target effort on caught Australian herring (hrs)	Non-target effort on retained Australian herring (hrs)	Total effort on Australian herring (hrs)	Target effort (% of total effort)
West Coast	20,340	249,983	270,323	7.5
Spencer Gulf	112,453	410,356	522,809	21.5
Gulf St. Vincent	190,166	571,395	761,561	25.0
Kangaroo Island	4,431	30,275	34,706	12.8
South-east SA	20,878	90,441	111,319	18.7
Total SA	348,268	1,352,450	1,700,718	20.5

Snook. Target effort for this species was relatively low (13%), in proportion to its total effort (Table 25). Highest target effort occurred in northern Adelaide metro waters (area 18), and the highest non-target effort occurred in rec fishing area 7 (south west Spencer Gulf). Within the regions, highest levels of total effort occurred in Spencer Gulf. Although total effort was low in the South east of SA, target effort in this region was the highest, as a proportion of total effort.

Table 25. Target and total effort (target and non-target effort, hrs fished) on snook for major regions of SA.

Fishing region	Target effort on caught snook (hrs)	Non-target effort on retained snook (hrs)	Total effort on snook (hrs)	Target effort (% of total effort)
West Coast	3,950	26,100	30,050	13.0
Spencer Gulf	9,129	88,952	98,081	9.3
Gulf St. Vincent	9,406	46,011	55,417	17.0
Kangaroo Island	93	1,882	1,975	4.7
South-east SA	2,822	4,408	7,230	39.0
Total SA	25,400	167,353	192,753	13.2

Other specified whiting (yellowfin and school whiting). Effort on these two species has been combined, and interpretation of effort, is based on knowledge of the contrasting spatial distributions of the two species (Ferguson, 2000; Dixon & Black, 1993, respectively), where yellowfin whiting are confined to the waters of Spencer Gulf and Gulf St. Vincent, and school whiting mainly occur in Kangaroo Island, Investigator Strait, West coast and South east waters. Target effort on both species combined throughout the state was at a relatively medium level compared with other species reported here (48% of total effort; Table. 26). Targeted and total effort were highest in the Gulf regions, where yellowfin whiting would have been the main species targeted. Highest targeted and non-targeted occurred off the northern Adelaide metropolitan waters (area 18). The South east was the only region where school whiting was targeted (37% of total effort). In West coast and Kangaroo Island waters, they were taken as by-product species, when recreational fishers were targeting other species (eg King George whiting).

Table 26. Target and total effort (target and non-target effort, hrs fished) on “other specified whiting” for major regions of SA.

Fishing region	Target effort on caught other whiting (hrs)	Non-target effort on retained other whiting (hrs)	Total effort on other whiting (hrs)	Target effort (% of total effort)
West Coast	0	3,614	3,614	0
Spencer Gulf	39,131	18,449	57,580	68.0
Gulf St. Vincent	39,022	52,097	91,119	42.8
Kangaroo Island	0	9,160	9,160	0
South-east SA	1,213	2,049	3,262	37.2
Total SA	79,366	85,369	164,735	48.2

Mullet (yellow eye and unspecified). Yellow eye mullet exhibited medium to low targeted effort as a proportion of total effort in most regions of the state (Table 27). Highest targeted and total effort on yellow eye mullet occurred in Gulf St. Vincent. Targeted effort on unspecified mullet amounted to 33% of the total effort. In the South east and Coorong lagoon, targeted effort was relatively high, as proportion of total effort.

Unspecified mullet species may have included yellow-eye mullet and jumper mullet (*Liza argentea*) and sea mullet (*Mugil cephalus*), but their relative contributions are unknown. The level of target effort on unspecified species (Table 28) was higher (36%) than that for yellow-eye mullet (Table 27). However, in similarity with yellow eye mullet, highest target and total effort occurred in Gulf St. Vincent.

Table 27. Target and total effort, hrs fished) on yellow eye mullet for major regions in SA.

Fishing region	Target effort on caught y-e mullet (hrs)	Non-target effort on retained y-e mullet (hrs)	Total effort on y-e mullet (hrs)	Target effort (% of total effort)
West Coast	262	20,525	20,787	1.3
Spencer Gulf	2,991	58,647	61,638	4.9
Gulf St. Vincent	26,671	148,548	175,219	15.2
Kangaroo Island	945	4,894	5,839	16.2
South-east SA	19,535	26,621	46,156	42.3
Coorong Lagoon	5,815	0	5,800	100.0
Un-resolved blocks	814	118	932	87.3
Total SA	57,033	259,353	316,386	18.0

Table 28. Target and total effort, hrs fished) on unspecified mullet species for major regions in SA.

Fishing region	Target effort on caught unspecified mullet (hrs)	Non-target effort on retained unspecified mullet (hrs)	Total effort on unspecified mullet (hrs)	Target effort (% of total effort)
West Coast	392	18,270	18,662	2.1
Spencer Gulf	3,085	11,788	14,873	20.7
Gulf St. Vincent	39,585	68,237	107,822	36.7
Kangaroo Island	1,162	932	2,094	55.5
South-east SA	26,083	20,777	46,860	55.7
Coorong Lagoon	0	683	683	0
Un-resolved blocks	1,343	7,065	8,408	16.0
Total SA	71,650	127,752	199,402	35.9

Mulloway. Target effort for this species was relatively high (76% of total effort), and with the exception of Spencer Gulf, this was consistent with all other regions (Table 29). The South east was the region of highest targeted and total effort, and included the mouth of the River Murray. Gulf St. Vincent was the next region of relatively high effort.

Table 29. Target and total effort, hrs fished) on mulloway for major regions in SA.

Region	Target Effort on caught mulloway (hrs)	Non-target effort on retained mulloway (hrs)	Total effort on mulloway (hrs)	Target effort (% of total effort)
West Coast	6,500	3,769	10,269	63.2
Spencer Gulf	2,685	2,857	5,542	48.4
Gulf St. Vincent	18,355	2,037	20,392	90.0
Kangaroo Island	0	0	0	
South-east SA	76,402	27,664	104,066	73.4
Coorong	8,228	0	8,228	100.0
Other regions	8,060	853	8,913	90.4
Total	120,230	37,180	157,410	76.4

Whaler sharks. Target effort on these sharks was low relative to the total effort (12.5% of total effort). Target effort occurred only in two regions (Gulf St. Vincent and the South east), where it amounted to 21.2 & 6.2% of the total effort on these sharks, resp (Table 30). Highest total effort occurred in Gulf St. Vincent and the South east region of SA, with the West coast waters being the third highest area.

Table 30. Target, non-target and total effort (hrs fished) on whaler sharks for major regions of SA.

Fishing Region	Target Effort on caught whaler sharks (hrs)	Non-target effort on retained whaler sharks (hrs)	Total effort on whaler sharks (hrs)	Target effort (% of total effort)
West Coast	0	2,121	2,121	0
Spencer Gulf	0	414	414	0
Gulf St. Vincent	1,986	7,384	9,370	21.2
Kangaroo Island	0	489	489	0
South-east SA	427	6,486	6,913	6.2
Total	2,413	16,894	19,307	12.5

8.3 Marine crustaceans

Blue swimmer crabs. Throughout the state, target effort on blue swimmer crabs was 89% of the total effort, with similar higher levels of effort in each gulf (Table 31). Within the two gulfs highest effort occurred in upper Spencer Gulf (9) and off the northern Adelaide metro coast (18) (App. 2; Table 63). Non-target effort in West coast waters was relatively high, in comparison to the target effort, possibly because in some areas blue crabs were harvested by recreational fishers when they were targeting on other crab species, such as sand crabs (see also Table 32).

Table 31. Target and total fishing effort (hrs fished) on blue swimmer crabs for major regions of SA.

Fishing region	Target effort on caught blue swimmer crabs (hrs)	Non-target effort on retained blue crabs (hrs)	Total effort on blue swimmer crabs (hrs)	Target effort (% of total effort)
West Coast	8,280	5,266	13,546	61.1
Spencer Gulf	197,665	24,126	221,791	89.1
Gulf St. Vincent	188,860	19,122	207,982	90.8
Kangaroo Island	0	0	0	
South-east SA	0	0	0	
Total SA	394,805	48,514	443,319	89.1

Sand Crabs. Throughout the state, target effort amounted to 70% of the total effort on sand crabs. Highest target effort occurred in West coast waters, and highest total effort occurred in Gulf St. Vincent (Table 32).

Table 32. Target and total fishing effort (hrs fished) on sand crabs for major regions of SA.

Major recreational fishing region	Target effort on caught sand crabs (hrs)	Non-target effort on retained sand crabs (hrs)	Total effort on sand crabs (hrs)	Target effort (% of total effort)
West Coast	14,132	4,071	18,203	77.6
Spencer Gulf	0	1,498	1,498	0
Gulf St. Vincent	13,018	7,225	20,243	64.3
Kangaroo Island	2,535	0	2,535	100.0
South-east SA	2,976	1,121	4,097	72.6
Total SA	32,661	13,915	46,576	70.1

Rock lobster. Because rock lobsters were mainly harvested by pots (Table 17), target effort was virtually the same as total effort (Table 33). Effort was highest in South east waters of the state, with Spencer Gulf being the next most important region.

Table 33. Target and total fishing effort (hrs fished) on rock lobster for major regions of SA.

Major recreational fishing region	Target effort on caught rock lobster (hrs)	Non-target effort on retained rock lobster (hrs)	Total effort on rock lobster (hrs)	Target effort (% of total effort)
West Coast	63,898	0	63,898	100
Spencer Gulf	272,725	310	273,035	99.9
Gulf St. Vincent	23,552	0	23,552	100
Kangaroo Island	7,635	0	7,635	100
South-east SA	1,005,122	1,159	1,006,281	99.9
Total SA	1,372,932	1,469	1,374,401	99.9

8.4 Marine molluscs

Southern Calamary. Target effort on southern calamary throughout the state was estimated at about 30% of total effort (Table 34). Highest target effort occurred in Gulf St. Vincent, with recreational fishing area 19 (southern Adelaide Metro and Fleurieu) having the highest effort for all recreational fishing blocks 69,443 hrs). Highest non-target effort occurred in rec fishing area 16 (201,673 hrs). Within the major regions, and target effort was proportionally higher in Gulf St. Vincent compared with all other areas of the state.

Table 34. Target and total effort (target and non-target hrs fished) on southern calamary for major regions of SA.

Rec Fishing Region	Target effort on caught southern calamary (hrs)	Non-target effort on retained southern calamary (hrs)	Total effort on southern calamary (hrs)	Target effort (% of total effort)
West Coast	33,528	118,504	152,032	22.1
Spencer Gulf	128,703	325,164	453,867	28.4
Gulf St. Vincent	200,200	405,073	605,273	33.1
Kangaroo Island	1,358	6,964	8,322	16.3
South-East of SA	6,070	13,618	19,688	30.8
State Total	369,859	869,323	1,239,182	29.8

Abalone. Target effort amounted to 54.3% of total effort throughout the state. Although highest target and total effort occurred in South east waters (Table 35), target effort, as a proportion to the total effort was slightly higher in West coast waters (57.4%).

Table 35. Target and total fishing effort (hrs fished) on abalone (greenlip, blacklip and unspecified species combined) for major regions of SA.

Major recreational fishing region	Target effort on gathered abalone (hrs)	Non-target effort on retained abalone (hrs)	Total effort on abalone (hrs)	Target effort (% of total effort)
West Coast	1,434	1,065	2,499	57.4
Spencer Gulf	351	178	529	66.4
Gulf St. Vincent	0	0	0	
Kangaroo Island	0	0	0	
South-east SA	5,358	4,780	10,138	52.9
Total SA	7,143	6,023	13,166	54.3

Goolwa cockles. Effort on this species was solely target effort (6,924 hrs) and was reported only for fishing block 19 (southern Fleurieu) (App. 2; Table 64).

