

# ABARE

Australian fisheries  
surveys report 1997

# Australian fisheries surveys report 1997

Physical and financial  
performance in selected  
Australian fisheries  
1994-95 to 1996-97

Debbie Brown

December 1997



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ABARE is a professionally independent government economic research agency.

### *Previous ABARE fisheries surveys*

#### ***Northern prawn fishery***

<i>Years covered</i>	<i>Reference</i>
1980-81 to 1981-82	BAE (1984a)
1986-87 to 1987-88	Collins and Kloessing (1988)
1989-90 to 1990-91	ABARE (1993a)
1990-91 to 1991-92	ABARE (1993b)
1992-93 to 1993-94	ABARE (1996a)

#### ***East coast prawn fishery***

<i>Years covered</i>	<i>Reference</i>
1980-81 to 1982-83	BAE (1985a)

#### ***East coast tuna fishery (now the eastern tuna and billfish fishery)***

<i>Years covered</i>	<i>Reference</i>
1989-90 to 1990-91	ABARE (1993a)
1991-92 to 1992-93	ABARE (1994)
1993-94 to 1994-95	ABARE (1996b)

#### ***Southern rock lobster fishery***

<i>Years covered</i>	<i>Reference</i>
1981-82 to 1982-83	BAE (1985b)

#### ***Bass strait scallop***

<i>Years covered</i>	<i>Reference</i>
1993-94 to 1994-95	BAE (1985b)

#### ***South east fishery***

<i>Years covered</i>	<i>Reference</i>
1978-79 to 1980-81	BAE (1984b)
1985-86 to 1987-88	Geen, Brown and Pascoe (1989)
1989-90 to 1990-91	ABARE (1993a)
1990-91 to 1991-92	ABARE (1993b)
1991-92 to 1992-93	ABARE (1994)
1992-93 to 1993-94	ABARE (1996a)

#### ***Southern bluefin tuna fishery***

<i>Years covered</i>	<i>Reference</i>
1980-81 to 1981-82	BAE (1986)

#### ***Southern shark fishery***

<i>Years covered</i>	<i>Reference</i>
1988-89	Battaglione and Campbell (1991)
1990-91 to 1991-92	ABARE (1993b)
1992-93 to 1993-94	ABARE (1996a)
1993-94 to 1994-95	ABARE (1996b)

#### ***Torres Strait prawn fishery***

<i>Years covered</i>	<i>Reference</i>
1989-90	Battaglione, Reid and Collins (1992)
1992-93 to 1993-94	ABARE (1996a)

ABARE project 1349

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### *Foreword*

ABARE has been undertaking economic surveys of selected Commonwealth fisheries since the early 1980s. Detailed information on fleet characteristics and economic performance is collected each year and published in an ongoing series of reports.

The survey information is used by fisheries policy makers, managers, researchers and the fishing industry. For example, it is used by the Department of Primary Industries and Energy in assessing the Australian Fisheries Management Authority's performance in managing Commonwealth fisheries. The information is made publicly available so that the industry can also independently assess the performance of fisheries and the impacts of management policies.

The current survey format has been in place since 1992. Gradually, a consistent time series is being developed for each fishery, to enable changes to be tracked over time. Time series data on costs and returns are crucial for economic assessments of fisheries, in the same way that catch and effort data are crucial for scientific assessments. As far as possible, the economic information in this report is presented in a consistent format, to allow comparisons between fisheries and over time.

This fisheries surveys report contains detailed estimates of the financial performance of operators in the fisheries surveyed by ABARE in 1997. Information is included on the trawl component of the south east fishery and the northern and Torres Strait prawn fisheries.

**BRIAN S. FISHER**  
*Executive Director*

December 1997

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### *Acknowledgments*

#### *ABARE staff*

ABARE's fisheries surveys program involves a cooperative effort among industry, fisheries management and research agencies and ABARE staff.

Deborah Brown of the Fisheries Economics Section undertook the analyses and compiled the report with the assistance of Laurie Cannon of the Information Services Section.

Sample selection and sample weighting were performed by Walter Shafron of the Rural Economic Analysis Section. Data were collected, entered and edited by Peter Beath, Carolyn Doyle, Ron Godenzi, Lou Sissian, Robin Stafford, Richard Paton, Sally Bourke and Ian Milthorpe of the Information Services Section. Survey administration and questionnaire design were carried out by Laurie Cannon, Tony Wain and Paul Phillips.

Programming and computer systems support was provided by Shona Lambert, Ken Colbert and Tri Lam of the Information Services Section.

#### *Industry*

ABARE relies heavily on the voluntary cooperation of fishing operators and their accountants in providing data for the fisheries surveys. Without this assistance the surveys would not be possible. The advice provided by industry representatives and the relevant Management Advisory Committees is also greatly appreciated.

#### *Management and research agencies*

The Australian Fisheries Management Authority (AFMA) provides logbook information necessary to select a sample and provide relevant population statistics. In particular, Thim Skousen provided valuable assistance. AFMA was supportive of the data collection and offered valuable advice.

#### *Funding*

The 1997 surveys of the south east, the northern prawn and Torres Strait prawn fisheries were funded by ABARE and the Fisheries Resources Research Fund.

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### *Summary*

ABARE conducted economic surveys of three major Commonwealth fisheries in 1997 — the trawl component of the south east fishery, and the northern and Torres Strait prawn fisheries. Presented in this report is information on per boat cash receipts, costs, profits, debt and equity for each fishery in 1994-95 and 1995-96.

The information is also disaggregated into major sectors within each fishery. For the south east fishery, results are provided for the inshore, offshore and the danish seine sectors. For the northern prawn fishery, the results are split on the basis of the number of boat units per boat — less than 375 units, 375-475 units and over 475 units. There was no disaggregation of results for the Torres Strait prawn fishery.

For each of the fisheries, estimates for 1996-97 were made of costs and receipts. These estimates were based on logbook data of changes in catch and effort levels, and market data of changes in price levels.

### *South east fishery*

The south east fishery is a multispecies fishery situated off the south east coast of Australia. Catches of sixteen major species are allocated to operators through individual transferable quotas. The value of production from the fishery was estimated to be \$48.7 million in 1996-97, or 16 per cent of the total value of production from Commonwealth fisheries (ABARE 1997a).

The average performance of the survey fleet in the fishery declined in 1995-96 compared with the previous financial year. A decline in average fishing receipts and a rise in total cash costs resulted in average boat profit more than halving to around \$20 900 per boat. Performance across the three sectors of the fishery — inshore trawler, offshore trawlers and danish seiners — varied for 1995-96, with average boat profit in the danish seine and inshore sectors increasing by 17 per cent and 50 per cent respectively. However, a substantial increase in total cash costs in the offshore sector resulted in average boat profit in this sector declining by 68 per cent.

While recorded catches in the fishery declined further in 1996-97, higher average prices for most species are expected to have resulted in higher cash receipts on average. Average boat profit for the fleet is estimated to have more

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than doubled in 1996-97 to \$45 400 per boat. This recovery in average boat profit is estimated to have occurred across all sectors of the fleet in 1996-97.

### *Northern prawn fishery*

Lower catches and lower export returns in the northern prawn fishery adversely affected performance of the fishery over the survey period. In 1995-96 average total cash receipts fell by 11 per cent, which together with little change in total cash costs resulted in average boat profit declining by 41 per cent to around \$166 000. While average boat profit for medium sized boats in the fishery was relatively unchanged from the 1994-95 level, both small and large sized boats had substantial falls in boat profit.

Although banana prawn catches rose in 1996-97 the rise was not sufficient to offset the decline for the third consecutive season in landings of the more valuable tiger prawns. As a result, average total cash receipts are estimated to have fallen by 5 per cent across the fleet in 1996-97.

It is estimated that average cash costs across the fleet declined by 4 per cent in 1996-97. Crew costs and repairs and maintenance costs are estimated to have fallen. Overall, average boat profit is estimated to have declined further in 1996-97 to \$94 400, 14 per cent lower than in 1995-96. This decline in performance is expected to be uniform across the fleet.

A review of the status of tiger prawn stocks in the northern prawn fishery suggested that there was evidence that tiger prawn stocks were overfished at the end of 1996 and that effort in the fishery would need to be reduced from its present level.

### *Torres Strait prawn fishery*

The prawn fishery is the most valuable sector of the Torres Strait fisheries, accounting for around 70 per cent of the value of production of all commercial fishing in this region. In 1996-97 the value of prawn catches was \$16 million. Management of this fishery is based on an allocation of transferable fishing days per vessel. In addition there are restrictions on boat sizes and gear used in this fishery, together with area and seasonal closures.

On average, the quantity of prawns sold per boat was 7 per cent lower in 1995-96 than in 1994-95, which together with lower export returns resulted in average prawn receipts per boat declining in 1995-96. Offsetting this decline in prawn receipts was an improvement in receipts from landings of bycatch species. Overall, total cash receipts per boat increased by less than 1 per cent

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in 1995-96. While the total prawn catch for the fishery rose by 3 per cent in 1996-97 this was more than offset by declines in prices for both tiger and endeavour prawns. On average there was little difference in total cash costs for the fishery between 1994-95 and 1995-96. Average boat cash income was 3 per cent lower in 1995-96 than in 1994-95. An increase in total cash costs in 1995-96 resulted in a 32 per cent decline in average boat profit to under \$12 000.

For 1996-97, it is estimated that lower catches and lower returns resulted in average boat cash income being 31 per cent lower than in the previous year. Average boat profit is estimated to have declined again in 1996-97. In 1996-97, while total cash costs are estimated to have declined, this decline is expected to have been more than offset by a fall in total receipts. Consequently, average boat profit is estimated at minus \$700 in 1996-97.

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### *1. ABARE fisheries surveys*

ABARE has been undertaking economic surveys of Australian rural industries since the 1940s, and of selected Australian fisheries since the early 1980s. The current fisheries surveys program involves surveying each Commonwealth fishery every few years, or more frequently where the fishery is undergoing major changes and monitoring is particularly important. The aim is to gradually develop a consistent time series of economic information for each fishery. Such a database is vital for assessing the economic performance of fisheries, in the same way that time series information on catch and effort is vital for scientific assessments of each fishery.

Surveys of operators within a fishery are an effective way to gather detailed information on fleet structure and economic performance. The surveys provide a broad range of information on the physical characteristics and financial performance of boats that operate in each fishery.

Based on logbook and boat registry information collected from all licensed fishing operations in Commonwealth fisheries, and supplied by the Australian Fisheries Management Authority (AFMA), a representative sample of boats is selected in each fishery and stratified by type of operation, boat size and catch.

Between February and June, the owner of each boat selected in the sample is visited by an ABARE officer. The officer interviews the boat owner to obtain physical and financial details of the fishing business for the survey years. In a number of instances, the skipper of the boat is also interviewed. Further information is subsequently obtained from accountants, selling agents and marketing organisations, on the signed authority of the survey respondents.

The information collected is summarised in the annual Australian Fisheries Surveys Report. Considerable effort is made to reconcile the information obtained from various sources and to produce the most accurate description possible of the physical and financial characteristics of each sample boat in the survey. The data presented in the surveys reports constitute only a small proportion of the total amount of data collected.

#### *The 1997 surveys*

In 1997 ABARE surveyed three Commonwealth fisheries — the trawl component of the south east fishery, the northern prawn fishery and the Torres

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Strait prawn fishery. All three fisheries were previously surveyed in 1995, and information for 1992-93, 1993-94 and 1994-95 was presented in *Australian Fisheries Surveys Report 1995*.

Results for all three fisheries for 1994-95, 1995-96 and 1996-97 are presented in this report. The 1994-95 information collected in the 1995 survey has been updated. For all three fisheries, the 1996-97 information presented in this report is preliminary.

Information is presented for the whole fleet in each fishery, and also major sectors within the fleet. For the south east fishery, the sectors are inshore, offshore and danish seine. For the northern prawn fishery, the results are split between different sized boats — under 375 boat units, 375–475 boat units and boats greater than 475 units. The results for the Torres Strait fishery were not split into different sectors.

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### *2. Definitions of items and reliability of estimates*

#### *Boat characteristics*

Information on the physical characteristics of boats was obtained from both the logbook information and the survey interviews.

*Effort* is measured in the number of hours of bottom time for boats in the inshore and offshore sectors of the south east fishery, while effort for danish seine sector is recorded as the number of shots. In the two northern prawn fisheries, effort is recorded as the number of hours that nets are in the water.

*Catch* is expressed in kilograms. The catch information reported applies only to the fishery surveyed. However, catches from other fisheries are included for the purpose of estimating boat fishing receipts.

