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Australian Bureau of Agricultural and Resource Economics and Sciences

Australian fisheries surveys report 2010

Results for selected fisheries, 2007–08 and 2008–09 Preliminary estimates for 2009–10

Christopher Perks and Simon Vieira

December 2010

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The ABARES fisheries surveys program involves a cooperative effort among industry, fisheries management and research agencies, and ABARES staff.

Industry

ABARES surveys are voluntary. The cooperation of fishing operators and their accountants in providing data is essential for the success of the fisheries surveys. Without this assistance the surveys would not be possible. The comments and advice on a draft of the report provided by industry representatives and representatives of relevant management advisory committees are also greatly appreciated. In particular, Simon Boag from the South East Trawl Fishing Industry Association provided valuable comments on the report.

Management and research agencies

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ABARES staff

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Foreword

The *Australian fisheries surveys report 2010* is the latest in a series of regular reports released over the past two decades. These reports provide detailed information about the financial and economic performance of key Commonwealth fisheries surveyed by ABARES. Funding for the reports is provided by the Fisheries Resources Research Fund.

Survey results are used by fishery policymakers, managers, researchers and industry. The Department of Agriculture, Fisheries and Forestry and the Australian Fisheries Management Authority (AFMA) use the information to monitor the performance of Commonwealth fisheries and the effect of management policies. The information is used by ABARES when providing annual assessments of the economic status of Commonwealth fisheries in its Fishery status reports series. Fishing industry operators can also use the survey results to assess their own performance and the effect of management policies.

The current report presents results of the 2010 survey, which focused on the Eastern Tuna and Billfish Fishery and two sectors of the Southern and Eastern Scalefish and Shark Fishery. These results comprise estimates of financial and economic performance for the 2007–08 and 2008–09 financial years, as well as non-survey–based estimates of economic performance for 2009–10.

The key economic performance indicator presented in the report is fishery–level net economic returns. It is the same indicator referred to in AFMA's legislated economic objective. Additionally, ABARES fishery surveys provide a useful dataset to guide AFMA in setting harvest levels for the surveyed fisheries that achieve maximum economic yield.

Phillip Glyde
Executive Director
December 2010

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1 Introduction and summary

This report presents estimates of the financial and economic performance of two key Commonwealth fisheries: the Eastern Tuna and Billfish Fishery and the Southern and Eastern Scalefish and Shark Fishery. It provides new survey-based estimates for both fisheries for the 2007–08 and 2008–09 financial years, calculated using survey data collected from operators in 2010. It also contains non-survey–based preliminary estimates of economic performance for both fisheries in 2009–10. These preliminary estimates were calculated using 2009–10 catch, effort and fish price data, in combination with historical survey data.

Throughout the report a distinction is made between financial performance and economic performance. Financial performance estimates are calculated for the average boat in a fishery and include all cash receipts and cash costs (including the value of any unpaid labour) that have been earned and incurred in the surveyed fishery and any other fisheries the boat operated in. As such, these estimates largely reflect the average boat's accounts-based profit and loss statement for all fishing activities.

The indicator of economic performance presented in the report is net economic returns, which are reported at the fishery level. The main distinction between this and financial performance estimates is that estimates of net economic return relate only to the surveyed fishery and include other non-cash economic costs such as depreciation, the opportunity cost of capital and the opportunity cost of labour. For definitions of these costs see appendix A.

Although both indicators provide slightly different information, both are important. Financial performance information can provide some context to observed trends in a surveyed fishery. For example, positive financial profits at the boat level may reveal how operators continue to operate in a fishery that has experienced negative net economic returns. These estimates are also more relevant to the needs of industry operators, who can compare their performance with that of the average boat.

Economic performance is most relevant to the needs of fishery managers and policymakers. First, net economic returns relate only to the specific fishery being managed. Moreover, by taking into account all cash receipts, cash costs and economic costs, net economic returns indicate the economic return to society associated with harvesting that fishery resource. For this reason, net economic return is the key economic performance indicator referred to in the *Fisheries Management Act 1991*. According to the Act, the Australian Fisheries Management Authority (AFMA) is required to maximise net economic returns to the Australian community from the management of Australian fisheries. Although survey estimates of net economic returns do not reveal how a fishery has performed relative to maximum economic yield (the potential net economic return that can be generated from a fishery), interpretation of net economic return trends and drivers can assist in assessing AFMA's performance against its

economic objective, particularly when considered alongside changes in stock abundance. Such interpretation is also discussed in Appendix A.

ABARES (previously ABARE) has been undertaking surveys of Commonwealth fisheries since the early 1980s and on a regular basis for key Commonwealth fisheries since 1992. The data that have been collected through these surveys allow the construction of a number of other economic indicators and tools that allow better assessment of AFMA's performance against its economic objective. These include productivity indexes, profit decompositions, efficiency analysis and bioeconomic models, which can provide information about the maximum economic yield for a fishery. A list of earlier fisheries surveys reports is presented at the end of this report.

A summary of results for the Eastern Tuna and Billfish Fishery and the Southern and Eastern Scalefish and Shark Fishery is presented below.

Key results

Eastern Tuna and Billfish Fishery

Financial performance – per boat

- In nominal terms, average total cash receipts per boat increased from approximately $711 000 in 2007–08 to more than $795 000 in 2008–09, while average total cash costs per boat rose from $702 000 in 2007–08 to $781 000 in 2008–09. Expenses for labour, fuel, freight, marketing, and repairs and maintenance accounted for 72 per cent of total cash costs for all boats in 2007–08 and 70 per cent in 2008–09.
- The proportional increase in average total cash receipts between survey years was slightly larger than the proportional increase in total cash costs per boat. Total cash receipts increased by 12 per cent, while total cash costs increased by 11 per cent. As a result, boat cash income increased from $9000 in 2007–08 to $14 000 in 2008–09.
- The average rate of return to full equity (including the value of quota and licences) increased from –1.1 per cent in 2007–08 to –0.2 per cent in 2008–09.

Economic performance – fishery as a whole

- Between 2002–03 and 2006–07, net economic returns averaged –$13.7 million. Since then, economic performance has been improving in real terms. Net economic returns were –$4.5 million in 2008–09.
- Non-survey–based estimates of net economic returns indicate that returns to the fishery (including management costs) are expected to have increased by 3 per cent to –$4.4 million in 2009–10.

Southern and Eastern Scalefish and Shark Fishery – Commonwealth Trawl Sector

Financial performance – per boat

- In nominal terms, average total cash receipts per boat for the entire sector decreased slightly from approximately $1 089 000 in 2007–08 to $1 081 000 in 2008–09, while average total cash costs per boat fell from $941 000 in 2007–08 to $895 000 in 2008–09, largely as a result of lower fuel, freight and marketing costs. Labour, fuel, freight, marketing, and repairs and maintenance accounted for 79 per cent of total cash costs for all boats in 2007–08 and 80 per cent in 2008–09.
- The proportional decrease in average total cash receipts between survey years was less than the proportional decrease in total cash costs per boat. The decrease in total cash receipts was 1 per cent, while the decrease in total cash costs was 5 per cent. As a result, boat cash income rose by 26 per cent, from $148 000 in 2007–08 to $186 000 in 2008–09.
- The average rate of return to full equity (including the value of quota and licences) decreased slightly from 11 per cent in 2007–08 to 10 per cent in 2008–09.

Economic performance – sector as a whole

- Between 2002–03 and 2004–05, net economic returns averaged –$5.0 million. Since then, economic performance improved in real terms to $4.0 million in 2007–08, before decreasing slightly to $3.9 million in 2008–09.
- Non-survey–based estimates of net economic returns indicate that returns to the fishery (including management costs) are expected to have increased by 73 per cent to $6.8 million in 2009–10.

Southern and Eastern Scalefish and Shark Fishery – Gillnet, Hook and Trap Sector

Financial performance – per boat

- In nominal terms, average total cash receipts per boat for the entire sector increased from approximately $536 000 in 2007–08 to $611 000 in 2008–09, while average total cash costs per boat increased from $489 000 in 2007–08 to $504 000 in 2008–09. Labour, fuel, leasing, and repairs and maintenance accounted for 76 per cent of total cash costs for all boats in 2007–08 and 72 per cent in 2008–09.
- The proportional increase in average total cash receipts between survey years was greater than the proportional increase in total cash costs per boat. The increase in total cash receipts was 14 per cent, while the increase in total cash costs was 2 per cent. As a result, boat cash income rose considerably from $46 000 in 2007–08 to $107 000 in 2008–09.
- The average rate of return to full equity (including the value of quota and licences) increased from 8 per cent in 2007–08 to 11 per cent in 2008–09.

Economic performance – sector as a whole

- Historically, real net economic returns in the sector have been low but positive, averaging $1.4 million between 1998–99 and 2006–07. In the two most recent survey years, economic performance has improved to $4.1 million in 2007–08 and to $6.1 million in 2008–09.

- Non-survey–based estimates of net economic returns indicate that returns to the sector (including management costs) are expected to have decreased by 65 per cent to $2.2 million in 2009–10. This is expected to be mainly driven by an 18 per cent decline in sector level cash receipts.

2 Eastern Tuna and Billfish Fishery

The fishery

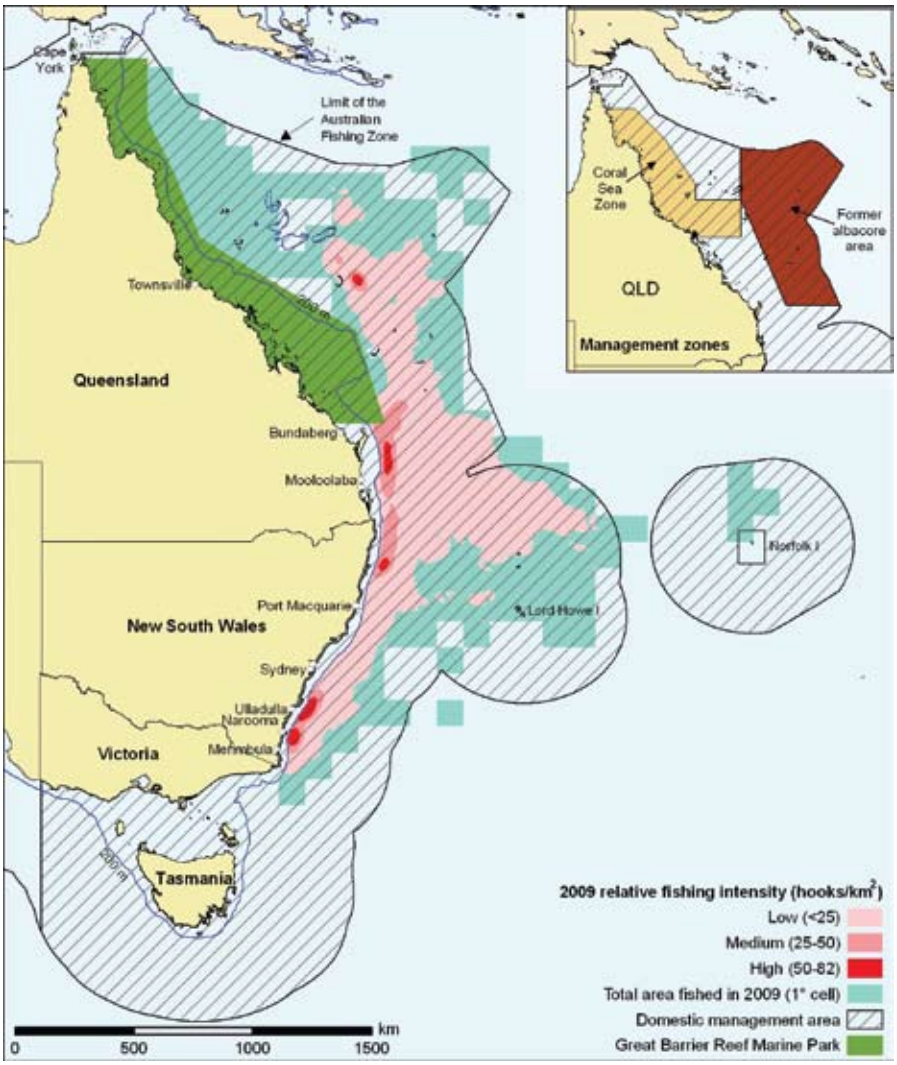
The Eastern Tuna and Billfish Fishery (ETBF) is a multispecies fishery that stretches from the tip of Cape York to the South Australian – Victorian border and includes the waters around Lord Howe Island and Norfolk Island (map 1). The fishery supports both commercial and recreational fishing activities. Commercial fishing occurs in a longline sector, which uses longline fishing methods, and a minor line sector in which rod-and-reel, handline and trolling methods are used. The longline sector accounts for the majority of the fishery's catch (Wilson et al. 2010). The commercial longline sector can also be divided into boats that land catch in Queensland (the majority of boats being based in Mooloolaba) and those that land catch in New South Wales.

Key target species in the ETBF include yellowfin tuna, bigeye tuna, albacore tuna, broadbill swordfish and striped marlin. The current biological status of these species is not overfished and not subject to overfishing, with the exception of bigeye tuna and striped marlin. Bigeye tuna was most recently assessed as both overfished and subject to overfishing, while the status of striped marlin is uncertain (Wilson et al. 2010). The migratory nature of these species means that these stocks are shared internationally. The Western and Central Pacific Fisheries Commission (WCPFC) is the regional fisheries management organisation through which these stocks are jointly managed with other countries. Domestic management arrangements reflect Australia's obligations to the WCPFC.

The ETBF is currently going through a period of significant change. The Australian Government's recent Securing Our Fishing Future structural adjustment package included a $149 million fishing concession buyback to allow individual fishing businesses to leave the industry. The ETBF was one of the fisheries targeted in this buyback. Concluding in December 2006, the buyback resulted in 45 per cent and 49 per cent reductions in longline and minor line permits, respectively (Vieira et al. 2010).