Mud cockles. Similarly, all effort directed on mud cockles was targeted effort (4,755 hrs; Table 36). Highest target effort occurred in Gulf St. Vincent, and within this region highest effort occurred in fishing block 16 (central western Gulf St. Vincent (Table 64).

Table 36. Target and total fishing effort (hrs fished) on mud cockles for major regions of SA

Major recreational fishing region	Target effort on gathered mud cockles (hrs)	Non-target effort on retained mud cockles (hrs)	Total effort on mud cockles (hrs)	Target effort (% of total effort)
West Coast	225	0	225	100
Spencer Gulf	850	0	850	100
Gulf St. Vincent	3,619	0	3,619	100
Kangaroo Island	0	0	0	–
South-east SA	61	0	61	100
Total SA	4,755	0	4,755	100

8.5 Inland water native species

All three species showed a high level of target effort, relative to their levels of total effort, and this was evident for each of the regions where they were harvested (Table 37).

Table 37. Target and total effort (hrs fished) on inland waters native species.

Region	Golden Perch			Murray Cod			Yabbies		
	Target	Total	Target (% Total)	Target	Total	Target (% Total)	Target	Total	Target (% Total)
Lakes	3,145	3,145	100	–	–	–	1,607	1,607	100
Lower Murray	346,069	365,991	94.6	13,501	13,942	96.8	90,887	98,510	92.3
Upper Murray	262,043	300,866	87.1	20,514	26,496	77.4	227,287	247,705	91.8
Other regions	70,132	74,222	94.5	4,792	4,792	100	88,103	89,958	97.9
Total	681,389	744,224	91.6	38,807	45,230	85.8	407,884	437,780	93.1

8.6 Summary

Of all the key marine species reported here, highest state-wide total effort was expended on King George whiting, Australian herring, rock lobsters and southern calamary, and lowest effort on mud cockles, Goolwa cockles and whaler sharks (Table 38). There was considerable inter-specific variation in the relative level of targeted effort. Relatively high target effort for a species may have been due to a number of reasons, including whether specific gear was used to take the species (eg rock lobster pots), or whether the species was a highly valued one for consumption, (eg King George whiting) or sport species (eg mulloway). For some species which had a medium proportion of their total effort as target effort, there appeared to be high spatial variation in the proportional target effort, depending on whether areas included beaches where species were specifically targeted (eg Australian salmon beaches in West coast and Yorke Peninsula (see Table 23). The species which showed consistently low proportional targeted effort were those often taken as by-product (eg whaler sharks) to targeted effort on sport species such as mulloway. Other species showing relatively low targeted effort were those which were often harvested within a group of species (eg Australian herring, garfish and snook) during the same fishing event.

For the inland native species, all showed relatively high targeted effort. Of these species, highest total effort was expended on golden perch (Table 37).

Table 38. Target, non-target and total fishing effort (hrs fished) for all key marine species in SA waters

Species	Target effort (hrs)	Non-target effort (hrs)	Total Effort (hrs)	Target effort (% of total effort)
King George whiting	1,339,659	366,912	1,706,571	78.5
Snapper	249,652	109,431	359,083	69.5
Garfish	239,783	503,953	743,736	32.2
A. salmon	207,954	496,583	704,537	29.5
A. herring	348,268	1,352,450	1,700,718	20.5
Snook	25,400	167,353	192,753	13.2
Other specified whiting	79,366	85,369	164,735	48.2
Yellow-eye mullet	57,033	259,353	316,386	18.0
Unspecified mullet	71,650	127,752	199,402	35.9
Mulloway	120,230	37,180	157,410	76.4
Whaler sharks	2,413	16,894	19,307	12.5
Blue crabs	394,805	48,514	443,319	89.1
Sand crabs	32,661	13,915	46,576	70.1
Rock lobster	1,372,932	1,469	1,374,401	99.9
Southern calamary	369,859	869,323	1,239,182	29.8
Abalone	7,143	6,023	13,166	54.3
Goolwa cockles	6,924	0	6,924	100
Mud cockles	4,755	0	4,755	100

9 ATTRIBUTABLE EXPENDITURE AND INVESTMENT BY RECREATIONAL FISHERS

9.1 Introduction

Information on expenditure attributable to recreational fishing was collected from resident fishers aged five years or older during the second phase of the survey, i.e. during the diary interviews. Respondents were also asked where the expenditure occurred and each expenditure event was allocated to an ABS statistical area (here called economic zone), either in SA, or interstate (expenditure outside Australia was not included). Only expenditure allocated to vehicle fuel was not allocated an economic zone.

Results are presented as expanded population estimates, based on ABS estimated resident population and participation rates obtained from the initial survey.

9.2 Attributable expenditure by recreational fishers

9.2.1 Expenditure within SA by residents and visitors

Attributable Expenditure throughout the state was \$ 148.48 million (+/- 14,062). When car fuels costs are taken out of this expenditure was \$110.2 million. Of this sum, 97% was expended by SA residents and 3 % by visitors (Tables 39 & 40).

On a regional basis, the Adelaide region was the one where largest expenditure occurred for SA residents (65.5%). The next highest region for residents was the Northern region (7.5 million; 7%). The South east of the state was the region where highest expenditure by visitors occurred (1.9 million, 63% of all visitors expenditure) (Table 39).

Table 39. Regional expenditure within SA – Residents & Visitors

Region	Residents (\$)	Visitors (\$)	Total (\$)
West Coast (S1)	1,457,356	283,449	1,740,805
Northern (S2)	7,538,156	14,518	7,552,674
Lincoln (S3)	4,712,826	89,108	4,801,934
Yorke & Lower North (S4)	7,130,104	84,731	7,214,835
Barossa (S5)	2,089,906	0	2,089,906
Adelaide (S6)	70,218,913	307,453	70,526,366
Kangaroo Island (S7)	544,136	52,804	596,940
Fleurieu (S8)	2,517,608	88,309	2,605,917
Murray Lands (S9)	5,780,028	161,870	5,941,898
South East (S10)	5,185,111	1,949,496	7,134,607
Total:	107,173,541	3,031,738	110,205,283

In terms of expenditure by categories, highest expenditure was associated with boat/trailer costs and next most important categories were expenditure on accommodation and fishing gear (Table 40). The expenditure categories covered the items listed in Table 40, and expenditure for each item (regions combined) is presented in Appendix 3.

Table 40. Expenditure per year within SA by expenditure category, recreational fishers, aged five years or over – Residents & Visitors.

Expenditure Category	Residents (\$)	Visitors (\$)	Total (\$)
Accommodation	16,196,543	538,309	16,734,852
Bait, berley, ice	3,697,489	145,267	3,842,756
Boat, trailer	68,776,169	1,947,606	70,723,775
Boat hire/charter	1,367,726	58,280	1,426,006
Clothing	3,178,660	122,121	3,300,781
Dive gear	526,761	0	526,089
Fees, licences	962,339	20,865	983,204
Fishing Gear	10,111,020	117,983	10,229,003
Others	790,943	0	790,943
Travel	1,565,891	81,307	1,647,198
Total:	107,173,541	3,031,738	110,205,283

9.2.2 Expenditure not covered in scope of the survey

An additional expenditure of \$ 33.46 million was made on items considered to be not in the scope (Table 41).

Table 41. Expenditure on items not covered in scope of the attributable expenditure estimates.

Expenditure Item	Expenditure (\$)
Car fuel / oil	809,704
Car maintenance	55,405
Contributions	468,751
Food / drink	1,445,880
Real Estate (not home) capital	24,450,198
Real Estate (not home) insurance, rates, etc)	2,477,909
Real Estate (not home) maintenance, repairs	3,747,843
Total	33,455,691

9.3 Attributed expenditure by SA residents outside SA, by state fished

When SA residents went recreational fishing interstate, higher attributable expenditure occurred in eastern mainland states (84.3%). Almost 13% of the expenditure was derived from Western Australia (Table 42).

Table 42. Attributed expenditure by SA residents outside SA, by state fished.

State Fished	Attributable Expenditure (\$)	% by state
NSW	521,160	23.6
Vic	584,507	26.5
Qld	754,809	34.2
WA	29,569	1.3
Tas	35,246	1.6
NT	283,003	12.8
ACT	0	0
Total:	2,208,294	100

9.4 Attributed expenditure by SA residents outside SA, by item category

Highest attributable expenditure items were for boats/trailers, followed by fishing gear, and the lowest (nil) was for dive gear (Table 43).

Table 43. Attributable expenditure by SA residents outside SA, by item category.

Item category	Attributable Expenditure (\$)	% by category
Accommodation	346,279	15.6
Bait, berley, Ice	172,285	7.8
Boat / trailer	777,684	35.2
Boat hire / charter	274,109	12.4
Clothing	25,547	1.2
Dive gear	0	0
Fees / licences	51,025	2.3
Fishing Gear	464,842	21.0
Travel	51,406	2.3
Other	45,116	2.0
Total:	2,208,294	100

9.5 Proportion of expenditure spent in home or “away” economic zone

Recreational fishers in “away” category were defined as those fishers who expended money > 40 km from their residence. The highest percentage of fishers expending away from their residence were those in the Adelaide (79%), Northern (72%) and Port Lincoln (62%) economic regions. For all other economic regions, more than 64% of resident fishers, spent money on recreational fishing items “at home” (Table 44).

Table 44. Proportion of expenditure by recreational fishers, at home or “away” from their residence.

Economic Region	% spent in home zone	% spent in “away” zone
West Coast (S1)	73	27
Northern (S2)	28	72
Lincoln (S3)	38	62
Yorke & Lower North (S4)	86	14
Barossa (S5)	91	9
Adelaide (S6)	21	79
Kangaroo Island (S7)	79	21
Fleurieu (S8)	80	20
Murray Lands (S9)	64	36
South East (S10)	67	33

9.6 Estimated expenditure, landing and days fished according to employment status (adapted from Campbell & Murphy, 2004)

SA recreational fishers spent on average, \$452 / fisher, and averaged 6.1 days of fishing per year. As a group, full-time professional employed people expended the most on recreational fishing and they also exerted the highest level of fishing effort. On average, each fisher of this group spent \$441 per fisher, and fished 5.3 days per year, both of which were marginally less than the State averages (Table 45). Highest average expenditure was made by the fully employed labour group of recreational fishers (\$ 549 / fisher).

Table 45. Estimated expenditure, landings and days fished, according to employment status for SA recreational fishers.

	Professional	Fully Employed		Unknown	Not fully employed	Not Employed
		Trade	Labour			
Number of people	134,527	70,013	48,189	84	66,908	8,506
Estimated attributable expenditure (\$ '000)	59,308	27,649	26,472	96	25,320	9,638
Estimated landing (kept fish, '000)	5,639	4,328	1,935	39	5,700	91
No. days fished ('000)	714	449	265	1	544	29

9.7 Attributable expenditure by waters fished

Greatest expenditure occurred by recreational fishers who fished in marine waters, and estuaries were the water body where least expenditure occurred (Table 46).

Table 46. Attributable expenditure by water bodies fished.

Families in sample No.	Days effort ('000)	Harvest (no. fish kept)	Estuaries	Expenditure (\$ ' 000)		Total
				Marine	Inland	
1,030	2,003	17,732	10,381	111,334	26,770	148,484

10 MOTIVATIONS, AWARENESS AND OPINIONS ON RECREATIONAL FISHING

10.1 Introduction

The information within this chapter was collected at the end of the diary phase for SA residents. To ensure the educational effects of certain questions (eg enhanced awareness of size limits) did not influence the behaviour of respondents during the diary phase of the survey, a diarist (aged 15 yrs or over) was selected randomly from each household and asked a series of questions to assess opinions on a range of fishing related issues.

Results are presented as expanded population estimates (based on ABS estimated resident population). The results presented here are for the whole of SA.

10.2 Motivation for fishing

Respondents were questioned about their motivations (reasons) to go fishing. The percentage of recreational fishers indicating the importance of each of the factors is seen in Table 47. The results of all 1009 respondents in SA are presented.

