

FISHERIES

SURVEYS REPORT



1992

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Physical and financial
performance in
Australian fisheries
1989-90 to 1991-92



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Foreword

The *Fisheries Surveys Report 1992* contains detailed estimates of the physical and financial performance of domestic operators in fisheries surveyed by ABARE in 1992. The report, produced by the Fisheries Economics Section of ABARE, is the first in an annual series of reports on the economic performance of Australia's major Commonwealth fisheries.

In this issue, information is included on the northern prawn and south east fisheries for the financial years 1989-90, 1990-91, 1991-92, and for the east coast tuna fishery for the financial

years 1989-90 and 1990-91. The estimates are presented, as far as possible, in a consistent format to facilitate comparisons within and between industries.

BRIAN FISHER
Executive Director, ABARE

May 1993

Acknowledgments

ABARE staff

The survey information presented in this report was a cooperative effort between the Fisheries Economics Section, the Surveys Section and the Research Resource Unit of ABARE. The report was compiled by Tony Battaglione and Sean Pascoe of the Fisheries Economics Section. Some of the text was adapted from the *Farm Surveys Report 1992*, compiled by John Tucker, Don Barker and Jonathan Horton of the Surveys Section. The analyses were undertaken by Trevor Dann (northern prawn fishery), Patrick Power (south east fishery) and Michael Stephens (east coast tuna fishery) of the Fisheries Economics Section. The maps were produced by Jane Wright of the Research Resource Unit.

Sample selection and sample weighting were performed with the assistance of Milly Lubulwa and Ray Hinde of the Research Resource Unit. Data were collected, entered and edited by Paul Phillips, Damo Nambiar, Laurie Cannon, Lorraine Crowe, Barry Swan, Peter Martin and Madeleine Taylor, of the Surveys Section, and Ken Baulch and Michael Stephens of the Fisheries Economics Section. The survey

questionnaire was designed by Paul Phillips, Damo Nambiar, Ken Baulch, Michael Stephens and Sean Pascoe.

Industry

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

The Australian Fisheries Management Authority provided logbook information necessary to select a sample and provide relevant population statistics. The Australian Fisheries Management Authority has been supportive of the data collection and has also offered invaluable advice.

Funding

For the 1991-92 data collection on the northern prawn, south east and east coast tuna fisheries ABARE received financial assistance from the Fisheries Resources Research Fund.

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ABARE fisheries surveys

The Australian fishing industry is currently undergoing a period of substantial change. Declining catch levels, concerns surrounding the long term sustainability of the resource, and low profit levels have been experienced in recent times in a number of important Australian fisheries. Substantial restructuring has already occurred in the southern bluefin tuna fishery; and, following the implementation of recent fisheries management changes, adjustment has commenced in the northern prawn and south east fisheries and is likely to occur in the southern shark fishery. Restructuring may also be necessary in other Commonwealth managed fisheries.

The Commonwealth government has acknowledged that it has an important role in fisheries management and has accepted the responsibility of maximising the economic efficiency of the fishing industry while conserving the resource for future generations (Commonwealth of Australia 1989). However, there is still a high level of uncertainty surrounding the economic and biological status of many Australian fisheries. In addition, the likely impact of industry restructuring on operators and fish stocks is largely unclear. Surveys providing up-to-date information on the costs and returns from fishing and on the economic structure of the fishing industry are likely to provide an important input into more efficient and effective fisheries management in Australia.

ABARE has conducted economic surveys of selected Australian fisheries on an ad hoc basis since the early 1980s (see appendix A). However, in view of the current rapid rate of change in the northern prawn and south east fisheries, an annual review of the economic performance of these fisheries is desirable. For the other Commonwealth managed fisheries, regular surveys would also provide valuable information for managers.

It is intended that a selection of the principal Commonwealth fisheries will be surveyed each year. In 1992, surveys were undertaken on domestic activity in:

- the northern prawn fishery;
- the south east fishery; and
- the east coast tuna fishery.

The first two of these are undergoing substantial restructuring, and the intention is to survey them annually while this process is occurring. The third has not previously been surveyed by ABARE. These surveys provide a broad range of information on the physical characteristics and financial performance of boats that operated in these fisheries. The information gained is summarised in this report.

The sampling of boats is based on logbook information collected from all licensed fishing operations in Commonwealth fisheries, and supplied by the Australian Fisheries Management Authority. This information is used to select a sample of boats in each fishery stratified by type of operation, boat size and catch. Details of the boats sampled, and the populations which they represent, are presented on pages 5–8.

Between March and June 1992 the owner or skipper of each sample boat selected was visited by an ABARE officer. The officer interviewed the boat owner or skipper to obtain physical and financial details of the fishing business for the 1989-90 and 1990-91 financial years. Further information was subsequently obtained from accountants, selling agents and marketing organisations, on the signed authority of the respondents. Logbook information, recent market information and input price indexes were used to estimate expected receipts and costs for 1991-92.

Considerable effort has been made to reconcile the information obtained from the 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 this report constitute only a small proportion of the total amount of detailed data collected.

The survey estimates

The 1989-90 and 1990-91 estimates presented in this report are **final**. All the data from sampled operators, their accountants and marketing agents have been reconciled, and no further changes are expected in the estimates.

The 1991-92 figures are **preliminary** estimates. Preliminary logbook information, recent market information and input price indexes were used to estimate expected receipts and costs for 1991-92. Details of the methods used to make these estimates are given in appendix B.

An indication of the reliability of the estimates is given by the relative standard errors (see pp. 5, 8 for an explanation of this measure). Relative standard errors have been calculated for all 1989-90, 1990-91 and 1991-92 estimates.

Mapping fishing performance

The northern prawn, east coast tuna and south east fisheries operators all complete logbook information which includes the latitude, longitude, fish species, date and catch weight of each trawl or set. Maps depicting the value of catch by location in 1990-91 were produced using this logbook information and market prices for each fish species. Details of the methods used to construct these maps are given in appendix C.

Definitions of items

The following are definitions and explanations of the main physical and financial items reported.

Physical items

The physical information was taken from both the logbook information and the survey interviews. The information is presented for both the sample and the population on pages 6–8.

Boat size is expressed in management units, for the northern prawn and south east fishery boats. These units are the sum of underdeck volume in cubic metres and engine power in kilowatts. For the east coast tuna fishery (where management does not employ boat units), boat size is expressed as length in metres.

Effort is measured in hours fished, for the northern prawn and south east fishery boats. This includes both search time and trawl time. For the east coast tuna boats, effort is expressed in thousands of hook-hours. This is the number of hooks (in thousands) used on each boat multiplied by the number of hours the hooks were in the water.

Catch is expressed in kilograms. The catch information applies only to the fishery surveyed. For example, the catch for the northern prawn boats excludes catch taken in Torres Strait or other prawn fisheries for which the boat may be endorsed. The south east fishery catch excludes catch taken in state waters. The east coast tuna catch excludes any catch taken in other fisheries, such as the south east fishery, or in state waters.

Financial items

The boat **capital** value shown is the total gross value of capital items, including the value of the hull, engine and other on-board capital (but excluding the value of the licence). Licence holders were asked to provide estimates of the

capital invested in boats and fishing gear. The boats are treated as if wholly owned by the proprietors. This procedure is adopted so that the financial performance of all sample boats can be compared, regardless of the proprietors' shares in the equity.

Receipts for fish products sold are ex-vessel values. Receipts shown are prior to any deductions made by marketing authorities for freight and selling charges. Where appropriate these charges are included in costs. Receipts include amounts received in the survey year for fish harvested and delivered in previous years. The value of receipts was obtained through the interviews.

Total cash receipts are the cash inflows to the boat during the financial year from the sale of fish, non-fishing receipts (which include non-fishing use of the boat, such as charter operations), and other sources (insurance claims and compensation, government assistance and any other revenue). As far as possible, fishing income is apportioned to the fishery from where the fish came and only that income associated with the surveyed fishery is counted.

Total cash costs include the payments made for both permanent and casual hired labour (including an imputed payment to the owner-operators at rates comparable with their employed counterparts in the fishery, where necessary), and payments for materials and services (including payments on capital items subject to leasing, rent, interest, licence fees and, for the northern prawn fishery, aerial spotting). Capital and household expenditures are excluded.

Boat cash income is defined as the difference between total cash receipts and total cash costs. Boat cash income is one measure of the boat owner's capacity to continue operating in a fishery in the short term — that is, over a period during which the fishing boat does not need to be replaced. Operators can withstand a

negative return on investment and depreciation over such a period as long as they receive sufficient return to meet all of the cash costs incurred.

Depreciation figures were obtained from the taxation returns of survey respondents and so represent respondents' estimates of depreciation. Depreciation is a non-cash cost representing the decline in productive services from capital items maintained during the survey year.

Boat profit (or return to capital) is defined as boat cash income less depreciation.

Profit at full equity is measured 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 owned 100 per cent of the assets employed in the business.

To stay in a fishery over the longer term, operators need to meet all costs including depreciation of capital plus a return on the original investment equivalent to that which could have been earned elsewhere. Profit at full equity therefore provides a measure of the capacity of operators to stay in the fishery in the long run.

Rates of return (to boat capital) are computed by expressing profit at full equity as a percentage of total capital (excluding licence value).

Boat characteristics, sample sizes and reliabilities of estimates

The survey samples, and boat characteristics

The numbers of licence holders in the northern prawn fishery, south east fishery and east coast tuna fishery from whom responses were obtained (the sample) and the population, by group where applicable, are provided in tables 1, 2 and 3. The classification of boats into groups is explained on pages 11 and 17. The populations are based on logbook returns for the survey years. The proportions of the fishery populations sampled changed slightly over the survey years due to boats entering or leaving the fisheries (tables 1, 2 and 3).

It should be noted that, in the northern prawn fishery, some operators who were licensed to fish did not do so during the survey years, or returned incomplete logbooks, and therefore were excluded from the population for the purpose of the survey. As a result there may be differences between the number of fishermen licensed to fish in the northern prawn fishery and the populations from which the survey samples were selected for the survey years. Logbook data for only 155 boats were available, and it was these that were used to weight the sample data collected (see below), although the actual vessel population in 1991-92 may have been larger. However, this is not expected to substantially affect the sample means estimated.

For the east coast tuna fishery, estimates could not be calculated for 1991-92 (see appendix B). Moreover, in this fishery there is some disparity between the sample measures and population values (see 'Sampling errors' below) for both effort and catch. This occurs because there are a small number of boats in the population that take very large catches and consequently have high effort levels, which were underrepresented in the survey due to non-response. However, the boats surveyed are typical of the majority of boats in the fishery.

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, 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).

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 can be seen from tables 1 and 2.

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.