Following the buyback, a harvest strategy framework was developed for the fishery in response to a Ministerial Direction to AFMA to address and eliminate overfishing in Commonwealth fisheries. The framework is scheduled to be fully implemented in 2010. Interim management arrangements were introduced in November 2009 and currently apply. Under these arrangements, harvest levels are managed using a total allowable effort (TAE). The TAE is set using target-driven catch per unit effort rules and a 'decision tree' approach that uses a range of fishery indicators and associated reference levels. Together, these tools indicate a recommended biological catch for each target species and a corresponding TAE can then be

map **1** Location and relative fishing intensity, Eastern Tuna and Billfish Fishery, 2009



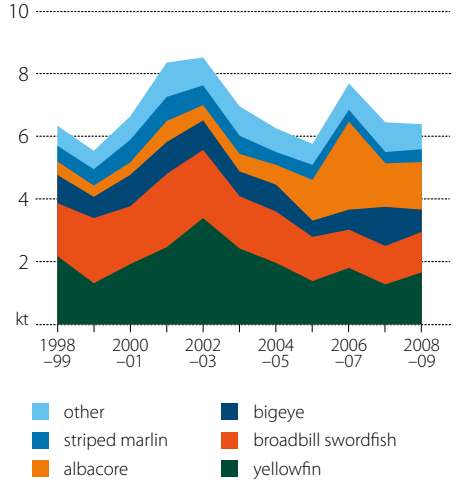
determined (Wilson et al. 2010). These interim arrangements are planned to cease with the introduction of output-based management under individual transferrable quotas in 2011.

For an in-depth overview of the fishery including its history, management arrangements, biological and economic status, see Wilson et al. (2010).

Catch and gross value of production

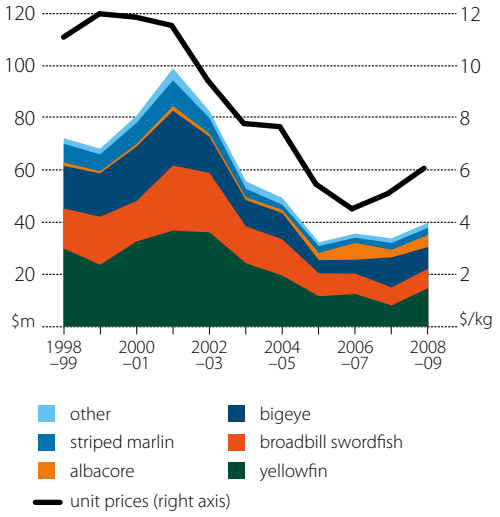
Historically, the combined catch of yellowfin tuna and billfish has comprised more than half of the fishery's catch (figure a). However, since 2004–05 operators have increasingly targeted albacore tuna, thus altering the catch composition in the fishery. The production volume of albacore rose from 630 tonnes in 2004–05 to 2800 tonnes in 2006–07, but declined to 1520 tonnes in 2008–09. Of the 6400 tonnes of fish landed in 2008–09, the combined weight of yellowfin tuna (26 per cent), albacore tuna (24 per cent) and broadbill swordfish (20 per cent) accounted for more than three-quarters of the catch. Key changes in 2008–09 were a 43 per cent drop in bigeye tuna landings and a 31 per cent increase in yellowfin tuna landings.

a Landed catch, Eastern Tuna and Billfish Fishery, longline and minor line



b Real gross value of production and real unit prices, Eastern Tuna and Billfish Fishery, longline and minor line

2009–10 dollars



Although the total volume of production fell by only 1 per cent between 2007–08 and 2008–09, the fishery's gross value of production (GVP) increased by 18.0 percent in real terms to $39.8 million (2009–10 dollars) (figure b). This is 60 per cent lower than the peak of $98.9 million recorded in 2001–02. An 83 per cent increase in the value of yellowfin tuna landings and a 60 per cent increase in the value of albacore landings, both in 2008–09, were key contributing factors. In the case of yellowfin tuna, this increase occurred with an increase in yellowfin tuna landings, together with a 40 per cent increase in real prices. Similarly, albacore prices increased by 45 per cent in real terms in 2008–09. Yellowfin tuna (37 per cent of GVP), bigeye tuna (21 per cent) and broadbill swordfish (19 per cent) were the key species in value terms in 2008–09.

Survey results

Boats surveyed

The 2010 survey collected data for the 2007–08 and 2008–09 financial years. The survey method used by ABARES is described in appendix B. The target population for the ETBF survey was defined as any longline boat that recorded catch in either of these two financial years. The minor line sector was excluded. There were 58 boats that recorded catch in the ETBF in 2007–08 and 55 in 2008–09. Out of this survey population,

24 boats were sampled in each year, which was a sample size of 41 per cent and 44 per cent of the population in 2007–08 and 2008–09, respectively.

For the purpose of constructing estimates of financial and economic performance, the fishery population is divided into two fleet types: Queensland fleet and New South Wales fleet. A sampled boat only represents a non-sampled boat of the same fleet. The reason for this approach is that the operating characteristics of the two fleets are likely to differ. This is partly because of differences in the spatial characteristics and location of fishing activity between the two fleets. Additionally, most Queensland boats operate in vertically integrated business structures where fish harvesting activities are integrated with fish processing activities within the same business structure. The operating characteristics of these boats are likely to differ to other non-vertically integrated operators, particularly in terms of boat cost and revenue structures. Financial performance estimates could not be reported at the fleet level for confidentiality reasons.

Boat-level financial performance

Survey-based estimates of average boat-level financial performance are presented in nominal terms in table 1. Financial performance estimates include the receipts and costs earned and incurred by boats in both the fishery being surveyed and any other fisheries that sampled boats may have operated in during the survey years. For the current ETBF survey, all operators surveyed indicated that they only operated in the ETBF during the survey period. Consequently, the receipts and costs displayed in table 1 relate only to the ETBF. Differences in financial performance that arise from specific fleet characteristics for Queensland and New South Wales boats are also noted where relevant. Definitions of items contained in table 1 are included in appendix A.

Receipts

Average seafood receipts per boat in the ETBF in nominal terms increased between 2007–08 and 2008–09 from $695 000 to $782 000. This represented an increase of 12 per cent.

Costs

Total cash costs for the average boat in the ETBF also increased in 2008–09, but by marginally less than seafood receipts. Total cash costs were $702 000 a boat in 2007–08 and increased by 11 per cent to $781 000 a boat in 2008–09.

The key cost items in both years were crew costs (accounting for 29 per cent of total cash costs in 2008–09), fuel (14 per cent), repairs and maintenance (14 per cent) and freight and marketing (13 per cent). Together, these cost items accounted for 70 per cent of total cash costs for the average ETBF boat in 2008–09.

Key changes between 2007–08 and 2008–09 were an 18 per cent increase in average crew costs per boat and a 13 per cent decline in fuel costs per boat. Given crew are generally paid a share of seafood receipts, the increase in crew costs was broadly consistent with the increase in fishing receipts. The decline in average fuel costs per boat reflects the fall in average fuel prices between the two years.

Boat cash income and profit

Boat cash income reflects the difference between total cash receipts and total cash costs per boat. For the average ETBF boat, boat cash income increased from $9000 to $14 000 between 2007–08 and 2008–09, which was an increase of 64 per cent. Boat business profit, which is boat cash income less depreciation, for the average boat in the ETBF remained negative over the two years, although it did improve from –$41 000 in 2007–08 to –$31 000 in 2008–09.

Profit at full equity, which is boat business profit plus interest, leasing and rent, increased from –$12 000 a boat in 2007–08 to –$2000 a boat in 2008–09. This profit measure is calculated by removing all costs associated with interest, leasing and rent to treat these items as transfers to other entities rather than costs. While these items impose a cost on the operator, they represent profits that have been redistributed to other investors in the fishery. As such, profit

1 Financial performance of boats operating in the Eastern Tuna and Billfish Fishery average per boat

		all boats			
		2007–08		2008–09	
Seafood receipts	$	695 358	(14)	781 905	(6)
Non-fishing receipts	$	15 412	(25)	13 284	(21)
Total cash receipts	$	710 770	(14)	795 190	(6)
Administration	$	14 829	(11)	20 267	(12)
Bait	$	37 353	(11)	35 682	(9)
Crew costs	$	191 855	(12)	226 573	(6)
Freight and marketing expenses	$	96 688	(20)	101 743	(20)
Fuel	$	129 521	(14)	112 134	(7)
Insurance	$	23 344	(15)	23 933	(8)
Interest paid	$	13 762	(43)	17 174	(60)
Licence fees and levies	$	11 512	(13)	18 437	(20)
Packaging	$	51 521	(18)	60 918	(16)
Repairs and maintenance	$	86 757	(8)	106 859	(19)
Other costs	$	44 867	(6)	57 139	(20)
Total cash costs	$	702 008	(11)	780 861	(7)
Boat cash income	$	8 762	(274)	14 329	(296)
less depreciation **a**	$	49 992	(18)	45 446	(10)
Boat business profit	$	–41 241	(57)	–31 113	(142)
plus interest, leasing and rent	$	28 954	(21)	29 086	(36)
Profit at full equity	$	–12 287	(219)	–2 027	(1678)
Capital					
– excluding quota and licences	$	626 915	(5)	506 344	(6)
– including quota and licences	$	1 094 884	(4)	927 622	(5)
Rate of return					
– to boat capital **b**	%	–2.0	(218)	–0.4	(1682)
– to full equity **c**	%	–1.1	(220)	–0.2	(1681)
Population	no.	58		55	
Sample	no.	24		24	

a Depreciation adjusted for profit or loss on capital items sold. **b** Excluding value of quota and licences. **c** Including value of quota and licences.
Note: Figures in parentheses are relative standard errors. A guide to interpreting these is included in appendix B. For a given standard error, the relative standard error will be higher for mean estimates closer to zero.

at full equity represents the average return to the business unit had the boat and capital (including quota and licences) been fully owned by the operator.

Rates of return

The rate of return to boat capital, excluding the value of quota and licences, for the average ETBF boat improved substantially between survey years from –2.0 per cent a boat in 2007–08 to –0.4 per cent a boat in 2008–09. To allow the financial performance of all boats to be compared irrespective of the operators' equity in the business unit, rates of return are calculated assuming all capital assets are owned by the operator.

The rate of return to full equity includes the value of quota and licences in addition to other capital, and therefore provides an indication of the return to total capital invested in the business unit. It reflects changes in the value of capital, quota and licences, as well as changes in boat-level profitability. The rate of return to full equity for the average boat in the ETBF increased from –1.1 per cent a boat in 2007–08 to –0.2 per cent in 2008–09.

Fishery-level economic performance

The boat-level estimates displayed in table 1 indicate the financial performance of the average boat in the ETBF in 2007–08 and 2008–09. However, the measure presented is not an accurate indicator of fishery-level economic performance as it excludes some key economic costs.

Table 2 presents historical receipts, costs and key measures of fishery-level profitability; namely, boat cash profit and net economic return, in real terms. Boat cash profit measures the difference between cash receipts and cash costs in a fishery. As such, it reveals the cash position of the fishery. Net economic return, in comparison, reveals economic profitability, as it incorporates depreciation costs and the opportunity cost of capital and labour and it treats all interest and leasing expenditure as an economic return to external investors in the fishery. Furthermore, it includes the total amount spent on managing the fishery, rather than just the management fees recovered from operators. A more detailed explanation of net economic return is included in appendix A.

In real terms, fishing income peaked in 2001–02 at $108.1 million (2009–10 dollars) then declined until 2005–06, reflecting falls in catches that can be linked to stock level reductions (particularly for swordfish), declining fish prices and a 35 per cent fall in the number of boats operating in the fishery. In the three years since 2005–06, fishing income has remained relatively stable at slightly more than $40 million.

Operating costs also peaked in 2001–02 at $96.7 million and has also declined since then. However, the rate of decline was slower relative to fishing income. As a result, boat cash profit declined from $17.8 million in 2000–01 to become negative for the first time in 2002–03 at –$5.2 million—the lowest reported boat cash profit since 1993–94. Boat cash profit has recovered incrementally in the years since, although it remained negative until 2006–07 (figure c).

In the three years since 2005–06, while fishing income remained relatively stable, operating costs continued to decline (mainly reflecting declines in boat numbers). In the two survey years, 2007–08 and 2008–09, operating costs were $40.5 million and $41 million, respectively, while fishing income increased from $42.6 million to $44 million (an increase of 3 per cent)

over the same period. As a result, boat cash profit continued to recover, becoming positive in 2007–08 at $2.0 million and increasing further in 2008–09 to $3.0 million.

With the inclusion of non-cash costs and the removal of interest, leasing and management fees (see appendix A for explanation), net economic returns (excluding management costs) have also recovered since 2002–03. The rate of recovery in net economic returns has been greater relative to boat cash profit, given the decline in boat numbers in the fishery and, consequently, non-cash costs (especially capital-related costs—the opportunity cost of capital and depreciation).

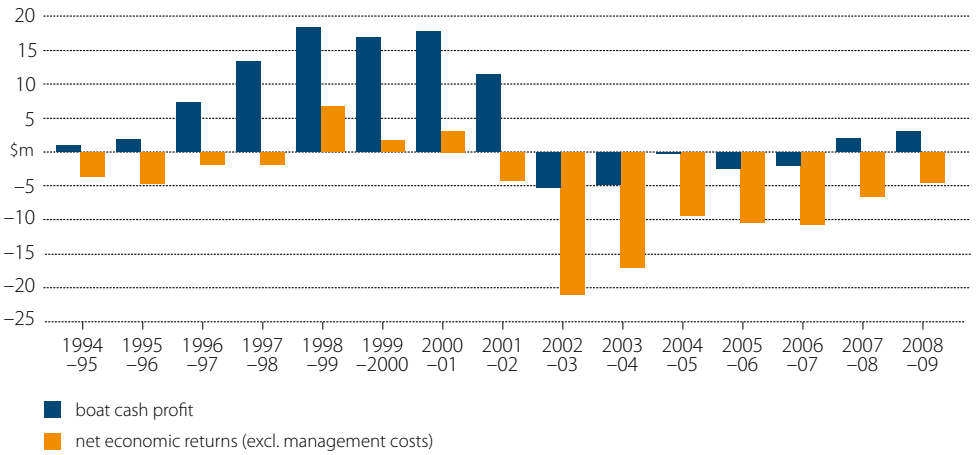
Net economic returns (excluding management costs) increased from –$7.5 million in 2006–07 to –$3.3 million in 2007–08. The recovery continued in 2008–09, with net economic returns increasing to –$1.5 million. However, with the inclusion of management costs, net economic returns remained substantially negative in 2008–09 at –$4.5 million (figure c).