Table 47. Importance of factors motivating recreational fishers in SA, aged 15 year or over.

Factor	Very	Quite	Not Very	Not at all	Unsure	Didn't indicate
Relax & Unwind	59.5	36.7	8.5	2.5	0.1	2.5
To be outdoors	54.6	33.5	6.7	2.4	0.1	2.5
For solitude	18.5	21.5	34.1	23.2	0.1	2.5
To be with family	38.1	27.7	17.8	13.5	0.3	2.5
To be with friends	36.5	36.3	15.3	9.3	0.1	2.5
Competitions	1.8	2.7	11.4	81.3	0.3	2.5
Fish for sport	46.9	36.8	10.4	3.3	0.1	2.5
Fish for food	40.7	29.2	18.4	8.9	0.1	2.5

The most important factors (i.e. those expressed by over 80% of respondents) were to be outdoors (88.1%), relax and unwind (86.2%) and to fish for sport (83.7%). The next most important factors (i.e. > 60% of respondents), were to be with friends (72.8%), to fish for food (69.9%) or to be with the family (65.8%). The least important factor was fishing competitions (4.5%). The SA results are generally similar to those in the nationally aggregated data (Table 5.13 in Henry & Lyle, 2003). The only factor which showed a higher importance in SA compared to the national data, was to fish for food (national aggregate: 61%).

Respondents were then asked their primary reason for going fishing. The primary reason for, by far, the greatest number of respondents, was to relax and unwind (32%), and then fishing for food or sport or to be with the family were the primary reasons for 14.6–15.5% of respondents (Table 48). The least number of respondents regarded fishing competitions as their primary reason for fishing (0.3%).

Table 48. Primary reason for recreational fishing by SA respondents.

Motivation	Main Reason (numbers)	Main Reason (% respondents)
Relax & unwind	318	32.0
To be out-doors	95	9.4
For solitude	24	2.4
To be with the family	156	15.4
To be with friends	63	6.2
Competitions	3	0.3
Fish for sport	148	14.6
Fish for food	156	15.5
Unsure	20	1.9
Didn't Indicate	26	2.5
	1,009	100

10.3 Awareness of recreational regulations for the management of the King George whiting, snapper and southern calamary fisheries

Participants were asked whether they were aware of recreational regulations for the management of the King George whiting, snapper and southern calamary fisheries in the state. The data were investigated for all fishers, and marine only fishers (Tables 49–51).

Table 49. Awareness of King George whiting regulations (% of respondents)

	Size limit	Bag Limit	Boat Limit
All recreational fishers	65	61	59
Recreational fishers excluding inland fishers	72	68	62

Table 50. Awareness of snapper regulations (% of respondents)

	Size limit	Bag Limit	Boat Limit
All recreational fishers	45	37	35
Recreational fishers excluding inland fishers	50	43	41

Table 51. Awareness of southern calamary regulations (% of respondents)

	Bag Limit	Boat Limit
All recreational fishers	32	28
Recreational fishers excluding inland fishers	35	32

Of the three species surveyed, highest awareness was recorded for King George whiting, and the lowest for southern calamary. In all sets of regulations and the three species, the % awareness was slightly higher for recreational fishers, who concentrated their activities in marine waters.

10.4 Awareness of fisheries information

Respondents were asked their main sources of information on recreational fishing. From a list of 13 possible sources, the two main reasons were: a) from other fishers and b) from television. The respondents were asked about their awareness on fish management information, specific to SA. These are summarised in Table 52.

Table 52. % awareness by respondents on recreational fishing information specific to SA.

Recreational Fishing Information	% of respondents aware
Recreational Fishing guide	45
Fish Measuring stations on jetties 7 wharves	78
Recreational size and bag limit signs on boat ramps	67
Plastic measurers for abalone, crabs & rock lobsters	60

10.5 Introduction of a general fishery licence

Fishers were asked whether or not they would support the introduction of a recreational fishing licence with the same guidelines as those in NSW and Victoria. Under the NSW and Victorian guidelines, children and pensioners are exempt, licences are available for different periods at a reasonable cost, and revenue is used directly for research and improvement of fishing (Anon, 2002). There were similar levels of support and non-support for a general fishery licence (Table 53).

Table 53. Levels of support / non support for the application of a SA general Recreational fishing licence, and associated reasons.

Support for general recreational fishing licence	No support for general recreational licence	Unsure
47%	42%	11%
Reasons provided: <ul style="list-style-type: none"> • Need to spend more money on research for recreational fishing. • Policing of fishing regulations. 	Reasons provided: <ul style="list-style-type: none"> • Expense on top of other fishing costs such as boat, fuel & bait; • Govt should fund research and improvement of fishing; • Distrust of government to put revenue back into fishing; • Taking the spontaneity out of fishing by having to obtain a licence. 	

11 DISCUSSION

11.1 Uncertainties

Identification of species by fishers. Many avid recreational fishers have high fish identification skills; however, as this survey aimed to gather information from a representative sample of all recreational fishers, a strong emphasis of the survey was to maximize the diarists' chances to correctly identify the species they caught. This was done by providing all diarists with fish identification sheets for all the main species.

Delineation of fishing areas. The identification of catch and effort associated with the Coorong estuary and ocean beach is complex, as catch and effort in marine waters adjacent to the mouth of the Murray River is included in recreational fishing block 22, however, for the purposes of regionalisation, the catch and effort data from the Murray mouth has been included in the South east region.

Estimated biomass. In terms of catch information, this report has placed most emphasis on the numbers of fish harvested and released, and only minor emphasis on biomass of species harvested. Estimates of harvested biomass have been based on the average weights of fish harvested. To estimate these average weights, a number of independent creel surveys were undertaken during the diary survey, however, these surveys were patchy, both spatially and temporally. Therefore, more reliance has been placed on size composition data from commercial catch sampling programs undertaken at the same time (eg snapper – see Fowler et al, 2005).

Numbers of released fish have not been converted to biomass of by-catch, simply because there is a high uncertainty about the average size of those species released. Fish were released for a number of reasons, including undersized, and legal sized fish as part of catch and release fisheries.

11.2 Interpretation and future use of the information

This report has brought together the results from the components of the NRFS for SA (i.e. the screening, telephone/diary and “washup” surveys). Although all these surveys essentially interviewed the same households, we recommend against attempting to link the results from each component. For example, the survey was not designed to estimate catch and effort on species (specifically estimated from the 2000/01 diary survey), using the boat ownership data derived from the pre-March, 2000 screening survey, or, for that matter, any other available data on boat owners.

Some aspects of the results of the survey have already been used for a number of other research / stock assessments and management of SA's Fisheries. These include:

- a. Incorporation of the recreational catch and effort data into stock assessment models developed for estimating fishable biomass and exploitation rates for key marine scale fish species (eg, King George whiting, snapper and garfish; McGarvey et al 2003; Fowler et al, 2005).
- b. Estimating catch rates of King George whiting by recreational fishers, for use in management of the King George whiting fishery (MSFMC).
- c. Review of research and fishery information on the survival of released line caught fish (National Review). McLeay et al, 2002).

As the management of SA fisheries become increasingly directed towards ensuring the sustainability of the ecosystems associated with each fished species, there will be requirements for each sector of the fishery to demonstrate that they are minimising their impact on by-catch and the associated fisheries habitat. The data collected from this NRFS, will act as a valuable set of information, which can be used to initiate further ecological research on this sector of the fishery.

11.3 The recreational fishery in the context of the SA managed fisheries

The catch and effort data estimated from this survey can now be placed in the context of the SA managed fisheries (see PIRSA fisheries management plans, eg Noell et al, 2005 & Sloan, 2005). Table 54 summarises the recreational harvest (numbers) and effort in each of the managed fisheries. For the single species managed fisheries, recreational effort was the total effort (target and non-target applied to those species (see chapter 8)). For the multi-species Inland waters managed fishery, recreational effort was that applied in all Inland waters of the state, as reported in Table 8. For the multi-species Marine Scalefish and Miscellaneous managed Fishery, the effort is the difference between the total state-wide effort (Table 8), and the sum of the effort for all other fisheries. The effort clearly shows the dominance of recreational harvest and effort in the Marine Scalefish and Miscellaneous managed fishery, with more than 70 & 58% of all harvest and effort in SA. The inland waters fishery, which includes the Lakes & Coorong and the River Murray was the second most important.

Table 54. The recreational harvest (numbers) and total fishing effort (hrs fished) in SA waters, according to the managed fisheries.

Managed Fishery	Harvest (numbers) (% of total recreational harvest)	Fishing effort (hrs fished) (% of total recreational effort)
Marine Scalefish & Miscellaneous	12,113,449 (70.3%)	5,742,000 (58.8%)
Goolwa cockles *	1,474,859 (8.6%)	6,924 (0.07%)
Inland Waters ** (R. Murray & L & C)	2,378,255 (13.8%)	2,200,248 (22.3%)
Rock Lobster (N Zone)	19,305 (1.1%)	368,120 (3.8%)
Rock Lobster (S Zone)	94,375 (5.5%)	1,006,281 (10.3%)
Abalone (W Zone)	4,712 (0.02%)	2,627 (0.03%)
Abalone (C Zone)	701 (< 0.01%)	350 (< 0.01 %)
Abalone (S Zone)	12,367 (0.07%)	10,139 (0.1%)
Blue crabs (gulf waters)	1,102,273 (6.4%)	429,773 (4.4%)
WK Prawns ***	10,807 (0.06%)	N/a
Pilchards ****	1,227 (< 0.01%)	N/a
Total	17,212,330	9,766,591

* : The Goolwa cockle fishery, with is part of the L & C managed fishery, has been separated from the rest of the Inland waters fisheries.

** : The inland waters fishery does not include the fishery along the Coorong Ocean Beach – this component has been included in the MSF & Miscellaneous Fishery.

***: All salt water prawns, and may include WK prawns.

**** : All baitfish, and may include some pilchards and other clupeid species managed in this fishery.

11.4 Spatial and temporal comparison of the King George whiting harvest by recreational fishers in SA

A number of other surveys of recreational participation, expenditure and catch and effort have been undertaken in SA waters in the past 30 years (Tables 56–58), however, because a wide range survey techniques were used, and, as most were undertaken at different times, and were often spatially restricted, it is difficult to compare some of these with the results from the recent NRFS.

This difficulty can clearly be demonstrated when the estimated regional harvest of King George whiting by recreational fishers is compared between different surveys done at different times. McGarvey et al (2003) compared the estimated recreational harvest of King George whiting in West coast, Spencer Gulf and Gulf St. Vincent waters from the 1994-96 bus route survey (McGlennon & Kinloch, 1997) and the 2000/01 NRIFS. They found that the size of the estimated biomass harvested in each of the areas was higher in 2000/01 compared with the previous survey.

Previous attempts during the early 1980's have been made to estimate the recreational harvest of King George whiting using other survey techniques. Jones et al (1990) estimated the regional harvest of King George whiting by recreational fishers in SA, using the relative recapture rates

of tagged whiting by commercial and recreational line fishers operating in the same regions, as well as the known commercial handline harvest. All regional estimates of the annual recreational harvest calculated from the three surveys undertaken in 1978–82, 1994–96 and 2000–01 are presented in Figure 40. The interannual differences in regional harvest could have been due to inter-annual differences in fishing effort, relative abundance of King George whiting or the different survey methods. The only consistency between times of the three surveys appears to be the similarity in relative level of harvest between the regions. Thus, Spencer Gulf and Gulf St. Vincent were consistently the two regions with the highest level of harvest.