1 Boat characteristics, northern prawn fishery: population and sample Average per boat a

		Smaller than 375 units		375–475 units		Larger than 475 units		All boats	
	Unit	Sample	Population	Sample	Population	Sample	Population	Sample	Population
1989-90									
Number of boats	no.	17	71	18	65	30	63	65	199
Size	A units b	290 (7)	308	430 (1)	425	590 (2)	563	430 (2)	427
Hours fished	hr	1 790 (5)	1 649	2 280 (3)	2 229	2 210 (2)	2 214	2 090 (2)	2 017
Catch									
– banana	kg	5 470 (27)	5 015	11 790 (14)	12 661	18 480 (12)	18 607	11 650 (9)	11 815
– tiger	kg	12 600 (9)	12 598	16 650 (5)	16 547	16 960 (6)	17 217	15 300 (4)	15 350
– endeavour	kg	4 510 (11)	4 656	5 660 (10)	4 821	5 210 (6)	4 788	5 110 (5)	4 752
– king	kg	250 (25)	298	650 (13)	599	530 (8)	580	470 (8)	486
Total	kg	22 830 (0) c	22 567	34 750 (0)	34 628	41 180 (0)	41 192	32 530 (0)	32 403
1990-91									
Number of boats	no.	18	70	20	48	31	50	69	168
Size	A units b	300 (7)	307	420 (1)	422	590 (1)	562	420 (2)	416
Hours fished	hr	1 880 (3)	1 799	2 340 (3)	2 408	2 330 (3)	2 403	2 150 (2)	2 153
Catch									
– banana	kg	16 050 (13)	16 054	44 280 (5)	43 978	66 240 (4)	64 116	39 140 (3)	38 336
– tiger	kg	15 470 (8)	15 626	18 310 (5)	18 630	18 400 (6)	19 699	17 160 (4)	17 696
– endeavour	kg	3 760 (8)	3 597	4 010 (8)	4 086	4 050 (6)	4 163	3 920 (4)	3 905
– king	kg	360 (32)	361	680 (13)	580	450 (16)	565	480 (12)	484
Total	kg	35 640 (0)	35 638	67 280 (0)	67 274	89 140 (0)	88 543	60 700 (0)	60 422
1991-92 p									
Number of boats	no.	18	65	20	44	31	46	69	155
Size	A units b	302 (3)	307	425 (1)	424	590 (1)	569	420 (2)	418
Hours fished	hr	1 980 (4)	1 958	2 470 (2)	2 428	2 470 (1)	2 505	2 270 (2)	2 254
Catch									
– banana	kg	6 270 (19)	6 157	19 490 (8)	18 331	24 350 (6)	24 679	15 390 (5)	15 110
– tiger	kg	19 300 (8)	20 095	22 790 (4)	24 078	28 140 (2)	27 991	22 910 (3)	23 569
– endeavour	kg	6 180 (5)	5 455	6 390 (9)	6 282	6 760 (3)	6 549	6 410 (4)	6 014
– king	kg	100 (25)	142	430 (11)	404	470 (9)	490	300 (7)	320
Total	kg	31 850 (0)	31 849	49 100 (0)	49 095	59 720 (0)	59 709	45 010 (0)	45 013

a Figures in parentheses are relative standard errors: see 'sampling errors' in this chapter. b Units of boat size are explained on p. 3. c Here and in table 2, relative standard errors in sample catch figures are zero because catch is the basis for weighting (see p. 5). p Preliminary.

2 Boat characteristics, south east fishery: population and sample Average per boat a

		Inshore trawlers		Offshore trawlers		Danish seiners		All boats	
	Unit	Sample	Population	Sample	Population	Sample	Population	Sample	Population
1989-90									
Number of boats	no.	14	62	13	59	11	20	38	141
Size	unit b	119 (8)	130	220 (8)	279	65 (4)	68	154 (6)	183
Hours fished	hr	724 (12)	600	330 (21)	335	464 (13)	493	522 (9)	474
Catch	kg	135 772 (0)	135 772	764 071 (0)	764 071	106 268 (0)	106 268	394 492 (0)	394 492
1990-91									
Number of boats	no.	17	55	14	39	11	22	42	116
Size	unit b	146 (5)	144	271 (8)	304	65 (4)	69	173 (5)	184
Hours fished	hr	994 (7)	840	306 (14)	299	495 (11)	505	668 (6)	595
Catch	kg	213 114 (0)	213 114	873 391 (0)	873 391	115 421 (0)	115 421	416 576 (0)	416 576
1991-92 p									
Number of boats	no.	13	48	12	41	9	18	34	107
Size	unit b	125 (5)	130	247 (9)	282	66 (6)	68	162 (6)	176
Hours fished	hr	863 (9)	792	632 (18)	571	494 (9)	520	712 (8)	662
Catch	kg	155 646 (0)	155 646	575 112 (0)	575 112	99 975 (0)	99 975	307 011 (0)	307 011

a Figures in parentheses are relative standard errors. b Units of boat size are explained on p. 3. p Preliminary.

3 Boat characteristics, east coast tuna fishery: population and sample Average per boat ^a

	Unit	Sample	Population
1989-90			
Number of boats	no.	28 79	
Length	m	15 (4)	16
Days fished	days	31 (7)	31
Effort	'000 hook-hours	64 (8)	110
Catch	kg	8 721 (6)	10 735
1990-91			
Number of boats	no.	40	73
Length	m	16 (3)	18
Days fished	days	29 (5)	36
Effort	'000 hook-hours	92 (10)	140
Catch	kg	10 646 (4)	14 747

^a Figures in parentheses are relative standard errors.

In general, the smaller the relative standard error, the more reliable the estimate. Note, however, that because relative standard errors are expressed as percentages of the estimates, numerically small estimates tend to have large relative standard errors.

Example of 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 a survey estimate is within one standard error of the exact value which would have been obtained if all boats in the target population had been surveyed (the census value). There is roughly a nineteen-in-twenty chance that a survey estimate is within two standard errors of this census value. (Tables 1-3 illustrate this fact, since they show variables for which — unlike the financial measures — the census values are known.)

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 changes derived from successive survey estimates, or when comparing different industries, than when using single estimates.

When comparing estimates, it is important to recognise that the differences are also subject to sampling error. As a rough rule of thumb, a conservative estimate (that is, an overestimate) 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.

For example, suppose that total cash receipts were \$100 000 in one year and \$125 000 in the next — 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:

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

When comparing estimates for change from year to year it should be noted that there may be changes in the industry populations from one

year to the next. As mentioned in the discussion of target populations above, the northern prawn fishery in particular is subject to considerable change in composition between years.

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 non-sampling errors (see below).

Non-sampling errors

The values obtained in a survey are affected by errors other than those relating directly to the

sampling procedure. For example, it might not be possible to contact certain types of boats; the responses may be influenced by the interviewer; the respondent may provide inaccurate information; non-respondents may differ from respondents in terms of a variable being surveyed; and mistakes may occur in the editing and processing of data.

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

Survey results for the northern prawn fishery

The northern prawn fishery is located in Commonwealth waters in the Australian Fishing Zone between Cape Londonderry and Cape York. It covers about 1 million square kilometres of water, making it one of Australia's largest fisheries by area. It is also one of Australia's highest valued fisheries, with production in 1991-92 estimated to be worth over \$81 million from a total catch of around 7000 tonnes (ABARE 1992). Over 90 per cent of the catch from the northern prawn fishery is exported, the principal market being Japan.

Despite the high valued nature of the resource, profitability in the fishery has been generally low. This is largely because there has been an excessive number of vessels competing to harvest the limited resource. Falling world prawn prices have further reduced the profitability of the fishery over recent years. Management policies in recent years have been focused on reducing the number of vessels in the fishery so that the overall profitability may be improved. In 1985, almost 300 vessels were endorsed to operate in the fishery. The current

management scheme is aimed at reducing the fleet size to about 120 boats by 1993.

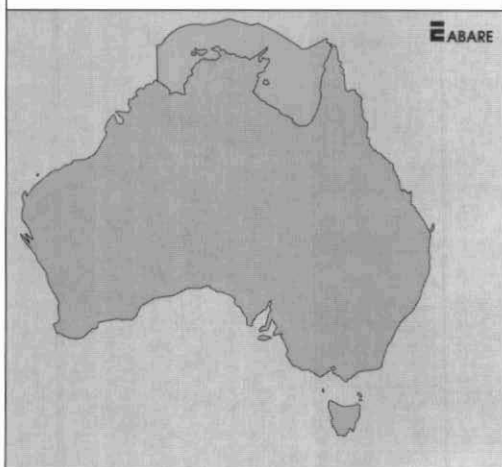
There is a large variety in the size of boats that operate in the fishery. In the class A units employed in the current management plan (the sum of hull volume in cubic metres and engine size in kilowatts), boat sizes range from below 200 units to over 600 units. Some of the smaller boats are also endorsed to fish in the Torres Strait (Commonwealth) and Queensland east coast (state) prawn fisheries.

The average annual prawn catch in the fishery over the past nine years has been just over 9000 tonnes. Over this period, banana prawns accounted for 46 per cent of the catch but only 22 per cent of the fishing effort. In contrast, tiger prawns accounted for 41 per cent of the catch but 71 per cent of the effort. The tiger prawn catch was made up of brown and grooved tiger prawns in roughly equal proportions. Endeavour prawns and king prawns accounted for most of the remainder of the annual catch. These were generally bycatch from tiger prawn fishing activities, although some targeting occurred.

The prawn season begins in March/April with operators targeting banana prawns almost exclusively. At this stage of the season, banana prawns aggregate into large 'boils' which are easily located, making the prawns very vulnerable to capture. Once the banana prawn catch rates fall, operators target the more valuable (but harder to catch) tiger prawns.

Banana prawn catches vary considerably from year to year, with recruitment to the fishery (that is, the quantity of juvenile prawns becoming vulnerable to fishing) highly correlated with monsoonal rainfall. The higher the rainfall the greater the number of prawns that enter the fishery in that season. The length of the banana prawn season is generally related to the number of banana prawns that enter the fishery — the greater the number of prawns, the longer

Area of the northern prawn fishery



the period before operators begin to target tiger prawns.

Management policies in Australia's northern prawn fishery were first introduced in the early 1970s, and have undergone many changes. The current management scheme incorporates various regulations that have been implemented over the years, and includes: seasonal closures, daylight trawling bans, limited entry, boat replacement rules, gear restrictions and a buy-back scheme.

Physical characteristics

For the purpose of the survey the fleet was, before sampling, categorised into three groups of similar sized boats (based on class A units). A sample of boats from each group was then chosen for inclusion in the survey. The three groups were:

- smaller than 375 class A units;
- between 375 and 475 class A units; and
- larger than 475 class A units.

The physical characteristics of boats in the northern prawn fishery over the survey period are presented in table 4. (Note that these are for the whole population, not for a sample.) Based on logbook data, the number of vessels in the fleet was reduced by around 22 per cent between 1989-90 and 1991-92, from 199 boats to 155. This was primarily due to a government approved buy-back package — the Voluntary Adjustment Scheme — introduced in 1990. During the first phase of this scheme (completed by March 1991) 40 boats were removed from the fishery. A further three boats were removed from the fishery under a second phase of the buy-back between September and December 1991 (Macreadie and Yates 1992). The reduction was greatest for the medium and large boats (32 per cent and 27 per cent, respectively, between 1989-90 and 1991-92), while only 8 per cent of the small boats left the fishery during the period.