While economic performance as measured by net economic returns is improving in the ETBF, returns still remain negative and have been since 2002–03. Positive boat cash profit provides some explanation as to why boats continue to operate in the fishery. Additionally, the Queensland fleet that dominates the fishery in terms of both boat numbers and catch mainly comprises boats that operate in vertically integrated business structures whereby harvesting, processing and exporting is all undertaken within one entity. As a result, there may be some transfer of economic rents from harvesting to post-harvesting operations within these vertically integrated entities.

Factors outside the control of fishery management affect both net economic returns and other measures of financial performance in the sector. For example, movements of the Australian dollar affect the prices received by fishers as well as the prices of some fishery inputs, such as fuel. More generally, the price of inputs such as fuel and gear are not controlled by fishery managers. However, the fishery manager may alter management settings to allow net economic returns to be maximised given prevailing input and output prices. This may require periodic review of the optimal level of catch and effort in the fishery to ensure stocks are maintained at profitable levels.

C Boat cash profit and net economic returns, total for the Eastern Tuna and Billfish Fishery

2009–10 dollars



2 Boat cash profit and net economic returns in the Eastern Tuna and Billfish Fishery

total for fishery, 2009–10 dollars

		1993–94		1994–95		1995–96		1996–97		1997–98		1998–99		1999–2000		2000–01	
Receipts																	
Fishing income	$m	20.7	(29)	22.9	(14)	27.3	(14)	48.9	(14)	78.7	(15)	92.5	(9)	85.9	(12)	99.6	(9)
Cash costs																	
Operating costs	$m	19.1	(31)	22.0	(14)	25.4	(14)	41.6	(15)	65.3	(11)	74.3	(10)	69.1	(12)	81.8	(8)
Boat cash profit	$m	1.6	(53)	0.9	(76)	1.9	(38)	7.3	(19)	13.4	(42)	18.3	(33)	16.8	(21)	17.8	(22)
less																	
– owner and family labour	$m	2.1	(30)	2.0	(13)	3.3	(20)	5.8	(14)	11.2	(12)	10.9	(13)	10.3	(19)	12.1	(12)
– opportunity cost of capital	$m	1.2	(34)	1.5	(16)	1.9	(22)	2.3	(20)	4.6	(22)	4.8	(20)	4.7	(23)	4.6	(12)
– depreciation	$m	1.9	(32)	2.5	(16)	2.9	(21)	3.9	(20)	7.0	(21)	8.4	(19)	7.1	(23)	7.9	(13)
plus interest, leasing and management fees	$m	2.4	(32)	2.7	(16)	2.8	(16)	3.8	(14)	8.6	(9)	13.8	(20)	8.4	(18)	11.5	(13)
Net return (excluding management costs)	$m	–1.0	(110)	–2.4	(35)	–3.5	(36)	–0.9	(134)	–0.8	(745)	8.0	(76)	3.2	(94)	4.7	(86)
Management costs	$m	na	na	1.2	na	1.1	na	1.0	na	1.0	na	1.3	na	1.5	na	1.6	na
Net return (including management costs)	$m	na	na	–3.6	na	–4.6	na	–1.8	na	–1.8	na	6.7	na	1.7	na	3.1	na
Number of active boats	no.	85		84		94		118		143		146		143		132	
Net return (excluding management costs) per boat	$	–12 000	(110)	–28 000	(35)	–37 000	(36)	–7 000	(134)	–6 000	(744)	55 000	(756)	22 000	(94)	36 000	(86)
Management costs per boat **a**	$	na	na	15 000	na	12 000	na	8 000	na	7 000	na	9 000	na	11 000	na	12 000	na
Net return (including management costs) per boat	$	na	na	–43 000	na	–49 000	na	–16 000	na	–13 000	na	46 000	na	12 000	na	24 000	na

continued...

2 Boat cash profit and net economic returns in the Eastern Tuna and Billfish Fishery

total for fishery, 2009–10 dollars *continued*

		2001–02		2002–03		2003–04		2004–05		2005–06		2006–07		2007–08		2008–09	
Receipts																	
Fishing income	$m	108.1	(8)	86.9	(5)	72.8	(11)	65.5	(14)	48.3	(12)	43.5	(12)	42.6	(16)	44.0	(13)
Cash costs																	
Operating costs	$m	96.7	(9)	92.1	(5)	77.6	(11)	65.7	(15)	50.7	(11)	45.5	(10)	40.5	(13)	41.0	(13)
Boat cash profit	$m	11.4	(25)	−5.2	(50)	−4.8	(72)	−0.2	(1291)	−2.4	(62)	−2.0	(67)	2.0	(87)	3.0	(62)
less																	
– owner and family labour	$m	7.0	(20)	4.9	(15)	4.2	(25)	2.8	(19)	1.7	(26)	1.5	(29)	2.4	(21)	3.0	(22)
– opportunity cost of capital	$m	5.2	(15)	5.8	(8)	5.4	(15)	3.5	(15)	3.2	(12)	2.6	(9)	1.9	(16)	1.5	(17)
– depreciation	$m	7.5	(15)	9.3	(9)	7.8	(16)	5.6	(15)	4.5	(12)	4.1	(9)	3.1	(16)	2.4	(16)
plus interest, leasing and management fees	$m	6.7	(11)	7.3	(7)	8.5	(20)	5.7	(18)	4.4	(14)	2.6	(16)	2.0	(16)	2.4	(28)
Net return (excluding management costs)	$m	−1.7	(215)	−17.9	(14)	−13.7	(19)	−6.4	(28)	−7.3	(21)	−7.5	(17)	−3.3	(54)	−1.5	(102)
Management costs	$m	2.6	na	3.1	na	3.3	na	2.9	na	3.1	na	3.2	na	3.2	na	3.0	na
Net return (including management costs)	$m	−4.2	na	−21.0	na	−17.0	na	−9.3	na	−10.4	na	−10.7	na	−6.5	na	−4.5	na
Number of active boats	no.	141		138		132		112		91		73		58	.	55	.
Net return (excluding management costs) per boat	$	−12 000	(215)	−130 000	(14)	−104 000	(19)	−57 000	(28)	−81 000	(21)	−103 000	(17)	−57 000	(54)	−27 000	(102)
Management costs per boat **a**	$	18 000	na	22 000	na	25 000	na	26 000	na	34 000	na	44 000	na	55 000	na	54 000	na
Net return (including management costs) per boat	$	−30 000	na	−152 000	na	−129 000	na	−83 000	na	−115 000	na	−147 000	na	−112 000	na	−82 000	na

a Management costs per boat do not represent management fees paid by individual boats as these costs include management fees recovered from licence and quota holders and non-recovered management costs that are covered by government. **na** Not applicable.

Note: Figures in parentheses are relative standard errors. A guide to interpreting these is included in appendix B. For a given standard error, the relative standard error will be higher for mean estimates closer to zero. Management costs are actual figures and not survey-based estimates. As a result, they have no corresponding relative standard error. Management costs not available for 1993–94.

Preliminary estimates of economic performance

Non-survey–based estimates of net economic returns for 2009–10 in real terms are presented in table 3, together with survey-based estimates for 2008–09 for comparison. The break-up of revenues and costs in table 3 differs to that in table 2 because of the different approaches taken to estimating the individual cost components in each table. The approach taken to estimating 2009–10 non-survey–based estimates for the ETBF is described in appendix C. Summary statistics for the 2009–10 preliminary estimates for the ETBF are provided in appendix D.

At the fishery level, declines in both catch and average unit prices in 2009–10 are estimated to have resulted in a 16 per cent decline in real cash receipts, from $44.0 million in 2008–09 to $36.8 million in 2009–10 (2009–10 dollars).

Key changes in cost items in 2009–10 in real terms were a $2.7 million (21 per cent) decline in labour costs, a $1.5 million (24 per cent) decline in fuel costs and a $1.3 million (22 per cent) decline in repairs and maintenance costs. The decrease in labour costs is consistent with the estimated decline in cash receipts, given that crew are generally paid a share of cash receipts. The decrease in fuel costs is because of declines in effort (in terms of distance travelled by boats) and average fuel prices (table 3). Overall, total adjusted operating costs are expected to have declined by $8 million (12 per cent), from $41.6 million in 2008–09 to $33.6 million in 2009–10.

3 Preliminary non-survey–based estimates of net economic returns for the Eastern Tuna and Billfish Fishery in 2009–10

total for fishery and total per boat, 2009–10 dollars

		financial year		percentage
Fishery level		2008–09	2009–10	change
Cash receipts	$m	44.0	36.8	–16%
less Operating costs				
– Fuel	$m	6.3	4.8	–24%
– Labour	$m	12.8	10.1	–21%
– Repairs and maintenance	$m	6.0	4.7	–22%
– Other material costs **a**	$m	3.6	3.3	–9%
– Other service costs **b**	$m	12.9	10.7	–17%
Total adjusted operating costs **b**	$m	41.6	33.6	–19%
less Capital costs				
– Opportunity cost of capital	$m	1.5	1.9	23%
– Depreciation	$m	2.4	3.0	25%
Net economic returns	$m	–1.5	–1.6	–7%
Management costs **c**	$m	3.0	2.8	–8%
Net economic returns (incl. management costs)	$m	–4.5	–4.4	3%
Boat level				
Population (no. of boats)	no.	55	54	–2%
Net economic return per boat (excl. management costs)	$	–27 000	–30 000	–9%
Net economic return per boat	$	–82 000	–81 000	1%

a Excludes fuel and repairs and maintenance costs that are normally included in materials costs. **b** Excludes interest, leasing and management fees. **c** Management costs for 2009–10 are based on budgeted figures provided by AFMA.

After the deduction of capital costs, real net economic returns (excluding management costs) are expected to have remained relatively stable, at –$1.5 million in 2008–09 and –$1.6 million in 2009–10. Since management costs are estimated to have fallen by 8 per cent in 2009–10 to $2.8 million, the ETBF has benefited from a slight improvement in net economic returns (including management costs), from –$4.5 million in 2008–09 to –$4.4 million in 2009–10.

At the boat level, the exit of a single boat from the population means that, in percentage terms, net economic returns increased proportionally more at the fishery level (3 per cent) than it did at the boat level (1 per cent). In 2009–10, net economic returns (including management costs) were –$81 000 a boat.

Figure d shows receipts, costs and net economic returns for all survey years, together with the non-survey–based estimates for 2009–10. More detail on the drivers of changes in historical economic performance in this fishery is provided in Wilson et al. 2010.

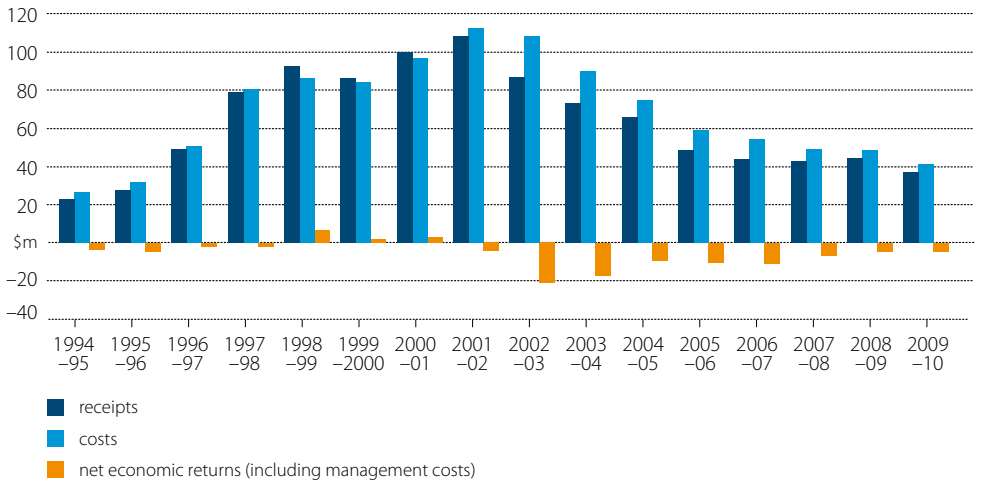
4 Key drivers of change in net economic returns in the Eastern Tuna and Billfish Fishery, 2008–09 and 2009–10 2009–10 dollars

	2008–09	2009–10	variable percentage change
Active boat numbers	55	54	–2%
Total catch (tonnes) **a**	6 399	5 707	–11%
Average catch price per kilogram **b**	$6.22	$5.28	–15%
Distance travelled per boat proxy (kilometres) **c**	28 165	18 984	–33%
Diesel fuel price per litre	$1.26	$1.11	–12%

a Total catch based on CDR data supplied by AFMA. **b** Average price per kilogram for 2008–09 is as presented in *Australian Fisheries Statistics 2009* and based on ABARES estimates for 2009–10. **c** Distance travelled applies only to boats previously sampled by ABARES, is approximate and is based on ABARES calculations.
Note: All 2009–10 estimates are preliminary. Prices are in real terms (2009–10 dollars). Catch data based on catch disposal record data.