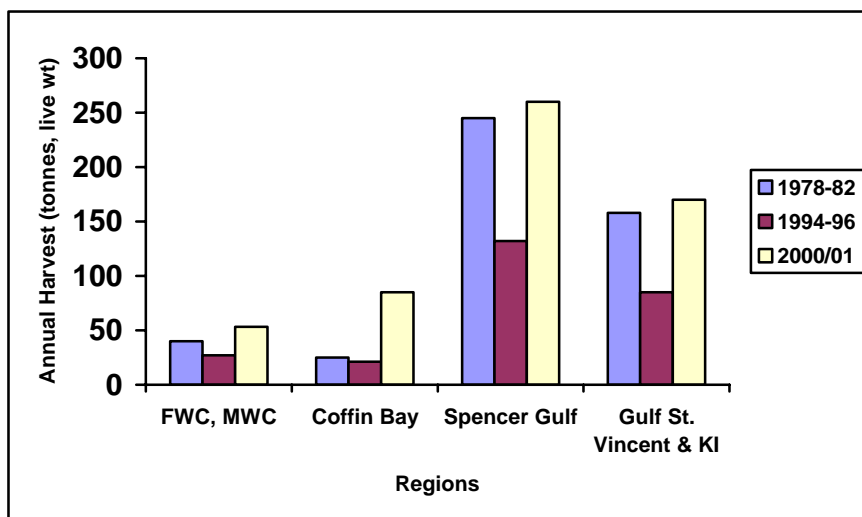


Figure 40. Spatial variation in regional harvest of King George whiting by recreational fishers in 1978-82, 1994-96 and 2000/01 (FWC: far west coast; MWC: mid west coast). (Note:1994-96 estimate for GSV & KI did not include KI.)

When the regional harvests are expressed as a proportion of the total harvests in the four regions and then compared, there has been a slight temporal decrease in the relative size of the harvest in the waters of the gulfs and a slight increase for the West coast regions (Table 55).

Table 55. Proportional regional harvest of King George whiting by recreational fishers, 1978-82 – 2000/01.

Region	1978-82 Harvest (%) (Jones et al, 1990)	1994-96 Harvest (%) (McGarvey et al, 2003)	2000/01 Harvest (%) (McGarvey et al, 2003)
Far west coast (FWC), Mid west coast (MWC)	40 (8.5%)	27 (10.2%)	53.1 (9.3 %)
Coffin Bay	25 (5.3%)	21.3 (8.0 %)	85 (15.0 %)
Spencer Gulf	245 (52.4%)	132 (49.8 %)	260 (45.8 %)
Gulf St. Vincent & KI	158 (33.8%)	85 (32.0 %) *	170 (29.9 %)
Estimated Harvest (tonnes)	468 (100%)	265.3 (100%)	568.1 (100%)

* Harvest estimate for GSV & KI for 1994-96 does not include KI – see McGarvey et al (2003) & McGlennon & Kinloch (1997) for details.

However, without the development of standardised methods for undertaking on-going recreational fishing surveys, there will continue to be uncertainties in interpreting trends in recreational catch and effort in SA waters.

Table 56. Summary of surveys in SA to estimate participation and / or expenditure by recreational fishers.

Year of Survey	Spatial extent	Survey method	Results	Reference
1982–83	State-wide	ABS quarterly survey of SA households	Quarterly regional participation levels, state-wide capital value of recreational fishing boats and associated gear.	Philipson et al, 1986
1989	Coffin Bay	6 month creel survey of recreational catch and effort, and recreational and commercial expenditure for Coffin Bay.	Comparison of expenditures by recreational and commercial fishers, using the marginal increment model.	Staniford & Siggins, 1992.
1994–96	SA Gulfs & West Coast	Bus-route surveys of numbers of boats at key boat launching facilities.	Seasonal and daily number of boats using key boat ramps between April, 1994 and March, 1996	McGlennon, 1996
1997	State-wide	Phone survey of SA households for up to a 12 monthly retrieval of remembered information.	Participation, expenditure – state-wide and regional data.	Cierpicki et al, 1997
1997	State-wide	Contingent valuation method for KG whiting and snapper in SA	Estimate of marginal willingness of anglers to pay for catching the species, and comparison with economic values of commercial harvests for both species.	Coombs, 1997
1998	Fleurieu & KI regions	Cost-benefit analysis of recreational fishing for Australian salmon in SA regional areas (Questionnaire surveys)	Comparison on economic values of Australian salmon between recreational and commercial fishers	Lindsay et al, 1998
2000–01	National / State-wide / regional	NRFS, screening & telephone/diary surveys of households (Monthly retrieval of information from diaries).	Regional levels of participation, attributable expenditure	Henry & Lyle 2003; this report
2001–02	National / Statewide	Multi-faceted "recall" survey of National population.	Statewide participation levels by recreational fishers for 2001/02.	Kiwagama, 2002

Table 57. Summary of surveys in SA to estimate finfish catch and effort by recreational fishers.

Year of survey	Spatial extent	Survey method	Results	Reference
1979–80	State-wide	Aerial Survey (Fisheries Compliance helicopter survey)	Spatial distribution of recreational boat fishing effort	Jones, 1981
1980	Adelaide Metropolitan coastline	a) Roving creel surveys of boat, jetty and shore fishing. b) Boat creel survey compared with voluntary logs	a) Catch composition by fishing platform b) Bias on catch rate data from voluntary logs.	Jones, 1981, 1982
1983	Sthn Eyre Peninsula	Monitoring of National Recreational Line Fishing Championships	Catch composition for boat, estuary and beach fisheries.	Jones, 1983
1983–84	Sthn YP, Victor Harbor	Monitoring of spear-fishing competition in SA	Catch composition of reef fish harvested during SA spear fishing championships	Johnson, 1985a,b.
1985–86	Pt. Lincoln Bays	1. Roving creel survey of boat ramps, and shore based fishing line fishing. 2. Log books for selected recreational net fishers.	Catch compositions & fishing effort by boat and shore based recreational fishers. Comparison with commercial fishery in same area.	Jones, 1986

Year of survey	Spatial extent	Survey method	Results	Reference
1985	Pt. Hughes - Wallaroo	Roving creel survey of boat ramps and jetties	Catch composition, CPUE's for boat and jetty based fishers	Hill, 1987
1983-89	SA Gulfs & West Coast	Relative recapture rates of tagged KG whiting by recreational and commercial line fishers.	KG whiting harvest by recreational fishers – regional data.	Jones et al, 1990
1984-86	SA Gulfs, KI & West Coast	Release / recapture rates of tagged Australian salmon, and catch & effort survey of anglers recapturing tagged fish.	Regional recapture rates of tagged salmon by anglers, and estimated harvest levels for 1984 –86. Also, comparison with recapture rates from previous tagging programs in the same regions.	Cappo 1987
1989	Franklin Harbour, SG	Roving creel survey of boat fishers. (12 months duration)	Catch composition, Fishing effort, KGW CPUE's	Jones & Retaillick, 1990.
1990	Adelaide coastal waters	12 month Creel survey of boat fishers off Adelaide metropolitan coastline.	Catch composition, fishing effort, CPUE's for main species	McGlennon, 1992
1994-96	SA Gulfs & West Coast	Bus-route creel survey.	Regional annual catch composition, harvest estimates by boat fishers	McGlennon & Kinloch, 1997
1994	SA Marine and Inland waters	Analysis of long term catch and effort records from SA angling clubs on key species (KGW, Aust. Salmon, mullet, yellow-eye mullet, sweep, golden perch, catfish)	CPUE and average wt trends for key species between 1964 and 1994	Slade, 1994
1997	Adelaide coastal waters	Bus route creel survey, targeting KG whiting	KGW CPUE's comparison with previous metro surveys	SARDI unpublished data
2000-01	State-wide	Telephone / diary survey (NRFS)	Regional data on catch (harvest, released numbers), target and non-target for key marine and inland waters species.	This report

Table 58. Summary of surveys in SA to estimate catch and effort by recreational fishers for crustaceans and molluscs.

Year of Survey	Spatial extent	Survey method	Results	Reference
1998-99, 2001-02	State-wide	Telephone survey of rock lobster pot permit holders.	Catch, effort and CPUE's (regional)	McGlennon (1999), Venema et al, (2003)

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APPENDIX 1: HARVEST AND RELEASED NUMBERS OF KEY SPECIES CAUGHT BY RECREATIONAL FISHERS, BY EACH RECREATIONAL FISHING BLOCK

The location of each recreational fishing block is seen in Figure 1.

Species: *King George whiting (Sillaginodes punctata)*

Region	Fishing Block	Harvest numbers	Released numbers	Total Catch (nos)	% released	Region	Harvest numbers	Released numbers	% released
Far West Coast	1	0	0	0		FWC	107,857	57,595	34.8
	2	107,857	57,595	165,452	34.8	MWC	120,010	59,011	33.0
Mid west coast	3	110,610	56,921	167,531	34.0	CB	425,942	148,369	25.8
	4	9,400	2,090	11,490	18.2	SSG	548,353	71,622	11.6
Coffin Bay	5	423,106	142,825	565,930	25.2	NSG	407,218	302,239	42.6
	6	2,836	5,544	8,380	66.2	SGSV,FP	158,237	53,447	25.2
SW Sp. Gulf	7	200,540	26,714	227,254	11.8	NGSV	338,753	96,501	22.2
CW Sp. Gulf	8	103,635	25,365	129,000	19.7	KI	91,950	19,292	17.3
Up. Sp. Gulf	9	171,174	209,537	380,711	55.0	SE SA	39,751	12,370	23.7
NE Sp. Gulf	10	132,409	67,337	199,746	33.7	L & C	0	0	
CE Sp. Gulf	11	159,825	27,018	186,843	14.5	TOTAL SA	2,238,071	820,446	26.8
SE Sp. Gulf	12	187,988	17,890	205,878	8.7				
NW Inv. Strait	13	1,714	0	1,714	0				
N. Inv. Strait	14	38,541	2,420	40,961	5.9				
SW GSV	15	21,944	7,579	29,523	25.7				
CW GSV	16	106,594	32,345	138,939	23.3				
Up. GSV	17	23,170	2,380	25,550	9.3				
C,N Ad. Metro	18	208,989	61,776	270,764	22.8				
S Ad. Metro, FP	19	96,038	43,448	139,486	31.1				
KI NC	20	78,374	16,881	95,255	17.7				
KI SC	21	13,576	2,411	15,987	15.1				
SE SA	22	3,588	1,502	5,090	29.5				
	23	15,143	1,944	17,087	11.4				
	24	4,850	565	5,415	10.4				
	25	16,170	8,359	24,529	34.1				
SA Total:		2,238,071	820,446	3,058,515	26.8				

Species: Snapper (Pagrus auratus) (* total harvest differs by 3 from total provided in Table 5.1, due to rounding up, of regional figures)

Region	Fishing Block	Harvest numbers	Released numbers	Total Catch (nos)	% released	Region	Harvest numbers	Released numbers	% released
Far West Coast	1	0	0	0		FWC	2,093	1,966	48.4
	2	2,093	1,966	4,059	48.4	MWC	506	911	64.3
Mid west coast	3	207	649	856	75.8	CB	1,704	1,600	48.4
	4	299	262	561	46.7	SSG	22,203	48,054	68.4
Coffin Bay	5	1,704	1,517	3,221	47.1	NSG	74,900	213,221	74.0
	6	0	83	83	100	SGSV,FP	3,593	18,691	83.4
SW Sp. Gulf	7	4,127	5,311	9,438	56.2	NGSV	3,127	26,947	89.6
CW Sp. Gulf	8	2,618	9,319	11,937	78.1	KI	1,753	11,397	86.7
Up. Sp. Gulf	9	49,484	143,082	192,566	74.3	SE SA	5,922	2,998	33.6
NE Sp. Gulf	10	22,798	60,820	83,618	72.7	L & C	0	0	
CE Sp. Gulf	11	6,423	22,851	29,274	78.1	TOTAL SA	115,801 *	325,785	73.8
SE Sp. Gulf	12	11,653	19,892	31,545	63.1				
NW Inv. Strait	13	486	11,334	11,820	95.9				
N Inv. Strait	14	215	3,480	3,695	94.2				
SW GSV	15	531	0	531	0				
CW GSV	16	1,791	478	2,269	21.1				
Up. GSV	17	1,005	967	1,972	49.3				
C, N Ad. Metro	18	331	25,502	25,833	98.7				
S Ad. Metro, FP	19	2,361	3,877	6,238	62.2				
KI NC	20	1,753	11,397	13,150	86.7				
KI SC	21	0	0	0					
SE SA	22	979	188	1,167	16.1				
	23	2,150	1,395	3,545	39.4				
	24	1,193	426	1,619	26.3				
	25	1,600	989	2,589	38.2				
Coorong Lgn.	26	0	0	0	0				
SA Total:		115,801	325,785	441,586	73.8				