#### *Financial items*

*Cash receipts* are the financial inflows to the boat during the year from the sale of fish, non-fishing activities including charter operations, and other sources (insurance claims and compensation, quota and or endorsements leased out, government assistance and any other revenue). Receipts shown from the sale of fish are prior to any deductions made by marketing authorities for freight and selling charges. Where appropriate these charges are included in costs. Receipts also include amounts received in the survey year for fish harvested and delivered in previous years.

*Cash costs* include the payments made for both permanent and casual hired labour and payments for materials and services (including payments on capital items subject to leasing, rent, interest, licence fees and repairs and maintenance). Labour costs include wages, salaries and share of receipts paid to owner operators, partners and their families. If family or other labour were unpaid, an estimate of the cost of their labour (based on rates comparable with their employed counterparts in the fishery) was obtained at interview and has been included in cash costs. Capital and household expenditures were excluded.

*Boat cash income* is defined as the difference between total cash receipts and total cash costs.

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**Depreciation** is a noncash cost representing the cost of wear and tear on capital items during the survey year.

Depreciation figures, including depreciation for the hull, engine and other on-board and shore based plant, equipment (excluding gear) and structures, were estimated by the diminishing value method, based on the current replacement cost and age of each item. The rates applied are the standard rates allowed by the Commissioner of Taxation. For items purchased or sold during the survey year, depreciation is assessed as if the transaction had taken place at the midpoint of the year.

This method of calculating depreciation is also used in other ABARE industry surveys and an explanation of this method and a comparison with the previous method appears in the *Australian Fisheries Survey Report 1995*.

**Boat business profit** is defined as boat cash income less depreciation.

**Profit at full equity** is defined as boat profit, plus rent, interest and finance lease payments. It is the return produced by the resources used in the fishing business, and is the profit from fishing that would accrue to the owners if they fully owned the assets employed in the business.

**Capital** is defined as the value placed on the assets employed by the surveyed boat business. It includes the total gross value of the boat, including the value of the hull, engine and other on-board and shore based plant, equipment (including gear) and structures. Estimates are also reported for the value of quotas and endorsements held by the surveyed boat.

**Rate of return to boat capital** is calculated on total capital as if all fishing assets were wholly owned by the proprietors so that the financial performance of all sample boats can be compared, regardless of the proprietors' equity in the business. Rate of return to boat capital is computed by expressing profit at full equity as a percentage of total capital (excluding quota and licence value). The rate of return to boat capital provides an indication of the impact of management changes on the fishery.

**Rate of return to full equity** is computed by expressing profit at full equity as a percentage of total capital (including quota and licence value). This gives operators interested in investing in a new boat and/or licence a measure of the economic performance of the fishery.

**Debt** information for operators in each of the fisheries was collected at interview. Change in debt over the year is calculated for each boat as the

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difference between debt at 1 July and the following 30 June. It is an estimate of the change in indebtedness of a given population of boats during the financial year.

**Boat business equity** is derived by deducting the boat business debt from the value of capital employed in, and owned by, the fishing business.

**The equity ratio** is reported as a percentage of capital employed in, and owned by, the fishing business. The debt and equity figures shown are averages for those boats for which information on debt was available.

### *Target populations*

Population information for the surveyed fisheries was obtained from logbooks and boat registry data supplied by AFMA. Fishery management plans are usually based on a calendar year so the fleet structure may change in the middle of the financial year. As a result, the target populations included only those boats that operated in the fishery in both the first and second halves of the financial year.

For the south east fishery only those boats which held quota and caught more than 10 tonnes of fish in the year were included in the target population.

In the northern prawn and Torres Strait prawn fisheries, only boats endorsed to operate in their respective fisheries and that caught prawns in the fishery were included in the target population.

### *Sample weighting*

Because the sample sizes for each sector of a fishery are not necessarily proportional to the actual population sizes of the sectors, the estimates presented in this report are all calculated by appropriately weighting the data collected from each sample boat. The sample weights are derived by comparing the total numbers of boats in the target populations, and total catches from the annual logbook data collected by the Australian Fisheries Management Authority, with the corresponding numbers and catch details of the boats in the various survey samples.

Different sample weights are used in the estimates for the different years, because of differences in population numbers and outputs, as well as in sample numbers and outputs, between years. Technical details of the method of weighting used are given in Bardsley and Chambers (1984).

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### *Sampling errors*

Only a small proportion of the total number of boats in a particular fishery are sampled to produce the survey estimates. The differences between these estimates and the estimates that would have been obtained if information had been collected from all boats (the population or census values) are called sampling errors. The more boats there are in the sample, the smaller the sampling error is likely to be. So, for example, boat group estimates are likely to have greater sampling errors than fisherywide estimates.

As a guide to the reliability of the survey estimates, estimates of 'standard errors' have been calculated. These estimated errors, expressed as a percentage of the survey estimates (termed 'relative standard errors'), are given next to each estimate in parentheses.

### *Example of the use of relative standard errors*

To obtain the standard error from the relative standard error, multiply the relative standard error by the survey estimate and divide by 100. For example, if average total cash receipts are estimated to be \$100 000 with a relative standard error of 6 per cent, the standard error for this estimate is \$6000.

There is roughly a two in three chance that the census value (which would have been obtained if all boats in the target population had been surveyed) is within one standard error of the survey estimate. There is roughly a nineteen in twenty chance that a census value is within two standard errors of this survey estimate.

Thus, in the above example, there is an approximately two in three chance that the census value is between \$94 000 and \$106 000, and an approximately nineteen in twenty chance that the census value lies between \$88 000 and \$112 000.

### *Comparing estimates*

Greater caution should be exercised when calculating estimates of change derived from the survey estimates than when using the estimates themselves.

When comparing estimates between different industries, it is important to recognise that the differences are also subject to sampling error. An estimate of the standard error of the difference can be constructed by adding the squares of the estimated standard errors (note: not of the relative standard errors) of the component estimates, and then taking the square root of the result.

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For example, suppose that total cash receipts were \$100 000 in one industry and \$125 000 in another — a difference of \$25 000 — and that the relative standard errors are given as 6 per cent and 8 per cent respectively. The standard error of the difference can be estimated as:

$$\sqrt{[(0.06 \times \$100\,000)^2 + (0.08 \times \$125\,000)^2]} = \$11\,662.$$

Hence, the *relative* standard error of the difference is:

$$(\$11\,662/\$25\,000) \times 100 = 47 \text{ per cent.}$$

Similar estimates of the standard errors of differences can be made when comparing years. Under some circumstances, those estimates would be conservative — that is, they would be overestimates of the standard errors of differences.

However, in instances where there are substantial changes in the population from year to year, the estimation of standard errors is more complex and recourse to the survey database would probably be required.

There may also be differences in data quality between the two estimates being compared: final estimates are more reliable than preliminary estimates because the final data have been cross-checked against a greater number of external data sources, lowering the probability of nonsampling errors.

### *Nonsampling errors*

The values obtained in a survey are affected by errors other than those related directly to the sampling procedure. For example, respondents may provide inaccurate information and mistakes may occur in the editing and processing of data.

ABARE's experience in conducting surveys has resulted in procedures designed to minimise nonsampling errors. However, when drawing inferences from estimates derived from sample surveys or from census data, users of data should bear in mind that nonsampling as well as sampling errors can occur.

### *3. South east fishery survey results*

#### *The fishery*

The south east fishery is a multispecies fishery situated off the south east coast of Australia. The trawl sector of the fishery extends southward from Barrenjoey Point in New South Wales around Victoria and Tasmania and west to Cape Jervis in South Australia. The main harvesting method is otter trawling, although a danish seine fleet operating primarily out of Lakes Entrance, Victoria, also forms an important part of the fishery.

There is a nontrawl sector of the fishery that covers a much larger geographical area of the fishery. The main harvesting methods are demersal gillnetting and line fishing. For this survey operators in this sector of the fishery were not included.

More than ninety species of finfish and invertebrates are taken in the south east fishery. However, seven species constitute about two-thirds of the trawl catch. Orange roughy is still the major species landed but its share of the trawl catch continues to decline.

Gross value of production from the trawl sector of the fishery in 1996-97 was estimated to be \$48.7 million from a total catch of 22 679 tonnes (liveweight). This represents about 16 per cent of the gross value of production from Commonwealth fisheries in 1996-97 (ABARE 1997a).

The south east fishery continues to be an important component of the Australian fishing industry, taking the largest tonnage and supplying most of the fresh fish for the Sydney and Melbourne markets.

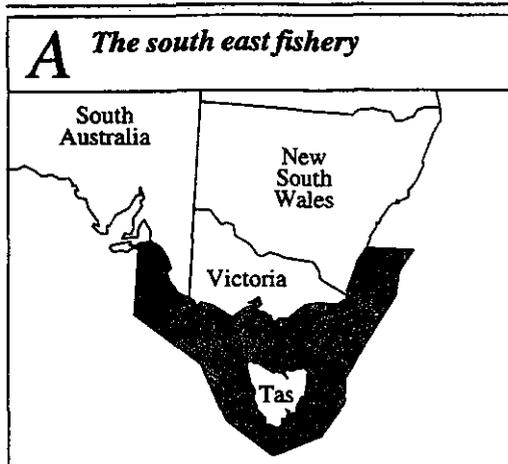
Up to the mid-1980s total south east fishery landings were dominated by catches taken off New South Wales and eastern Bass Strait. Since then, increased targeting of orange roughy and blue grenadier in waters around Tasmania has brought about a marked increase in Tasmanian and Victorian landings (Bureau of Resource Sciences 1997).

#### *Biological status of the fishery*

The south east fishery operates in Commonwealth waters adjacent to four states, New South Wales, Victoria, Tasmania and South Australia (figure A).

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The heavily fished status of some of the stocks has been known for several years. In 1989 a subcommittee of the Australian Fisheries Council reported there 'were a number of species under severe biological stress and that there was concern for a number of other specific stocks and little potential for increased total catches' (Bureau of Resource Sciences 1997).

In 1993 the South East Fishery Assessment Group (SEFAG) was established to prepare stock assessment for each of the quota species. In the 1996 assessment, five species failed to satisfy performance criteria relating to catch rates set by the Australian Fisheries Management Authority (SEFAG 1996). These species were blue warehou, western gemfish, jackass morwong, mirror dory and redfish. It should be noted that a decline in catch rate does not necessarily reflect a drop in stock abundance, as other factors such as environmental effects, changes in fishing practices or interactions with other species could also reduce catch rate.

The 1996 assessment of eastern gemfish suggested that the species was still below AFMA's target of 40 per cent of 1979 spawning biomass but improving (SEFAG 1996). In 1997 the total allowable catch for eastern gemfish was raised from zero to 1200 tonnes, of which 1000 tonnes were allocated to the trawl sector. By allowing commercial fishing for gemfish in 1997 it was hoped that timely and appropriate information and data could be incorporated into the stock assessment process. Operators were informed that the total allowable catch for 1998 would be returned to zero.

For orange roughy, the other major species in the fishery, the 1996 assessment was less optimistic than the 1995 assessment about the rate at which the stock was rebuilding (SEFAG 1996).

### *Management of the fishery*

Management boundaries for the trawl component of the fishery extend from a line east from Barrenjoey Point in New South Wales to a line south from Cape Jervis in South Australia, including waters around Tasmania, from a distance of three nautical miles offshore (the limit of the state managed waters) to the 200 nautical mile limit of the Australian fishing zone.

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Individual transferable quotas (ITQs) were introduced into the trawl component of the south east fishery in 1989. Initially, only one species, eastern gemfish, was managed this way. At the beginning of 1992, ITQs were introduced for a further fifteen species. Since January 1994, full and permanent transferability of quota has been permitted. Prior to this, operators were only allowed to lease quota on a seasonal basis to other operators within the fishery; the sale of quota was prohibited. Under this system each of these species is subject to a total allowable catch apportioned between the operators who are entitled to fish. The total allowable catches can be adjusted each year by the fishery's managers in response to environmental fluctuations or to satisfy management objectives.

All quota species in the south east fishery, except orange roughy and gemfish, are currently managed as single stocks. For orange roughy there are three management zones (eastern, southern and remote zone) and for gemfish there are two (eastern and western). Each zone has a separate total allowable catch.

Allocated quotas for most species over the period 1995–97 have largely remained unchanged. The exceptions are a decline in the blue warehou total allowable catch in 1997, and a progressive decline in the total allowable catch for orange roughy in the southern zone from 4000 tonnes in 1995, 3000 tonnes in 1996 to 1000 tonnes in 1997. Increases in total allowable catch for ling and redfish occurred in 1997.