During these years, variable climatic conditions in the Gulf of Carpentaria affected both catches and operator behaviour in the northern prawn fishery. Low monsoonal rainfalls prior to the 1990 and 1992 banana

prawn seasons resulted in lower than average catches of banana prawns in 1989-90 and 1991-92. In contrast, high monsoonal rainfalls resulted in an extended banana prawn season and consequently near record banana prawn catches in 1990-91. This may have also assisted increased production of tiger prawns in 1991-92, by allowing these prawns to reach a larger size before they were harvested. Total catch weight of tiger prawns was considerably higher in 1991-92 than in either 1990-91 or 1989-90.

The fluctuation in catch levels between years was evident for all boat groups. For example, the large boats averaged a catch of around 41 tonnes of prawns in 1989-90; 89 tonnes in 1990-91; and 60 tonnes in 1991-92. High banana prawn catches were the major reason for the large increase in the 1990-91 catch, for all boat groups.

The significant fluctuations in prawn catches over the survey period were not reflected in the average effort levels per boat for any of the three groups. There was an average rise in nominal effort for the fishery as a whole from 1989-90 to 1990-91 of around 7 per cent, and then a further rise of around 5 per cent in 1991-92. Small boats showed the largest increase in effort: on average, around 19 per cent greater in 1991-92 than in 1989-90.

Catch value and location

The value of catches per unit area in the northern prawn fishery during 1990-91 is shown in map 1. As mentioned above, the major commercial species caught in the northern prawn fishery are banana, tiger, endeavour and king prawns. The catches and average prices received by fishermen for these species in 1990-91, and the method used to construct this map, are given in appendix C.

As has been noted, in 1990-91 the northern prawn fishery experienced large banana prawn catches. The high values in the (dark blue) regions north of Wyndham and on the west coast of Cape York Peninsula are a result of this banana prawn catch. The region east of Numbulwar through to north of Karumba was characterised by a high catch value because of

4 Boat characteristics, northern prawn fishery Average per boat

	Unit	Smaller than 375 units	375-475 units	Larger than 475 units	All boats
1989-90					
Number of boats	no.	71	65	63	199
Size	A units	308	425	563	427
Hours fished	hr	1 649	2 229	2 214	2 017
Catch					
- banana	kg	5 015	12 661	18 607	11 815
- tiger	kg	12 598	16 547	17 217	15 350
- endeavour	kg	4 656	4 821	4 788	4 752
- king	kg	298	599	580	486
Total	kg	22 567	34 628	41 192	32 403
1990-91					
Number of boats	no.	70	48	50	168
Size	A units	307	422	562	416
Hours fished	hr	1 799	2 408	2 403	2 153
Catch					
- banana	kg	16 054	43 978	64 116	38 336
- tiger	kg	15 626	18 630	19 699	17 696
- endeavour	kg	3 597	4 086	4 163	3 905
- king	kg	361	580	565	484
Total	kg	35 638	67 274	88 543	60 422
1991-92 p					
Number of boats	no.	65	44	46	155
Size	A units	307	424	569	418
Hours fished	hr	1 958	2 428	2 505	2 254
Catch					
- banana	kg	6 157	18 331	24 679	15 110
- tiger	kg	20 095	24 078	27 991	23 569
- endeavour	kg	5 455	6 282	6 549	6 014
- king	kg	142	404	490	320
Total	kg	31 849	49 095	59 709	45 013

p Preliminary.

good catches of tiger prawns, which receive the highest average price of the four species.

maintained downward pressure on the price of prawns on that market.

Financial performance

The principal measures of the financial performance of boats in the northern prawn fishery obtained from the survey are given in table 5.

A major influence on the financial performance of boats in the northern prawn fishery over the survey period is the fluctuating catch levels caused by varying seasonal conditions, referred to above. In addition, operators in the fishery have also had to contend with falling prices for prawns on the Japanese market during the surveyed years. High production from prawn farms in south east Asia which export their product to Japan has

Receipts

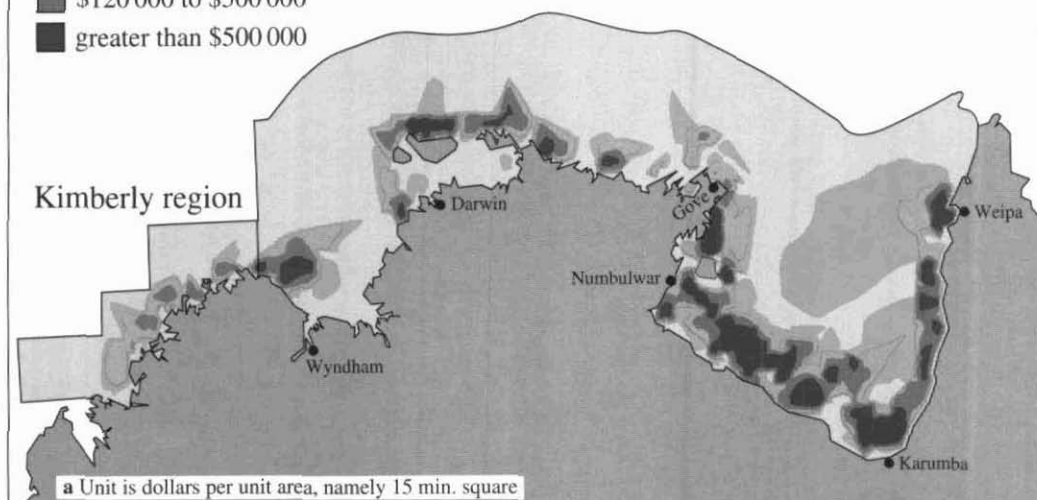
On average, the total cash receipts of northern prawn fishery boats increased by around 51 per cent in 1990-91, to around \$678 000, largely due to high banana prawn catches. Following a fall in banana prawn catches in the 1992 season, total cash receipts of northern prawn fishery boats fell by an estimated 25 per cent in 1991-92. In 1991-92 the large boat sector of the fleet was the worst affected, with average receipts estimated to have fallen by around 30 per cent. Medium sized boats experienced an average decrease in receipts of 25 per cent, while receipts for the small boats are estimated to have fallen by around 15 per cent.

1 Value of catches in the northern prawn fishery, 1990-91

ABARE

Key:

- less than \$7 000 a
- \$7 000 to \$28 000
- \$28 000 to \$120 000
- \$120 000 to \$500 000
- greater than \$500 000



Costs

On average, total cash costs for the whole fishery per vessel rose by around 17 per cent to \$538 000 in 1990-91, before falling an estimated 8 per cent in 1991-92. In 1991-92, it is estimated that total cash costs fell by around 11 per cent for vessels in the large boat sector, 7 per cent for the medium boats, and 4 per cent for small boats.

The cost reductions were largely in crew costs and packaging costs, which on average are estimated to have fallen by around 22 per cent to \$127 000 and 26 per cent to \$24 000, respectively, from 1990-91 to 1991-92. The reductions in these costs can be explained by the fact that they are directly correlated with boat catch. Crew costs are determined as a proportion of boat revenue, while marketing and packaging are charged per kilogram. Interest payments also fell, falling on average by around 18 per cent to \$26 000. In contrast, fuel costs showed an apparent small average increase of around 2 per cent across the fishery, despite the reduction

in catch. This reflects the small increase in effort in the fishery between 1990-91 and 1991-92.

Rates of return

The effect of catch fluctuations on operators' incomes is evident in the estimates of financial performance. Average boat cash income for the fishery fluctuated from a low of -\$12 000 in 1989-90 to \$141 000 in 1990-91 and thence to an estimated \$15 000 in 1991-92. In terms of boat profit (allowing for depreciation of capital) the fall in cash income resulted in an average loss of -\$24 000 over the entire fishery in 1991-92 compared with an average profit of \$99 000 in 1990-91. In 1991-92, medium sized boats had an estimated average loss of -\$62 000, while large boats averaged losses of -\$24 000. Only the small boats appear to have returned a positive average profit in 1991-92.

For the fishery as a whole the average rate of return to boat capital in 1991-92 is likely to have been positive — well below the 1990-91 average of 18 per cent, but better than the 2 per cent average loss recorded in 1989-90. Again

5 Financial performance of northern prawn fishery boats Average per boat a

		Smaller than 375 units			375-475 units		
	Unit	1989-90	1990-91	1991-92 p	1989-90	1990-91	1991-92 p
Receipts							
Prawn receipts	\$	308 670 (10)	437 610 (9)	369 100 (6)	466 920 (5)	723 110 (3)	538 800 (2)
Other fishing receipts	\$	760 (93)	770 (92)	1 200 (85)	0 (na)	0 (na)	0 (na)
Non-fishing receipts	\$	2 850 (35)	8 220 (30)	7 400 (35)	3 100 (41)	8 330 (36)	7 500 (36)
Total cash receipts	\$	312 280 (10)	446 600 (9)	377 700 (6)	470 020 (5)	731 440 (3)	546 300 (2)
Costs							
Administration	\$	12 130 (33)	15 790 (40)	15 500 (32)	49 710 (29)	32 520 (23)	35 500 (23)
Aerial spotting	\$	630 (46)	1 080 (50)	1 000 (47)	140 (59)	720 (51)	700 (50)
Crew costs	\$	81 550 (18)	113 190 (11)	97 600 (10)	119 360 (3)	166 190 (4)	132 200 (7)
Food	\$	2 700 (25)	3 250 (25)	3 600 (25)	730 (59)	780 (23)	800 (21)
Fuel	\$	56 640 (9)	78 600 (9)	81 100 (9)	104 000 (3)	124 680 (4)	127 600 (6)
Ice	\$	0 (na)	0 (na)	0 (na)	0 (na)	1 460 (77)	1 500 (75)
Insurance	\$	12 020 (10)	13 050 (9)	12 400 (8)	22 410 (5)	20 490 (5)	18 800 (5)
Interest paid b	\$	35 940 (28)	28 460 (27)	22 500 (26)	60 400 (30)	49 350 (23)	41 300 (23)
Licence fees	\$	16 960 (8)	11 110 (6)	11 400 (6)	32 890 (2)	21 450 (6)	21 400 (6)
Packaging	\$	11 990 (17)	19 480 (11)	17 200 (10)	19 920 (8)	36 160 (6)	26 600 (6)
Repairs and maintenance	\$	54 700 (12)	50 440 (12)	51 300 (12)	83 870 (9)	101 390 (9)	108 400 (9)
Other costs	\$	17 380 (23)	30 260 (22)	34 800 (20)	18 770 (20)	33 130 (15)	33 900 (14)
Total cash costs	\$	302 640 (10)	364 710 (6)	348 400 (6)	512 200 (5)	588 320 (3)	548 700 (3)
Boat cash income	\$	9 640 (163)	81 890 (19)	29 300 (37)	-42 180 (64)	143 120 (28)	-2 400 (526)
Depreciation	\$	31 490 (20)	28 720 (19)	27 300 (18)	65 660 (24)	65 750 (23)	59 900 (20)
Total costs	\$	334 130 (10)	393 430 (7)	375 700 (6)	577 860 (6)	654 070 (3)	608 600 (3)
Financial performance measures							
Boat profit	\$	-21 850 (71)	53 170 (28)	2 000 (543)	-107 840 (36)	77 370 (44)	-62 300 (29)
Profit at full equity	\$	14 090 (92)	81 630 (22)	24 500 (49)	-47 440 (53)	126 720 (23)	-21 000 (63)
Capital	\$	372 198 (10)	399 130 (11)	402 500 (9)	836 010 (5)	839 440 (5)	855 800 (5)
Rate of return	%	3.8 (93)	20.5 (23)	6.1 (49)	-5.7 (50)	15.1 (25)	-2.5 (63)