Species: Garfish – all species; “southern sea” and “river” (Genus Hyporhamphus; mainly H. melanochir)

Region	Fishing Block	Harvest numbers	Released numbers	Total Catch (nos)	% released	Region	Harvest numbers	Released numbers	% released
Far West Coast	1	0	0	0		FWC	13,326	394	2.9
	2	13,326	394	13,720	2.9	MWC	3,770	1,548	29.1
Mid west coast	3	3,147	1,548	4,695	33.0	CB	137,083	18,273	11.8
	4	623	0	623	0	SSG	328,640	34,864	9.6
Coffin Bay	5	136,107	18,273	154,380	11.8	NSG	132,350	19,671	12.9
	6	976	0	976	0	SGSV,FP	165,592	9,603	5.5
SW Sp. Gulf	7	83,033	9,089	92,122	9.9	NGSV	552,683	93,951	14.5
CW Sp. Gulf	8	6,712	446	7,158	6.2	KI	28,940	4,587	13.7
Up. Sp. Gulf	9	104,212	17,808	122,020	14.6	SE SA	148,698	16,147	9.8
NE Sp. Gulf	10	21,426	1,417	22,843	6.2	L & C	0	0	0
CE Sp. Gulf	11	189,530	19,102	208,632	9.1	Unr. block	170	0	0
SE Sp. Gulf	12	56,077	6,673	62,750	10.6	TOTAL SA	1,720,956	224,950	11.6
NW Inv. Strait	13	1,670	35	1,705	2.1				
N Inv. Strait	14	1,656	0	1,656	0				
SW GSV	15	47,769	1,245	49,014	2.5				
CW GSV	16	123,592	19,842	143,434	13.8				
Up. GSV	17	26,927	2,193	29,120	7.5				
C,N Ad. Metro	18	402,164	71,916	474,080	15.2				
S Ad. Metro, FP	19	114,497	8,323	116,756	7.1				
KI NC	20	26,415	4,124	30,539	13.5				
KI SC	21	2,525	463	2,988	15.5				
SE SA	22	123	124	247	50.2				
	23	66,231	3,403	69,634	4.9				
	24	17,437	870	18,307	4.8				
	25	64,907	11,750	76,657	15.3				
Unresolved block	31	170	0	170	0				
SA Total:		1,511,252	199,038	1,710,290	11.6				

Species: Southern Calamary (*Sepioteuthis australis*)

Region	Fishing Block	Harvest numbers	Released numbers	Total Catch (nos)	% released
Far West Coast	1	0	0	0	
	2	141,292	136	141,428	0.1
Mid west coast	3	34,791	4,919	39,710	12.4
	4	1,147	0	1,147	0
Coffin Bay	5	9,646	46	9,692	0.5
	6	6,901	0	6,901	0
SW Sp. Gulf	7	70,044	1,545	71,589	2.2
CW Sp. Gulf	8	22,329	950	23,279	4.1
Up. Sp. Gulf	9	55,822	1,057	56,879	1.9
NE Sp. Gulf	10	35,731	75	35,806	0.2
CE Sp. Gulf	11	147,074	1,623	148,897	1.1
SE Sp. Gulf	12	25,233	1,567	26,800	5.8
NW Inv. Strait	13	0	0	0	
N. Inv. Strait	14	20,929	143	21,072	0.7
SW GSV	15	40,524	291	40,818	0.7
CW GSV	16	147,802	97	147,899	0.1
Up. GSV	17	19,624	0	19,924	0
C,N Ad. Metro	18	153,663	1,803	155,466	1.2
S Ad. Metro, FP	19	70,405	1,857	72,262	2.6
KI NC	20	4,625	0	4,624	0
KI SC	21	556	0	556	0
SE SA	22	1,996	0	1,996	0
	23	2,583	0	2,583	0
	24	446	0	446	0
	25	714	0	714	0
Coorong Lgn.	26	0	0	0	
Un-resolved blocks	31	226	0	226	0
SA Total:		943,494	14,274	1,029,986	1.5

Region	Harvest numbers	Released numbers	% released
FWC	141,292	136	0.1
MWC	35,938	4,919	12.0
CB	16,547	46	0.3
SSG	242,351	4,735	1.9
NSG	113,881	2,082	1.8
SGSV,FP	131,858	2,291	1.7
NGSV	321,089	1,900	0.6
KI	5,180	0	0
SE SA	5,739	0	0
L & C	0	0	0
Unr. block	226	0	0
TOTAL SA	943,494	14,274	1.5

Species: Australian salmon (*Arripis truttacea* & *A. trutta*)

Region	Fishing Block	Harvest numbers	Released numbers	Total Catch (nos)	% released
Far West Coast	1	15,852	19,535	35,387	55.2
	2	12,823	14,787	27,610	53.6
	3	23,954	3,634	27,588	13.2
Mid west coast	4	28,341	15,214	43,555	34.9
	5	90,892	8,956	99,848	9.0
Coffin Bay	6	14,283	6,028	20,311	29.7
	7	42,319	6,695	49,014	13.7
SW Sp. Gulf	8	6,099	135	6,234	2.2
CW Sp. Gulf	9	34,529	6,493	41,022	15.8
Up. Sp. Gulf	10	8,919	5,065	13,984	36.2
NE Sp. Gulf	11	42,596	105	42,701	0.2
CE Sp. Gulf	12	4,931	3,628	8,559	42.4
SE Sp. Gulf	13	5,810	1,141	6,951	16.4
NW Inv. Strait	14	2,363	74	2,437	3.0
N. Inv. Strait	15	7,129	6,141	13,270	46.3
SW GSV	16	37,651	0	37,651	0
CW GSV	17	0	1,052	1,052	100
Up. GSV	18	33,143	23,982	57,125	42.0
C,N Ad. Metro	19	230,846	65,982	269,828	22.2
S Ad. Metro, FP	20	4,503	329	4,832	6.8
KI NC	21	3,684	569	4,253	13.4
KI SC	22	24,115	8,537	32,652	26.1
SE SA	23	11,084	5,359	16,443	32.6
	24	7,960	2,542	10,502	24.2
	25	19,643	9,801	29,444	33.3
Coorong Lgn.	26	2,162	1,526	3,688	41.4
Unresolved blocks	35	135	2,156	2,291	94.1
SA Total:		715,766	219,466	935,232	23.5

Region	Harvest numbers	Released numbers	% released
FWC	28,675	34,322	54.5
MWC	52,295	18,848	26.5
CB	105,175	14,984	12.5
SSG	89,846	10,428	10.4
NSG	49,547	11,693	19.0
SGSV,FP	246,148	73,338	23.0
NGSV	70,794	25,034	26.1
KI	8,187	898	9.9
SE SA	62,802	28,395	31.1
L & C	02,162	1,526	41.4
Unr. block	135	2,156	94.1
TOTAL SA	715,766	219,466	23.5

Species: Australian herring (*Arripis georgiana*)

Region	Fishing Block	Harvest numbers	Released numbers	Total Catch (nos)	% released
Far West Coast	1	567	0	567	0
	2	40,128	18,375	58,503	31.4
Mid west coast	3	131,347	12,498	143,845	8.7
	4	66,067	41,727	107,794	38.7
Coffin Bay	5	152,243	24,054	176,297	13.6
	6	11,875	412	12,287	3.4
SW Sp. Gulf	7	244,471	43,531	288,002	15.1
CW Sp. Gulf	8	278,303	22,744	301,047	7.6
Up. Sp. Gulf	9	55,902	11,353	67,255	16.9
NE Sp. Gulf	10	99,538	10,161	109,699	9.3
CE Sp. Gulf	11	238,018	81,372	319,390	25.5
SE Sp. Gulf	12	67,410	17,984	85,394	22.0
NW Inv. Strait	13	27,267	7,682	34,949	21.9
N. Inv. Strait	14	46,688	11,778	58,466	20.1
SW GSV	15	130,549	40,401	170,950	23.6
CW GSV	16	660,007	111,397	771,404	14.4
Up. GSV	17	32,518	4,234	36,752	11.5
C,N Ad. Metro	18	259,040	78,886	337,926	23.3
S Ad. Metro, FP	19	217,823	126,436	344,259	36.7
KI NC	20	62,811	28,061	90,872	30.9
KI SC	21	4,251	0	4,251	0
SE SA	22	2,939	1,502	4,441	33.8
	23	118,814	67,507	186,321	36.2
	24	5,675	5,031	10,706	47.0
	25	14,228	7,975	22,203	35.9
Coorong Lgn.	26	1,456	0	1,456	8.8
Unresolved blocks	30, 31, 34	3,506	682	4,188	16.3
SA Total:		2,973,441	775,783	3,749,224	20.7

Region	Harvest numbers	Released numbers	% released
FWC	40,695	18,375	31.1
MWC	197,414	54,225	21.5
CB	164,118	24,466	13.0
SSG	549,899	142,258	20.6
NSG	433,743	44,308	9.3
SGSV,FP	422,327	186,299	30.6
NGSV	951,565	194,517	17.0
KI	67,062	28,061	29.5
SE SA	141,656	82,015	36.7
L & C	1,456	0	8.8
Unr. block	3,506	682	16.3
TOTAL SA	2,973,441	775,783	20.7

Species: Snook (*Sphyaena novaehollandiae*)

Region	Fishing Block	Harvest numbers	Released Numbers	Total Catch (nos)	% released
Far West Coast	1	0	0	0	
	2	8,251	1,081	9,332	11.6
Mid west coast	3	4,691	94	4,785	2.0
	4	0	0	0	
Coffin Bay	5	4,027	175	4,202	4.2
	6	305	0	305	0
SW Sp. Gulf	7	19,619	1,192	20,811	5.7
CW Sp. Gulf	8	37,909	1,216	39,125	3.1
Up. Sp. Gulf	9	3,190	712	3,902	18.2
NE Sp. Gulf	10	10,540	1,124	11,664	9.6
CE Sp. Gulf	11	10,554	4,469	15,023	29.7
SE Sp. Gulf	12	18,550	0	18,550	0
NW Inv. Strait	13	0	0	0	
N. Inv. Strait	14	7,145	0	7,145	0
SW GSV	15	33,584	681	34,265	2.0
CW GSV	16	11,020	0	11,020	0
Up. GSV	17	149	0	149	0
C,N Ad. Metro	18	3,845	226	4,071	5.6
S Ad. Metro, FP	19	5,075	420	5,495	7.6
KI NC	20	1,196	2,294	3,490	65.7
KI SC	21	0	0	0	
SE SA	22	281	0	281	0
	23	4,646	169	4,815	3.5
	24	114	0	114	0
	25	1,257	154	1,411	10.9
	26	0	0	0	
Coorong Lgn.					
SA Total:		185,948	12,171	198,119	6.5

Region	Harvest numbers	Released numbers	% released
FWC	8,251	1,081	11.6
MWC	4,691	94	2.0
CB	4,332	175	3.9
SSG	48,723	5,661	10.4
NSG	51,639	1,216	2.3
SGSV,FP	45,804	1,101	2.3
NGSV	15,014	226	1.5
KI	1,196	2,294	65.7
SE SA	6,298	323	4.9
L & C	0	0	
TOTAL SA	185,948	12,171	6.5

Species: Other specified whiting (yellowfin (*Sillago schomburgkii*), school whiting (*S. bassensis*))