d Real revenue, costs and net economic returns in the Eastern Tuna and Billfish Fishery

total for fishery, 2009–10 dollars

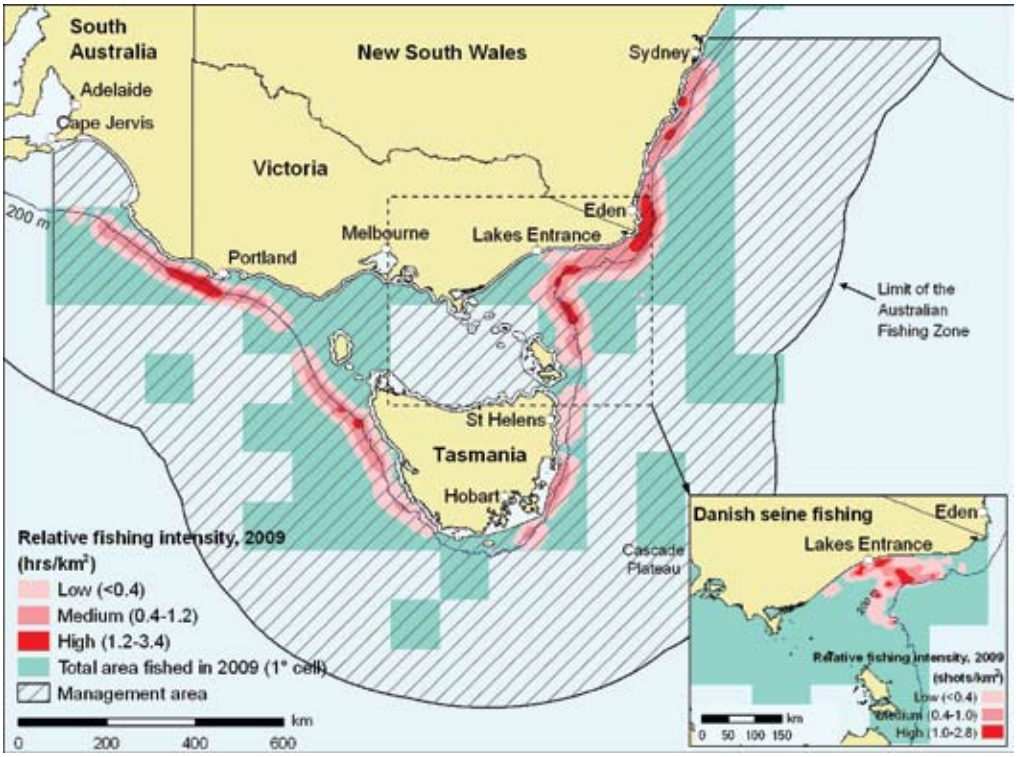


3 Commonwealth Trawl Sector

The sector

The Commonwealth Trawl Sector (CTS) is one of four sectors in the Southern and Eastern Scalefish and Shark Fishery (SESSF), and is the largest sector in catch and value terms. Previously managed as the South East Trawl Fishery, the sector is one of Australia's oldest commercial fishing sectors, commencing operation off the coast of Sydney in the early 1900s (DEH 2003). Activity in the CTS occurs in waters extending south from Barrenjoey Point (north of Sydney) around the New South Wales, Victorian and Tasmanian coastlines to Cape Jervis in South Australia (map 2). The primary harvesting method used in the sector is otter trawling, although a number of Danish seine boats operate out of Lakes Entrance in Victoria.

map **2** Location and relative fishing intensity, Commonwealth Trawl Sector, 2009



Management of the fishery is mainly based on output controls in the form of individual transferable quotas and total allowable catches (TACs) on key species. Under this system, there are 16 individual quota species and 29 species that are covered under basket or multispecies quotas (Stobutzki 2010). However, more than 100 species are routinely caught in the CTS. Since 2005, a harvest strategy framework has been used as a guide when determining TACs to provide a more strategic approach. The framework uses TACs to manage fisheries at target biomass levels. The rules that guide TAC setting have been designed to incorporate more precaution when there is increased uncertainty about stock status. The framework also improves the transparency of the TAC setting process (Larcombe and McLoughlin 2007).

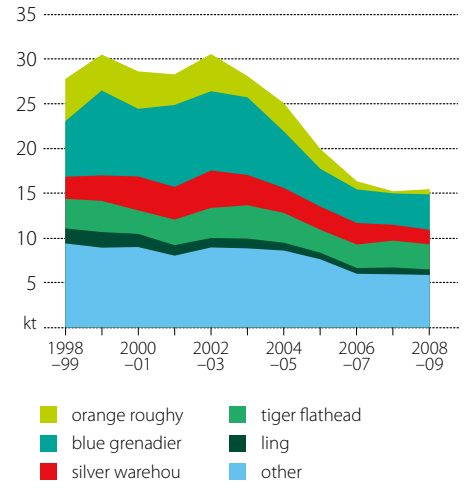
In November 2005, the Australian Government announced the $220 million Securing Our Fishing Future initiative. The initiative aimed to reduce excess effort in fisheries subject to overfishing or at significant risk of overfishing. As part of the initiative, $149 million was set aside for a voluntary tender process for fishing businesses to exit the industry (DAFF 2006). At the completion of the buyback in November 2006, a total of 59 CTS boat statutory fishing rights had been bought out (Vieira et al. 2010).

For more information about the CTS, and SESSF more broadly, see Wilson et al. 2010.

Catch and gross value of production

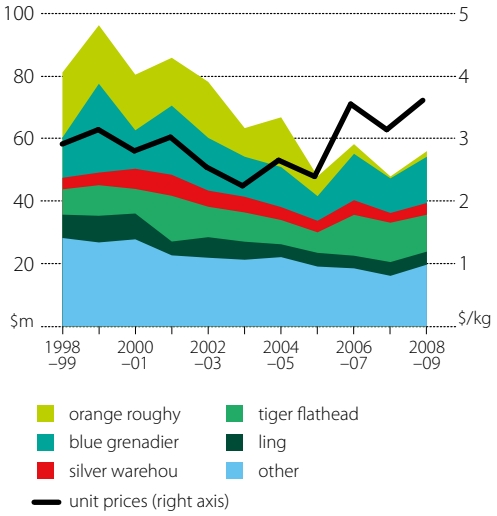
Catches in the CTS peaked at 30 600 tonnes in 2002–03, when catches of orange roughy and blue grenadier were substantially higher than more recent catches (figure e). In the period that followed 2002–03, catches declined each year up to and including 2007–08. In 2008–09, catches increased slightly by 2 per cent to 15 400 tonnes. This is approximately half the 2002–03 peak catch and reflects more conservative TAC settings and lower boat numbers. Three key species—blue grenadier (4000 tonnes), tiger flathead (2800 tonnes) and silver warehou (1600 tonnes)—constituted more than 54 per cent of the 2008–09 catch.

e Landed catch, Commonwealth Trawl Sector



Historically, the sector's gross value of production (GVP) has followed a similar downward trend to catches (figure f). In 1999–2000, GVP in real terms was $98.4 million (2009–10 dollars). The value of the sector in 2008–09 was $57.2 million, which was 42 per cent lower than in 1999–2000. However, if it were not for large increases in the average unit price received for catches in recent years, it is likely GVP would be even lower. Average real unit prices were $2.46 a kilogram in 2005–06, but have increased by 51 per cent to $3.71 a kilogram since then. This has been driven mainly

f Real gross value of production and unit prices, Commonwealth Trawl Sector
2009–10 dollars



by increased prices for blue grenadier and tiger flathead. At the species level, the reduction in the value of orange roughy production from $21.3 million in 1998–99 to $1.8 million in 2008–09 has been a key change and is the result of stock declines and large TAC reductions for this species.

Survey results

Boats surveyed

The current survey of the CTS covered the 2007–08 and 2008–09 financial years. The survey method used by ABARES is described in appendix B. The target population for the survey was defined as boats that operated in the sector and caught more than 1000 kilograms in either of two financial years, with the exception of two factory trawlers that were excluded from the analysis. Aside from difficulties in sampling these factory trawl operators, these boats are excluded because they have revenue and cost structures that are unrepresentative of the population.

Within the defined population, boats can be divided into two categories: otter trawlers and Danish seiners. In both 2007–08 and 2008–09, 7 Danish seine boats were sampled out of a population of 13. For otter trawler boats, 7 out of 37 boats were sampled in 2007–08 and 8 out of 39 boats were sampled in 2008–09.

Boat-level financial performance

Survey-based estimates of average boat-level financial performance are presented in nominal terms in table 5. Definitions of items included in table 5 are provided in appendix A. Financial performance estimates include the receipts and costs earned and incurred by boats in both the sector being surveyed and any other fisheries that sampled boats may have operated in during the survey years. In the case of the CTS, none of the boats sampled in the 2010 survey operated in other fisheries. As such, the financial performance measures presented in this year's report in table 5 relate only to the CTS.

The results reported in table 5 are divided into 'trawl', 'Danish seine' and 'all boats'. The species targeted and cost and revenue structures associated with the trawl and Danish seine methods differ. As a result, it is necessary to stratify the survey population by method in order to derive these survey-based estimates. This ensures that sampled boats only represent those non-sampled boats that used the same method and, therefore, were likely to have the same cost and revenue structure.

Receipts

Average seafood receipts per boat in the CTS decreased by 4 per cent between 2007–08 and 2008–09 from $1 020 000 to $982 000 (nominal terms). Seafood receipts are substantially greater for the average trawl boat compared with Danish seine boats. The average trawl boat reported a slightly greater decrease in seafood receipts between 2007–08 and 2008–09, from $1 154 000 in 2007–08 to just over $1 098 000 in 2008–09. Seafood receipts for the average Danish seine boat remained relatively constant, falling by 1 per cent to $633 000 in 2008–09.

Average seafood receipts reported by the average CTS boat in 2007–08 were 43 per cent higher than those reported for the 2006–07 financial year (Vieira et al. 2008).

Costs

Total cash costs for the average boat in the CTS also decreased in nominal terms in 2008–09, but by an amount similar to seafood receipts. Total cash costs were $941 000 a boat in 2007–08 and decreased by 5 per cent to $895 000 a boat in 2008–09.

The key cost items in both years were crew costs (accounting for 31 per cent of total cash costs in 2008–09), fuel (23 per cent), freight and marketing (16 per cent) and repairs and maintenance (10 per cent). Together, these cost items accounted for 80 per cent of total cash costs for the average CTS boat.

Key changes between 2007–08 and 2008–09 were a 9 per cent decline in average fuel cost per boat and a 9 per cent decline in average freight and marketing costs. The decrease in average fuel costs may have resulted from a combination of lower average effort levels and the fall in average fuel prices between the two years. The decrease in freight and marketing costs is broadly consistent with the decreases in fish sales.

Total cash costs per trawl boat were higher relative to the average Danish seine boat. Total cash costs were $1 098 000 per trawl boat in 2007–08 and decreased by 7 per cent to $1 023 000 per trawl boat in 2008–09. The average Danish seine boat reported an increase in total cash costs of 3 per cent between 2007–08 and 2008–09, with 82 per cent of the total in 2008–09 comprising crew costs, fuel, freight, marketing, and repairs and maintenance. Total cash costs for the average Danish seine boat increased from $497 000 to $513 000 over the two-year survey period. Fuel, labour, and repairs and maintenance costs are substantially lower for the average Danish seine boat than for the average trawl boat. In particular, fuel costs for the average Danish seine boat were $42 000 in 2008–09 compared with $264 000 for the average trawl boat.

Since trawl boats comprise a larger proportion of the fleet than Danish seine boats, the 7 per cent decrease in total cash costs for the average trawl boat has outweighed the 3 per cent increase in total cash costs for the average Danish seine boat, resulting in a decrease in total cash costs of 5 per cent for all boats.

5 Financial performance of boats operating in the Commonwealth Trawl Sector

average per boat

		Trawl				Danish seine				All boats			
		2007–08		2008–09		2007–08		2008–09		2007–08		2008–09	
Seafood receipts	$	1 153 575	(19)	1 098 291	(24)	639 078	(9)	633 065	(8)	1 019 806	(16)	981 984	(19)
Non-fishing receipts	$	84 419	(33)	125 412	(21)	26 787	(41)	21 127	(26)	69 435	(30)	99 341	(40)
Total cash receipts	$	1 237 994	(19)	1 223 702	(22)	665 866	(9)	654 193	(7)	1 089 241	(16)	1 081 325	(20)
Administration	$	20 670	(26)	21 959	(39)	6 550	(9)	8 105	(6)	16 998	(23)	18 496	(31)
Crew	$	305 896	(19)	291 139	(26)	192 342	(14)	240 479	(15)	276 372	(16)	278 474	(20)
Freight and marketing	$	180 163	(26)	158 546	(31)	98 315	(13)	100 098	(11)	158 883	(22)	143 934	(26)
Fuel	$	291 760	(17)	263 737	(37)	52 469	(8)	42 398	(6)	229 544	(16)	208 402	(35)
Insurance	$	22 903	(19)	18 644	(47)	18 003	(10)	21 867	(6)	21 629	(15)	19 449	(34)
Interest	$	17 046	(35)	34 704	(83)	10 358	(47)	9 663	(53)	15 307	(30)	28 444	(81)
Licence fees and levies	$	29 374	(16)	27 855	(39)	19 890	(22)	16 975	(20)	26 908	(14)	25 135	(33)
Repairs and maintenance	$	93 817	(14)	101 831	(44)	43 610	(17)	37 605	(20)	80 763	(13)	85 775	(37)
Other costs	$	135 905	(29)	104 176	(40)	55 855	(28)	35 811	(19)	115 092	(25)	87 085	(30)
Total cash costs	$	1 097 532	(17)	1 022 591	(30)	497 391	(9)	513 002	(10)	941 495	(15)	895 194	(24)
Boat cash income	$	140 462	(51)	201 111	(28)	168 475	(23)	141 191	(27)	147 746	(37)	186 131	(31)
less depreciation **a**	$	23 754	(22)	30 332	(31)	21 597	(16)	24 118	(15)	23 193	(17)	28 778	(22)
Boat business profit	$	116 709	(60)	170 779	(32)	146 878	(27)	117 073	(33)	124 553	(42)	157 353	(40)
plus interest, leasing and rent	$	114 321	(31)	106 207	(55)	41 153	(33)	20 482	(29)	95 297	(28)	84 775	(35)
Profit at full equity	$	231 029	(35)	276 986	(28)	188 031	(25)	137 555	(26)	219 850	(28)	242 108	(31)
Capital													
– excluding quota and licences	$	407 644	(17)	490 882	(20)	326 228	(11)	315 636	(11)	386 476	(14)	447 071	(16)
– including quota and licences	$	2 117 707	(11)	2 298 790	(12)	2 016 528	(7)	2 355 752	(6)	2 091 400	(9)	2 313 031	(10)
Rate of return													
– to boat capital **b**	%	57	(30)	56	(46)	58	(34)	44	(28)	57	(24)	54	(40)
– to full equity **c**	%	11	(29)	12	(41)	9	(27)	6	(20)	11	(23)	10	(36)
Population	no.	37		39		13		13		50		52	
Sample	no.	7		8		7		7		14		15	

a Depreciation adjusted for profit or loss on capital items sold. **b** Excluding value of quota and licences. **c** Including value of quota and licences.

Note: Figures in parentheses are relative standard errors. A guide to interpreting these is included in Appendix B. For a given standard error, the relative standard error will be higher for mean estimates closer to zero.

Boat cash income and profit

Boat cash income reflects the difference between total cash receipts and total cash costs per boat. For the average boat in the CTS, boat cash income increased from $148 000 a boat to $186 000 a boat between 2007–08 and 2008–09, which was an increase of 26 per cent (nominal terms). This compares with a 43 per cent increase for the average trawl boat, from $140 000 a boat to $201 000 a boat, and a 16 per cent decrease for the average Danish seine boat, from $168 000 a boat to $141 000 a boat over the two-year period.