(Continued on next page)

5 Continued

		Larger than 475 units				All boats			
	Unit	1989-90	1990-91	1991-92	p	1989-90	1990-91	1991-92	p
Receipts									
Prawn receipts	\$	577 850 (4)	946 450 (2)	657 600 (2)		445 600 (3)	671 570 (3)	502 900 (2)	
Other fishing receipts	\$	0 (na)	0 (na)	0 (na)		300 (93)	320 (92)	500 (37)	
Non-fishing receipts	\$	370 (77)	2 190 (66)	2 600 (58)		2 150 (26)	6 440 (22)	6 000 (23)	
Total cash receipts	\$	578 220 (4)	948 640 (2)	660 200 (1)		448 050 (3)	678 330 (3)	509 400 (2)	
Costs									
Administration	\$	68 160 (20)	47 350 (16)	49 100 (13)		42 150 (15)	30 020 (13)	31 100 (12)	
Aerial spotting	\$	620 (74)	0 (na)	0 (na)		470 (39)	650 (38)	900 (36)	
Crew costs	\$	129 240 (6)	230 450 (2)	163 100 (2)		109 000 (5)	163 460 (3)	126 900 (4)	
Food	\$	1 860 (67)	550 (17)	600 (21)		1 790 (27)	1 740 (20)	1 900 (20)	
Fuel	\$	126 960 (3)	139 980 (2)	141 600 (3)		94 370 (3)	110 140 (3)	112 200 (4)	
Ice	\$	0 (na)	0 (na)	0 (na)		0 (na)	420 (77)	100 (75)	
Insurance	\$	27 500 (4)	26 360 (4)	24 700 (3)		20 320 (3)	19 160 (3)	17 900 (3)	
Interest paid b	\$	29 580 (51)	20 780 (35)	17 000 (31)		41 910 (20)	32 100 (16)	26 200 (15)	
Licence fees	\$	44 690 (2)	30 530 (2)	30 300 (2)		30 950 (2)	19 880 (3)	19 800 (2)	
Packaging	\$	21 800 (12)	46 280 (6)	31 000 (6)		17 690 (7)	32 270 (4)	24 000 (4)	
Repairs and maintenance	\$	101 920 (5)	110 640 (6)	114 400 (5)		79 180 (5)	83 010 (5)	86 200 (5)	
Other costs	\$	32 780 (22)	75 660 (11)	78 100 (10)		22 710 (13)	44 700 (9)	47 400 (8)	
Total cash costs	\$	585 110 (3)	728 580 (2)	649 900 (2)		460 540 (3)	537 550 (2)	494 600 (2)	
Boat cash income	\$	-6 890 (290)	220 060 (9)	10 300 (144)		-12 490 (98)	140 780 (9)	14 800 (49)	
Depreciation	\$	38 660 (10)	38 320 (9)	34 400 (8)		44 920 (13)	42 150 (11)	38 600 (11)	
Total costs	\$	623 770 (3)	766 900 (2)	684 300 (2)		505 460 (3)	579 700 (2)	533 200 (2)	
Financial performance measures									
Boat profit	\$	-45 550 (43)	181 740 (10)	-24 100 (62)		-57 410 (26)	98 630 (13)	-23 800 (34)	
Profit at full equity	\$	-15 970 (90)	202 520 (9)	-7 100 (180)		-15 500 (67)	130 730 (9)	2 400 (323)	
Capital	\$	1 105 370 (3)	1 094 800 (2)	1 100 300 (2)		755 860 (3)	732 220 (3)	738 300 (3)	
Rate of return	%	-1.4 (89)	18.5 (9)	-0.6 (179)		-2.1 (66)	17.9 (10)	0.3 (324)	

a Figures in parentheses are relative standard errors: see pp. 5, 8 for explanation. b Includes rent and finance lease payments. p Preliminary. na Not applicable (no observations).

only the small boats recorded a positive rate of return to boat capital in 1991-92, averaging 6 per cent, down from the 21 per cent recorded in 1990-91. The largest boats apparently had a small negative average rate of return to boat capital in 1991-92, as against a positive rate of 19 per cent in 1990-91. The financial performance of the larger boats fluctuates more than that of the small boats because it is much easier for them to increase their catch of banana prawns, and therefore returns, in good years. The rate of return to boat capital for medium sized boats fell from 15 per cent in 1990-91 to an estimated -3 per cent in 1991-92. These boats showed the lowest rates of return of the three size groups throughout the period of the survey,

and appear to be the most reliant on favourable conditions to remain financially viable.

It must be remembered, when interpreting the above results, that the performance of all but the smallest boats in the fleet is restricted by the current management strategy of the fishery. Gear restrictions limit both the number and size of nets that the larger boats can carry. This may prevent the medium and large sized boats from carrying the most efficient configurations of nets for their size, and hence may prevent them from operating at the most efficient level. A lifting of such restrictions would be expected to allow the larger vessels to improve their financial performance.

Survey results for the south east fishery

The south east fishery is located in the Commonwealth waters of the Australian Fishing Zone from Barenjoey Point, just north of Sydney, to Beachport, South Australia. Gross value of production in 1991-92 was estimated to be almost \$64 million (ABARE 1992).

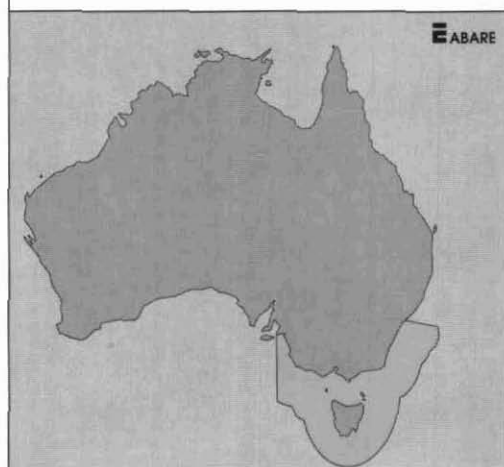
Over 100 species are caught in this fishery. However, a relatively small number of species dominate the commercial catch, and half the gross value of production is derived from one species: orange roughy. Until recently, redfish and gemfish also provided an important part of the income of some operators. However, concerns over the state of the stocks of these three species have led managers to reduce the allowable catches, thus reducing returns obtained from them.

The south east fishery can be considered as three separate subfisheries, according to vessel type. The inshore trawl boats generally operate on the continental shelf and upper continental slope to depths of around 500 metres. These boats operate mostly off the south coast of New South Wales. They target a range of species, most of which are destined for the domestic

fresh fish market. The danish seiner fleet operates in the shallower waters, mostly off Lakes Entrance, and targets predominantly flathead and whiting. The deep water fleet operates predominantly out of Tasmanian and Victorian ports, on the continental slope (mainly in depths of 600-1000 metres), with orange roughy the main target species. Most of the orange roughy catch from these offshore trawlers is processed into fillets and exported. While there is some overlap in the species caught by these three groups, it is generally minor. This division into three sectors was followed in the present survey.

Individual transferable quotas (ITQs) were introduced into the south east fishery in 1989. Initially, only one species – gemfish – was managed in this way. ITQs were introduced for a further 16 species at the beginning of 1992. Under an individual transferable quota system, operators are restricted by their quota holdings as to how much of a given species they may catch. Operators may purchase, sell or lease quota to adjust their operations so as to maximise their profits. Understanding of the new system, problems in quota allocation and lack of a developed quota market may have caused some difficulties for a number of operators in the fishery. Reductions in orange roughy, gemfish and redfish total allowable catches (the sums of individual quotas) have also reduced the earning potential of a number of operators.

Area of the south east fishery



Physical characteristics

The danish seiner boats are generally small (13-20 metres in length), low powered vessels. The otter trawl fleet, which comprises the other two sectors, is much more diverse and includes boats from 12.5 metres to 40 metres in length. The offshore sector consists mainly of the larger boats.

The physical characteristics of boats in the south east fishery over the survey period are presented in table 6, based on logbook data for the population. The average boat size in each sector of the fishery remained fairly constant over the three years of the survey period.

For offshore trawlers the main operational change was a 16 per cent decrease in the hours fished between 1989-90 and 1990-91 followed by a 91 per cent increase between 1990-91 and 1991-92. Catches by offshore boats increased on average by 14 per cent from 1989-90 to 1990-91, but are estimated to have fallen by around 34 per cent in 1991-92 despite the large increase in effort. Similarly, average catches by danish seiners fell by around 13 per cent from 1990-91 to 1991-92 despite an increase in hours fished of around 3 per cent. For inshore boats, there was a decrease in estimated hours fished of around 6 per cent from 1990-91 to 1991-92, and a 27 per cent reduction in catch.

Catch value and location

The value of catches in the south east fishery per unit area during 1990-91 is given in map 2. As mentioned above, the south east fishery is a multispecies fishery. Catches and average

prices received by fishermen for the major commercial species in 1990-91 are given in appendix C, together with the method used to construct this map.

The dominant species in the south east fishery in terms of catch is orange roughy. In the majority of the areas of high catch value on the east and north west coasts of Tasmania and the south west coast of Victoria, the high values are probably due to the large orange roughy catch. Given that the average price received for orange roughy (\$1.50/kg) is less than the average price received for other species (\$2.19/kg in Melbourne and \$2.33/kg in Sydney), it is the high catch quantity rather than the unit value which results in the above value concentrations.

Tiger flathead, school whiting and redfish account for much of the high catch value areas around south east Victoria. The low value of fish caught in Bass Strait is due to the low production of trawl species in this area (Tilzey, Zann-Schuster, Klaer and Williams 1990).