The 1996 agreed total allowable catch for all species was 33 165 tonnes, with a final allocation of 40 315 tonnes that included carryovers from the previous year and the outcome of any litigation. In New South Wales the state management agency imposed trip limits on certain quota species taken in waters under its jurisdiction. These limits reduced the opportunity for claiming that catches taken in Commonwealth waters were actually taken in state waters and thus not counting against quota. In 1997 the agreed total allowable catch was 32 105 tonnes, with a final allocation of 38 186 tonnes.

Since the introduction of individual transferable quotas, the only total allowable catch that has been exceeded is that for orange rougy in the eastern sector. Even when catches recorded in state waters are added, catches for the remaining species are well below their total allowable catches (Bureau of Resource Sciences 1997).

### *Boats surveyed*

For the purpose of the survey, the population was defined as boats endorsed for the south east fishery that caught fish within the survey years. The trawl

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sector of the south east fishery can be considered as three separate subfisheries, according to vessel type — inshore trawl, danish seine and offshore. There is some overlap in the species caught by these subfisheries.

The inshore trawl boats generally operate on the continental shelf and upper shelf to depths of around 500 metres. Boats in this sector target a range of species most of which are destined for the domestic fresh market. The danish seine fleet comprises generally smaller, low powered vessels and operates in shallower waters, targeting predominantly whiting and flathead. The offshore fleet consists mainly of the larger boats and operates predominantly out of Tasmanian and Victorian ports, with orange roughy and blue grenadier the main target species. However, with the decline in the total allowable catches for orange roughy, some boats in this fleet are moving toward catching table fish for the domestic market.

The survey only covered the trawl sector of the south east fishery. Based on logbook data, the number of vessels operating in the south east fishery in 1994-95 comprised 61 boats in the inshore sector, 27 in the offshore sector and 22 in the danish seine sector. A total sample of 44 boats from a population of 110 boats was surveyed. Twenty-one boats were sampled in the inshore sector, 7 in the offshore sector and 16 in the danish seine sector.

In 1995-96, 108 boats operated in the trawl component of the south east fishery. Twenty-three boats in a population of 64 boats in the inshore sector were surveyed, 11 boats out of 23 boats in the offshore sector and 17 boats were surveyed out of a population of 21 boats in the danish seine sector.

### *Financial performance*

The major measures of the financial performance of surveyed boats in the south east fishery are shown in table 1. The average performance of the surveyed boats declined in 1995-96 compared with the previous financial year. The decline was the largest for operators in the offshore sector. Increases in freight and marketing charges, fuel and repairs and maintenance costs were the major contributing factors to the poor performance.

### *Receipts*

Total recorded catches of quota species fell by 3 per cent in 1995-96, while catch of other (nonquota) species fell by 12 per cent in 1995-96 (ABARE 1997a). Average total cash receipts per boat for operators in the south east fishery were almost \$583 000 in 1995-96, 3 per cent lower than in 1994-95. On average, receipts from fishing and returns from nonfishing activities were

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## FISHERIES SURVEYS 1997

### **I** *Financial performance of south east fishery boats – inshore trawlers* Average per boat

	Unit	1994-95	1995-96	1996-97 <sup>p</sup>
<b>Receipts</b>				
Fish receipts	\$	423 509 (8)	402 400 (13)	453 500 (13)
Nonfishing receipts	\$	69 632 (20)	62 480 (20)	59 800 (20)
Total cash receipts	\$	493 141 (9)	464 880 (14)	513 300 (14)
<b>Costs</b>				
Administration	\$	22 445 (35)	22 860 (43)	23 300 (43)
Crew costs	\$	138 177 (10)	127 890 (13)	144 100 (13)
Freight and marketing	\$	62 304 (16)	54 230 (19)	61 100 (19)
Fuel	\$	70 473 (11)	69 150 (12)	80 700 (11)
Insurance	\$	14 096 (15)	17 720 (25)	16 000 (15)
Interest paid	\$	14 189 (26)	13 030 (30)	12 100 (27)
Leasing	\$	11 430 (23)	14 010 (28)	14 500 (25)
Licence fees and levies	\$	18 472 (16)	15 090 (16)	17 100 (14)
Repairs and maintenance	\$	80 047 (14)	69 380 (15)	71 700 (13)
Other costs	\$	23 221 (10)	20 790 (12)	21 400 (11)
Total cash costs	\$	454 854 (8)	424 150 (12)	462 000 (11)
<b>Boat cash income</b>	\$	38 287 (46)	40 730 (42)	51 300 (47)
less depreciation <sup>a</sup>	\$	28 007 (14)	25 500 (15)	26 000 (15)
<b>Boat business profit</b>	\$	10 280 (157)	15 230 (100)	25 300 (88)
plus interest, leasing and rent	\$	25 773 (17)	27 130 (26)	26 700 (23)
<b>Profit at full equity</b>	\$	36 052 (47)	42 360 (48)	52 000 (52)
<b>Capital</b>				
– excl. quota and licences	\$	471 555 (11)	434 560 (10)	434 600 (10)
– incl. quota and licences	\$	na	1 043 260 (13)	1 043 300 (13)
<b>Rate of return to capital <sup>b</sup></b>	%	7.7 (48)	9.8 (42)	12.0 (46)
<b>Rate of return to full equity <sup>c</sup></b>	%	na	4.1 (42)	5.0 (45)

*Continued* ◊

## FISHERIES SURVEYS 1997

### I Financial performance of south east fishery boats – offshore trawlers Average per boat

	Unit	1994-95	1995-96	1996-97 p
<b>Receipts</b>				
Fish receipts	\$	1 071 944 (31)	1 128 460 (16)	1233 400 (16)
Nonfishing receipts	\$	86 293 (36)	98 070 (22)	103 700 (23)
Total cash receipts	\$	1 158 237 (30)	1 226 530 (14)	1 337 100 (14)
<b>Costs</b>				
Administration	\$	13 737 (21)	27 600 (30)	28 200 (30)
Crew costs	\$	255 615 (21)	283 640 (16)	310 000 (16)
Freight and marketing	\$	80 791 (32)	115 380 (18)	126 100 (18)
Fuel	\$	144 495 (30)	207 580 (16)	235 300 (16)
Insurance	\$	23 477 (47)	27 300 (24)	24 200 (20)
Interest paid	\$	0 (0)	21 360 (81)	19 200 (81)
Leasing	\$	169 457 (47)	107 450 (24)	104 000 (24)
Licence fees and levies	\$	36 020 (27)	43 770 (21)	49 600 (24)
Repairs and maintenance	\$	157 198 (28)	194 200 (15)	158 900 (17)
Other costs	\$	27 337 (23)	69 570 (31)	75 200 (30)
Total cash costs	\$	908 127 (26)	1 097 850 (13)	1 130 700 (13)
<b>Boat cash income</b>	\$	250 110 (51)	128 680 (64)	206 400 (49)
less depreciation a	\$	72 747 (24)	71 070 (13)	72 600 (13)
<b>Boat business profit</b>	\$	177 363 (64)	57 610 (149)	133 800 (78)
plus interest, leasing and rent	\$	169 457 (47)	129 040 (20)	123 400 (20)
<b>Profit at full equity</b>	\$	346 820 (52)	186 650 (48)	257 200 (41)
<b>Capital</b>				
– excl. quota and licences	\$	791 118 (25)	1 017 580 (15)	1 017 600 (15)
– incl. quota and licences	\$	na	2 337 900 (12)	2 337 900 (12)
<b>Rate of return to capital b</b>	%	43.8 (32)	18.3 (55)	25.3 (50)
<b>Rate of return to full equity c</b>	%	na	8.0 (47)	11.0 (42)

*Continued* ◊

## FISHERIES SURVEYS 1997

### **I** *Financial performance of south east fishery boats – danish seiners* Average per boat

	Unit	1994-95	1995-96	1996-97 <sup>p</sup>
<b>Receipts</b>				
Fish receipts	\$	211 777 (4)	236 050 (3)	263 200 (4)
Non-fishing receipts	\$	2 213 (24)	1 870 (17)	2 100 (21)
Total cash receipts	\$	213 990 (4)	237 920 (3)	265 300 (4)
<b>Costs</b>				
Administration	\$	6 467 (18)	5 200 (8)	5 200 (9)
Crew costs	\$	84 043 (5)	92 600 (3)	102 500 (4)
Freight and marketing	\$	38 538 (7)	44 810 (4)	49 700 (5)
Fuel	\$	14 272 (11)	14 830 (7)	16 500 (8)
Insurance	\$	7 407 (7)	7 360 (5)	7 600 (6)
Interest paid	\$	7 456 (26)	8 630 (16)	7 400 (20)
Leasing	\$	17 (59)	2 190 (46)	1 900 (50)
Licence fees and levies	\$	11 218 (5)	12 750 (3)	13 500 (4)
Repairs and maintenance	\$	18 310 (8)	24 130 (7)	21 600 (6)
Other costs	\$	10 900 (5)	11 240 (5)	11 900 (6)
Total cash costs	\$	198 628 (4)	223 740 (3)	237 800 (3)
<b>Boat cash income</b>	\$	15 362 (28)	14 180 (27)	27 500 (18)
less depreciation <sup>a</sup>	\$	17 784 (11)	16 190 (8)	17 300 (8)
<b>Boat business profit</b>	\$	-2 422(211)	-2 010(226)	10 200 (24)
plus interest, leasing and rent	\$	7 651 (27)	11 310 (19)	9 900 (23)
<b>Profit at full equity</b>	\$	5 229 (75)	9 300 (40)	20 100 (24)
<b>Capital</b>				
- excl. quota and licences	\$	275 606 (9)	267 250 (7)	276 600 (8)
- incl. quota and licences	\$	na	461 840 (5)	467 600 (5)
<b>Rate of return to capital <sup>b</sup></b>	%	1.9 (78)	3.5 (43)	7.3 (28)
<b>Rate of return to full equity <sup>c</sup></b>	%	na	2.0 (42)	4.3 (27)

*Continued* ⇨

## FISHERIES SURVEYS 1997

### **I** *Financial performance of south east fishery boats – all boats* Average per boat

	Unit	1994-95	1995-96	1996-97 p
<b>Receipts</b>				
Fish receipts	\$	540 324 (16)	524 680 (9)	582 600 (9)
Nonfishing receipts	\$	60 238 (18)	58 280 (15)	57 900 (15)
Total cash receipts	\$	600 562 (15)	582 960 (9)	640 500 (9)
<b>Costs</b>				
Administration	\$	17 112 (26)	20 430 (30)	20 800 (30)
Crew costs	\$	156 176 (10)	154 190 (9)	171 400 (9)
Freight and marketing	\$	62 088 (14)	65 420 (11)	72 700 (11)
Fuel	\$	77 402 (15)	88 070 (10)	101 200 (10)
Insurance	\$	15 061 (20)	17 750 (17)	16 100 (11)
Interest paid	\$	9 360 (22)	13 950 (31)	12 700 (30)
Leasing	\$	47 936 (41)	31 610 (19)	31 100 (19)
Licence fees and levies	\$	21 329 (13)	20 740 (12)	23 400 (12)
Repairs and maintenance	\$	86 637 (14)	87 160 (10)	80 500 (10)
Other costs	\$	21 767 (9)	29 320 (17)	31 000 (16)
Total cash costs	\$	514 868 (12)	528 640 (8)	560 900 (8)
<b>Boat cash income</b>	\$	85 694 (38)	54 320 (38)	79 600 (32)
less depreciation b	\$	36 944 (13)	33 390 (9)	34 200 (9)
<b>Boat business profit</b>	\$	48 750 (60)	20 930 (98)	45 400 (57)
plus interest, leasing and rent	\$	57 416 (35)	45 760 (15)	44 000 (15)
<b>Profit at full equity</b>	\$	106 166 (43)	66 690 (34)	89 400 (31)
<b>Capital</b>				
– excl. quota and licences	\$	510 803 (11)	526 190 (8)	528 000 (8)
– incl. quota and licences	\$	na	1 205 920 (8)	1 207 000 (8)
<b>Rate of return to capital c</b>	%	20.8 (35)	12.7 (35)	16.9 (32)
<b>Rate of return to full equity d</b>	%	na	5.5 (32)	7.4 (29)

a Figures in parentheses are relative standard errors. b Depreciation adjusted for profit and loss on capital items sold. c Excluding the value of quota or licence. d Including the value of quota or licence. p Preliminary. na Not available.

## FISHERIES SURVEYS 1997

lower in 1995-96.