Boat business profit, which is boat cash income less depreciation, for the average CTS boat improved from $125 000 a boat in 2007–08 to $157 000 a boat in 2008–09. For trawl boats, boat business profit improved by 46 per cent in 2008–09 to $171 000 a boat. The average Danish seine boat is estimated to have reported a 20 per cent decrease in boat business profit.

Profit at full equity, which is boat business profit plus interest, leasing and rent, increased by 37 per cent to $220 000 a boat between 2006–07 and 2007–08 when compared with previous survey results for the fishery (Vieira et al. 2008). It then increased further to $242 000 a boat in 2008–09. This profit measure is calculated by removing all costs associated with interest, leasing and rent to treat these items as transfers to other entities rather than costs. While these items impose a cost on the operator, they represent profits that have been redistributed to other investors in the fishery. As such, profit at full equity represents the average return to the business unit had the boat and capital (including quota and licences) been fully owned by the operator. Profit at full equity was relatively higher in both years for trawl-based boats, and increased from $231 000 a boat in 2007–08 to $277 000 a boat in 2008–09. However, the average profit at full equity for Danish seine boats fell over the same period, from $188 000 to $138 000.

Rates of return

The rate of return to boat capital, excluding the value of quota and licences, for the average CTS boat fell slightly between survey years, from 57 per cent a boat in 2007–08 to 54 per cent a boat in 2008–09. This latter value compares with returns to boat capital of 56 per cent and 44 per cent for the average trawl boat and the average Danish seine boat, respectively, in 2008–09. To allow the financial performance of all boats to be compared irrespective of the operators' equity in the business unit, rates of return are calculated assuming all capital assets are owned by the operator.

The rate of return to full equity includes the value of quota and licences in addition to other capital, and therefore provides an indication of the return to total capital invested in the business unit. It reflects changes in the value of capital, quota and licences, as well as changes in boat-level profitability. The rate of return to full equity for the average boat in the CTS remained relatively constant, falling from 11 per cent a boat in 2007–08 to 10 per cent in 2008–09. The average trawl boat benefited from an increase in its rate of return to full equity, from 11 per cent to 12 per cent. The average Danish seine boat incurred a decrease in this profit measure from 9 per cent to 6 per cent over the two-year survey period.

Sector-level economic performance

The boat-level estimates displayed in table 5 indicate the financial performance of the average boat in the CTS in 2007–08 and 2008–09. However, the measure presented is generally not an accurate indicator of sector level economic performance as it excludes some key economic costs.

Table 6 contains historical receipts, costs and key measures of sector level profitability; namely, boat cash profit and net economic return, in real terms. Boat cash profit measures the difference between cash receipts and cash costs in a sector. As such, it reveals the cash position of the sector. Net economic return, in comparison, reveals economic profitability, as it incorporates depreciation costs and the opportunity cost of capital and labour and it treats all interest and leasing expenditure as an economic return to external investors in the sector. Furthermore, it includes the total amount spent on managing the sector, rather than just the management fees recovered from operators. A more detailed explanation of net economic return is included in appendix A.

In real terms, fishing income has declined since 2000–01, when it was $87.6 million (2009–10 dollars). This has reflected falls in total landings, resulting from declines in stocks of key species, reductions in TACs and a fall in the number of boats operating in the sector. Since 2004–05, the declines in fishing income have slowed to average 1 per cent a year over the four years, to slightly more than $50 million in 2008–09.

Operating costs have also declined in real terms since peaking at $77.8 million in 2001–02, subsequently falling to $41.8 million in 2008–09. This decline has occurred faster than the fall in fishing income in recent years. While income has fallen by 2 per cent a year since 2004–05, costs have fallen by an average of 5 per cent a year. As a result, boat cash profit, which had initially declined from $11.9 million in 2000–01 to a low of 1.0 million in 2004–05, has recovered to $8.6 million in 2008–09 (figure g).

With the inclusion of economic costs and the removal of interest, leasing and management fees (see appendix A for explanation), net economic returns (excluding management costs) have also recovered strongly since 2004–05. This improvement has been driven by the increase in boat cash profit, which may be the result of the decline in boat numbers and, consequently, costs.

Real net economic returns (excluding management costs) increased from –$1.1 million in 2004–05 to $7.5 million in 2008–09. This figure is 4 per cent lower than the $7.8 million reported in 2006–07. When management costs are included, it is estimated that net economic returns have improved from –$4.8 million in 2004–05 to $3.9 million in 2008–09.

Factors outside the control of fishery management affect both net economic returns and other measures of financial performance in the sector. For example, movements of the Australian dollar affect the prices received by fishers as well as the prices of some fishery inputs, such as fuel. More generally, the price of inputs such as fuel and gear are not controlled by fishery managers. However, the fishery manager can alter management settings to ensure net economic returns can be maximised given prevailing input and output prices. This may require

6 Boat cash profit and net economic returns in the Commonwealth Trawl Sector

total for sector, 2009–10 dollars

Receipts		1996–97		1997–98		1998–99		1999–2000		2000–01		2001–02	
Fishing income	$m	82.7	(17)	90.2	(16)	73.5	(14)	80.8	(15)	87.6	(12)	85.2	(14)
Cash costs													
Operating costs	$m	74.0	(14)	76.4	(14)	65.1	(14)	72.7	(15)	75.7	(12)	77.8	(15)
Boat cash profit	$m	8.6	(46)	13.8	(44)	8.5	(36)	8.1	(55)	11.9	(24)	7.4	(47)
less													
– owner and family labour	$m	7.6	(10)	8.0	(10)	5.1	(13)	5.3	(13)	7.3	(13)	6.6	(17)
– opportunity cost of capital	$m	3.2	(11)	2.8	(12)	2.1	(13)	2.0	(15)	2.0	(11)	1.7	(11)
– depreciation	$m	4.5	(10)	4.4	(11)	3.0	(11)	3.1	(14)	2.7	(10)	2.6	(10)
plus interest, leasing and management fees	$m	12.8	(24)	11.4	(22)	5.5	(14)	5.7	(16)	6.4	(14)	6.9	(18)
Net return (excluding management costs)	$m	6.1	(108)	10.1	(63)	3.7	(90)	3.5	(142)	6.3	(56)	3.5	(96)
Management costs	$m	2.8	na	4.0	na	3.5	na	3.7	na	3.4	na	3.0	na
Net return (including management costs)	$m	3.3	na	6.1	na	0.2	na	–0.2	na	2.9	na	0.5	na
Number of active boats	no.	109		109		103		101		106		97	
Net return (excluding management costs) per boat	$	56 000	(108)	93 000	(63)	36 000	(90)	34 000	(142)	59 000	(56)	36 000	(96)
Management costs per boat **a**	$	26 000	na	36 000	na	34 000	na	36 000	na	32 000	na	31 000	na
Net return (including management costs) per boat	$	30 000	na	56 000	na	2 000	na	–2 000	na	27 000	na	5 000	na

continued....

6 Boat cash profit and net economic returns in the Commonwealth Trawl Sector

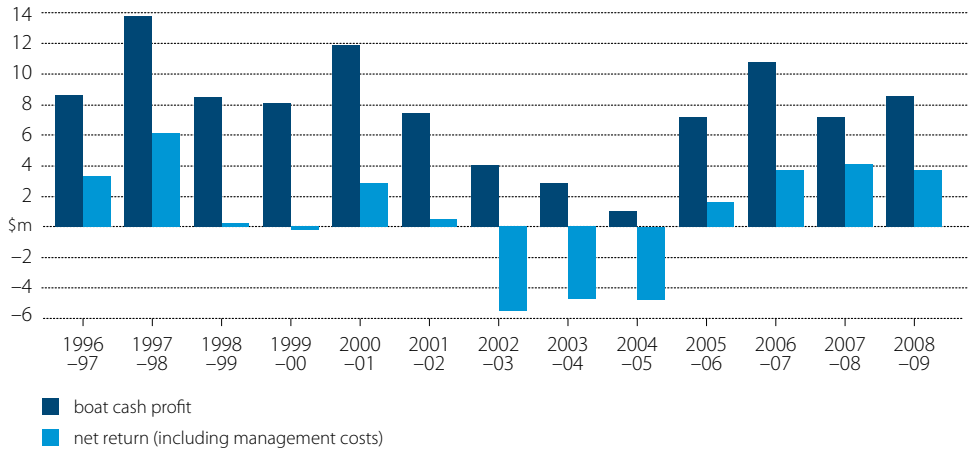
total for sector, 2009–10 dollars *continued*

Receipts		2002–03		2003–04		2004–05		2005–06		2006–07		2007–08		2008–09	
Fishing income	$m	65.9	(17)	60.4	(13)	56.9	(20)	52.3	(16)	51.9	(20)	51.4	(18)	50.3	(21)
Cash costs															
Operating costs	$m	61.9	(15)	57.6	(12)	55.9	(20)	45.1	(16)	41.1	(19)	44.2	(18)	41.8	(18)
Boat cash profit	$m	4.0	(69)	2.8	(84)	1.0	(155)	7.2	(36)	10.8	(34)	7.2	(53)	8.6	(44)
less															
– owner and family labour	$m	7.9	(14)	6.6	(14)	6.0	(16)	4.9	(24)	4.7	(23)	3.3	(48)	4.0	(46)
– opportunity cost of capital	$m	1.6	(16)	1.6	(16)	1.3	(16)	1.2	(16)	1.1	(22)	0.8	(20)	1.0	(22)
– depreciation	$m	2.3	(15)	2.6	(16)	2.1	(15)	1.6	(15)	1.5	(18)	1.1	(19)	1.5	(22)
plus interest, leasing and management fees	$m	6.0	(16)	6.7	(20)	7.3	(37)	4.8	(17)	4.3	(23)	5.9	(24)	5.5	(30)
Net return (excluding management costs)	$m	–1.8	(145)	–1.3	(201)	–1.1	(270)	4.2	(53)	7.8	(51)	8.0	(31)	7.5	(46)
Management costs	$m	3.7	na	3.4	na	3.7	na	2.6	na	4.1	na	3.9	na	3.6	na
Net return (including management costs)	$m	–5.5	na	–4.7	na	–4.8	na	1.6	na	3.7	na	4.1	na	3.9	na
Number of active boats	no.	100		97		91		81		73	.	50	.	52.0	
Net return (excluding management costs) per boat	$	–18 000	(145)	–13 000	(201)	–12 000	(270)	52 000	(53)	106 000	(51)	160 000	(31)	139 000	(47)
Management costs per boat **a**	$	37 000	na	36 000	na	40 000	na	32 000	na	56 000	na	77 000	na	68 000	na
Net return (including management costs) per boat	$	–55 000	na	–49 000	na	–52 000	na	20 000	na	51 000	na	82 000	na	76 000	na

a Management costs per boat do not represent management fees paid by individual boats as these costs include management fees recovered from licence and quota holders and non-recovered management costs that are covered by government. **na** Not applicable.

Note: Figures in parentheses are relative standard errors. A guide to interpreting these is included in appendix B. For a given standard error, the relative standard error will be higher for mean estimates closer to zero. Management costs are actual figures and not survey-based estimates. As a result, they have no corresponding relative standard error.

g Boat cash profit and net economic returns, total for the Commonwealth Trawl Sector
2009–10 dollars



periodic review of the optimal level of catch and effort in the fishery to ensure stocks are maintained at profitable levels.

Preliminary estimates of economic performance

Non-survey–based estimates of real net economic returns for 2009–10 are presented in table 7, together with survey-based estimates for 2008–09 for comparison. The break-up of revenues and costs in table 7 differs to that in table 6 because of the different approaches taken to estimating the individual cost components in each table. Summary statistics for the 2009–10 preliminary estimates for the CTS are provided in appendix D. The approach taken to estimating 2009–10 non-survey–based estimates for the CTS is presented in appendix C.

At the sector level, real cash receipts are expected to have remained relatively constant between 2008–09 and 2009–10, declining by 4 per cent to $48.3 million (2009–10 dollars). A 9 per cent decline in catch and a 9 per cent increase in gross value unit prices in 2009–10 are the basis for this relative stability (table 8).

Total adjusted operating costs are expected to have declined by $4.9 million (12 per cent), from $40.6 million in 2008–09 to $35.7 million in 2009–10. The main driver of this was a $2.5 million (24 per cent) fall in fuel costs between 2008–09 and 2009–10 to $7.9 million. This estimate is based on declines in average effort per boat in 2009–10, a 12 per cent decline in the price of fuel and a fall in the number of boats in the sector's surveyed population, from 52 boats in 2008–09 to 49 boats in 2009–10. Other key cost changes between 2008–09 and 2009–10 were a $1.4 million (14 per cent) decline in other service costs and a $0.9 million (21 per cent) decline in repairs and maintenance costs.

With the deduction of capital costs, which are expected to decline slightly between 2008–09 and 2009–10, net economic returns (excluding management costs) are expected to increase from $7.2 million in 2008–09 to $10.3 million in 2009–10. With the inclusion of management costs, net economic returns are estimated to have increased by 73 per cent between 2008–09 and 2009–10, from $3.7 million to $6.8 million. Net economic returns in the sector have been positive since 2005–06 (figure h).

The fall in boat numbers between the two years means that the improvement in net economic returns at the boat level is more substantial than at the fishery level. Net economic returns (including management costs) increased from $76 000 a boat in 2008–09 to $139 000 a boat in 2009–10.

More detail on the drivers of changes in historical economic performance in this sector is provided in Wilson et al. 2010.