Financial performance

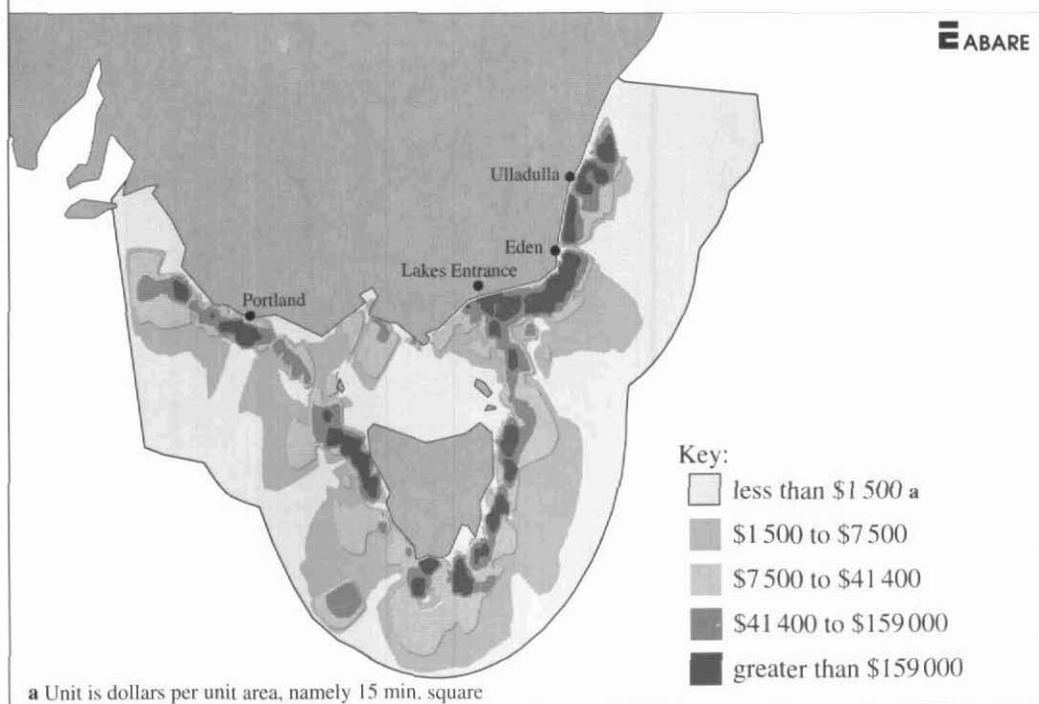
The major measures of financial performance in the south east fishery are given in table 7. The

6 Boat characteristics, south east fishery Average per boat

	Unit	Inshore trawlers	Offshore trawlers	Danish seiners	All boats
1989-90					
Number of boats	no.	62	59	20	141
Size	units ^a	130	279	68	183
Hours fished	hr	600	335	493	474
Catch	kg	135 772	764 071	106 268	394 492
1990-91					
Number of boats	no.	55	39	22	116
Size	units ^a	144	304	69	184
Hours fished	hr	840	299	505	595
Catch	kg	213 114	873 391	115 421	416 576
1991-92 ^p					
Number of boats	no.	48	41	18	107
Size	units ^a	130	282	68	176
Hours fished	hr	792	571	520	662
Catch	kg	155 646	575 112	99 975	307 011

^a Sum of hull volume in cubic metres and engine power in kilowatts. ^p Preliminary.

2 Value of catches in the south east fishery, 1990-91



financial performance of boats in this fishery is affected by catch quota levels. (A total allowable catch was imposed for gemfish in 1988, followed by individual transferable quotas in 1989. For orange roughy, a total allowable catch was introduced in 1989, followed by ITQs in 1992.) In general, incomes have tended to fall in the sectors of the fishery that are more dependent on species for which the quota levels have been reduced.

Receipts

On average, total cash receipts for south east fishery boats remained the same in 1990-91 as in 1989-90. However, average total cash receipts for inshore trawlers increased by around 36 per cent, and for danish seiners by around 16 per cent, while receipts of offshore boats may also have increased. This situation occurred because there was a large decrease in the number of vessels in the offshore sector of the fleet (by 34 per cent), reducing the contribution of this relatively more productive (per boat) sector of the fleet to the fishery average receipts, and

giving the sectors having smaller outputs per boat relatively more weight.

On average, total cash receipts for south east fishery boats again remained approximately unchanged, at around \$620 000, in 1991-92. There was an increase in average total cash receipts for offshore boats, while in the inshore and danish seiner sectors average total cash receipts fell.

The total cash receipts for danish seiners fell by around 19 per cent to an estimated \$130 000 in 1991-92, due to a 47 per cent fall in whiting landings. While flathead catches increased from about 700 tonnes in 1990-91 to about 1000 tonnes in 1991-92, this was not sufficient to offset the decrease in revenue from the reduced whiting catch.

For inshore trawlers average total cash receipts fell by about 31 per cent to an estimated \$290 000 in 1991-92. This fall in cash receipts was in part due to lower gemfish and red fish catches. Gemfish landings fell from 1600 tonnes in 1989-90 to around 300 tonnes in 1991-92 as a result of a reduction in the total allowable

7 Financial performance of south east fishery boats Average per boat a

		Inshore trawlers						Offshore trawlers					
	Unit	1989-90		1990-91		1991-92 p		1989-90		1990-91		1991-92 p	
Receipts													
Fishing receipts	\$	275 840	(11)	399 240	(8)	279 100	(9)	1 086 120	(21)	1 124 110	(15)	1 221 900	(23)
Non-fishing receipts	\$	31 230	(42)	17 420	(37)	8 700	(32)	11 990	(36)	3 290	(41)	7 900	(48)
Total cash receipts	\$	307 070	(10)	416 660	(7)	287 800	(8)	1 098 110	(21)	1 127 400	(15)	1 229 800	(23)
Costs													
Administration	\$	7 810	(18)	13 810	(20)	13 400	(11)	14 250	(23)	24 630	(19)	23 300	(24)
Crew costs	\$	68 960	(11)	99 810	(8)	70 200	(9)	280 710	(22)	292 270	(15)	316 800	(23)
Food	\$	5 020	(22)	6 780	(9)	5 300	(20)	10 500	(23)	10 880	(16)	12 800	(15)
Fuel	\$	31 000	(15)	43 940	(10)	73 100	(23)	52 910	(18)	120 580	(10)	185 400	(18)
Ice	\$	2 290	(38)	6 750	(60)	5 500	(63)	4 070	(27)	7 780	(25)	5 200	(31)
Insurance	\$	9 970	(13)	15 620	(17)	12 600	(11)	19 880	(14)	22 600	(11)	21 000	(12)
Interest paid b	\$	16 530	(36)	25 740	(24)	25 000	(22)	56 290	(25)	59 610	(38)	41 200	(52)
Licence fees	\$	8 230	(16)	10 050	(6)	8 100	(14)	6 240	(25)	9 930	(16)	10 300	(21)
Packaging	\$	500	(98)	3 630	(86)	2 600	(78)	0	(na)	1 930	(56)	400	(86)
Repairs and maintenance	\$	45 820	(15)	81 600	(15)	62 700	(13)	144 090	(19)	150 480	(10)	161 800	(13)
Other costs	\$	19 300	(30)	42 060	(38)	38 000	(39)	81 160	(22)	109 640	(16)	86 400	(22)
Total cash costs	\$	215 430	(11)	349 790	(9)	316 500	(7)	670 100	(15)	810 330	(10)	864 600	(16)
Boat cash income	\$	91 640	(12)	66 870	(32)	-28 700	(85)	428 010	(32)	317 070	(35)	365 200	(49)
Depreciation	\$	24 820	(27)	42 100	(22)	35 800	(21)	62 660	(26)	96 040	(26)	86 400	(40)
Total costs	\$	240 250	(11)	391 890	(8)	352 300	(7)	732 760	(13)	906 370	(11)	951 000	(15)
Financial performance measures													
Boat profit	\$	66 820	(15)	24 770	(82)	-64 500	(42)	365 350	(38)	221 030	(55)	278 800	(71)
Profit at full equity	\$	83 350	(13)	50 510	(17)	-39 500	(62)	421 640	(32)	280 640	(41)	320 000	(58)
Capital	\$	306 070	(14)	424 840	(8)	372 100	(10)	1 239 890	(16)	1 786 320	(14)	1 666 100	(18)
Rate of return	%	27.2	(20)	11.9	(42)	-10.6	(63)	34.0	(17)	15.7	(37)	19.2	(51)

(Continued on next page)

7 Continued

	Unit	Danish seiners			All boats		
		1989-90	1990-91	1991-92 p	1989-90	1990-91	1991-92 p
Receipts							
Fishing receipts	\$	275 840 (11)	399 240 (8)	279 100 (9)	1 086 120 (21)	1 124 110 (15)	1 221 900 (23)
Fishing receipts	\$	140 200 (10)	162 410 (7)	130 400 (8)	595 660 (17)	598 030 (10)	615 400 (18)
Non-fishing receipts	\$	2 250 (45)	2 150 (31)	2 400 (32)	19 070 (32)	9 770 (32)	7 300 (26)
Total cash receipts	\$	142 450 (10)	164 560 (7)	132 800 (7)	614 730 (16)	607 800 (10)	622 700 (18)
Costs							
Administration	\$	3 660 (18)	2 980 (16)	3 000 (22)	9 910 (15)	15 400 (13)	15 400 (14)
Crew costs	\$	46 270 (10)	53 590 (7)	43 000 (8)	154 350 (17)	155 750 (10)	160 100 (18)
Food	\$	2 790 (11)	3 030 (12)	3 500 (8)	7 000 (16)	7 450 (9)	7 900 (11)
Fuel	\$	8 210 (7)	10 700 (6)	12 100 (7)	36 930 (12)	63 410 (7)	105 900 (14)
Ice	\$	3 760 (10)	4 710 (14)	3 500 (6)	3 250 (19)	6 710 (30)	5 000 (33)
Insurance	\$	6 140 (8)	5 500 (9)	5 600 (8)	13 570 (9)	16 050 (10)	14 600 (8)
Interest paid b	\$	10 770 (29)	11 740 (30)	5 600 (37)	32 350 (20)	34 470 (24)	27 900 (31)
Licence fees	\$	2 190 (14)	2 210 (14)	1 600 (12)	6 540 (13)	8 530 (7)	7 800 (12)
Packaging	\$	0 (na)	0 (na)	0 (na)	220 (98)	2 370 (64)	1 300 (70)
Repairs and maintenance	\$	18 950 (23)	13 560 (18)	13 600 (21)	83 130 (14)	91 850 (8)	92 400 (9)
Other costs	\$	6 710 (14)	9 010 (10)	10 800 (7)	43 400 (18)	58 510 (16)	52 000 (19)
Total cash costs	\$	109 450 (5)	117 030 (4)	102 300 (6)	390 650 (11)	460 500 (7)	490 300 (11)
Boat cash income	\$	33 000 (41)	47 530 (22)	30 500 (22)	224 080 (26)	147 300 (26)	132 400 (52)
Depreciation	\$	7 870 (19)	8 800 (17)	7 200 (20)	38 250 (20)	53 920 (18)	50 400 (27)
Total costs	\$	117 320 (5)	125 830 (5)	109 500 (7)	428 900 (10)	514 420 (4)	540 700 (10)
Financial performance measures							
Boat profit	\$	25 130 (55)	38 730 (27)	23 300 (25)	185 830 (31)	93 380 (45)	82 000 (93)
Profit at full equity	\$	35 900 (35)	50 470 (37)	28 900 (21)	218 180 (26)	127 850 (31)	109 900 (66)
Capital	\$	158 070 (12)	154 390 (12)	150 000 (13)	675 820 (13)	831 290 (10)	830 600 (14)
Rate of return	%	22.7 (41)	32.7 (23)	19.3 (23)	32.3 (15)	15.4 (28)	13.2 (60)

a Figures in parentheses are relative standard errors: see pp. 5.8. b Includes rent and finance lease payments. p Preliminary. na Not applicable (no observations).

catch. In addition, a total allowable catch for redfish of 500 tonnes was introduced in 1992. Since this was lower than historical catch levels, it reduced the landings of this species in 1991-92.