Performance across the surveyed fleet varied. Total cash receipts for operators in the inshore fleet fell, while those for the offshore and danish seine sectors rose. For inshore boats, average cash receipts per boat in 1995-96 were around \$465 000, 6 per cent lower than in 1994-95. Contributing to the fall was a 17 per cent fall in the quantity of fish sold by sample boats in 1995-96 (table 2) combined with lower prices (ABARE 1997a). In addition, nonfishing receipts declined by 10 per cent in 1995-96 compared with the previous year. Nonfishing receipts include returns from quota leasing, rebates and refunds and other boat receipts (for example charter). For the inshore sector, receipts from quota leasing declined by 34 per cent, with only a slight decline in rebates and refunds in 1995-96 compared with 1994-95.

For operators in the offshore sector, average cash receipts per boat were \$1.23 million in 1995-96, 6 per cent higher than in 1994-95 (table 1). The quantity of fish sold by surveyed boats rose by 27 per cent in 1995-96 (table 2) which, together with higher prices for species caught by the offshore sector, led to higher fishing receipts. Nonfishing receipts also rose by 14 per cent in this sector to

### 2 *Quantity of fish sold by sample boats in the south east fishery* Average per boat

	Units	Inshore boats	Offshore boats	Danish seiners	All boats
<b>1994-95</b>					
Number of boats	no.	21	7	16	44
Trapping	kg	0 (0)	0 (0)	0 (0)	0 (0)
Longline	kg	0 (0)	0 (0)	0 (0)	0 (0)
Trawl	kg	210 719 (11)	401 877 (30)	101 922 (8)	235 880 (14)
Gillnet	kg	0 (0)	0 (0)	1 547 (56)	309 (56)
Dropline	kg	0 (0)	0 (0)	0 (0)	0 (0)
Other method	kg	2 044 (58)	0 (0)	2 818 (37)	1 697 (41)
Total	kg	212 763 (10)	401 877 (30)	106 287 (7)	237 886 (14)
<b>1995-96</b>					
Number of boats	no.	23	11	17	51
Trapping	kg	0 (0)	0 (0)	0 (0)	0 (0)
Longline	kg	0 (0)	0 (0)	0 (0)	0 (0)
Trawl	kg	173 842 (14)	499 116 (16)	121 348 (5)	232 906 (10)
Gillnet	kg	0 (0)	0 (0)	1 162 (46)	226 (46)
Dropline	kg	0 (0)	0 (0)	0 (0)	0 (0)
Other method	kg	2 148 (57)	13 183 (74)	1 971 (32)	4 464 (50)
Total	kg	175 990 (14)	512 299 (16)	124 481 (4)	237 596 (9)

Note: Figures in parentheses are relative standard errors, expressed as percentages of the estimates.

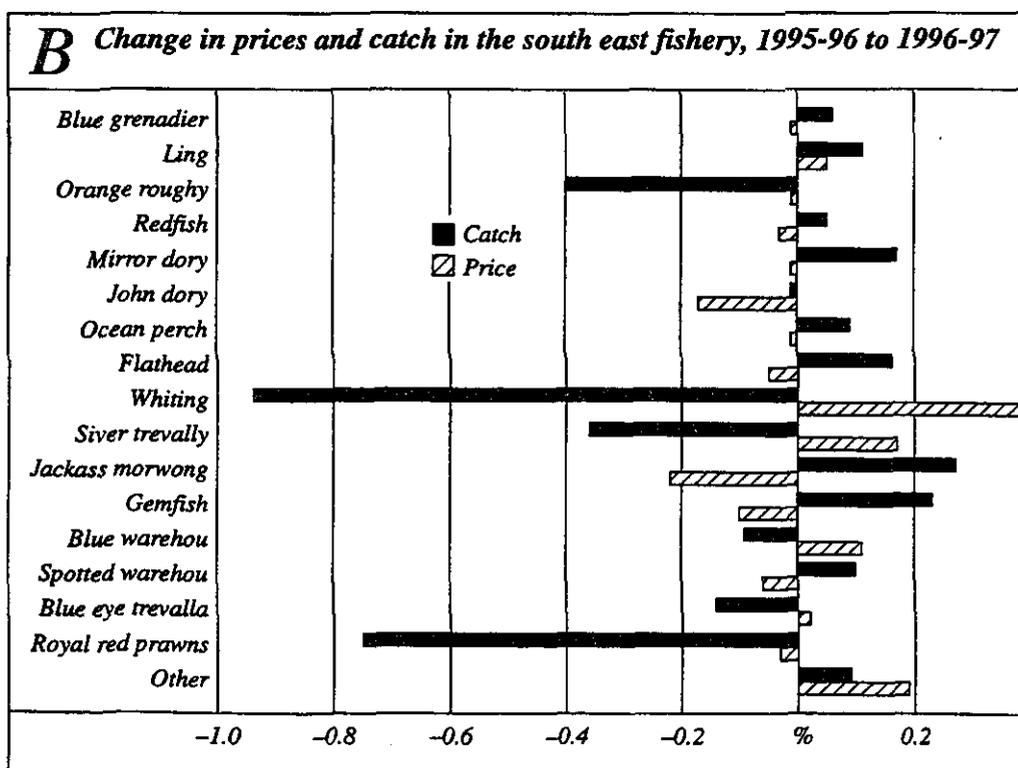
## FISHERIES SURVEYS 1997

around \$98 000 in 1995-96. While receipts from quota leasing fell by nearly \$10 000, there was an increase in rebates and refunds of nearly 40 per cent to \$76 000.

In the danish seine sector average cash receipts per boat were around \$238 000, 11 per cent higher than in the previous year (table 1). This increase came entirely from higher fishing receipts.

Estimates of average boat receipts in 1996-97 were based on changes in catch and prices between 1995-96 and 1996-97 (figure B). Catch information for the two years was obtained from logbooks and the quota monitoring system. Changes in prices were based on Sydney and Melbourne market information, as well as information provided by a number of cooperatives and processors.

From figure B it can be seen that the movements in average prices varied across the species. The impact of these price changes on average returns to the fishery will depend on the relative contribution they make to total catches and hence total revenue of the fishery. For instance, nonquota species contributed to 54 per cent of the total landings in 1996-97. This high proportion, together with



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a 24 per cent rise in average unit value (ABARE 1997a), appears to have offset the observed price declines for other (quota) species.

For 1996-97, estimated average cash receipts per boat across the fleet are estimated to have risen by 10 per cent to \$640 500 (table 1). For danish seiners, cash receipts per boat in 1996-97 are estimated at \$265 000, 12 per cent higher than in 1995-96. This reflects an increase in the price of whiting, and an increase in landing of the other major target species for these boats, tiger flathead, for the third consecutive year.

For inshore trawlers, average cash receipts per boat in 1996-97 are estimated at \$513 000, 10 per cent higher than in 1995-96. This reflects higher catches and for some species higher prices. In particular, landings of blue grenadier, ling, redfish, jackass morwong and silver warehou increased in 1996-97 compared with landings in the previous year.

In the offshore sector, total cash receipts are estimated to have increased by 10 per cent in 1996-97. Although landings of orange roughy declined in 1996-97, landings of other deepwater species such as oreos have been increasing. In addition some boats in this sector have or are moving toward catching 'market or table' fish for the Sydney and Melbourne markets.

### *Costs*

For the fishery as a whole, average total cash costs per boat increased by 3 per cent to nearly \$529 000 in 1995-96 (table 1). On average, about 30 per cent of total cash costs were attributable to crew costs, while freight and marketing, fuel, leasing and repairs and maintenance contributed around 52 per cent to total cash costs.

These higher cash costs per boat were not uniform across the fleet. Cash costs in the inshore sector fell, on average, by 7 per cent, while in the offshore and danish seine sectors they rose by 21 per cent and 13 per cent respectively.

Across the fleet there were increases in all cost items except for crew costs and leasing and licence fees. Crew costs are a proportion of boat revenue and therefore are correlated with catch and fishing receipts. The decline in crew costs can be attributable to lower fishing receipts while leasing costs would have been influenced by the availability of quota and its cost.

On average, fuel costs accounted for around 17 per cent of average total cash costs in 1995-96. For the offshore sector, fuel costs were estimated at around \$208 000 per boat, 44 per cent higher than in 1994-95. The estimated fuel cost

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## *FISHERIES SURVEYS 1997*

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for the inshore boats was nearly 2 per cent lower in 1995-96 relative to 1994-95, at \$69 200, whereas fuel cost for danish seine boats, at \$14 800 were 4 per cent higher. These rises in the amounts spent on fuel are attributable to increases in effort and higher fuel costs.

Freight and marketing charges were slightly higher in 1995-96 at around \$65 400 per boat across the fleet. Approximately 30 per cent of this total is attributable to freight charges. Freight and marketing charges in the offshore sector increased by 43 per cent in 1995-96 to \$115 000. This most probably reflects the shift that is occurring in this sector away from targeting species for processing to harvesting larger quantities of 'table or market' fish destined for both the Sydney and Melbourne markets.

For the inshore sector, freight and marketing charges fell by 13 per cent in 1995-96 to around \$54 200. Like crew costs, freight and marketing charges are related to the quantity of fish sold. This decline is consistent with the decline in the quantity of fish handled in this sector (table 2) and lower fishing receipts. In the danish seine sector, on the other hand, there was an increase in the quantity of fish sold (table 2), which resulted in freight and marketing charges rising by 16 per cent in 1995-96 to \$44 800 per boat.

Crew costs, which form the largest single component of all boat costs, were 1 per cent lower, on average, across the fleet (at an estimated \$154 000 per boat) in 1995-96. Crew costs were higher in 1995-96, on average, by 11 per cent for the offshore sector and 10 per cent for the danish seine sector, but lower by 7 per cent for the inshore sector. Crew costs are generally a proportion of boat revenue and therefore are correlated with catch and fishing receipts.

Amounts spent on repairs and maintenance varied across the fleet. While for the fleet as a whole there was a less than 1 per cent increase in the amount spent between 1994-95 and 1995-96, for the individual sectors of the fleet there were substantial changes. For the inshore sector there was 13 per cent decline to \$69 400, for offshore boats a 24 per cent rise to \$194 000 and for the danish seine boats a 32 per cent rise to \$24 100.

Lease payments were 34 per cent lower in 1995-96 than in 1994-95 at around \$31 600 per boat. Nearly all of the lease payment can be attributable to leasing quota. However, the amount of quota leasing varied across the fishery, with average leasing costs for the offshore sector being around \$107 000, \$2200 in the danish seine sector and \$14 000 in the inshore sector.

Costs in 1996-97 were calculated using estimates obtained from operators on the major cost items and on a series of indexes based on costs and changes in

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## FISHERIES SURVEYS 1997

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catch and effort. Catch and effort indexes were derived from logbook information and affect crew payments and marketing costs for 1996-97. The cost indexes were determined by ABARE from a survey of suppliers of goods and services to the rural sector (ABARE 1997b). Based on these indexes and changes in catch and effort, average cash costs per boat are estimated to have been 6 per cent higher in 1996-97 than in 1995-96.

For danish seiners, on average, cash costs per boat are estimated at \$238 000 in 1996-97, 6 per cent higher than in the previous year. Crew costs, freight and marketing charges and fuel costs are expected to have risen in 1996-97.

For the inshore sector of the fleet, average cash costs per boat are estimated at \$462 000, 9 per cent than in 1995-96. Increases are estimated to have occurred for all the major cost items. Crew costs and freight and marketing charges were higher, reflecting the expected improvement in fishing receipts, while the rise in fuel costs reflected increases in effort and higher fuel charges.

Fishing costs for boats in the offshore sector are estimated to have risen again in 1996-97 — by 3 per cent to \$1.13 million (table 1).

### *Boat cash income and profit*

Boat cash income and business profit provide an indication of the ability of the operator to remain viable in the fishery in the short to medium term without the need for recourse to additional finance. Following a substantial fall in 1994-95, average cash income per boat was again lower (37 per cent) in 1995-96, at around \$54 300. Falls were recorded for the danish seine and offshore sectors, while there was a slight improvement in the inshore sector.

In 1996-97, as the estimated increase in fishing receipts more than offset the increase in total cash costs, boat cash income is estimated to have increased, on average, by 47 per cent across the fleet to \$79 600 per boat.

In the inshore sector in 1995-96, the fall in total cash costs was less than the fall in total cash receipts, so there was a rise in boat cash income of around 6 per cent to \$40 700. In 1996-97, with an estimated rise in total receipts offsetting a rise in total cash costs, average boat cash income is estimated to have increased by 26 per cent to \$51 300 (table 1).

Operators in the danish seiners had an 8 per cent decline in average boat cash income in 1995-96 to \$14 200. As with the inshore sector, an estimated increase in total cash receipts is likely to have resulted in boat cash income nearly doubling to \$27 500 in 1996-97.