7 Preliminary non-survey–based estimates of real net economic returns for the Commonwealth Trawl Sector in 2009–10

total for sector and total per boat, 2009–10 dollars

		financial year		percentage change
Fishery level		2008–09	2009–10	
Cash receipts	$m	50.3	48.3	–4%
less Operating costs				
– Fuel	$m	10.4	7.9	–24%
– Labour	$m	14.4	14.7	0%
– Repairs and maintenance	$m	4.2	3.3	–21%
– Other material costs **a**	$m	1.0	0.9	–13%
– Other service costs **b**	$m	10.2	8.8	–14%
Total adjusted operating costs **b**	$m	40.3	35.7	–12%
less Capital costs				
– Opportunity cost of capital	$m	1.0	0.9	–4%
– Depreciation	$m	1.5	1.4	–5%
Net economic returns	$m	7.5	10.3	42%
Management costs **c**	$m	3.6	3.5	–2%
Net economic returns (incl. management costs)	$m	3.9	6.8	85%
Boat level				
Population (no. of boats)	no.	52	49	–6%
Net economic return per boat (excl. management costs)	$	139 000	210 000	51%
Net economic return per boat	$	76 000	139 000	96%

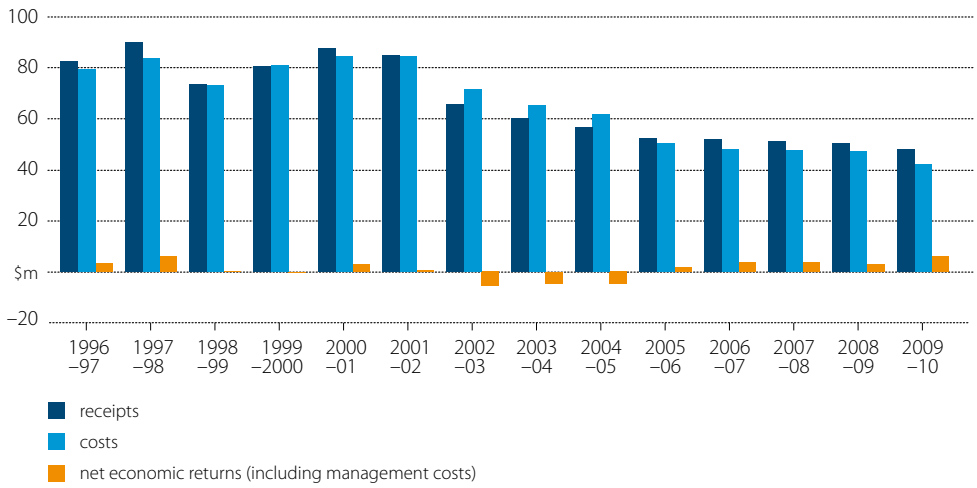
a Excludes fuel and repairs and maintenance costs that are normally included in materials costs. **b** Excludes interest, leasing and management fees. **c** Management costs for 2009–10 are based on budgeted figures provided by AFMA.

8 Key drivers of change in net economic returns in the Commonwealth Trawl Sector, 2008–09 and 2009–10 2009–10 dollars

	2008–09	2009–10	variable percentage change
Active boat numbers	52	49	–6%
Total catch (tonnes) **a**	15 449	14 023	–9%
Average catch price per kilogram **b**	$3.71	$4.04	9%
Average hours trawled per boat **c**	1 094	788	–28%
Diesel fuel price per litre	$1.26	$1.11	–12%

a Total catch based on CDR data supplied by AFMA. **b** Average price per kilogram for 2008–09 is as presented in *Australian Fisheries Statistics 2009* and based on ABARES estimates for 2009–10. **c** Uses trawl hour data supplied by AFMA and average based only on boats previously sampled by ABARES.
Note: All 2009–10 estimates are preliminary. Prices are in real terms (2009–10 dollars). Catch data based on catch disposal record data.

h Real revenue, costs and net economic returns in the Commonwealth Trawl Sector
total for sector, 2009–10 dollars



4 Gillnet, Hook and Trap Sector

The sector

The Gillnet, Hook and Trap Sector (GHTS) comprises what were previously the South East Non-Trawl Fishery and the Southern Shark Fishery. Both fisheries were in operation for a long time before being merged into the GHTS—the South East Non-Trawl Fishery since the early 1900s and the Southern Shark Fishery since 1927 (AFMA 2004). The sector extends south from southern Queensland to the western border of South Australia and includes waters to the south of Tasmania (map 3). Gear types that can be used in the sector include gillnets, droplines, demersal longlines, automatic longlines and, to a lesser extent, traps. Gillnets are used to target shark species (mainly gummy shark), while all other methods are used primarily to target finfish species, with some targeting of shark species using line methods. Operators are only permitted to use the gear types specified on their boat statutory fishing right or fishing permit (AFMA 2004).

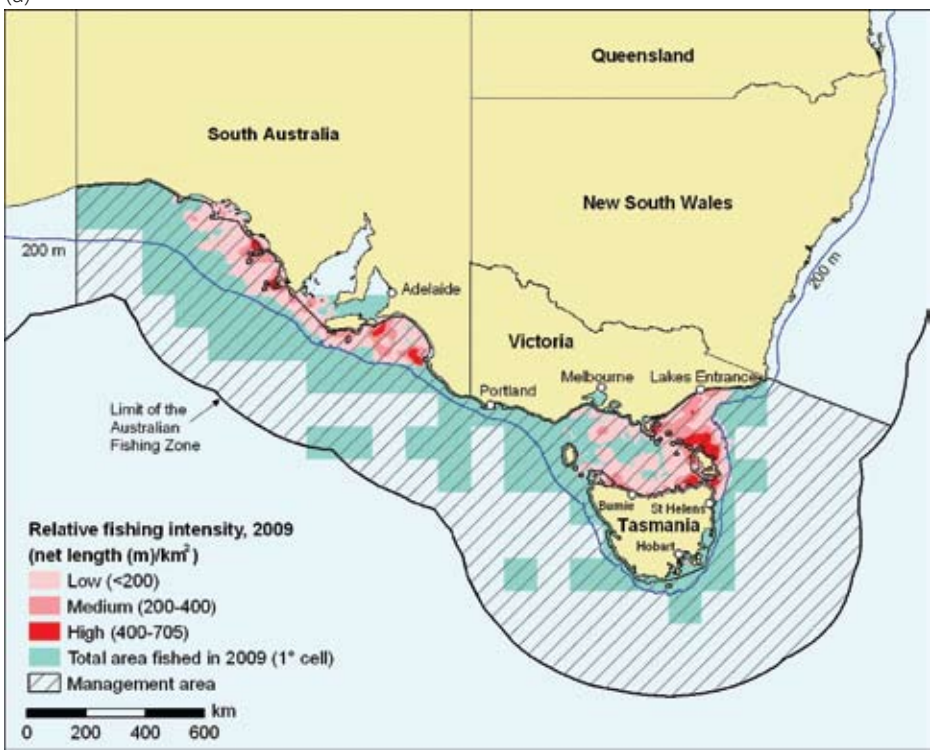
Like the Commonwealth Trawl Sector, the GHTS is a sector of the Southern and Eastern Scalefish and Shark Fishery (SESSF). Accordingly, the management of the sector is also based on output controls—species-based total allowable catches (TACs) and individual transferable quotas (ITQs). ITQ management was not implemented in the sector until 1998 when it was expanded to cover catches of blue eye trevalla, blue warehou and pink ling, given increasing catches of these species in that sector. ITQ management of all quota-managed species in the South East Trawl Fishery was then expanded to the non-trawl sector in 2001, when global TACs were set across both sectors (Wilson et al. 2010).

The harvest strategy framework adopted for the SESSF in 2005 also applies to the GHTS and provides a more strategic approach for determining TACs. The framework identifies TAC setting rules for different species based on whether a stock (or an indicator of stock) declines or rises above or below predetermined levels (Larcombe and McLoughlin 2007). As in the CTS, a range of input controls are also used to manage the fishery, including area and seasonal closures, limited entry, catch size restrictions and a variety of gear restrictions.

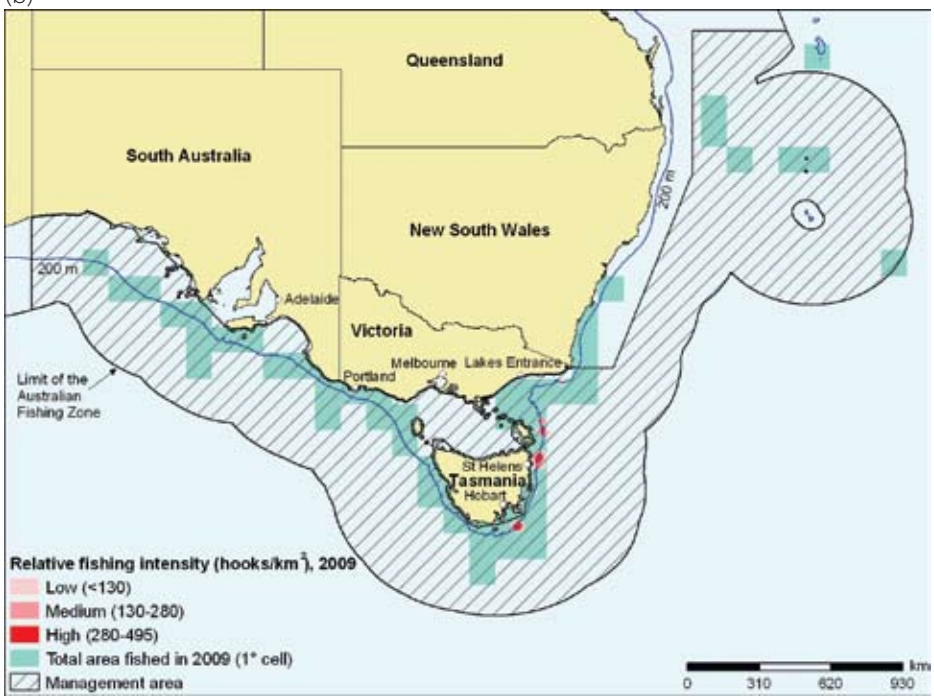
Automatic longlining is a relatively new fishing method used in the GHTS. It is a form of demersal longlining in which some of the functions are automated, allowing operators to set and haul more hooks (AFMA 2005). Operators using this method of fishing are subject to specific rules regulating where and when they may use this method. Furthermore, all operations using this method are required to comply with additional restrictions, including an upper hook limit of 15 000 hooks, mandatory use of bird scaring (tori) lines, observer coverage and integrated computer vessel monitoring system requirements (AFMA 2005).

map **3** Location and relative fishing intensity for the Shark Gillnet Sector (a) and Scalefish Hook Sector, (b) of the Gillnet, Hook and Trap Sector, 2009

(a)



(b)



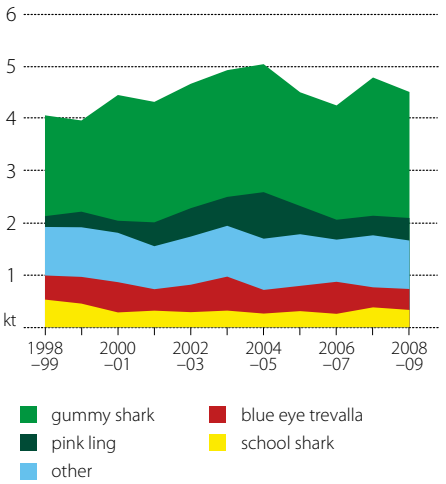
In November 2005, the Australian Government announced the $220 million Securing Our Fishing Future initiative. The initiative aimed to reduce excess effort in fisheries subject to overfishing or at significant risk of overfishing. As part of the initiative, $149 million was set aside for a voluntary tender process for fishing businesses to exit the industry. A total of 114 statutory fishing rights/permits were purchased from the GHTS by the conclusion of the tender process in November 2006 (Vieira et al. 2010).

Catch and gross value of production

The total landed catch for the GHTS in 2008–09 was 4509 tonnes (whole weight equivalent) (figure i). This is 11 per cent below the peak catch of 5040 tonnes recorded in 2004–05. Gummy shark catch typically accounts for around 50 per cent of the sector's total catch and made up 54 per cent in 2008–09. Other key species include pink ling (which accounted for 10 per cent of catch in 2008–09), blue eye trevalla (9 per cent) and school shark (7 per cent). As gummy shark catches were relatively stable over the period 1998–99 to 2008–09, the sector's total catch has also been stable.

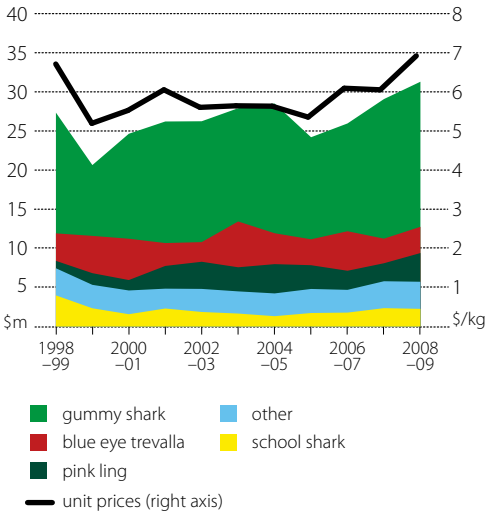
Relatively strong prices in 2008–09 contributed to an increasing trend in the real gross value of production (GVP) in the sector, with GVP peaking in 2008–09 at $31.3 million (figure j). This represents an 8 per cent increase relative to 2007–08 and is 52 per cent higher than the lowest value recorded in 1999–2000. Driving the increase in 2008–09 was a 60 per cent ($1.4 million) increase in the value of pink ling landings and a 4 per cent ($0.7 million) increase in gummy shark value. These latter increases reflect a 39 per cent increase in the real price for pink ling and a 14 per cent increase for gummy shark.

i Landed catch, Gillnet, Hook and Trap Sector (whole weight)



j Real gross value of production and real unit prices, Gillnet, Hook and Trap Sector

2009–10 dollars



Survey results

The 2010 survey collected data for the 2007–08 and 2008–09 financial years. The survey method used by ABARES is described in appendix B. The target population for the GHTS survey was defined as any boat that recorded catch of more than 1750 kilograms in either of these two financial years. This limited the population to 67 boats in 2007–08 and 68 in 2008–09. The survey population can be divided into subgroups based on method. In 2007–08, the population included 44 gillnet boats, 6 autolongliners and 17 boats that employed other line methods (demersal longline or dropline). In 2008–09, the population included 46 gillnet boats, 6 autolongliners and 16 boats that employed other line methods.

Out of this survey population, 16 boats were sampled in each year, which was a sample size approximately equivalent to 24 per cent in both 2007–08 and 2008–09. This sample included 9 gillnet boats, 3 autolongline boats and 4 boats using other line methods in both years.

Boat-level financial performance

Survey-based estimates of average boat-level financial performance are presented in nominal terms in table 9. Definitions of items included in table 9 are provided in appendix A. Financial performance estimates include the receipts and costs earned and incurred by boats in both the fishery being surveyed and any other fisheries that sampled boats may have operated in during the survey years. Other fisheries operated in by sampled GHTS boats included the South Australian Rock Lobster Fishery and offshore high sea fisheries. Consequently, the receipts and costs displayed in table 9 relate to fishing activities in both the GHTS and these other fisheries.