In contrast, and despite a fall in fish catches, the average total cash receipts for offshore trawlers is estimated to have risen by 9 per cent in 1991-92 to \$1 200 000. This increase in cash receipts was largely due to an increase in price for orange roughy, the main species caught by offshore boats.

Costs

On average, estimated total cash costs per boat in the south east fishery rose by 6 per cent in 1991-92 in comparison to the previous year, to \$490 000. This increase was more than accounted for by an increase in the amount spent on fuel, which rose, on average, by 67 per cent (having increased by 72 per cent from 1989-90 to 1990-91). Fuel costs accounted for around 22 per cent of total cash costs per boat in 1991-92. For the offshore trawlers, the average fuel cost increased by 128 per cent in 1990-91 over 1989-90, and then by a further 54 per cent in 1991-92, to \$190 000. Fuel costs for inshore boats rose by about 66 per cent in 1991-92 relative to the previous year, and by 13 per cent for danish seiner boats. However, total cash costs fell by 13 per cent for danish seiners in 1991-92 relative to the previous year, and by 10 per cent for inshore trawlers.

The increases in the amounts spent on fuel are attributable to the increase in effort in the fishery (as measured by hours fished) and to an increase in steaming time to fishing grounds, as well as to an increase in time spent in trying to locate fish. Search time is likely to have increased the most for the offshore boats which fish for orange roughy in waters off Tasmania and in the Remote Zone.

Crew costs, which form the largest single component of all boat costs, appear to have risen slightly (to an estimated average of \$160 000 per boat across the fishery) in 1991-92 as compared with the previous year. Average crew costs fell by 20 per cent for danish seiners and by 30 per cent for the inshore trawlers, and are

likely to have risen for offshore trawlers. Crew costs are a set proportion of boat revenue and therefore are directly correlated with catch.

Average repair and maintenance costs remained unchanged from the previous year in 1991-92, at \$92 000. In contrast, average interest costs appear to have fallen by some 20 per cent to \$28 000 in that year, and average insurance costs by 9 per cent to \$15 000. This followed increases in average interest and insurance costs of 7 per cent and 18 per cent respectively from 1989-90 to 1990-91.

Rates of return

The effect of declining catches on operators' incomes is evident in the survey estimates of financial performance. Average boat cash income fell by 34 per cent from 1989-90 to 1990-91, to \$150 000, and by a further 10 per cent in 1991-92.

Here again, the trend across the fishery is not uniform. For offshore trawlers average cash income fell by 26 per cent from 1989-90 to 1990-91, but then rose by 15 per cent in 1991-92 following a recovery in the price for orange roughy. The average cash income for inshore trawlers fell by 27 per cent from 1989-90 to 1990-91, and by a further 140 per cent in 1991-92, due to price falls. For the danish seiners surveyed, average boat cash income rose by 44 per cent in 1990-91 over 1989-90 (following an increase in catch of 9 per cent) but fell by 36 per cent in 1991-92 after a drop in catch of 13 per cent.

The estimated average rate of return to boat capital across the fishery in 1991-92 was 13 per cent, down 2 percentage points on the previous year, and substantially below the 32 per cent return in 1989-90.

In all sectors of the fishery the average rate of return to boat capital was lower in 1991-92 than in 1989-90. However, for danish seiners the rate of return increased in 1990-91 from 23 per cent to 33 per cent, in line with the increase in catch, before decreasing to 19 per cent in 1991-92.

The very high catches of orange roughy in 1989-90 are reflected in the 34 per cent average rate of return to boats in the offshore sector for that year. With lower catches, the rate of return

has now fallen to an estimated 19 per cent in 1991-92. The average rate of return increased slightly in 1991-92 as compared to 1990-91 following the recovery in the price of orange roughly.

Inshore trawlers, however, on average, showed a fall in returns to capital across the three survey years, and gave a negative rate of return in 1991-92. In 1989-90 the average rate of return to inshore boats was 27 per cent, but it fell to an estimated -11 per cent in 1991-92.

Survey results for the east coast tuna fishery

The east coast tuna fishery extends down the east coast of Australia from the tip of Cape York to the waters off the southernmost point of the New South Wales coast (Cape Howe). Tuna has been fished within this region since the 1950s — mainly to supply the domestic canning industry. Recent growth in domestic fishing effort in the east coast tuna fishery is largely attributable to the marketing opportunities offered in the longline fishery, from which high value products such as fresh-chilled yellowfin and bigeye tunas are exported to Japanese sashimi markets.

The domestic east coast tuna fleet is mostly composed of small longline vessels which supply fresh-chilled tuna to the Japanese market. Around 70 per cent of the total catch from the east coast longline fishery is made up of yellowfin tuna, bigeye tuna and albacore. Marlin, billfish and shark are also taken, as bycatch. In addition to the longline fleet a small fleet of purse seine and pole-and-line vessels target skipjack and yellowfin tuna along the east coast of New South Wales. Tuna caught by purse seining is of a lower quality than that

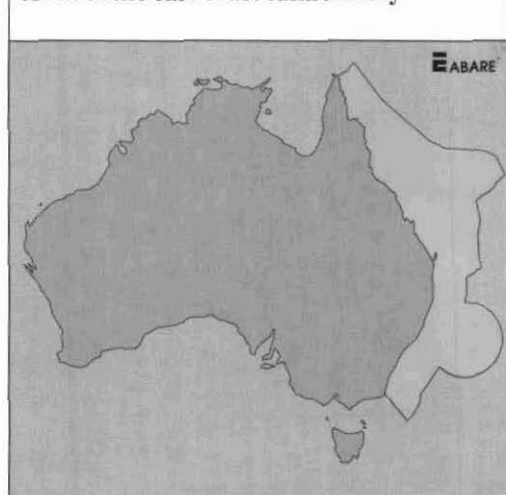
caught by longlining and is mainly sold to domestic canneries. It is not included in the present survey. In 1991-92, production in the east coast longline fishery was 998 tonnes with a value of almost \$6.9 million, while production in the east coast purse seine fishery was 6040 tonnes with a value of over \$3.7 million (ABARE 1992).

Most domestic operators concentrate their fishing effort in waters between five and eighty nautical miles off the Australian east coast between Eden in New South Wales and Mooloolaba in southern Queensland (Caton and Ward 1987). In addition to the domestic fishing fleet surveyed here, Japanese longline vessels have operated in the region since the 1950s, mainly targeting southern bluefin, yellowfin and bigeye tuna. However, since 1989-90 the Japanese fleet has been prohibited from operating within 50 miles of the east coast of Australia.

In July 1988 interim management arrangements for the longline fishery were introduced, aimed at limiting entry into the fishery. These management arrangements were based on the issuing of four categories of longline endorsements to operators with a history of involvement or investment in the fishery. Operators holding an appropriate endorsement were restricted in their longline fishing activities to within designated management areas. In 1990-91, approximately 165 operators held valid east coast longline endorsements: 113 historical, 48 inshore developmental and 4 offshore developmental.

A similar limited entry management regime was introduced in July 1990 for the purse seine fishery, with two categories of endorsement based on historical involvement in the fishery. In December 1991 an additional southern management zone (not surveyed here) was introduced in both the longline and purse seine fisheries, aimed at monitoring catch and effort

Area of the east coast tuna fishery



levels in waters between Cape Howe and the southernmost limit of the Australian Fishing Zone.

Physical characteristics

In the east coast tuna fishery there is large diversity in the type and size of boats and gear used. Many domestic longline operators are also involved in the trawl or pole fisheries, and there is a small fleet of purse seine vessels (not included here). However, the main sector of the fishery comprises longline vessels, mainly targeting yellowfin and bigeye tuna.

In the northern prawn and south east fisheries surveys the differences among the financial performance of operators due to time spent fishing, species caught, areas of operation and catches are picked up by subdividing the fleet into smaller homogeneous sectors on the basis of operational differences. In contrast the east coast tuna fishery fleet could not be subdivided into smaller sectors on the basis of operational differences, mainly because of insufficient data to reliably identify catches from, and effort in other fisheries, and the absence of clearly distinguishable homogeneous sectors due to the diversity of fishing operations.

Because information on what species were caught in the other fisheries, and in what quantities, were in general not available or unreliable, it was also difficult to estimate either quantities or species of fish caught for 1991-92. As this information was necessary to distinguish the changes in incomes from these fisheries from those obtained in the tuna fishery, it was concluded that financial information for 1991-92 could not be reliably estimated. Therefore,

physical characteristics of the fleet in 1991-92 are also not presented in this report.

For the purposes of the survey, the domestic east coast tuna fishery was defined as those vessels that caught tuna using predominantly longline fishing methods during the financial years 1989-90 and 1990-91. Due to the diversity of fishing activity, many endorsement holders either did not fish in the fishery or were involved in it for only a very short period during these years. Boats with an annual catch of one tonne or less, and those that operated within the fishery for five days or less during the survey year, were excluded from the survey population.

The physical characteristics of boats in the domestic east coast longline tuna fishery over the survey period are presented in table 8. Based on logbook data for the population, the main operational change in the fishery between 1989-90 and 1990-91 was a 27 per cent increase in the total number of hook-hours (number of hooks used on each boat multiplied by the number of hours the hooks were in the water). There was a 37 per cent increase in average catch, from under 11 tonnes in 1989-90 to almost 15 tonnes in 1990-91.

Catch value and location

The value of catches in the east coast tuna fishery during 1990-91 is given in map 3.

From the logbook data, the major commercial species caught in the east coast tuna fishery were yellowfin tuna, albacore, marlin, several shark varieties, bluefin tuna, broadbilled swordfish and bigeye. The catches and average prices received by fishermen for these species in 1990-91, used to construct this map, are given in appendix C.