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## *FISHERIES SURVEYS 1997*

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The offshore sector experienced the largest decline in average boat cash income both in relative and absolute terms in 1995-96. Average boat cash income for this sector in 1995-96 was around \$129 000 per boat or 48 per cent lower than in 1994-95. In 1996-97 it is estimated that boat cash income rose by 60 per cent to over \$206 000 per boat.

Boat profit (which allows for depreciation of capital) provides a measure of return to the business unit. Following a substantial fall in 1994-95, average boat business profit for the fleet more than halved to \$20 900 in 1995-96. For operators in the inshore sector, the decline in cash costs in 1995-96 more than offset the decline in total cash receipts. This resulted in an estimated 48 per cent increase in average boat profit to \$15 200. In the danish seine sector, average boat profit remained negative for the second consecutive year at around \$2000 per boat. In the offshore sector, average boat profit fell by 68 per cent to \$57 600.

With boat cash income increasing in 1996-97, boat profit for the fleet is estimated to have risen, on average, by 79 per cent to \$45 400 per boat. This recovery in average boat profit is estimated to have occurred across all sectors of the fleet. For the inshore sector the estimated increase was 66 per cent to \$25 300, for offshore boats it was a doubling to \$134 000 and for the danish seine sector it increased from an estimated minus \$2000 to \$10 200 per boat in 1996-97.

Profit at full equity for the fishery averaged \$66 700 per boat in 1995-96, a third lower than in 1994-95, reflecting the halving of profit at full equity in the offshore sector. In the danish seine and inshore sector, performance improved. In 1996-97 average boat profit at full equity is estimated to have increased across the fleet by a third to \$89 400.

For the offshore trawlers, profit at full equity in 1996-97 is estimated to have increased to around \$257 000 per boat, 38 per cent higher than in the previous year, reflecting higher fishing receipts. Similarly, higher fishing receipts in the other two sectors are estimated to have resulted in an improvement in profit at full equity. For inshore boats, average profit at full equity is estimated at \$52 000 in 1996-97, 23 per cent higher than in the previous year. In the danish seine sector, profit at full equity is estimated to have more than doubled to \$20 100.

### *Rates of return*

The estimated average rate of return to boat capital (excluding the value of quota and licences) across the fleet in 1995-96 was 12.7 per cent (table 1). The

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## FISHERIES SURVEYS 1997

rate of return for boats in the inshore sector was 9.8 per cent, in the offshore sector was 18.3 per cent and for danish seiners 3.5 per cent. In both the inshore and danish seine sectors there was an improvement in the rate of return to boat capital. While increases in profit at full equity contributed to the this increase, the value of capital (excluding quota and licences) for both inshore and danish seine sectors declined in 1995-96. In the offshore sector the decline in rate of return to boat capital may have been attributable to both a decline in profit at full equity and an increase in the value of boat capital.

### *Debt and equity*

Information was collected on the level and purpose of debt for the fleet and is reported in table 3. The average level of debt across the fishery rose in 1995-96 from an opening balance of around \$107 500 to a closing balance of \$173 100 (table 3). Boat purchases accounted for an estimated 62 per cent of the closing debt and working capital for 33 per cent, while the remainder was used for quota purchases and purchases of other capital items. Average interest payments for this debt rose by 16 per cent in 1995-96 to \$9000 per boat.

The debt servicing ratio is the proportion of total receipts used for interest payments. The average debt servicing ratio for the fleet was 2.4 per cent in 1995-96 (table 1). The average level of equity across the fleet was 81.9 per cent in 1995-96 (table 3).

### **3** *Boat debt and equity of south east fishery boats in 1995-96 Average per boat*

	Unit	All boats
Capital (incl. quota and licences) at 30 June <i>a</i>	\$	956 330 (10)
Boat business debt at 1 July <i>b</i>	\$	107 460 (22)
Boat business debt at 30 June <i>b</i>	\$	173 090 (31)
Change in debt over year <i>b</i>	\$	65 630 (72)
Boat business equity at 30 June <i>a</i>	\$	783 240 (10)
Boat business equity ratio at 30 June <i>a</i>	%	81.9 (6)

*a* Average per boat responding on debt. *b* Average per responding boat.

*Note:* Figures in parentheses are relative standard errors, expressed as percentage of the estimates.

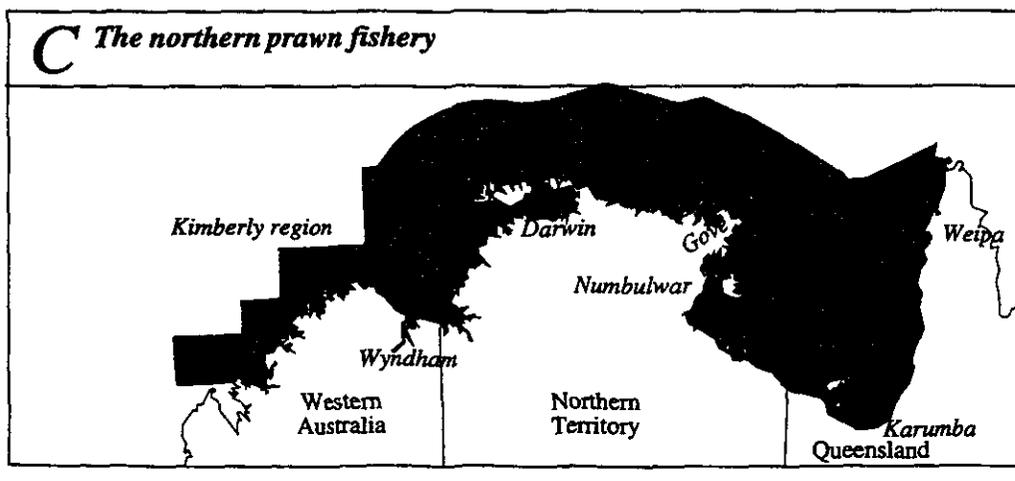
## FISHERIES SURVEYS 1997

### 4. Northern prawn fishery survey results

#### *The fishery*

The northern prawn fishery is located in Commonwealth waters in the Australian fishing zone and is bordered by Cape York in the east and Cape Londonderry in the west (figure C). It is the largest fishery by area in Australia, at over one million square kilometres. Gross value of prawn production from the fishery in 1996-97 was estimated to be \$102 million (from a catch of 8279 tonnes), which represents about 34 per cent of the total value of production from Commonwealth fisheries. Nearly \$3 million of other species were caught in 1996-97 (ABARE 1997a).

Boats are unitised under a system in which one A unit is required for each cubic metre of hull volume (underdeck tonnage) and one A unit for each kilowatt of engine power. Boat sizes range between 200 and 600 A units. The average age of the boats in the fleet is 15 years (Northern Prawn Fishery Assessment Group 1996) with a range of 5-26 years. High construction costs for new vessels make it more economic to upgrade existing hulls and to replace equipment such as engines or freezers as they wear out. Some of the existing vessels are being replaced by newly built boats, with six entering the fishery in 1996 (Northern Prawn Fishery Assessment Group 1996). All boats have dry freezer facilities and nearly all have some wet (brine) holding facility. All boats use modern electronic aids such as colour echo sounders and satellite navigation systems such as global positioning systems (GPS).



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The fishery is divided into two main seasons. A daytime fishery targeting schooling banana prawns, and a night time fishery for tiger prawns. The fleet starts fishing for banana prawns at the beginning of the fishing season (1 April) and then progressively changes to tiger prawn fishing as banana prawn catch rates decline. At present the banana prawn fishery lasts only about three to four weeks, and the tiger prawn fishery last eight months but is interrupted by a one month trawl closure in July (Wang and Die 1996).

Total prawn landings declined for the third consecutive year in 1996-97 to 8279 tonnes compared with 8860 tonnes in 1995-96 and 9097 tonnes in 1994-95. The total value of 1996-97 prawn landings fell by 10 per cent to \$102 million. Landings of banana prawns rose in 1996-97 to 4546 tonnes from 4347 tonnes in 1995-96, but catches of the more valuable species, tiger prawns, fell by 24 per cent to 2431 tonnes (ABARE 1997a). Landings of endeavour prawns, the other major species caught in the fishery, remained relatively unchanged in 1996-97 following a large increase in landings in 1995-96. The value of the nonprawn catch taken in the fishery, (mainly squid) rose sharply in 1996-97 from \$1 million in 1995-96 to nearly \$3 million.

There is a considerable amount of bycatch taken in the fishery and depending on gear setup, the prawn species being targeted, the area and the time of year, these bycatch species can make up from nearly nothing to as much as 90 per cent of the weight of the catch (Pender and Williams 1989). Bycatch consists of a wide variety of species, mainly small fish and crustaceans. Sea turtles are also caught occasionally. Most bycatch species have no or an extremely low value and most are discarded. A few species have commercial value and these are retained (for example, small shark). It is not feasible to retain large volumes of low value bycatch because the fishery is geared toward a high value, small volume frozen product, with boats operating at sea for extended periods.

### *Biological status of the fishery*

The fishery targets three commercial groups of prawns: banana prawns, tiger prawns and endeavour prawns, with small catches of king prawns, squid and bugs. Banana and tiger prawns account for about 80 per cent of the landed catch.

Commercial prawn species have a life span of up to two years. Juvenile prawns live in coastal and estuarine areas in beds of seagrass or mangrove lined creeks. After one to two months on the nursery grounds, the prawns move offshore into the fishing grounds. While banana prawns reach commercial size before six months of age, the market prefers tiger prawns to be larger (that is, at 9-12 months old).

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## *FISHERIES SURVEYS 1997*

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The sustainable long term average annual catch for banana prawns in the northern prawn fishery is thought to be around 4000 tonnes, which is approximately the average annual catch for the past ten years (Bureau of Resource Sciences 1997), although in individual years it has varied from around 2000 to 12 000 tonnes.

A review of the status of tiger prawn stock by the Northern Prawn Fishery Assessment Group (1996) reported that there was evidence that tiger prawn stocks were overfished at the end of 1996. The assessment argued that present fishing effort in the tiger prawn fishery is greater than that required to achieve maximum sustainable yield and stocks of spawning tiger prawns are reduced to levels where recruitment to the fishery is compromised.

The Fishery Assessment Group (1996) noted that there had been a number of changes to the configuration of trawlers in the northern prawn fishery in the period 1989-96. These included new entrants to the fishery, changes in gear configurations, the introduction of global position systems, plotters and differential GPS.

The new estimate of the maximum sustainable level for the tiger prawn fishery is 3785 tonnes (1866 tonnes of brown tiger and 1919 tonnes of grooved tiger prawns).

### *Management of the fishery*

In 1988, the Commonwealth government accepted managerial responsibility for the northern prawn fishery under the terms of the Offshore Constitutional Settlement. Also under the Offshore Constitutional Settlement the Commonwealth has jurisdiction for the target species of prawns, bugs, scallops, scampi and, where taken by prawn trawl gear, squid. The Commonwealth also has jurisdiction over any bycatch taken with the target species, for example turtles. Part of the Offshore Constitutional Settlement agreements entailed the making of Memorandums of Understanding with each state and the Northern Territory, setting bycatch limits.

The northern prawn fishery is managed by a series of input controls. The key feature is limited entry, complemented by a unitisation system, permanent and seasonal closures, gear limitations, controlled season start and, in recent years, a reduction in the size of the fleet.

The most recent strategy to enhance the economic viability of the fleet and help conserve prawn stocks was a voluntary buyback scheme. This involved the compulsory reduction of unit numbers on 1 April 1994 if the buyback had

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## *FISHERIES SURVEYS 1997*

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not withdraw sufficient effort. This led to a compulsory 30.76 per cent reduction in the number of units held against each trawler on 1 April 1994, resulting in a smaller fleet of 127 active vessels fishing. Restrictions on boat numbers continued through 1994 and 1995. Trawlers fishing in the northern prawn fishery range from 13 metres to 25 metres long and are permitted to fish with no more than two main nets.

Seasonal closures were introduced in the northern prawn fishery to optimise the yield of banana prawns by allowing the prawns to grow to an optimal market size and value before being harvested. The current opening date for the fishing season is 1 April. Closures during the winter months were introduced in 1987 to reduce fishing effort on the prespawning stock of tiger prawns. The midyear closure operates from 15 June to 1 August, with the fishing season closing on 1 December to avoid catching small tiger prawns that begin to recruit to offshore grounds at that time.

Further changes to management arrangements are currently being considered. The Northern Prawn Fishery Management Advisory Committee (NORMAC) agreed that there should be further effort adjustment in the fishery given the recent information about the status of the tiger prawn stocks. It is proposed that there be another compulsory surrender of class A units. While the exact level of surrender has yet to be determined, the Northern Prawn Fishery Assessment Group estimated that at the end of 1996 the amount of effort reduction required to achieve maximum sustainable yield was 10 per cent, and an additional 5 per cent reduction was likely for each year after that.