The results reported in table 9 are divided into 'gillnet boats' and 'all boats'. Gillnet fishing differs considerably from other methods such as auto-longlining and demersal longlining, particularly in regard to cost structures and species targeted. As a result, it is necessary to stratify the survey population by method to ensure sampled gillnet boats can only represent other gillnet boats in the population and, similarly, sampled autolongline boats can only represent other autolongline boats in the population. As a result, sampled boats are restricted to representing non-sampled boats that were likely to have a similar cost and revenue structure

9 Financial performance of boats operating in the Gillnet, Hook and Trap Sector average per boat

		Gillnet boats				All boats			
		2007–08		2008–09		2007–08		2008–09	
Seafood receipts	$	544 967	(15)	551 403	(17)	527 362	(15)	587 480	(15)
Non-fishing receipts	$	5 186	(67)	16 608	(28)	8 341	(33)	23 347	(23)
Total cash receipts	$	550 153	(15)	568 011	(17)	535 702	(15)	610 827	(15)
Administration	$	8 354	(16)	7 871	(16)	7 915	(14)	7 555	(13)
Bait	$	3 826	(59)	5 188	(62)	6 154	(28)	6 854	(32)
Crew	$	210 388	(16)	196 695	(19)	194 361	(16)	204 851	(18)
Freight and marketing	$	1 344	(63)	2 855	(72)	9 411	(55)	11 112	(56)
Fuel	$	59 264	(23)	55 201	(23)	57 734	(19)	47 642	(18)
Insurance	$	15 244	(14)	15 934	(15)	13 012	(13)	13 059	(13)
Interest	$	33 437	(70)	29 247	(70)	31 741	(52)	23 110	(61)
Leasing	$	79 189	(40)	80 633	(40)	76 875	(33)	69 215	(35)
Licence fees and levies	$	21 602	(18)	18 696	(30)	16 733	(17)	13 794	(27)
Repairs and maintenance	$	37 224	(16)	37 783	(21)	42 236	(12)	43 568	(13)
Other costs	$	39 823	(41)	40 729	(40)	33 186	(33)	64 178	(33)
Total cash costs	$	509 695	(15)	490 831	(17)	489 358	(13)	503 647	(14)
Boat cash income	$	40 458	(51)	77 180	(34)	46 344	(55)	107 181	(28)
less depreciation **a**	$	19 784	(25)	18 952	(23)	28 015	(30)	27 360	(22)
Boat business profit	$	20 674	(96)	58 229	(41)	18 328	(106)	79 592	(31)
plus interest, leasing and rent	$	113 419	(27)	110 718	(24)	109 137	(20)	91 600	(21)
Profit at full equity	$	134 093	(25)	168 947	(20)	127 465	(23)	180 726	(17)
Capital									
– excluding quota and licences	$	382 511	(12)	382 219	(12)	400 683	(18)	437 286	(18)
– including quota and licences	$	1 621 965	(25)	1 576 798	(24)	1 597 256	(18)	1 648 638	(18)
Rate of return									
– to boat capital **b**	%	35	(28)	44	(20)	32	(24)	41	(20)
– to full equity **c**	%	8	(25)	11	(19)	8	(22)	11	(20)
Population	no.	44		46		67		68	
Sample	no.	9		9		16		16	

a Depreciation adjusted for profit or loss on capital items sold. **b** Excluding value of quota and licences. **c** Including value of quota and licences.

Note: Figures in parentheses are relative standard errors. A guide to interpreting these is included in Appendix B. For a given standard error the relative standard error will be higher for mean estimates closer to zero.

Receipts

In nominal terms, average seafood receipts per boat for all boats in the GHTS increased between 2007–08 and 2008–09 from $527 000 to $587 000. This represents an increase of 11 per cent. For gillnet boats, average seafood receipts increased by 1 per cent over the survey period. Average seafood receipts per gillnet boat were $545 000 in 2007–08 and $551 000 in 2008–09.

Previous survey results for 2006–07 (Vieira et al. 2008) reveal that average seafood receipts in the GHTS increased by 39 per cent between 2006–07 and 2007–08 (nominal terms). This increase is consistent with the combination of a 15 per cent decrease in boat numbers and 16 per cent increase in nominal GVP.

Costs

Average total cash costs per boat for all boats in the GHTS increased in 2008–09. Nominal total cash costs were $489 000 a boat in 2007–08 and increased by 3 per cent to $504 000 a boat in 2008–09.

The key cost items in both years were crew (accounting for 40 per cent of total cash costs in 2008–09), fuel (9 per cent), leasing (13 per cent), and repairs and maintenance (9 per cent). Together, these cost items accounted for 72 per cent of total cash costs for the average GHTS boat.

One of the key changes in the GHTS was the 17 per cent decline in average fuel cost per boat between 2007–08 and 2008–09, largely reflecting the fall in average fuel prices between the two years.

In 2008–09, cash costs for the average gillnet boat fell below those for the average GHTS boat. Total cash costs were $510 000 a boat in 2007–08 and decreased by 4 per cent to $491 000 a boat in 2008–09. Once again, crew, fuel, leasing, and repairs and maintenance accounted for the major share of total cash costs per boat—75 per cent in 2008–09.

Crew costs for gillnet boats decreased by 7 per cent, despite increases of 5 per cent for all boats in the GHTS. At the same time, fuel costs fell by 7 per cent, slightly less than the decrease of 17 per cent in the fuel costs for all GHTS boats.

Boat cash income and profit

Boat cash income reflects the difference between total cash receipts and total cash costs per boat. For the average GHTS boat, boat cash income increased in nominal terms from $46 000 a boat to $107 000 a boat between 2007–08 and 2008–09, which was an increase of 131 per cent. This compares with a 91 per cent increase for the average gillnet boat from $40 000 a boat to $77 000 a boat over the same period.

Boat business profit, which is boat cash income less depreciation, for the average boat in the GHTS increased from $18 000 a boat in 2007–08 to $80 000 a boat in 2008–09. Boat business profit for gillnet boats improved by 182 per cent in 2008–09 to $58 000 a boat.

Profit at full equity, which is boat business profit plus interest, leasing and rent, increased from $127 000 a boat in 2007–08 to $181 000 a boat in 2008–09 for the average GHTS boat. This profit measure is calculated by removing all costs associated with interest, leasing and rent to treat these items as transfers to other entities rather than costs. While these items impose a cost on the operator, they represent profits that have been redistributed to other investors in the fishery. As such, profit at full equity represents the average return to the business unit had the boat and capital (including quota and licences) been fully owned by the operator. Profit at full equity for gillnet boats improved from $134 000 a boat in 2007–08 to $169 000 a boat in 2008–09.

Rates of return

The rate of return to boat capital, excluding the value of quota and licences, for the average GHTS boat improved substantially between survey years, from 32 per cent a boat in 2007–08 to 41 per cent a boat in 2008–09. This compares with a 44 per cent return to boat capital for the average gillnet boat. To allow the financial performance of all boats to be compared irrespective of the operators' equity in the business unit, rates of return are calculated assuming all capital assets are owned by the operator.

The rate of return to full equity includes the value of quota and licences in addition to other capital, and therefore provides an indication of the return to total capital invested in the business unit. It reflects changes in the value of capital, quota and licences, as well as changes in boat-level profitability. The rate of return to full equity for the average boat in the GHTS increased from 8 per cent a boat in 2007–08 to 11 per cent in 2008–09. For the average gillnet boat, a similar improvement occurred from 8 per cent a boat in 2007–08 to 11 per cent in 2008–09.

Sector-level economic performance

The boat-level estimates displayed in table 9 indicate the financial performance of the average boat in the GHTS in 2007–08 and 2008–09. However, the measure presented is generally not an accurate indicator of sector level economic performance as it includes revenues and costs associated with operations in other fisheries and excludes some key economic costs.

Table 10 presents historical receipts, costs and key measures of sector level profitability; namely, boat cash profit and net economic return, in real terms. Boat cash profit measures the difference between cash receipts and cash costs in a sector. As such, it reveals the cash position of the sector. Net economic return, in comparison, reveals economic profitability, as it incorporates depreciation costs and the opportunity cost of capital and labour and treats all interest and leasing expenditure as an economic return to external investors in the sector. Furthermore, it includes the total amount spent on managing the sector, rather than just the management fees recovered from operators. A more detailed explanation of net economic return is included in appendix A.

In real terms, fishing income peaked in 2003–04 at $31.2 million (2009–10 dollars). After consecutive falls in the two years that followed, fishing income has remained relatively constant at around $25 million since 2006–07. This is in large part because the sector is controlled with TACs, the level of which has remained relatively constant for key species. Without changes in fish prices and TACs, fishing income will remain relatively constant, irrespective of changes in the fleet structure.

Operating costs peaked in 2004–05 (the year after income peaked) in real terms at $24.6 million. In the year that followed, costs fell sharply to slightly more than $20 million and have remained at that level since. As income and costs stabilised, movements in boat cash profit also became relatively stable between 2005–06 and 2007–08. However, in 2008–09 boat cash profit increased by $2.2 million from $3 million in 2007–08 to $5.2 million in 2008–09.

While boat cash profit indicates a sector's cash position, net economic return is a more relevant measure of economic performance. It incorporates depreciation expenses, the opportunity costs of owner and family labour and the opportunity cost of capital—costs not accounted for in boat cash profit. Net economic returns also include a deduction of fishery management costs. These management costs include both management fees paid for by fishery operators (accounted for under 'licence fees and levies' in table 9) and non-recovered management costs paid for by government (not accounted for in table 9). An explanation of the calculation of net economic returns is included in appendix A.

With the inclusion of economic costs and the removal of interest, leasing and management fees (see appendix A for explanation), net economic returns (excluding management costs) have also recovered strongly since 2005–06. The increase in net economic returns has been greater than the increase in boat cash profit, in part because of reductions in the opportunity costs of capital and depreciation, arising from the smaller fleet size of the sector.

From 2005–06 to 2008–09, while real boat cash profit increased by 75 per cent, real net economic returns (excluding management costs) increased by 146 per cent, from $3.2 million in 2005–06 to $7.9 million in 2008–09. Once management costs are included, net economic returns have increased almost fivefold—from $1.1 million in 2005–06 to $6.1 million in 2008–09 (figure k).

Factors outside the control of fishery management affect both net economic returns and other measures of financial performance in the sector. For example, movements of the Australian dollar affect the prices received by fishers as well as the prices of some fishery inputs, such as fuel. More generally, the price of inputs such as fuel and gear are not controlled by fishery managers. However, the fishery manager can alter management settings to ensure net economic returns can be maximised given prevailing input and output prices. This may require periodic review of the optimal level of catch and effort in the fishery to ensure stocks are maintained at profitable levels.

10 Boat cash profit and net economic returns in the Gillnet, Hook and Trap Sector

total for sector, 2009–10 dollars

Receipts		1998–99		1999–2000		2000–01		2001–02		2002–03		2003–04	
Fishing income	$m	24.4	(13)	26.4	(14)	24.5	(14)	25.6	(17)	25.4	(19)	31.2	(26)
Cash costs													
Operating costs	$m	17.3	(11)	19.3	(16)	17.4	(15)	21.3	(20)	20.2	(21)	22.9	(29)
Boat cash profit	$m	7.0	(21)	7.1	(19)	7.0	(19)	4.3	(37)	5.2	(20)	8.3	(24)
less													
– owner and family labour	$m	6.3	(18)	5.2	(14)	5.1	(14)	3.4	(17)	3.0	(17)	5.3	(26)
– opportunity cost of capital	$m	0.8	(15)	0.8	(16)	0.7	(16)	0.7	(19)	0.6	(18)	0.9	(30)
– depreciation	for	1.3	(14)	1.2	(16)	1.2	(16)	1.0	(19)	0.9	(18)	1.3	(33)
plus interest, leasing and management fees	$m	3.1	(15)	3.8	(20)	3.4	(18)	4.5	(23)	3.6	(23)	6.0	(31)
Net return (excluding management costs)	$m	1.7	(59)	3.6	(27)	3.4	(34)	3.6	(35)	4.3	(28)	6.9	(29)
Management costs	$m	2.6	na	2.6	na	2.7	na	2.8	na	2.8	na	2.7	na
Net return (including management costs)	$m	–0.9	na	1.0	na	0.7	na	0.8	na	1.5	na	4.2	na
Number of active boats	no.	133		126		123		127		131		118	
Net return (excluding management costs) per boat	$	13 000	(59)	29 000	(27)	28 000	(34)	28 000	(35)	33 000	(28)	58 000	(29)
Management costs per boat **a**	$	20 000	na	20 000	na	22 000	na	22 000	na	21 000	na	23 000	na
Net return (including management costs) per boat	$	–7 000	na	8 000	na	6 000	na	6 000	na	12 000	na	35 000	na

continued....