Yellowfin tuna is captured in the largest quantities and is the main target species for operators in the east coast tuna fishery. Yellowfin tuna moves north to warmer waters in the autumn and winter, then south during spring with the east Australian current.

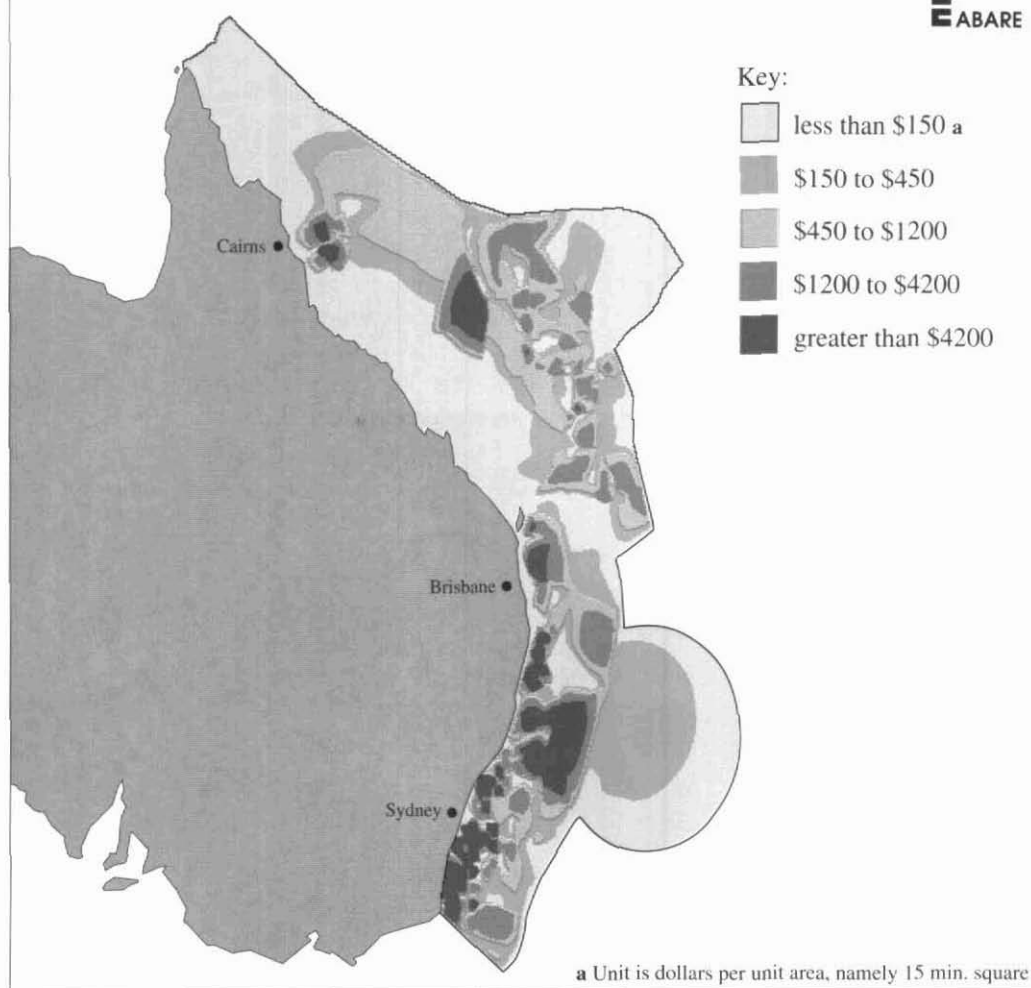
Fishing activity is generally concentrated in waters off southern New South Wales in the first half of the year, moving northwards in winter to around Coffs Harbour, with peak catches

8 Boat characteristics, east coast tuna fishery Average per boat

	Unit	1989-90	1990-91
Number of boats	no.	79	73
Length	m	16	18
Days fished	days	31	36
Effort	'000 hook-hours	110	140
Catch	kg	10 735	14 747

3 Value of catches in the east coast tuna fishery, 1990-91

E ABARE



occurring between March and June (Garvey 1991; East Coast Tuna Management Advisory Committee 1992).

The high value areas on the map are mainly due to catches of yellowfin. The average price received for yellowfin tuna in 1990-91 was \$7.91/kg, which is higher than the average price for fish from this fishery.

Financial performance

The major measures of financial performance in the domestic east coast tuna fishery are given in table 9.

Receipts

Average total cash receipts for east coast tuna fishery boats rose by about 17 per cent to \$145 000 between 1989-90 and 1990-91. The increase in cash receipts was due mainly to an increase in the catch of yellowfin tuna, which rose from about 530 tonnes in 1989-90 to around 570 tonnes in 1990-91. While catches of bigeye tuna fell from around 57 tonnes to about 14 tonnes, this was not sufficient to offset the increase in revenue from increased landings of the more valuable yellowfin tuna. Receipts from other fishing operations remained relatively stable over the same period.

9 Financial performance of east coast tuna fishery boats Average per boat a

	Unit	1989-90	1990-91
Receipts			
East coast tuna receipts	\$	94 290 (15)	118 380 (12)
Other fishing receipts	\$	22 620 (58)	22 070 (44)
Non-fishing receipts	\$	7 590 (53)	4 810 (29)
Total cash receipts	\$	124 500 (15)	145 260 (9)
Costs			
Administration	\$	4 220 (15)	7 850 (25)
Bait	\$	4 720 (21)	3 660 (8)
Crew costs	\$	35 070 (16)	42 140 (10)
Food	\$	1 690 (27)	3 830 (29)
Fuel	\$	12 010 (19)	23 190 (25)
Ice	\$	1 480 (22)	1 150 (16)
Insurance	\$	5 840 (24)	5 070 (13)
Interest paid b	\$	16 920 (35)	15 410 (27)
Licence fees	\$	4 350 (12)	3 820 (8)
Packaging	\$	630 (48)	750 (32)
Repairs and maintenance	\$	18 940 (16)	22 320 (10)
Other costs	\$	20 340 (21)	23 970 (23)
Total cash costs	\$	126 210 (14)	153 160 (13)
Boat cash income	\$	-1 710 (439)	-7 900 (123)
Depreciation	\$	21 980 (40)	30 940 (27)
Total costs	\$	148 190 (16)	184 100 (15)
Financial performance measures			
Boat profit	\$	-23 690 (57)	-38 840 (43)
Profit at full equity	\$	-6 770 (129)	-23 430 (71)
Capital	\$	206 000 (13)	248 950 (6)
Rate of return to boat capital	%	-3.3 (123)	-9.4 (68)

a Figures in parentheses are relative standard errors: see pp. 5, 8. b Includes rent and finance lease payments.

Costs

Average total cash costs in the east coast tuna fishery rose by 21 per cent in 1990-91, to \$153 000. The largest single contributor to this increase was a 93 per cent rise in average fuel costs. The rise in the average amount spent on fuel was probably largely due to an increase in search time for tuna. Fuel costs accounted for an estimated 15 per cent of total cash costs per boat in 1991-92.

Crew costs, which form the largest single component of all boat costs, rose by around 20 per cent to an average of \$42 000 per boat in 1990-91. Average repair and maintenance costs rose by 18 per cent in 1990-91, to \$22 000. In contrast, average insurance costs appear to have fallen by 13 per cent, and interest costs by around 9 per cent. Despite the increase in fishing effort across the fishery, bait costs also fell, by

22 per cent, to an average \$3700 per boat in 1990-91. This was probably due to an increase in the number of hours that hooks were in the water for each boat, and the increased use of cheaper bait species such as squid.

Rates of return

The effect of increased costs on operators' incomes is evident in the survey estimates of financial performance. Average boat cash income appears to have fallen substantially between 1989-90 to 1990-91, to a cash operating loss in the region of \$8000.

For both survey years, boat operators are on average likely to have made a negative rate of return to boat capital. In 1990-91 the estimated average rate of return was -9 per cent, down 6 percentage points from -3 per cent in 1989-90.

Appendix A: 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 (1989)

East coast prawn fishery

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

Southern rock lobster fishery

<i>Years covered</i>	<i>Reference</i>
1981-82 to 1982-83	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)

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>
1987-88 to 1988-89	Battaglene and Campbell (1991)

Torres Strait prawn fishery

<i>Years covered</i>	<i>Reference</i>
1989-90	Battaglene, Reid and Collins (1992)

Appendix B: Estimation of 1991-92 values

The 1992 ABARE surveys of the northern prawn, south east and east coast tuna fisheries were restricted to the years 1989-90 and 1990-91 because the 1991-92 financial year had not been completed at the time of data collection. In many cases, accounts information for 1991-92 was not expected to be available until March 1993.

Figures for 1991-92 were estimated using preliminary logbook data, average market prices and indexes of cost changes. Such estimation was possible only for boats in the northern prawn and south east fisheries. For east coast tuna boats, much of the income is derived from fisheries other than the tuna fishery, and information was not available to reliably separate out the changes in incomes from these fisheries.

Revenue

Average boat revenues for the northern prawn and south east fisheries in 1991-92 were estimated by multiplying the catch of each species by the estimated price of each species. Catch information for each boat was obtained from logbook returns. This information is preliminary and may not have been complete for all boats for the first half of 1992, though it is thought to be complete for most boats.

For the northern prawn boats, monthly average prices were used (table 10), since the average size and price of prawns change over the year. These prices were obtained directly from industry members. Average market prices for the year were used for valuing the catch of south east fishery boats (table 11). Sydney fish market prices were used for inshore boats, as most of these operate off the New South Wales south coast. Average Melbourne fish market prices, which were needed to estimate returns to the offshore boats, were not available for 1991-92. Average Melbourne prices for 1990-91 were indexed up assuming the same percentage change in prices that occurred on the Sydney fish market between 1990-91 and 1991-92. Prices for whiting, flathead and morwong, which make up the bulk of the danish seiner catch, were also obtained from the Lakes Entrance Co-operative. The prices received for other species by danish seiners were assumed to be the same as the estimated Melbourne market prices.

Income from other sources was estimated from that income in 1990-91. For the northern prawn fishery, other fishing income (non-prawn) was indexed up using the consumer price index (CPI) (table 12). In both the northern prawn and south east fisheries, the same procedure was used for non-fishing income.