### *Boats surveyed*

The fleet, for the purposes of the survey, was separated into three homogeneous groups on the basis of size (the unit of measure being the number of class A units). A sample of boats from each group was surveyed. The three groups were: smaller than 375 class A units (small boats), between 375 and 475 A units (medium boats) and larger than 475 A units (large boats).

The target population for the survey was defined as those boats that held a Commonwealth northern prawn endorsement for the fishery and fished during that year. The total number of boats eligible for the survey in 1994-95 was 133. Eight boats were sampled from a population of 42 in the small boat category, 25 from a population of 48 in the medium sized boat category and 26 from a population of 43 in the large boat category. In 1995-96, the total eligible population was 134 boats, of which nine out a population of 41 small boats were sampled, 30 out of a population of 53 in the medium sized category and 27 out of 40 boats in the large boat category were sampled.

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## *FISHERIES SURVEYS 1997*

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### *Financial performance*

The major measures of financial performance of the boats surveyed in the northern prawn fishery are shown in table 4. It should be noted that these estimates include activities in other fisheries, such as the Torres Strait, Kimberley and Queensland east coast prawn fisheries.

There are a number of external factors which affected the performance in the fishery over the survey period. With around 90 per cent of the product from the northern prawn fishery being exported, market conditions in overseas markets and exchange rate conditions have a major bearing on returns for this fishery. In addition, environmental factors such as monsoonal rains also have an influence on the availability of prawns for harvesting, particularly banana prawns.

Following a decline in the value of prawn exports in 1995-96 (\$223 million), the value of exports declined further in 1996-97 to \$184 million, a reduction of 18 per cent. This decline in value reflected both a decline in volume (13 074 tonnes in 1995-96 to 10 890 tonnes in 1996-97) and a fall in unit returns (ABARE 1997a).

### *Receipts*

Average total cash receipts per boat for operators across the fishery were around \$948 000 in 1995-96, 11 per cent lower than the fleet average in 1994-95. Lower catches and lower returns on export markets were the most likely contributors to this decline. Prawn receipts fell 2 per cent, 5 per cent and 21 per cent for small, medium and large boats respectively (table 4). For the larger and smaller sized boats there was a 9 per cent and 6 per cent decline respectively in the quantity of prawns sold, while for medium sized boats there was 3 per cent increase in the quantity of prawns sold (table 5).

In addition to lower catches influencing fishing receipts, the catch composition may also have been an influencing factor. Smaller boats have had a greater reliance on banana prawn sales compared with the other boats in the fishery. For medium and large sized boats the greater reliance on tiger prawns has meant they were relatively more affected by the 20 per cent decline in prices for tiger prawns in 1995-96 compared with the 3 per cent decline in banana prawn prices (ABARE 1997a).

Estimates of average receipts per boat in 1996-97 are based on changes in catch and prices between 1995-96 and 1996-97. The lower catch of the more valuable tiger prawns in the 1996 tiger prawn fishing season more than offset the rise

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### 4 *Financial performance of boats in the northern prawn fishery – under 375 units* Average per boat

	Unit	1994-95	1995-96	1996-97 <sup>p</sup>
<b>Receipts</b>				
Prawn receipts	\$	748 442 (34)	730 140 (11)	663 700 (12)
Other fishing receipts	\$	2 275 (83)	6 530 (61)	7 300 (62)
Nonfishing receipts	\$	792 (98)	740 (76)	900 (78)
Total cash receipts	\$	751 509 (34)	737 410 (11)	671 900 (12)
<b>Costs</b>				
Administration	\$	10 483 (39)	17 340 (25)	18 700 (27)
Crew costs	\$	247 962 (26)	241 930 (8)	221 200 (9)
Freight and marketing	\$	14 401 (28)	14 920 (20)	12 000 (20)
Fuel	\$	71 099 (35)	82 440 (11)	88 000 (8)
Insurance	\$	12 586 (43)	15 930 (15)	16 600 (16)
Interest paid	\$	15 570 (71)	26 090 (48)	25 400 (56)
Leasing	\$	11 983(115)	13 880 (89)	7 700 (91)
Licence fees and levies	\$	26 318 (33)	30 440 (11)	32 300 (11)
Packaging	\$	8 617 (45)	7 580 (27)	8 200 (26)
Repairs and maintenance	\$	95 923 (32)	126 450 (21)	83 500 (13)
Other costs	\$	20 276 (27)	28 190 (19)	36 300 (21)
Total cash costs	\$	535 218 (28)	605 190 (8)	549 900 (7)
<b>Boat cash income</b>	\$	216 291 (50)	132 220 (33)	121 900 (46)
less depreciation a	\$	26 701 (21)	40 130 (24)	41 600 (27)
<b>Boat business profit</b>	\$	189 590 (55)	92 090 (52)	80 400 (79)
plus interest, leasing and rent	\$	30 882 (60)	43 000 (39)	36 500 (41)
<b>Profit at full equity</b>	\$	220 472 (52)	135 090 (32)	116 900 (46)
<b>Capital</b>				
– excl. quota and licences	\$	624 960 (24)	745 160 (13)	678 200 (13)
– incl. quota and licences	\$	na	2 725 880 (9)	2 570 000 (9)
<b>Rate of return capital b</b>	%	35.3 (43)	18.1 (36)	17.2 (49)
<b>Rate of return to full equity c</b>	%	na	5.0 (32)	4.6 (45)

*Continued* ◊

## FISHERIES SURVEYS 1997

### 4 Financial performance of boats in the northern prawn fishery – 375–475 units Average per boat

	Unit	1994-95	1995-96	1996-97 p
<b>Receipts</b>				
Prawn receipts	\$	1 035 481 (4)	987 270 (5)	992 400 (4)
Other fishing receipts	\$	15 988 (27)	12 150 (24)	12 800 (25)
Nonfishing receipts	\$	22 423 (28)	11 030 (24)	10 000 (26)
Total cash receipts	\$	1 073 892 (4)	1 010 450 (5)	1 015 200 (4)
<b>Costs</b>				
Administration	\$	33 013 (17)	50 630 (12)	48 700 (12)
Crew costs	\$	271 493 (5)	228 320 (4)	229 400 (4)
Freight and marketing	\$	17 929 (11)	18 240 (11)	18 700 (10)
Fuel	\$	135 698 (3)	130 600 (4)	157 500 (2)
Insurance	\$	28 642 (7)	31 390 (7)	43 400 (9)
Interest paid	\$	14 927 (32)	15 210 (24)	33 300 (18)
Leasing	\$	4 701 (31)	16 120 (29)	15 100 (31)
Licence fees and levies	\$	41 997 (5)	41 200 (4)	52 900 (4)
Packaging	\$	17 133 (9)	16 690 (7)	18 100 (6)
Repairs and maintenance	\$	269 976 (7)	215 360 (6)	172 600 (5)
Other costs	\$	33 099 (9)	38 470 (15)	40 100 (15)
Total cash costs	\$	868 608 (2)	802 230 (4)	829 800 (2)
<b>Boat cash income</b>	\$	205 284 (17)	208 220 (14)	185 400 (22)
less depreciation a	\$	55 328 (9)	65 950 (8)	68 900 (8)
<b>Boat business profit</b>	\$	149 956 (22)	142 270 (21)	116 500 (36)
plus interest, leasing and rent	\$	20 997 (25)	32 370 (19)	49 500 (14)
<b>Profit at full equity</b>	\$	170 953 (19)	174 640 (19)	166 000 (25)
<b>Capital</b>				
– excl. quota and licences	\$	816 259 (3)	1 109 810 (7)	1 143 000 (7)
– incl. quota and licences	\$	na	3 620 770 (2)	3 643 700 (2)
<b>Rate of return capital b</b>	%	20.9 (18)	15.7 (23)	14.5 (30)
<b>Rate of return to full equity c</b>	%	na	4.8 (20)	4.6 (26)

Continued ◻

## FISHERIES SURVEYS 1997

### 4 *Financial performance of boats in the northern prawn fishery – over 475 units* Average per boat

	Unit	1994-95	1995-96	1996-97 <sup>p</sup>
<b>Receipts</b>				
Prawn receipts	\$	1 330 141 (4)	1 057 020 (3)	960 800 (2)
Other fishing receipts	\$	21 637 (21)	22 200 (28)	25 100 (30)
Nonfishing receipts	\$	61 (63)	1 540 (55)	100 (46)
Total cash receipts	\$	1 351 839 (4)	1 080 760 (3)	986 000 (2)
<b>Costs</b>				
Administration	\$	69 503 (9)	84 070 (8)	83 000 (10)
Crew costs	\$	333 096 (4)	250 300 (3)	227 400 (3)
Freight and marketing	\$	18 959 (7)	17 930 (7)	16 500 (8)
Fuel	\$	143 488 (3)	153 010 (3)	167 400 (2)
Insurance	\$	55 913 (6)	48 140 (6)	50 500 (6)
Interest paid	\$	6 314 (26)	10 310 (22)	12 600 (21)
Leasing	\$	529 (47)	500 (50)	500 (63)
Licence fees and levies	\$	56 134 (4)	53 240 (5)	58 200 (5)
Packaging	\$	29 193 (5)	23 000 (4)	22 400 (4)
Repairs and maintenance	\$	193 639 (6)	276 120 (7)	185 100 (5)
Other costs	\$	22 436 (7)	19 550 (8)	21 800 (9)
Total cash costs	\$	929 204 (3)	936 170 (4)	845 400 (2)
<b>Boat cash income</b>	\$	422 635 (9)	144 590 (23)	140 600 (17)
less depreciation <sup>a</sup>	\$	61 294 (4)	60 660 (3)	61 500 (4)
<b>Boat business profit</b>	\$	361 343 (11)	83 930 (40)	79 100 (31)
plus interest, leasing and rent	\$	7 021 (23)	11 000 (21)	13 300 (20)
<b>Profit at full equity</b>	\$	368 362 (11)	94 930 (36)	92 400 (27)
<b>Capital</b>				
– excl. quota and licences	\$	1 072 174 (4)	1 068 650 (3)	1 126 300 (3)
– incl. quota and licences	\$	na	4 107 720 (1)	4 207 400 (1)
<b>Rate of return capital <sup>b</sup></b>	%	34.4 (11)	8.9 (37)	8.2 (28)
<b>Rate of return to full equity <sup>c</sup></b>	%	na	2.3 (36)	2.2 (27)

*Continued* ◊

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### 4 Financial performance of boats in the northern prawn fishery – all boats Average per boat

	Unit	1994-95	1995-96	1996-97 <sup>p</sup>
<b>Receipts</b>				
Prawn receipts	\$	1 040 107 (8)	929 410 (3)	882 400 (3)
Other fishing receipts	\$	13 482 (16)	13 430 (19)	14 800 (20)
Nonfishing receipts	\$	8 352 (27)	5 050 (21)	4 300 (24)
Total cash receipts	\$	1 061 940 (8)	947 890 (3)	901 500 (4)
<b>Costs</b>				
Administration	\$	37 699 (8)	50 430 (7)	49 800 (8)
Crew costs	\$	283 989 (8)	239 040 (3)	226 300 (3)
Freight and marketing	\$	17 147 (9)	17 130 (7)	16 000 (7)
Fuel	\$	117 803 (7)	122 560 (3)	139 200 (2)
Insurance	\$	32 392 (7)	31 660 (4)	37 300 (5)
Interest paid	\$	12 343 (32)	17 080 (24)	24 700 (20)
Leasing	\$	5 652 (78)	10 770 (39)	8 400 (33)
Licence fees and levies	\$	41 616 (7)	41 500 (4)	48 200 (3)
Packaging	\$	18 344 (8)	15 780 (5)	16 400 (5)
Repairs and maintenance	\$	190 269 (7)	206 290 (6)	149 100 (4)
Other costs	\$	25 596 (8)	29 680 (10)	33 400 (10)
Total cash costs	\$	782 850 (6)	781 920 (3)	748 800 (2)
<b>Boat cash income</b>	\$	279 090 (14)	165 970 (12)	152 700 (16)
less depreciation <sup>a</sup>	\$	48 211 (5)	56 470 (6)	58 300 (7)
<b>Boat business profit</b>	\$	230 879 (16)	109 500 (20)	94 400 (28)
plus interest, leasing and rent	\$	19 599 (31)	29 240 (19)	34 700 (15)
<b>Profit at full equity</b>	\$	250 478 (16)	138 740 (15)	129 100 (19)
<b>Capital</b>				
– excl. quota and licences	\$	838 605 (6)	985 950 (14)	995 800 (4)
– incl. quota and licences	\$	na	3 492 320 (2)	3 483 400 (2)
<b>Rate of return capital<sup>b</sup></b>	%	29.9 (14)	14.1 (17)	13.0 (21)
<b>Rate of return to full equity<sup>c</sup></b>	%	na	4.0 (15)	3.7 (19)

<sup>a</sup> Depreciation adjusted for profit and loss on capital items sold. <sup>b</sup> Excluding value of quota or licence. <sup>c</sup> Including value of quota or licence. <sup>p</sup> Preliminary. na Not available.