Region	Fishing Block	Harvest numbers	Released numbers	Total Catch (nos)	% released	Region	Harvest numbers	Released numbers	% released
Far West Coast	1	0	0	0		FWC	4,598	601	11.6
	2	4,598	601	5,199	34.8	MWC	802	289	26.5
Mid west coast	3	382	289	671	34.0	CB	163	4,522	96.5
	4	420	0	420	18.2	SSG	5,712	2,056	26.5
Coffin Bay	5	163	4,522	4,685	25.2	NSG	196,547	67,924	25.7
	6	0	0	0	66.2	SGSV,FP	8,810	2,766	23.9
SW Sp. Gulf	7	2,063	873	2,936	11.8	NGSV	102,147	27,011	20.9
CW Sp. Gulf	8	15,209	4,369	19,578	19.7	KI	33,200	8,108	19.6
Up. Sp. Gulf	9	177,724	60,527	238,251	55.0	SE SA	608	342	36.0
NE Sp. Gulf	10	3,614	3,028	6,642	33.7	L & C	0	0	
CE Sp. Gulf	11	1,980	340	2,320	14.5	TOTAL SA	352,587	113,619	24.4
SE Sp. Gulf	12	1,669	843	2,512	8.7				
NW Inv. Strait	13	0	0	0	0				
N. Inv. Strait	14	0	568	568	5.9				
SW GSV	15	101	729	830	25.7				
CW GSV	16	429	116	545	23.3				
Up. GSV	17	2,065	334	2,399	9.3				
C,N Ad. Metro	18	99,653	26,561	126,214	22.8				
S Ad. Metro, FP	19	8,709	1,469	10,178	31.1				
KI NC	20	2,548	4,004	6,552	17.7				
KI SC	21	30,652	4,104	34,756	15.1				
SE SA	22	0	0	0	29.5				
	23	94	0	94	11.4				
	24	0	0	0	10.4				
	25	514	342	856	34.1				
Coorong Lgn.	26	0	0	0					
SA Total:		352,587	113,619	466,206	24.4				

Species: Yellow eye mullet (*Aldrichetta forsteri*)

Region	Fishing Block	Harvest numbers	Released numbers	Total Catch (nos)	% released
Far West Coast	1	0	529	529	100
	2	4,019	759	4,779	15.9
Mid west coast	3	2,141	2,430	4,571	53.2
	4	11,994	5,847	17,841	32.8
Coffin Bay	5	1,098	697	1,795	38.8
	6	1,402	170	1,572	10.8
SW Sp. Gulf	7	406	39	445	8.8
CW Sp. Gulf	8	2,094	895	2,989	29.9
Up. Sp. Gulf	9	6,794	2,044	8,838	23.1
NE Sp. Gulf	10	21,470	3,672	25,142	14.6
CE Sp. Gulf	11	34,616	7,880	42,496	18.5
SE Sp. Gulf	12	6,308	2,179	8,487	25.7
NW Inv. Strait	13	1,614	0	1,614	0
N Inv. Strait	14	6,061	15,771	21,832	72.2
SW GSV	15	8,504	809	93,13	8.7
CW GSV	16	38,801	2,165	40,966	5.3
Up. GSV	17	11,211	7,359	18,570	39.6
C,N Ad. Metro	18	43,121	24,110	67,231	35.9
S Ad. Metro, FP	19	133,455	102,563	236,018	43.5
KI NC	20	1,240	295	1,535	19.2
KI SC	21	3,389	365	3,754	9.7
SE SA	22	1,375	4,214	5,589	75.4
	23	500	1,240	1,740	71.3
	24	4,544	2,267	6,811	33.3
	25	10,955	4,732	15,687	30.2
Coorong Lgn.	26	81,142	30,129	90,510	33.3
Unresolved block	35	304	235	539	43.6
SA Total:		438,558	223,395	661,953	33.7

Region	Harvest numbers	Released numbers	% released
FWC	4,019	1,288	24.3
MWC	14,135	8,277	36.9
CB	2,500	867	25.7
SSG	41,330	10,098	19.6
NSG	30,358	6,611	17.9
SGSV,FP	149,634	119,143	44.3
NGSV	93,133	33,634	26.5
KI	4,629	660	12.5
SE SA	17,374	12,453	41.8
L & C	81,142	30,129	33.3
Unr. block	304	235	43.6
TOTAL SA	438,254	223,160	33.7

Species: Unspecified mullet species (including yellow eye (*A. forsteri*), jumping (*Liza argentea*) and sea mullet (*Mugil cephalus*))

Region	Fishing Block	Harvest numbers	Released numbers	Total Catch (nos)	% released	Region	Harvest numbers	Released numbers	% released
Far West Coast	1	1,213	532	1,745	30.5	FWC	4,104	1,712	29.4
	2	2,891	1,180	4,071	29.0	MWC	1,990	3,235	61.9
Mid west coast	3	1,180	0	1,180	0	CB	15,681	879	5.3
	4	810	3,235	4,045	80.0	SSG	7,447	7,866	51.4
Coffin Bay	5	13,593	879	14,472	6.1	NSG	10,269	5,596	35.3
	6	2,088	0	2,088	0	SGSV, FP	200,543	50,706	20.2
SW Sp. Gulf	7	6,921	323	7,244	4.5	NGSV	16,054	9,267	36.6
CW Sp. Gulf	8	57	0	57	0	KI	3,035	6,823	69.2
Up. Sp. Gulf	9	7,800	5,068	12,868	39.4	SE SA	72,785	27,368	34.7
NE Sp. Gulf	10	2,412	528	2,940	18.0	L & C	315	1,577	86.1
CE Sp. Gulf	11	0	96	96	100	Unr. block	6,012	1,853	23.6
SE Sp. Gulf	12	526	0	526	0	TOTAL SA	336,808	116,890	25.8
NW Inv. Strait	13	508	243	751	32.4				
N Inv. Strait	14	132,811	8,209	141,020	5.8				
SW GSV	15	15,675	2,272	17,947	12.7				
CW GSV	16	10,797	0	10,797	0				
Up. GSV	17	449	729	1,178	61.9				
C,N Ad. Metro	18	4,808	8,538	13,346	64.0				
S Ad. Metro, FP	19	51,549	39,982	90,093	44.4				
KI NC	20	371	433	804	53.9				
KI SC	21	2,664	959	3,623	26.5				
SE SA	22	30,504	9,998	40,502	24.7				
	23	10,734	5,784	16,518	35.0				
	24	5,106	1,032	6,138	16.8				
	25	26,441	10,554	36,995	28.5				
L & C Estuary	26,27	315	1,577	1,832	86.1				
Unresolved blocks	31,33,35	6,012	1,853	7,865	23.6				
SA Total:		336,808	116,890	453,698	25.8				

Species: Mulloway (*Argyrosomus japonicus*)

Region	Fishing Block	Harvest numbers	Released numbers	Total Catch (nos)	% released
Far West Coast	1	898	2,033	2,931	69.4
	2	421	257	678	37.9
Mid west coast	3	0	0	0	
	4	0	0	0	
Coffin Bay	5	0	0	0	
	6	0	0	0	
SW Sp. Gulf	7	51	0	51	0
CW Sp. Gulf	8	0	0	0	
Up. Sp. Gulf	9	521	347	868	40.0
NE Sp. Gulf	10	1,417	2,996	4,413	67.9
CE Sp. Gulf	11	113	56	169	33.1
SE Sp. Gulf	12	0	0	0	
NW Inv. Strait	13	0	0	0	
N Inv. Strait	14	339	113	452	25.0
SW GSV	15	0	0	0	
CW GSV	16	994	2,981	3,975	75.0
Up. GSV	17	0	0	0	
C,N Ad. Metro	18	273	623	896	69.5
S Ad. Metro, FP	19	2,925	6,264	9,189	68.2
KI NC	20	0	110	110	100
KI SC	21	0	0	0	
SE SA	22	10,088	29,190	39,278	74.3
	23	2,222	6,817	9,039	75.4
	24	840	1,272	2,112	60.2
	25	3,415	7,470	10,885	68.6
Coorong Lgn.	26,27	1,231	3,902	5,133	76.0
Unresolved	31,35	1,257	1,435	2,692	53.3
SA Total:		27,005	65,865	92,870	70.9

Region	Harvest numbers	Released numbers	% released
FWC	1,319	2,290	63.5
MWC	0	0	
CB	0	0	
SSG	164	56	25.5
NSG	1,938	3,343	70.2
SGSV,FP	3,264	6,377	66.1
NGSV	1,267	3,604	74.0
KI	0	110	100
SE SA	16,565	44,748	73.0
L & C	1,231	3,902	76.0
Unr. block	1,257	1,435	53.3
TOTAL SA	27,005	65,865	70.9

Species: Whaler Sharks (*bronze and dusky*) (*Carcharhinus brachyurus* & *C. obscurus*)

Region	Fishing Block	Harvest numbers	Released numbers	Total Catch (nos)	% released	Region	Harvest numbers	Released numbers	% released
Far West Coast	1	53	0	53	0	FWC	163	0	0
	2	110	0	110	0	MWC	0	0	
Mid west coast	3	0	0	0		CB	0	55	100
	4	0	0	0		SSG	0	0	
Coffin Bay	5	0	55	55	100	NSG	180	0	0
	6	0	0	0		SGSV,FP	0	0	
SW Sp. Gulf	7	0	0	0		NGSV	1134	0	0
CW Sp. Gulf	8	0	0	0		KI	113	0	0
Up. Sp. Gulf	9	73	0	73	0	SE SA	1,299	503	27.9
NE Sp. Gulf	10	107	0	107	0	L & C	0	0	
CE Sp. Gulf	11	0	0	0		TOTAL SA	2,889	558	16.2
SE Sp. Gulf	12	0	0	0					
NW Inv. Strait	13	0	0	0					
N Inv. Strait	14	0	0	0					
SW GSV	15	0	0	0					
CW GSV	16	17	0	17	0				
Up. GSV	17	0	0	0					
C,N Ad. Metro	18	1117	0	1117	0				
S Ad. Metro, FP	19	0	0	0					
KI NC	20	113	0	0	0				
KI SC	21	0	0	0					
SE SA	22	443	273	716	38.1				
	23	856	136	992	13.7				
	24	0	0	0					
	25	0	94	94	100				
Coorong Lgn.	22, 26, 27	0	0	0					
Unresolved	31, 35	0	0	0					
SA Total:		2,889	558	3,447	16.2				

Species: Golden Perch, Gallop (*Macquarie ambigua*)

Region	Fishing Block	Harvest (numbers)	Released numbers	Total	% Released
Lakes Alex. & Albert	27	0	0	0	
Lower Murray R.	28	31,732	65,042	96,774	67.2
Upper Murray R.	29	48,324	66,201	114,525	57.8
Nthn SA & Eyre	30	1,860	1,241	3,101	40.0
Mid Nth & YP	31	0	0	0	
Nthn Adelaide	32	1,197	0	1,197	0
Fleurieu Catchment	33	2,020	2,257	7,378	30.6
Murray Catchment Area	34	1,519	366	1,885	19.4
SE Catchment	35	0	0	0	
Total		86,652	135,107	221,759	60.9

Species: Murray Cod (*Maccullochella peelii peelii*)

Region	Fishing Block	Harvest (numbers)	Released numbers	Total	% Released
Lakes Alex. & Albert	27	0	0	0	
Lower Murray R.	28	73	0	73	0
Upper Murray R.	29	1,931	229	2,160	10.6
Nthn SA & Eyre	30	0	640	640	100
Mid Nth & YP	31	0	0	0	
Nthn Adelaide	32	0	0	0	
Fleurieu Catchment	33	0	0	0	
Murray Catchment Area	34	273	219	492	44.5
SE Catchment	35	0	0	0	
Total		2,277	1,088	3,365	32.3

Species: Yabbies (*Cherax destructor*)