10 Prices used for estimation of 1991-92 revenue, northern prawn fishery

Species	1991					1992		
	July	Aug.	Sept.	Oct.	Nov.	Apr.	May	June
	\$/kg	\$/kg	\$/kg	\$/kg	\$/kg	\$/kg	\$/kg	\$/kg
Banana	7.00	8.00	9.00	6.00	9.00	9.20	9.20	9.20
Tiger	13.80	13.10	13.30	14.80	15.20	14.00	14.00	14.00
Endeavour	7.20	7.10	7.10	7.30	7.00	7.00	7.00	7.00
King	6.80	7.00	7.50	7.50	7.50	7.50	7.50	7.50

11 Prices used for estimation of 1991-92 revenue, south east fishery

Species	Inshore trawlers	Offshore trawlers	Danish seiners
	\$/kg	\$/kg	\$/kg
Orange roughy	2.00	2.00	2.00
Blue grenadier	1.91	2.38	2.38
School whiting	1.14	1.52	1.21
Flathead	1.45	2.41	1.17
Silver warehou	1.32	1.75	1.75
Gemfish	3.18	3.51	3.51
Blue warehou	4.31	1.65	1.65
Morwong	2.09	1.66	0.95
Redfish	1.02	1.71	1.71
Ling	2.80	3.60	3.60
Trevally	1.15	1.40	1.40
Royal red prawns	2.85	2.85	2.85
Mirror dory	1.75	1.54	1.54
Ocean perch	1.47	1.76	1.76
John dory	3.87	4.25	4.25
Trevalla	4.31	7.74	7.74

12 Indexes used for estimation of 1991-92 costs and revenues, northern prawn and south east fisheries

		Index value		
	Index used	1990 -91	1991 -92	Index factor
Other fishing income a	CPI	98	100	1.019
Non-fishing income	CPI	98	100	1.019
Administration	Other overheads	120	128	1.067
Aerial spotting	Contracts	121	125	1.033
Food	CPI	98	100	1.019
Fuel	Fuel	120	112	0.933
Insurance	Insurance	129	128	0.992
Interest paid	Interest paid	127	104	0.819
Licence fees	-	-	-	1.000
Repairs				
and maintenance	Maintenance b	124	131	1.056
Other costs	Other materials	122	124	1.016
Packaging	CPI	98	100	1.019
Depreciation c	-	-	-	0.905

a Northern prawn boats only. b Plant and equipment component index. c Observed trend.

Costs

Costs were broken into two main components — those linked to the amount of effort and catch (variable costs) and those independent of effort and catch (fixed costs). In all cases, changes in costs were estimated for each individual boat in the survey. These individual boat estimates were then combined to determine the estimate of the average for the groups.

The values for the fixed costs in 1991-92 were estimated using a set of price indexes. These indexes are determined by ABARE based on a survey of suppliers of goods and services to the rural sector. These suppliers regularly provide ABARE with the latest prices of inputs such as fuel, contracting services, machinery costs and other inputs and services used by the rural sector. It was assumed that these indexes would also reflect the changes in prices for goods and services used by the fishing industry. Fixed costs for 1991-92 were estimated by multiplying the cost of the input or service in 1991-92 by the appropriate index (table 12).

Depreciation costs were estimated by following the trend in the change in depreciation costs between 1989-90 and 1990-91.

Variable costs include crew payments, packaging costs and fuel costs. Crew payments were taken as a proportion of the fishing revenue. The crew costs in 1990-91 were divided by the fishing income in 1990-91 to derive a crew cost proportion for each boat. This proportion was multiplied by the estimated fishing revenue for 1991-92 to estimate crew costs in 1991-92. Similarly, for each boat in the survey packaging costs in 1990-91 were divided by total catch in 1990-91 to derive an average packaging cost per kilogram. This average was multiplied by the catch in 1991-92. The resulting value was indexed using the CPI to allow for changes in packaging costs. The average fuel cost per hour for each boat in the survey was estimated by dividing fuel costs in 1990-91 by the amount of effort (in hours) recorded in the logbook. This value was multiplied by the effort recorded in 1991-92, and indexed to allow for changes in fuel prices.

Appendix C: Mapping value of catch

The northern prawn, east coast tuna and south east trawler operators all complete logbook information which includes the latitude, longitude, fish species, date and catch weight of each trawl. Maps depicting the value of catch per unit sea area in 1990-91 were produced using this logbook information and market prices for each fish species.

A grid measuring fifteen minutes by fifteen minutes was used. In each grid area, the catch weight (if any) of each species was multiplied by the average price received for that species in the 1990-91 financial year to give the total value of fishing catch for each area.

By interpolation, contours were then drawn for discrete values of fishing catch per unit area. The contour intervals are indicated on the maps by the five different colours. The intervals were chosen so that each includes approximately 20 per cent of the grid areas where fish were caught.

Fish were not caught in all grid areas. Interpolation is more accurate where there is a greater number of areas where fish were caught. The high value regions are therefore the most accurately mapped, since in these regions there are few if any unproductive grid areas. In areas where the fishing is sparse, such as areas near the outer boundary of the management region, the information provided by the maps should be taken to be indicative only of the total for that region.

The value of fish caught in each area changes through the year and from one year to the next. Seasonal effects such as water temperature and ocean currents influence the migration paths of various fish species, especially yellowfin tuna. Because only catch information for 1990-91 as a whole was used, the maps do not reveal this seasonal variation.

Mapping the northern prawn fishery

The value of catches in the northern prawn fishery during 1990-91 is given in map 1. The values for catches by northern prawn fishery boats in the Kimberley region, which lies outside the fishery, are also shown. The major commercial species caught in the northern prawn fishery are banana prawns, tiger prawns, endeavour prawns and king prawns, and the catches and prices received by fishermen for these species were used to construct this map. There is a large variation in prices for each prawn species according to the size, and the sizes of prawns are dependent on the time of year in which they are caught. In calculating the value of fish catch for 1990-91, therefore, average monthly prices (rather than annual prices) were used. These monthly prices are shown in table 13, together with total catch of each species for the year.

13 Catches and monthly average prices, 1990-91, northern prawn fishery

Species	Catch weight t	1990						1991		
		July	Aug.	Sept.	Oct.	Nov.	Dec.	Apr.	May	June
		\$/kg	\$/kg	\$/kg	\$/kg	\$/kg	\$/kg	\$/kg	\$/kg	\$/kg
Banana	6 500	8.92	9.33	9.77	10.33	10.50	12.00	7.00	7.00	7.00
Tiger	3 300	13.38	15.27	15.64	19.01	18.64	17.31	14.65	14.48	13.98
Endeavour	700	7.36	7.93	7.88	8.58	8.57	9.06	6.25	6.25	6.25
King	95	9.66	9.34	9.83	10.04	9.60	10.70	11.00	11.00	8.50

14 Catches and average prices, 1990-91, south east fishery

Species	Catch weight t	Average Sydney price \$/kg	Average Melbourne price \$/kg
Orange roughy	33 000	1.50	1.50
Blue grenadier	3 500	1.61	1.89
School whiting	2 000	1.21	1.21
Tiger flathead	2 000	1.66	1.91
Oreo dory	2 000	1.07	1.07
Silver warehou	1 600	1.39	1.39
Gemfish	1 200	2.91	2.79
Blue warehou	1 000	1.31	1.31
Morwong	1 000	1.97	1.97
Redfish	1 000	1.18	1.36
Ling	700	3.02	2.87
Squid	500	1.57	1.18
Silver trevally	400	1.04	1.11
Royal red prawns	360	2.88	2.88
Barracouta	300	0.77	0.77
Mirror dory	300	1.69	1.22
Ribbonfish	180	0.86	0.86
Ocean perch	156	2.68	2.68
John dory	150	6.40	3.37
Trevalla	150	5.05	6.15
King dory	100	2.48	2.48
Shark	11	2.59	3.00

Mapping the south east fishery

The value of catches in the south east fishery during 1990-91 is shown in map 2. Average prices received by fishermen for the major commercial species in 1990-91 were used to construct this map, and are given in table 14 together with total catches. Fish caught south of

15 Catches and average prices, 1990-91, east coast tuna fishery

Species	Catch weight t	Average price \$/kg
Yellowfin tuna	700	7.91
Albacore	170	2.32
Marlin varieties	100	4.13
Shark varieties	55	2.59
Bluefin tuna	42	37.50
Broadbilled swordfish	38	4.13
Bigeye	34	10.64

Eden were assumed to be sold in Melbourne, while Sydney prices were allocated to those fish caught north of Eden.

Mapping the east coast tuna fishery

The value of catches in the east coast tuna fishery during 1990-91 is shown in map 3. The annual average prices received for the major commercial species caught in the east coast tuna fishery, which were used to calculate value of fish catch, are given in table 15. They are averages of Sydney and Melbourne market prices.

The total catch weight shown in table 15 includes some catch taken outside the fishery. Catches of skipjack tuna (a major catch species for some boats) were not recorded in logbooks and therefore do not appear in table 15 and are not included in the values shown in map 3.

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Other ABARE survey data services

Agriculture and Resources Quarterly

Each issue contains summary estimates and forecasts for the broadacre industries.

Contact: Denise Flamia, ABARE publications officer, on (06) 272 2211.

Farm Surveys Report

Each year ABARE surveys the physical and financial performance of the main cropping, livestock and dairy industries in Australia. Estimates, on an 'average per farm' basis, are provided for farm costs, receipts, income, profit, rates of return, capital, assets and debt and for farm area, production and labour use.

Contact: Denise Flamia, ABARE publications officer, on (06) 272 2211.

ASPIRE

This computer package provides time series data from 1977-78 to 1991-92 on a wide range of physical and financial characteristics of farms covered in ABARE's annual surveys.

ASPIRE provides graphical presentations of ABARE survey data. The package allows up to six variables to be compared simultaneously. Three ASPIRE packages are available:

- Australian agricultural and grazing industries survey (AAGIS)
- Australian dairy industry survey (ADIS)
- AAGIS and ADIS combined

Contact: Vince O'Donnell, ABARE Surveys Section, on (06) 272 2255.

Mapping services

ABARE has the appropriate software, computing equipment and staff trained in mapping farm characteristics.

ABARE is also anticipating being able to cross-tabulate survey data with information on other variables such as climate and topography which will allow more sophisticated assessment of a range of factors affecting rural Australia.

Contact: Ann Cowling, Research Resource Unit, on (06) 272 2191

Customised data services

Tabulations

ABARE can provide special tabulations to meet specific requirements such as estimates for subpopulations, cross-tabulation of variables and quartiles.

Contact: John Tucker, ABARE Surveys Section, on (06) 272 2277.

Collections

ABARE's survey system can be used to obtain information on specific topics. Advice on surveys and questionnaire design is also available.

Contact: Vince O'Donnell, ABARE Surveys Section, on (06) 272 2255.

Statistical consultancy

ABARE can provide expert advice on

- designing and selecting a sample
- data analysis
- graphical presentation of results
- time series analysis
- data modelling and simulation
- statistical software evaluation

Contact: Dr Ray Hinde, Research Resource Unit, on (06) 272 2218.

A charge is made for these data services based on the size and complexity of the requests.



FISHERIES

Each year ABARE surveys the physical and financial performance of a number of key Commonwealth fisheries.

In this report, information is included on the northern prawn and south east fisheries for the financial years 1989-90, 1990-91 and 1991-92, and the east coast tuna fishery for the financial years 1989-90 and 1990-91.

Estimates are provided on an 'average per vessel' basis, and include fishing costs, receipts, profit and rates of return.



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