Note: Figures in parentheses are relative standard errors, expressed as percentages of the estimates.

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### 5 Quantity of prawns sold by sample boats in the northern prawn fishery *Average per boat*

		Smaller than 375 units	375-475 units	Larger than 475 units	All boats
<b>1994-95</b>					
Number of boats	no.	8	25	26	59
Tiger prawns	kg	25 079 (28)	25 616 (6)	32 658 (6)	27 725 (9)
Banana prawns	kg	19 442 (24)	34 067 (7)	46 075 (7)	33 330 (6)
Endeavour prawns	kg	7 802 (23)	6 999 (15)	6 011 (8)	6 933 (10)
King prawns	kg	220 (77)	977 (31)	543 (19)	597 (21)
Other	kg	1(117)	682 (45)	2 354 (15)	1 008 (16)
Total	kg	52 544 (25)	68 341 (4)	87 641 (4)	69 593 (6)
<b>1995-96</b>					
Number of boats	no.	9	30	27	66
Tiger prawns	kg	22 573 (12)	21 570 (7)	22 728 (5)	22 223 (5)
Banana prawns	kg	17 642 (13)	38 570 (5)	42 102 (7)	33 221 (4)
Endeavour prawns	kg	9 243 (14)	8 073 (6)	12 606 (4)	9 784 (5)
King prawns	kg	134 (55)	910 (29)	243 (11)	474 (23)
Other	kg	14 (54)	985 (36)	2 288 (12)	1 077 (15)
Total	kg	49 606 (11)	70 108 (4)	79 967 (3)	66 779 (3)

*Note:* Figures in parentheses are relative standard errors, expressed as percentages of the estimates.

in returns from the slightly higher banana prawn catch in the 1997 fishing season. These factors are estimated to, on average, have resulted in prawn receipts per boat declining by 5 per cent to \$882 000. Overall, total receipts are estimated to have fallen by 5 per cent to \$901 500 per boat in 1996-97 (table 4).

### *Costs*

Average cash costs for boats in the fishery in 1995-96 were relatively unchanged from the 1994-95 level at \$782 000. The major components of total costs are crew, fuel costs and costs for repairs to boat and equipment. In 1995-96, on average, administration, fuel, interest and repairs and maintenance costs were 34 per cent, 4 per cent, 38 per cent and 8 per cent higher, respectively, than in 1994-95. Conversely, crew costs were 16 per cent lower.

Changes in average total cash costs per boat, however, were not uniform throughout the fishery. Average total cash costs per boat for the small and large boat classes rose 13 per cent and 1 per cent respectively from their 1994-95 levels, while average total costs in the medium boat class fell by 8 per cent. A factor leading to this variation is that repairs and maintenance costs in the medium boat class fell in 1995-96, whereas they rose in the other two classes.

## *FISHERIES SURVEYS 1997*

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On average, 31 per cent of total cash costs were attributable to crew costs, while repairs and maintenance costs accounted for 26 per cent and fuel costs accounted for 16 per cent. In 1995-96, crew costs were 16 per cent lower for the entire fleet. For the small boat class, crew costs were 2 per cent lower, for medium boats 16 per cent lower and large boat class 25 per cent lower. As crew costs are generally a percentage of receipts, this decline in crew costs reflects the decline in receipts.

Costs in 1996-97 were estimated using a series of cost indexes, as well as on the basis of changes in catch and effort. Changes in catch and effort, derived from logbook information, affect crew payments, marketing costs and fuel costs. The cost indexes were determined by ABARE from a survey of suppliers of goods and services to the rural sector (ABARE 1997b).

Based on these indexes and changes in catch and effort, average total cash costs per boat in 1996-97 are estimated to have been \$749 000, 4 per cent lower than in 1995-96. Costs directly related to lower catches — that is, crew and freight and marketing — are estimated to have fallen by 5 per cent and 6 per cent respectively. Fuel costs rose by an estimated 14 per cent with further increases in effort and in the cost of fuel in 1996-97.

### *Boat cash income and profit*

Boat cash income and boat business profit provide an indication of the ability of the operator to remain in the fishery in the short to medium term without the need for recourse to additional finance. They reflect fluctuations in receipts and costs.

On average, cash income per boat for the entire fishery was \$279 000 in 1994-95 and \$166 000 in 1995-96. On average, smaller boats had a 39 per cent lower cash income per boat in 1995-96 (\$132 000), while for medium sized boats, it was 1 per cent higher (\$208 000) and for larger sized boats it was 66 per cent lower (\$145 000) compared with 1995-96 levels.

In 1995-96 for the fleet as a whole, boat profit averaged almost \$110 000, 52 per cent lower than in 1994-95. This decline reflects both lower boat cash income and higher depreciation costs.

Profit at full equity is estimated by adding leasing costs, interest charges and rent payments to boat profit. While these costs affect the financial position of the individual operator in the fishery, from a broader perspective they represent profits that are redistributed to other investors in the fishery. Profit at full equity provides a measure of the return which would have been earned by the business

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## *FISHERIES SURVEYS 1997*

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unit had the boat and capital (including entitlements) been fully owned by the operator.

Profit at full equity for the fishery averaged \$139 000 per boat, 45 per cent lower than the level in 1994-95. Performance across the sectors reflect the trends in average boat profit, with smaller and larger sized boats experiencing declines, while boats in the medium sized class had a slight improvement in performance.

For 1996-97 profit at full equity for the fleet is estimated to have declined again, although at a lower rate (7 per cent) than in the previous year to \$129 000. This fall in performance is estimated to have occurred across all sectors of the fishery.

### *Rates of return*

The rate of return to capital in the two survey years declined from 29.9 per cent in 1994-95 to 14.1 per cent in 1995-96 and is estimated to have fallen further to 13.0 per cent in 1996-97. There are differences in the rates of return achieved between the various sectors of the fleet. The rate of return for the smaller sized boats was higher than the fishery average, at 18.1 per cent in 1995-96, while for the larger boats in the fleet it was lower, at 8.9 per cent. For 1996-97, it is estimated that the small boat category was again the best performed sector of the fleet, with a rate of return to capital of 17.2 per cent, 4.2 percentage points higher than the fleet average and higher than the rates for the medium sized boat category (14.5 per cent) and large boat category (8.2 per cent).

This value excludes the value of the units and licence and may present a more favourable view of returns to investment in the fishery than was actually realised. When the value of units and licence are included, the average rate of return across the fleet is estimated at 3.7 per cent in 1996-97, compared with 4.0 per cent in 1995-96.

### *Debt and equity*

Information on debt and equity for the boats surveyed is reported in table 6. Across the fleet in 1995-96, the average level of debt per boat rose nearly two and half times to an average closing balance of \$338 000. Of this, 60 per cent was designated as being used for licence and endorsement purchase, 22 per cent for working capital and 17 per cent for boat purchase. Average interest payments for this debt rose by 38 per cent in 1995-96 to \$17 000 per boat.

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### 6 Boat debt and equity of northern prawn fishery boats in 1995-96

*Average per boat*

	Unit	All boats
Capital (incl. quota and licences) at 30 June a	\$	2 826 580 (8)
Boat business debt at 1 July b	\$	137 710 (28)
Boat business debt at 30 June b	\$	337 920 (57)
Change in debt over year b	\$	200 210 (100)
Boat business equity at 30 June a	\$	2 488 660 (11)
Boat business equity ratio at 30 June a	%	88.0 (8)

a Average per boat responding on debt. b Average per responding boat.

Note: Figures in parentheses are relative standard errors, expressed as percentage of the estimates.

The debt servicing ratio is the proportion of total receipts needed to make interest payments on the debt. The average debt servicing ratio in 1995-96 for the fleet was 2.7 per cent (table 4). Equity provides a measure of the financial ownership of a fishing enterprise. The average boat business equity ratio of the northern prawn fishery fleet was 88.0 per cent in 1995-96.

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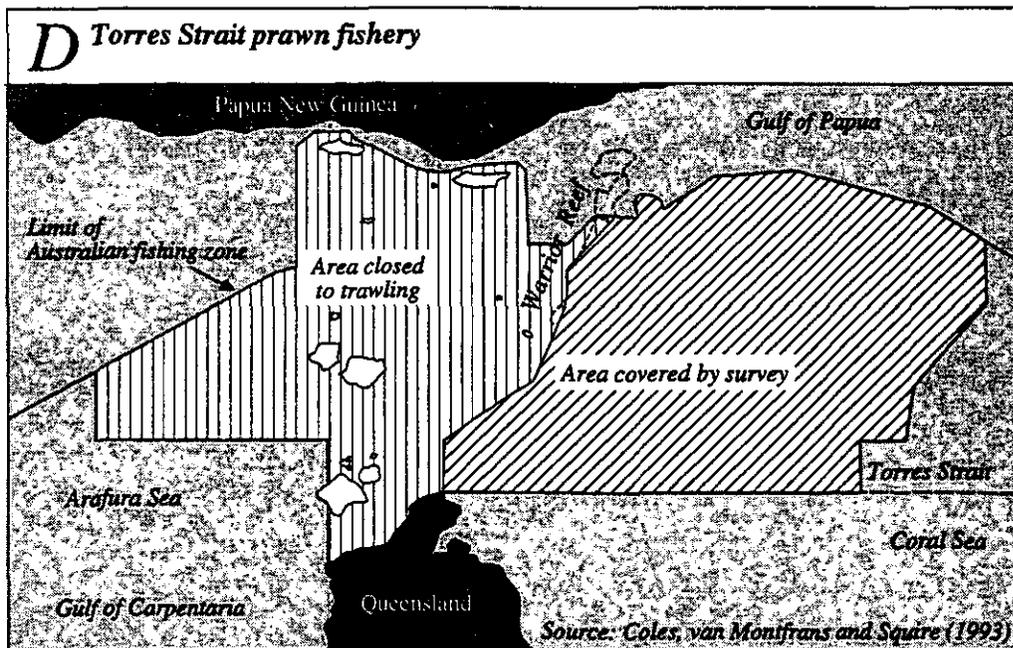
### 5. Torres Strait prawn fishery survey results

#### *The fishery*

The Torres Strait is located between the tip of the Cape York Peninsula of Queensland to the south coast of Papua New Guinea and bordered in the west by the Arafura Sea and the Coral Sea to the east. The main prawn fishing ground in the Torres Strait is the east of the Warrior Reef complex with a focus around Yorke Island which is the main anchorage for the fleet (figure D).

The fishery targets tiger and endeavour prawns. Endeavour prawns have comprised 30–65 per cent of the total catch of the fishery since 1980, and brown tiger prawns 30–61 per cent. The remaining 2–4 per cent is mostly made up of red spot king prawn (Bureau of Resource Sciences 1997).

In 1996-97 the gross value of prawn production from the fishery was \$16 million from a catch of 1624 tonnes (ABARE 1997a). The prawn fishery is the most valuable sector of the Torres Strait fisheries, accounting for 70 per cent of the value of production of all commercial fishing in the strait.



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In the Torres Strait prawn fishery, fishing is carried out by otter trawling at night by vessels up to 20 metres long and averaging 15 metres (Bureau of Resource Sciences 1997). Few vessels fish exclusively in the Torres Strait and most move between the Queensland east coast prawn fishery and the northern prawn fishery.

### *Biological status of the fishery*

The stocks are not considered to be in danger of being overfished under the existing management arrangements. The current sustainable yield estimates are similar to, or greater than the catches over the past five years. In addition, the effort expended by the trawler fleet in recent years is within or below the predicted range of effort required to achieve the optimum yield (Bureau of Resource Sciences 1997).

Sustainable yields in the Torres Strait range from 1370 to 2850 tonnes. These estimates are considered to be realistic given the variability and uncertainty in stock size and cover the range of historical catches (Bureau of Resource Sciences 1997).

Estimates of optimal effort required to fish the prawns in the Torres Strait vary between 8700 and 13 300 boat days. The suggestion is that, based on actual catch and effort data, and that the fleet could expand fishing effort to the maximum effort quota of 13 570 days, the fishery is fully fished (Bureau of Resource Sciences 1997).