Region	Fishing Block	Harvest (numbers)	Released numbers	Total	% Released
Lakes Alex. & Albert	27	1,639	410	2,049	20.0
Lower Murray R.	28	108,308	4,477	112,785	4.0
Upper Murray R.	29	208,819	43,841	252,660	17.4
Nthn SA & Eyre	30	32,856	10,329	43,185	23.9
Mid Nth & YP	31	41,087	6,691	47,778	14.0
Nthn Adelaide	32	125,478	13,643	139,121	9.8
Fleurieu Catchment	33	39,042	1,114	40,156	2.8
Murray Catchment Area	34	21,600	0	21,600	0
SE Catchment	35	14,280	3,077	17,357	17.7
Total		593,109	83,582	676,691	12.4

Species: Sand Crab (*Ovalipes australiensis*)

Region	Fishing Block	Harvest numbers	Released numbers	Total Catch (nos)	% released
Far West Coast	1	0	0	0	
	2	479	61	540	11.3
Mid west coast	3	22,382	26,612	48,994	54.3
	4	1,207	0	1,207	0
Coffin Bay	5	10,663	10,433	21,096	49.5
	6	298	0	298	0
	7	4,546	2,239	6,785	33.0
SW Sp. Gulf	8	0	0	0	
CW Sp. Gulf	9	699	1,920	2,619	73.3
Up. Sp. Gulf	10	96	646	742	87.1
NE Sp. Gulf	11	0	6,322	6,322	100.0
CE Sp. Gulf	12	0	605	605	100.0
SE Sp. Gulf	13	0	0	0	
NW Inv. Strait	14	113	0	113	0
N. Inv. Strait	15	0	0	0	
SW GSV	16	39,568	10,989	50,557	21.7
CW GSV	17	144	0	144	0
Up. GSV	18	4,377	19,834	24,211	81.9
C,N Ad. Metro	19	3,647	9,702	13,349	72.7
S Ad. Metro, FP	20	5,785	2,346	8,131	28.9
KI NC	21	0	0	0	
KI SC	22	0	0	0	
SE SA	23	0	0	0	
	24	504	0	504	0
	25	2,299	0	2,299	0
	26	0	0	0	
Coorong Lgn.					
SA Total:		96,807	91,709	188,516	48.6

Region	Harvest numbers	Released numbers	% released
FWC	479	61	11.3
MWC	23,589	26,612	53.0
CB	10,961	10,433	48.8
SSG	4,546	9,166	66.8
NSG	795	2,566	76.3
SGSV,FP	3,760	9,702	72.1
NGSV	44,089	30,823	41.1
KI	5,785	2,346	28.9
SE SA	2,803	0	0
L & C	0	0	
TOTAL SA	96,807	91,09	48.6

Species: Blue swimmer crabs (*Portunus pelagicus*)

Region	Fishing Block	Harvest numbers	Released numbers	Total Catch (nos)	% released
Far West Coast	1	0	0	0	
	2	20,018	6,432	26,450	24.3
	3	3,864	4,033	7,897	51.1
Mid west coast	4	0	0	0	
	5	0	0	0	
Coffin Bay	6	0	0	0	
	7	501	1,589	2,090	76.0
SW Sp. Gulf	8	31,610	8,633	40,243	21.5
CW Sp. Gulf	9	441,151	161,950	603,101	26.9
Up. Sp. Gulf	10	149,561	74,580	224,141	33.3
NE Sp. Gulf	11	51,916	10,973	62,889	17.4
CE Sp. Gulf	12	3,397	113	3,510	3.2
SE Sp. Gulf	13	0	0	0	
NW Inv. Strait	14	27	0	27	0
N. Inv. Strait	15	105	655	760	86.2
SW GSV	16	45,590	37,520	83,110	45.1
CW GSV	17	61,386	101,569	162,955	62.3
Up. GSV	18	311,034	115,991	427,025	27.2
C,N Ad. Metro	19	5,995	868	6,863	12.6
S Ad. Metro, FP	20	0	0	0	
KI NC	21	0	0	0	
KI SC	22	0	0	0	
SE SA	23	0	0	0	
	24	0	0	0	
	25	0	0	0	
	26	0	0	0	
Coorong Lgn.					
SA Total:		1,126,155	524,906	1,651,061	31.8

Region	Harvest numbers	Released numbers	% released
FWC	20,018	6,432	24.3
MWC	3,864	4,033	51.1
CB	0	0	
SSG	55,814	12,675	18.5
NSG	622,322	245,163	28.3
SGSV,FP	6,127	1,523	19.9
NGSV	418,010	255,080	37.9
KI	0	0	
SE SA	0	0	
L & C	0	0	
TOTAL SA	1,126,155	524,906	31.8

Species: Rock Lobster (*Jasus edwardsii*)

Region	Fishing Block	Harvest numbers	Released numbers	Total Catch (nos)	% released
Far West Coast	1	112	0	112	0
	2	150	0	150	0
Mid west coast	3	642	0	642	0
	4	951	90	1041	8.6
Coffin Bay	5	1,973	302	2,275	13.3
	6	62	0	62	0
SW Sp. Gulf	7	209	9	218	4.1
CW Sp. Gulf	8	0	0	0	
Up. Sp. Gulf	9	0	0	0	
NE Sp. Gulf	10	0	0	0	
CE Sp. Gulf	11	0	0	0	
SE Sp. Gulf	12	11,857	3,935	15,792	24.9
NW Inv. Strait	13	0	61	61	100.0
N. Inv. Strait	14	417	179	596	30.0
SW GSV	15	211	105	316	33.2
CW GSV	16	0	0	0	
Up. GSV	17	0	0	0	
C,N Ad. Metro	18	0	0	0	
S Ad. Metro, FP	19	1,049	1,599	2,648	60.4
KI NC	20	1,672	92	1,764	5.2
KI SC	21	0	0	0	
SE SA	22	2,962	304	3,266	9.3
	23	13,778	4,354	18,132	24.0
	24	29,888	7,230	37,118	19.5
	25	47,747	16,610	64,357	25.8
Coorong Lgn.	26	0	0	0	
SA Total:		113,680	34,870	148,550	23.5

Region	Harvest numbers	Released numbers	% released
FWC	262	0	0
MWC	1,593	90	5.3
CB	2,035	302	12.9
SSG	12,066	3,944	24.6
NSG	0	0	
SGSV,FP	1,677	1,944	53.7
NGSV	0	0	
KI	1,672	92	5.2
SE SA	94,375	28,498	23.2
L & C	0	0	
TOTAL SA	113,680	34,870	23.5

Species: Abalone (*Haliotis* spp, greenlip and blacklip combined)

Region	Fishing Block	Harvest numbers	Released numbers	Total Catch (nos)	% released
Far West Coast	1	0	0	0	
	2	0	0	0	
Mid west coast	3	2,197	3,988	6,185	64.5
	4	1,661	0	1,661	0
Coffin Bay	5	562	0	562	0
	6	140	0	140	0
	7	152	0	152	0
SW Sp. Gulf	8	0	0	0	
CW Sp. Gulf	9	0	0	0	
Up. Sp. Gulf	10	0	0	0	
NE Sp. Gulf	11	701	0	701	0
CE Sp. Gulf	12	0	0	0	
SE Sp. Gulf	13	0	0	0	
NW Inv. Strait	14	0	0	0	
N. Inv. Strait	15	0	0	0	
SW GSV	16	0	0	0	
CW GSV	17	0	0	0	
Up. GSV	18	0	0	0	
C,N Ad. Metro	19	0	0	0	
S Ad. Metro, FP	20	0	0	0	
KI NC	21	0	0	0	
KI SC	22	0	0	0	
SE SA	23	2,281	0	2,281	0
	24	3,441	0	3,441	0
	25	6,645	0	6,645	0
Coorong Lgn.	26	0	0	0	
SA Total:		17,780	3,988	21,768	18.3

Region	Harvest numbers	Released numbers	% released
FWC	0	0	
MWC	3,858	3,988	50.8
CB	702	0	0
SSG	853	0	0
NSG	0	0	
SGSV,FP	0	0	
NGSV	0	0	
KI	0	0	
SE SA	12,367	0	0
L & C	0	0	
TOTAL SA	17,780	3,988	18.3

Species: Cockles – Mud, sand cockles (*Katelysia spp.*) & surf, Goolwa (*Donax deltooides*) (Goolwa cockles in parenthesis)

Region	Fishing Block	Harvest numbers	Released numbers	Total Catch (nos)	% released	Region	Harvest numbers	Released numbers	% released
Far West Coast	1	0	0	0		FWC	0	0	
	2	0	0	0		MWC	10,055	0	0
Mid west coast	3	10,055	0	10,055	0	CB	20,380	0	0
	4	0	0	0		SSG	51,013	0	0
Coffin Bay	5	20,380	0	20,380	0	NSG	0	0	
	6	0	0	0		SGSV,FP	0 (1,474,859)	0 (352,908)	19.3 (0)
SW Sp. Gulf	7	51,013	0	0	0	NGSV	216,767	0	0
CW Sp. Gulf	8	0	0	0		KI	0	0	
Up. Sp. Gulf	9	0	0	0		SE SA	2,430	0	0
NE Sp. Gulf	10	0	0	0		L & C	0	0	
CE Sp. Gulf	11	0	0	0		Total SA (GC)	1,474,859	820,446	19.3
SE Sp. Gulf	12	0	0	0		Total SA (MC)	300,645	0	0
NW Inv. Strait	13	0	0	0					
N. Inv. Strait	14	0	0	0					
SW GSV	15	0	0	0					
CW GSV	16	211,795	0	0	0				
Up. GSV	17	0	0	0					
C,N Ad. Metro	18	4,972	0	0	0				
S Ad. Metro, FP	19	(1,474,859)	352,908	(1,827,766)	(19.3)				
KI NC	20	0	0	0					
KI SC	21	0	0	0					
SE SA	22	0	0	0					
	23	2,430	0	0					
	24	0	0	0					
	25	0	0	0					
	26	0	0	0					
Coorong Lgn.									
SA Total :Goolwa cockle		1,474,859	352,908	1,827,767					
SA Total: mud cockle		300,645	0	0					

APPENDIX 2: TARGET AND NON-TARGET FISHING EFFORT (HRS FISHED) IN KEY SPECIES, FOR EACH RECREATIONAL FISHING BLOCK

Table 59. Target and non-target fishing effort (hrs fished) on harvested King George whiting, snapper, garfish and southern calamary by fishing block. (Highest fishing effort for a species is highlighted in bold).