### *Management of the fishery*

Management of the Torres Strait prawn fishery as a separate and distinct jurisdiction fishery from the northern prawn fishery and Queensland east coast otter trawl fishery only occurred when the Torres Strait Treaty was ratified in 1985. At the time of ratifying the Treaty about 500 vessels had obtained a licence to operate in the Torres Strait prawn fishery.

The major objectives of management in the Torres Strait are to conserve the prawn stocks while allowing their optimum utilisation, as well as to maximise opportunities for traditional inhabitants to participate in the fishery. In 1987, among other restrictions, limited entry management of the prawn fishery was introduced to reduce latent effort and prepare for the catch sharing provisions of the treaty. This management arrangement effectively reduced the number of vessels holding a licence to operate in the Torres Strait Protected Zone prawn fishery to 150. In addition, a boat replacement policy was proposed but this was rejected. In 1989 a freeze on the transfer of licences instead of a boat

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replacement policy was implemented and by June 1992 around 110 vessels were licensed to operate in the fishery.

In 1993 interim management provisions were introduced in an attempt to cap effort by allocating each vessel a number of fishing days in which it may operate in the Torres Strait prawn fishery. This allocation was based on the greatest number of days the vessel fished in the strait during any one of the four previous financial years ended 1991-92, with an additional allocation for nonfishing time and breakdowns.

In 1994 the interim management provisions were approved with the addition of transferability of fishing days access (in ten day blocks) between operators in the fishery. As at January 1996 the fleet comprised 94 licensed vessels assigned 13 570 fishing days, compared with 110 licensed vessels in June 1992 having a potential 30 250 fishing days. All vessels are also required to hold Queensland east coast prawn endorsements and 31 vessels held entitlements to fish in the northern prawn fishery (AFMA 1997).

In addition there are restrictions on sizes of boat and gear used in the fishery. Seasonal and area closures of the prawn fishery are an important management tool, keeping sensitive areas free from trawling and allowing protection for areas at important times — such as during recruitment of small prawns to the fishery.

The whole of the Torres Strait prawn fishery is closed between 1 December and 1 March the following year.

### *Boats surveyed*

For the purpose of the survey, the fleet was defined as boats that only operated in the Torres Strait prawn fishery. Boats that operated in the northern prawn fishery were not included in this survey as they were included in the survey of the northern prawn fishery. Because of the uniformity in the size of boats and types of operations in the fishery, the fleet was not divided into sectors as was the case for the other fishery surveys, and results are presented only for the fleet as a whole.

For the survey a total sample of 17 boats from a population of 60 boats were selected in 1994-95, while in 1995-96 24 vessels were sampled from a population of 60 boats.

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### Financial performance

The principal measures of financial performance obtained from survey results are presented in table 7. Most prawns are exported, with the destination depending on the size and type of prawn. The principal market for the larger tiger prawns is Japan, while endeavour prawns are exported to the United States. There is also a large bycatch of Moreton Bay bugs. In some cases, tropical rock lobster are also caught in commercial quantities but under regulations have to be returned to the sea.

#### 7 Financial performance of Torres Strait prawn fishery boats – all boats Average per boat

	Unit	1994-95	1995-96	1996-97 <sup>p</sup>
<b>Receipts</b>				
Prawn receipts	\$	413 816 (11)	407 940 (5)	360 600 (5)
Other fishing receipts	\$	8 342 (31)	16 510 (29)	16 900 (32)
Nonfishing receipts	\$	2 399 (56)	2 210 (41)	9 700 (65)
Total cash receipts	\$	424 557 (11)	426 660 (5)	387 200 (5)
<b>Costs</b>				
Administration	\$	9 511 (19)	11 310 (10)	11 500 (11)
Crew costs	\$	136 145 (13)	141 960 (6)	129 100 (7)
Freight and marketing	\$	15 004 (14)	16 460 (8)	14 300 (8)
Fuel	\$	68 029 (10)	69 730 (4)	63 000 (7)
Insurance	\$	13 067 (14)	13 240 (6)	13 400 (6)
Interest paid	\$	14 945 (29)	16 100 (16)	14 900 (20)
Leasing	\$	439 (81)	1 250 (56)	1 000 (75)
Licence fees and levies	\$	4 423 (19)	4 590 (6)	5 000 (7)
Packaging	\$	4 114 (27)	4 420 (17)	5 000 (19)
Repairs and maintenance	\$	97 945 (16)	92 140 (7)	87 200 (8)
Other costs	\$	21 140 (15)	17 020 (8)	16 300 (9)
Total cash costs	\$	384 762 (10)	388 220 (4)	360 700 (5)
<b>Boat cash income</b>	\$	39 795 (36)	38 440 (4)	26 500 (51)
less depreciation <sup>a</sup>	\$	22 507 (25)	26 610 (7)	27 200 (8)
<b>Boat business profit</b>	\$	17 288 (73)	11 830 (65)	-700 (2560)
plus interest, leasing and rent	\$	16 228 (26)	17 530 (14)	16 000 (18)
<b>Profit at full equity</b>	\$	33 516 (44)	29 360 (25)	15 300 (89)
<b>Capital</b>				
–excl. quota and licences	\$	418 394 (6)	399 960 (5)	393 500 (5)
– incl. quota and licences	\$	na	659 670 (5)	651 900 (5)
<b>Rate of return capital <sup>b</sup></b>	%	8.0 (42)	7.3 (24)	3.9 (89)
<b>Rate of return to full equity <sup>c</sup></b>	%	na	4.5 (24)	2.4 (89)

<sup>a</sup> Depreciation adjusted for profit and loss on capital items sold. <sup>b</sup> Excluding value of quota or licence. <sup>c</sup> Including value of quota or licence. <sup>p</sup> Preliminary. na Not available.

Note: Figures in parentheses are relative standard errors, expressed as percentages of the estimates.

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### *Receipts*

The quantity of prawn sales per boat (36 tonnes), on average, was 7 per cent lower in 1995-96 than in 1994-95, because of lower sales of endeavour prawns (table 8). This decline in quantity was partly offset by an increase in the price of endeavour prawns (ABARE 1997a), so that average prawn receipts per boat were around \$408 000 in 1995-96, only 1 per cent lower than in 1994-95.

Average cash receipts per boat of the Torres Strait prawn fleet from prawning in both the Torres Strait prawn fishery and Queensland east coast prawn fishery were lower in 1995-96 than in 1994-95. In 1995-96 prawn receipts from the Torres prawn fishery were \$354 000 per boat, while receipts from the Queensland east coast prawn fishery averaged \$54 000 per boat.

On average, total cash receipts per boat increased by less than 1 per cent in 1995-96 to \$427 000. Offsetting the decline in prawn receipts was an improvement in receipts of bycatch species from \$8300 in 1994-95 to \$16 500 in 1995-96.

Estimates of total cash receipts per boat for 1996-97 were based on changes in catch and effort recorded in logbooks between 1995-96 and 1996-97. Total cash receipts per boat, on average, are estimated to have been \$387 000 in 1996-97, 9 per cent lower than in 1995-96. While the total catch in the fishery rose by 3 per cent in 1996-97 this was more than offset by declines in prices for both tiger and endeavour prawns (ABARE 1997a).

### *Costs*

On average, cash costs per boat for the fishery increased marginally in 1995-96 to \$388 000. All the major cost items such as crew, freight and marketing,

### *Quantity of prawns sold by sample boats in the Torres Strait prawn fishery* *Average per boat*

	Units	1994-95	1995-96
<b>All boats</b>			
Number of boats	no.	17	24
Tiger prawns	kg	12 908 (14)	12 329 (10)
Banana prawns	kg	0 (0)	0 (0)
Endeavour prawns	kg	21 710 (15)	18 897 (10)
King prawns	kg	1 702 (35)	1 104 (32)
Other	kg	2 587 (58)	3 820 (36)
<b>Total</b>	<b>kg</b>	<b>38 906 (11)</b>	<b>36 150 (7)</b>

*Note:* Figures in parentheses are relative standard errors, expressed as percentages of the estimates.

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fuel, insurance and interest payments increased during 1995-96. The only major cost item that fell was the cost involved with repairs and maintenance.

Crew costs are the largest component of total cash costs, representing almost 37 per cent of average total cash costs per boat in 1995-96. Generally, the crew receives a percentage of fishing receipts from which they have to pay a share of boat running costs, such as fuel and food. In 1995-96, crew costs were 4 per cent higher at \$142 000 per boat.

Fuel and repairs and maintenance costs are the other major components of total cash costs, together accounting for around 43 per cent of total cash costs. In 1995-96 fuel costs were around \$69 700, almost 3 per cent higher than in 1995-96. This was offset by a 6 per cent decline in repairs and maintenance costs over the same period.

Costs in 1996-97 were estimated using a series of cost indexes, and recorded changes in catch and effort. Changes in catch and effort, derived from logbook information, affect crew payments, marketing costs and fuel costs. The cost indexes were determined by ABARE from a survey of suppliers of goods and services to the rural sector (ABARE 1997b). On the basis of these indexes and changes in catch and effort, average cash costs per boat in 1996-97 are estimated at almost \$361 000 per boat, a decline of 7 per cent. Declines are estimated for all three of the major costs items — crew, fuel and repairs and maintenance.

### *Boat cash income and profit*

Boat cash income and boat business profit provide an indication of the ability of the operator to remain in the fishery in the short to medium term without the need for recourse to additional finance. They reflect fluctuations in receipts and costs. In 1995-96, on average, boat income (\$38 400) was 3 per cent lower than in the previous year. Boat cash income in 1996-97 is estimated to have been 31 per cent lower than in 1995-96, at \$26 500, following lower average total cash receipts per boat (table 7).

Boat profit allows for the depreciation of capital, to provide a measure of return to the operator. Boat profit has followed the same trend as boat income. In 1995-96 boat profit was \$11 800, 32 per cent lower than in 1994-95. On average, boat profit in 1996-97 is estimated to have fallen further to minus \$700. The lower estimated average boat profit in 1996-97 reflects a expected fall in prawn receipts.

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The operational performance of the fishery can be measured by profit at full equity. This is estimated by adding leasing costs, interest charges and rent payments back into boat profit. While these costs affect the financial position of the individual operator in the fishery, from a broader perspective they represent profits that are redistributed to other investors in the fishery. Profit at full equity provides a measure of the return which would have been earned by the business unit had the boat and capital (including licences) been fully owned by the operator. As such, this measure provides a common basis for comparison of the operational performance of all boats in the fishery.

Profit at full equity per boat in 1995-96 was around \$29 400, 12 per cent lower than in 1994-95. Profit at full equity per boat in 1996-97 is estimated to have fallen to \$15 300 because of lower fishing receipts.

Rate of return to boat capital is calculated on total capital as if all fishing assets were wholly owned by the proprietors so that the financial performance of all sample boats can be compared, regardless of the proprietors' equity in the business. Rate of return to boat capital is computed by expressing profit at fully equity as a percentage of total capital (excluding licence value). The rate of return to capital per boat was 8.0 per cent in 1994-95, 7.3 per cent in 1995-96 and an estimated 3.9 per cent in 1996-97. Rate of return to full equity is computed by expressing profit at full equity as a percentage of total capital (including licence values). This gives operators interested in investing in a new boat and/or licence a measure of the economic performance of the fishery. This measure was 4.5 per cent in 1995-96 and an estimated 2.4 per cent in 1996-97.

### *Debt and equity*

Average boat debt rose during 1995-96 from an opening balance of \$97 300 to a closing balance of \$127 400 (table 9). Around 56 per cent of the debt is

#### **9** *Boat debt and equity of Torres Strait prawn fishery boats in 1995-96* Average per boat

	Unit	All boats
Capital (incl. quota and licences) at 30 June <b>a</b>	\$	657 750 (6)
Boat business debt at 1 July <b>b</b>	\$	97 320 (26)
Boat business debt at 30 June <b>b</b>	\$	127 360 (21)
Change in debt over year <b>b</b>	\$	30 040 (57)
Boat business equity at 30 June <b>a</b>	\$	530 400 (9)
Boat business equity ratio at 30 June <b>a</b>	%	80.6 (5)

**a** Average per boat responding on debt. **b** Average per responding boat.

Note: Figures in parentheses are relative standard errors expressed as percentage of the estimates.

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incurred for boat purchases, 31 per cent for working capital and the rest for purchases of effort units/licences. Interest payments for this debt rose 8 per cent in 1995-96 to \$16 100.

Equity provides a measure of the financial ownership of a fishing enterprise. The average equity ratio of the Torres Strait fleet in 1995-96 was 80.6 per cent. There was an improvement in the boat business equity from around \$370 000 in 1993-94, to \$530 000 in 1995-96. There was also an improvement in the equity ratio over the period from 73.5 per cent in 1993-94 to 80.6 per cent in 1995-96.

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