Rec. fishing Block	King George whiting		Snapper		Garfish		Southern Calamary	
	Target effort	Non-target effort	Target effort	Non-target effort	Target effort	Non-target effort	Target effort	Non-target effort
1	0	0	0	0	0	0	0	0
2	34,265	23,518	1,932	1,143	1,095	2,101	18,004	75,971
3	121,065	3,939	0	781	1,016	5,225	9,793	46,198
4	7,871	3,432	778	601	2,204	417	1,557	2,133
5	145,901	48,583	2,174	490	12,093	56,156	1,439	17,032
6	8,530	932	0	0	0	4,506	3,108	1,609
7	86,161	24,490	7,187	3,552	26,031	28,937	43,888	79,861
8	43,783	2,367	5,929	2,144	2,604	4,901	2,064	17,197
9	121,723	25,321	102,628	16,109	15,978	32,234	12,361	57,474
10	87,779	32,211	31,396	3,150	10,777	14,495	6,557	40,005
11	144,766	23,966	11,549	4,486	41,814	41,022	52,810	161,910
12	86,504	19,047	36,738	4,011	6,774	16,312	10,350	55,572
13	0	9,852	0	3,891	833	1,112	0	0
14	28,605	17,834	2,545	465	629	937	23,724	27,756
15	8,205	16,755	302	1,216	2,811	20,161	42,614	49,356
16	73,515	17,925	3,110	5,530	7,121	56,828	16,657	213,908
17	11,485	3,565	2,248	0	3,455	14,692	22,097	24,412
18	178,576	39,122	0	4,963	48,784	124,540	25,665	99,460
19	59,100	15,423	24,532	281	21,911	39,606	69,443	114,046
20	40,999	4,294	2,427	1,603	5,006	6,601	1,358	4,938
21	4,252	6,142	0	0	0	1,347	0	2,918
22	6,317	1,032	281	2,903	0	1,114	0	915
23	14,014	17,423	6,333	2,867	9,824	15,495	1,542	6,559
24	8,516	6,077	1,059	1,248	9,081	2,311	0	3,168
25	17,727	3,662	6,504	47,997	8,416	14,017	0	4,065
26	0	0	0	0	1,526	0	0	0
Unres. blocks							4,528	0
Total	1,339,659	366,912	249,652	109,431	239,783	503,953	369,859	869,323

Table 60. Target and non-target fishing effort (hrs fished) on harvested Australian salmon, herring (ie tommy ruffs), snook & other specified whiting species by fishing block. (Highest fishing effort occurring for a species is highlighted in bold)

Rec. Fishing Block	Aust. salmon		Aust. herring		Snook		Other specified whiting	
	Target effort	Non-target effort	Target effort	Non-target effort	Target effort	Non-target effort	Target effort	Non-target effort
1	12,503	10,474	0	5,261	0	0	0	0
2	8,254	7,702	2,446	33,984	2,740	8,994	0	1,532
3	5,011	29,261	6,050	70,220	0	9,236	0	771
4	33,645	1,141	6,626	16,292	0	0	0	755
5	8,731	53,878	4,705	119,160	370	7,543	0	556
6	2,040	5,694	513	5,066	840	327	0	0
7	17,814	28,505	24,702	131,168	2,634	26,308	635	1,614
8	1,663	11,184	26,127	17,998	151	25,101	2,893	1,886
9	5,747	18,210	7176	40,295	1,978	7,628	32,198	3,506
10	10,828	9,161	10,290	46,105	2,998	4,971	0	2,984
11	0	11,608	17805	113,839	184	11,349	3,405	2,084
12	955	646	3,222	60,951	1,184	13,591	0	6,375
13	13,128	9,906	26,353	17,576	0	0	0	0
14	11,694	1,742	1,436	49,638	797	7,474	0	0
15	3,250	4,779	28,880	34,500	5,325	224	288	0
16	24,011	99,487	94,318	168,657	48	18,231	1,254	269
17	0	0	8,122	41,228	0	869	1,052	2,186
18	15,205	22,036	28,636	153,424	2,695	18,166	36,428	37,103
19	77,117	70,472	25,552	106,372	541	1,047	0	12,539
20	4,842	2,502	4,061	27,676	93	1,882	0	1,638
21	10,006	937	370	2,599	0	0	0	7,522
22	5,622	22,309	0	9,638	47	0	0	0
23	5,788	12,352	15,941	63,131	2,775	13,018	1,162	848
24	9,813	8,837	35	5,527	0	170	0	0
25	10,287	61,711	4,902	12,145	0	1,220	51	1,201
26	0	2,049	0	0	0	0	0	0
Total:	297,954	496,583	348,268	1,352,450	25,400	167,353	79,366	85,218

Table 61. Target and non-target fishing effort (hrs fished) on harvested yellow-eye mullet, unspecified mullet species and mulloway by fishing block. (Highest fishing effort occurring for a species is highlighted in bold).

Rec. Fishing Block	Yellow-eye Mullet		Unspecified mullet		Mulloway		Whaler Sharks	
	Target effort	Non-target effort	Target effort	Non-target effort	Target effort	Non-target effort	Target effort	Non-target effort
1	0	0	0	2,507	5,057	2,224	0	399
2	0	3,706	0	2,791	1,443	1,545	0	1,322
3	0	2,356	0	3,921	0	0	0	0
4	0	11,845	0	866	0	0	0	0
5	262	2,366	392	5,902	0	0	0	0
6	0	252	0	2,283	0	0	0	0
7	2,081	2,352	298	6,009	25	76	0	0
8	0	3,006	142	57	0	0	0	0
9	0	4,941	1,356	3,591	0	1,431	0	271
10	107	23,985	1,289	2,059	1,417	0	0	143
11	0	24,363	0	0	0	1,350	0	0
12	803	0	0	72	1,243	0	0	0
13	0	2,428	0	1,354	0	0	0	0
14	60	5,057	636	37,661	2,264	0	0	0
15	2,295	5,186	5,344	16,323	0	0	0	0
16	4,028	21,844	7,316	2,104	4,969	0	1,986	310
17	2,368	242	212	100	0	0	0	0
18	6,175	29,779	6,695	1,694	2,465	0	0	7,740
19	11,745	84,012	19,382	9,001	8,667	2,037	0	0
20	945	0	0	186	0	0	0	489
21	0	4,894	1,162	746	0	0	0	0
22	14,135	14,994	13,788	2,361	19,392	18,418	0	2,447
23	790	1,377	5,943	7,386	18,836	6,243	427	4,039
24	2,161	2,548	1,221	5,228	14,252	334	0	0
25	2,449	7,702	5,131	5,802	23,922	2,669	0	0
26	5,815	0	0	0	7,545	0	0	0
27	0	0	0	683	683	0	0	0
Un-resolved blocks (31–35)	814	118	1,343	7,065	8,060	853	0	0
Total:	57,033	259,353	71,650	127,752	120,240	37,180	2,413	16,894

Table 62. Target and non-target effort on harvested Inland waters species by fishing block. (Highest fishing effort occurring for a species is highlighted in bold).

Fishing Block	Golden Perch (Callop)		Murray Cod		Yabbies	
	Target effort	Non-target effort	Target effort	Non-target effort	Target effort	Non-target effort
27	3,145				1,607	
28	346,069	19,922	13,501	441	90,887	7,623
29	262,043	38,823	20,514	5,982	227,287	20,418
30	11,442	2,607			10,179	1,266
31					2,277	279
32	204	990			11,765	
33	21,787		3,767		23,172	310
34	25,292	493	1,025		34,192	
35					6,518	
Unresolved Blocks	11,407					
Total	681,389	62,835	38,827	6,423	407,884	29,896

Table 63. Target and non-target effort (hrs fished) on retained species of marine crustaceans by fishing block. (Highest fishing effort occurring for a species is highlighted in bold).

Rec Fishing Block	Blue swimmer crabs		Sand crabs		Rock Lobsters	
	Target effort	Non-target effort	Target effort	Non-target effort	Target effort	Non-target effort
1	0	0	0	0	1,598	0
2	6,224	154	560	425	75	0
3	2,056	2,498	2,567	850	16,021	0
4	0	2,614	1,245	0	35,859	0
5	0	0	5,581	182	10,299	0
6	0	0	4,179	2,614	46	0
7	331	818	0	1,426	415	310
8	9,189	4,181	0	0	0	0
9	111,312	4,305	0	0	0	0
10	47,594	14,348	0	72	0	0
11	25,590	474	0	0	0	0
12	3,640	0	0	0	272,310	0
13	0	0	0	0	1,466	0
14	0	0	589	1,016	792	0
15	1,309	264	0	0	1,185	0
16	39,561	0	525	3,053	0	0
17	31,103	0	0	0	0	0
18	114,484	15,559	11,904	3,156	2,480	0
19	2,423	3,299	0	347	17,629	0
20	0	0	2,535	0	7,635	0
21	0	0	0	0	0	0
22	0	0	0	0	77,511	0
23	0	0	536	0	134,504	0
24	0	0	0	1,121	505,609	480
25	0	0	2,440	0	287,408	679
Total	394,805	48,514	32,661	13,915	1,372,932	1,469

Table 64. Target and non-target fishing effort on key marine molluscs by fishing block. (Highest fishing effort occurring for a species is highlighted in bold).

Rec. Fishing Block	Abalone (greenlip, blacklip & unspecified)		Goolwa cockles		Mud cockles	
	Target effort	Non-target effort	Target effort	Non-target effort	Target effort	Non-target effort
1	0	0	0	0	0	0
2	0	0	0	0	0	0
3	770	67	0	0	0	50
4	526	860	0	0	0	0
5	76	138	0	0	0	175
6	62	0	0	0	0	0
7	0	178	0	0	0	850
8	0	0	0	0	0	0
9	0	0	0	0	0	0
10	0	0	0	0	0	0
11	351	0	0	0	0	0
12	0	0	0	0	0	0
13	0	0	0	0	0	0
14	0	0	0	0	0	0
15	0	0	0	0	0	0
16	0	0	0	0	0	3,264
17	0	0	0	0	0	0
18	0	0	0	0	0	355
19	0	0	0	6924	0	0
20	0	0	0	0	0	0
21	0	0	0	0	0	0
22	0	0	0	0	0	0
23	691	706	0	0	0	61
24	115	2,412	0	0	0	0
25	4,552	1,662	0	0	0	0
Total	7,143	6,023	0	6,924	0	4,755

APPENDIX 3: LIST OF ITEMS COVERED FOR EACH EXPENDITURE CATEGORY (REFER TO CHAPTER 9)

State of Residence	Item list name	Item Category	Final \$ Estimate
04.SA	Accom.(fees)	Accommodation	2,925,586.970
04.SA	Airfares	Travel	687,568.649
04.SA	Bait/berley	Bait, Burley, Ice	3,768,279.589
04.SA	Boat ramp\$	Boat and Trailer	288,813.738
04.SA	Boat-capital	Boat and Trailer	49,483,438.115
04.SA	Boat-charter	Boat Hire, Charter	1,289,937.016
04.SA	Boat-fuel/oil	Boat and Trailer	4,451,248.639
04.SA	Boat-hire	Boat Hire, Charter	349,283.680
04.SA	Boat-maint	Boat and Trailer	4,473,225.627
04.SA	Boat-moor	Boat and Trailer	643,481.277
04.SA	Boat/ trailer - insurance	Boat and Trailer	4,764,620.837
04.SA	Boat/ trailer - registration fees	Boat and Trailer	4,135,223.038
04.SA	Books/mags	Others	510,215.171
04.SA	Camp - maintenance	Accommodation	394,539.861
04.SA	Camp - registration/ insurance	Accommodation	812,346.040
04.SA	Camp-capital	Accommodation	12,410,349.124
04.SA	Car-capital	Travel	569,150.067
04.SA	Car-hire/ch	Travel	28,052.719
04.SA	Car-KMS	Travel	39,102,549.425
04.SA	Clothing/ apparel - capital	Clothing	1,782,065.141
04.SA	Dive - air fills	Dive Gear	38,861.226
04.SA	Dive equipment - capital	Dive Gear	160,005.972
04.SA	Dive equipment - hire	Dive Gear	61,549.760
04.SA	Dive equipment - maintenance	Dive Gear	266,344.322
04.SA	Fees-club	Fees, Licences	500,661.050
04.SA	Fees-comp.	Fees, Licences	91,224.340
04.SA	Fees-licence	Fees, Licences	305,337.802
04.SA	Fuel - other (not boat or car)	Others	731.457
04.SA	Ice	Bait, Burley, Ice	101,494.691
04.SA	Information - other	Others	101,418.218
04.SA	Oth.access\$	Fees, Licences	61,654.023
04.SA	Oth.PT/travel	Travel	332,525.758
04.SA	Other	Others	1,300.216
04.SA	Other equipment (NEC) - capital	Others	222,394.348
04.SA	Other govt. Licence fees (boat drivers, radio)	Fees, Licences	54,486.960
04.SA	Safety gear (NEC) - life jackets	Clothing	1,422,142.237
04.SA	Tackle - hire	Boat Hire, Charter	2,614.575
04.SA	Tackle-C/M	Fishing Gear	8,202,283.256
04.SA	Tackle-Maint	Fishing Gear	235,169.587
04.SA	Tackle-Term	Fishing Gear	2,138,409.035
04.SA	Trlr-capital	Boat and Trailer	604,914.787
04.SA	Trlr-maint	Boat and Trailer	708,886.470
Total			\$ 148,484,384.813 (+/- 14,062)