10 Boat cash profit and net economic returns in the Gillnet, Hook and Trap Sector

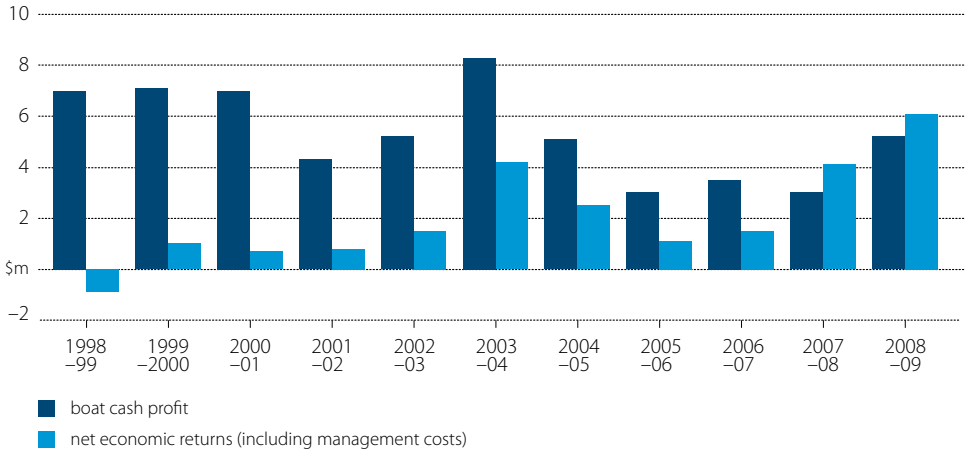
total for sector, 2009–10 dollars *continued*

		2004–05		2005–06		2006–07		2007–08		2008–09	
Receipts											
Fishing income	$m	29.7	(21)	23.1	(20)	25.6	(22)	24.6	(23)	26.5	(22)
Cash costs											
Operating costs	$m	24.6	(22)	20.1	(21)	22.2	(21)	21.6	(22)	21.3	(22)
Boat cash profit		5.1	(27)	3.0	(52)	3.5	(51)	3.0	(29)	5.2	(25)
less											
– owner and family labour	$m	4.8	(20)	2.5	(25)	2.4	(21)	2.4	(30)	2.2	(28)
– opportunity cost of capital	$m	1.0	(31)	1.1	(23)	0.9	(22)	0.6	(29)	0.6	(24)
– depreciation	$m	1.7	(33)	1.5	(24)	1.4	(23)	0.9	(20)	0.9	(23)
plus interest, leasing and management fees	$m	7.2	(23)	5.3	(18)	5.4	(24)	7.4	(22)	6.5	(27)
Net return (excluding management costs)	$m	4.8	(28)	3.2	(51)	4.2	(52)	6.4	(86)	7.9	(61)
Management costs	$m	2.2	na	2.1	na	2.6	na	2.3	na	1.7	na
Net return (including management costs)	$m	2.5	na	1.1	na	1.5	na	4.1	na	6.1	na
Number of active boats	no.	107		80		79		67		68	
Net return (excluding management costs) per boat	$	45 000	(28)	40 000	(51)	53 000	(52)	96 000	(86)	116 000	(61)
Management costs per boat **a**	$	21 000	na	27 000	na	33 000	na	34 000	na	26 000	na
Net return (including management costs) per boat	$	24 000	na	13 000	na	20 000	na	62 000	na	92 000	na

a Management costs per boat do not represent management fees paid by individual boats as these costs include management fees recovered from licence and quota holders and non–recovered management costs that are covered by government. **na** Not applicable.

Note: Figures in parentheses are relative standard errors. A guide to interpreting these is included in Appendix B. For a given standard error, the relative standard error will be higher for mean estimates closer to zero. Management costs are actual figures and not survey-based estimates. As a result, they have no corresponding relative standard error.

k Boat cash profit and net economic returns, total for the Gillnet, Hook and Trap Sector
2009–10 dollars



Preliminary estimates of economic performance

Non-survey–based estimates of real net economic returns for 2009–10 are presented in table 11 together with survey-based estimates for 2008–09 for comparison. The break-up of revenues and costs in table 11 differs to that in table 10 because of the use of different estimation approaches for each table. Summary statistics for the 2009–10 preliminary estimates for the GHTS are provided in appendix D.

At the sector level, declines in both catch and average unit prices in 2009–10 (table 12) are estimated to have resulted in an 18 per cent decline in real cash receipts, from $26.5 million in 2008–09 to $21.9 million in 2009–10 (2009–10 dollars). The decline in average unit prices in the sector was driven by declines in both the price and catch of pink ling and gummy shark, which are the most valuable species in the sector.

The largest cost change in 2009–10 was a $1.5 million (17 per cent) decline in labour costs, which is consistent with the estimated decline in cash receipts, given that crew are generally paid a share of cash receipts. An estimated $0.5 million (22 per cent) decline in fuel costs is based on declines in both effort (in terms of estimates of distance travelled by boats) and average fuel prices (as shown table 12). Overall, total adjusted operating costs (excluding interest, leasing and management fees) are expected to have declined by $0.9 million (6 per cent), from $17.1 million in 2008–09 to $16.2 million in 2009–10.

With the deduction of capital costs, which are relatively small in the GHTS compared with other fishery sectors, net economic returns (excluding management costs) are expected to have declined, from $7.9 million in 2008–09 to $4.3 million in 2009–10. Estimates of management costs increased in 2009–10 by 24 per cent to $2.2 million. As a result, the decline in net economic returns is relatively greater with the inclusion of management costs, from

$6.1 million in 2008–09 to $2.2 million in 2009–10. This represents a 65 per cent decline between the two years. In historical terms, it is expected that the positive net economic returns that have been maintained over the past decade will continue in 2009–10 (figure l).

Constant boat numbers between the two years means that declines in net economic returns at the boat level were equivalent to those at the fishery level in percentage terms. In 2009–10, net economic returns (including management costs) were $32 000 a boat.

More detail on the drivers of changes in historical economic performance in this fishery is provided in Wilson et al. 2010.

11 Preliminary non-survey–based estimates of real net economic returns for the Gillnet, Hook and Trap Sector in 2009–10

total for sector and total per boat, 2009–10 dollars

		financial year		
Sector level		2008–09	2009–10	percentage change
Cash receipts	$m	26.5	21.9	–18%
less Operating costs				
– Fuel	$m	2.4	1.8	–22%
– Labour	$m	9.1	7.6	–17%
– Repairs and maintenance	$m	2.3	3.1	36%
– Other material costs **a**	$m	0.9	1.4	60%
– Other service costs **b**	$m	2.5	2.3	–9%
Total adjusted operating costs **b**	$m	17.1	16.2	–6%
less Capital costs				
– Opportunity cost of capital	$m	0.6	0.6	–11%
– Depreciation	$m	0.9	0.8	–14%
Net economic returns	$m	7.9	4.3	–45%
Management costs	$m	1.7	2.2	24%
Net economic returns (incl. management costs)	$m	6.1	2.2	–65%
Boat level				
Population (no. of boats)	no.	68	68	0%
Net economic return per boat (excl. management costs)	$	116 000	64 000	–46%
Net economic return per boat	$	92 000	32 000	–65%

a Excludes fuel and repairs and maintenance costs that are normally included in materials costs. **b** Excludes interest, leasing and management fees. **c** Management costs for 2009–10 are based on budgeted figures provided by AFMA.

12 Key drivers of change in net economic returns in the Gillnet Hook and Trap Sector, 2008–09 and 2009–10 2009–10 dollars

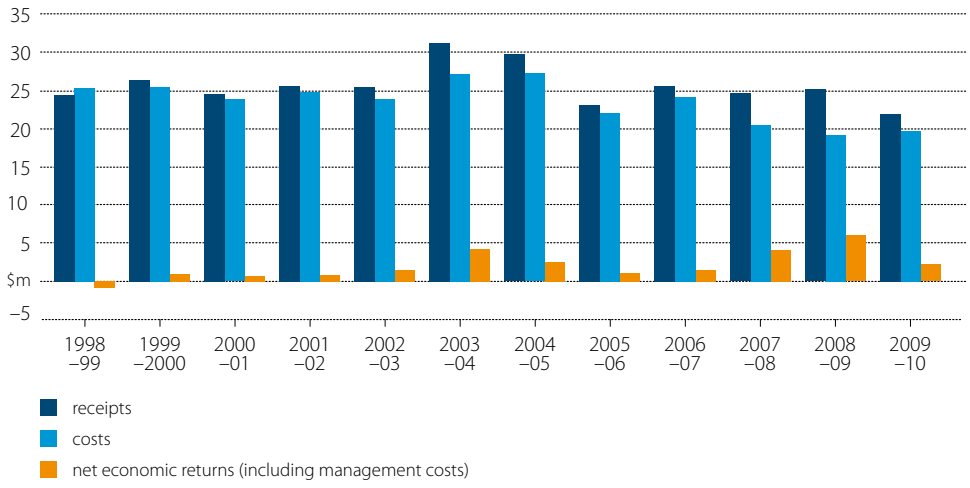
	2008–09	2009–10	variable percentage change
Active boat numbers	68	68	0%
Total catch (tonnes) a	4 509	4 116	–9%
Average catch price per kilogram b	$6.94	$5.96	–14%
Distance travelled per boat proxy (kilometres) c	10 466	9 274	–11%
Diesel fuel price per litre	$ 1.26	$ 1.11	–9%

a Total catch based on CDR data supplied by AFMA. **b** Average price per kilogram for 2008–09 is as presented in *Australian Fisheries Statistics 2009* and based on ABARES estimates for 2009–10. **c** Distance travelled applies only to boats previously sampled by ABARES, is approximate and is based on ABARES calculations

Note: All 2009–10 estimates are preliminary. Prices are in real terms (2009–10 dollars). Catch data based on catch disposal record data.

Real revenue, costs and net economic returns in the Gillnet, Hook and Trap Sector

total for sector, 2009–10 dollars



appendix A Survey definitions

This chapter provides definitions of key financial performance variables, net economic returns and the ABARES method for calculating net economic returns. The use of net economic returns as an indicator of economic performance is then briefly discussed.

Financial performance

The definitions of key variables used in the analysis of boat-level financial performance are provided in box 1.

box 1 **Definition of key financial performance variables**

Total cash receipts represent the sum of seafood receipts and non-fishing receipts. Seafood receipts are the returns from the sale of fish, while non-fishing receipts include receipts from charter operations and other sources (insurance claims and compensation, quota and or endorsements leased out, government assistance and any other revenue) in the financial year.

For the majority of operators, this information is readily available from their own records. However, different operators record their fishing income in different ways. In some cases, such as where fish are sold through a cooperative, some operators may only record the payments received from the cooperative. These payments may be net of commissions and freight, as well as net of other purchases made through the cooperative.

In other cases, the crew is paid directly for the catch by the cooperative or agency and the owner's financial records might include only the amount of revenues they received after the crew's share was deducted.

For these reasons, operators are asked to provide a breakdown of the total catch of their boat and an estimate of the total value of that catch. For consistency, marketing charges may need to be added into fishing receipts for some boats to give a gross value. Where this is necessary, these selling costs are also added into the cost estimates to offset the new revenue figure. Receipts also include amounts received in the survey year for fish sold in previous years.

Total 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). Capital and household expenditures are excluded.

Labour costs are often the highest cash cost in the fishing operation. Labour costs include wages and an estimated value for owner/partner, family and unpaid labour. Labour costs cover the cost of labour involved in boat-related aspects of the fishing business, such as crew or onshore administration costs, but do not cover the cost of onshore labour involved in processing the fisheries products.

continued...

box 1 Definition of key financial performance variables continued

On many boats, the costs of labour are reflected in the wages paid by boat owners and/or in the share of the catch they earn. However, in some cases, such as where owner skippers are involved, or where family members work in the fishing operation, the payments made can be low or even nil, which will not always reflect the market value of the labour provided. To allow for this possible underestimation, all owner/partner and family labour costs are based on estimates collected at the interview of the amount it would cost to employ someone else to do the work.

Another substantial cost item is fuel. Fuel costs are the gross amount paid by operators. Any diesel fuel rebates are not included in these figures. Diesel fuel rebates are captured by non-fishing receipts.

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

Boat business profit is boat cash income less depreciation costs associated with all capital that is used in the fishing business.

Profit at full equity is boat business profit, plus rent, interest and lease payments. This profit measure is calculated by removing all costs associated with interest, leasing and rent to treat these items as transfers to other entities rather than costs. While these items impose a cost on the operator, they represent profits that have been redistributed to other investors in the fishery. As such, profit at full equity represents the average return to the business unit had the boat and capital (including quota and licences) been fully owned by the operator.

Capital is the value placed on the assets employed by the owning business of the surveyed boat. It includes the value of the hull, engine and other onboard equipment (including gear). Estimates of the value of capital are based on the market value of capital and are usually obtained at interview, but in some cases quota and endorsement values are obtained from industry sources.

Depreciated replacement value is the depreciated capital value based on the current age and replacement values of the boat and gear. The value of quota and endorsements held is not included in the estimate.

Rate of return to boat capital is calculated as if all fishing capital were wholly owned by the fishing business operator. This enables the financial performance of sample boats to be compared regardless of the proprietor's equity in the business. Rate of return to boat capital is calculated by expressing profit at full equity as a percentage of total capital (excluding quota and licence value).

Rate of return to full equity is calculated by expressing profit at full equity as a percentage of total capital (including quota and licence value). It represents a rate of return relative to the market value of capital, quota and licences associated with the fishing business.

Net economic returns

Net economic returns are the long-run profits from a fishery after all costs have been met, including fuel, crew, repairs, the opportunity cost of family and owner labour, fishery management costs, depreciation and the opportunity cost of capital.

More specifically, a fishery's net economic return for a given period can be defined as:

$$\underbrace{NR = R}_{\text{cash receipts}} - \underbrace{CC - OWNFL + ILR}_{\text{operating costs}} - \underbrace{OppK - DEP}_{\text{capital costs}} + \underbrace{recMC - totMC}_{\text{management costs}}$$

where:

NR = net returns

R = total cash receipts attributable to the fishery, excluding leasing income

CC = total cash costs attributable to the fishery, including recovered management costs

OWNFL = imputed cost of owner and family labour

ILR = interest and quota/permit leasing costs

OppK = opportunity cost of capital

DEP = depreciation

recMC = recovered management costs

totMC = total management costs.

Recovered management costs are those management costs paid by industry via management fees and are included in total cash costs (**CC**). These costs are removed (as indicated by "+ **recMC**") to prevent double counting given that these costs are a component of total management costs. Similarly, interest and quota/permit leasing costs are removed (indicated by "+ **ILR**") as these costs at the fishery level represent revenues that have been redistributed to external investors in the fishery.

The method of collecting data for each component and then calculating an estimate is outlined in the last section of this appendix.

Survey-based estimation of net economic returns

Fish sale receipts

Fish sale receipts are usually taken from fishers' financial accounts. Where a fisher operates in more than one fishery, they are asked to indicate what proportion of total fish sales is attributable to the fishery being surveyed. Any freight or marketing costs must also be deducted. This provides an estimate of net fishing receipts that incorporates only the 'beach

price' that has been received for catch; that is, the price received for fish at its first landing point.

Income received from the leasing out of quota and licences is not included as income in the calculation of net economic returns. This item represents a redistribution of profits among investors in the fishery. Also, the amount a fisher earns from leasing out quota and licences is related to the amount of profits that the fishery is generating. Including leasing revenue would therefore result in double counting.

Operating costs

Operating costs include day-to-day operational expenses that are incurred to harvest fish in the fishery. Cash costs (**CC**) are a component of operating costs, and includes those cost items that are easily identified in fishers' accounts such as fuel, repairs and gear replacements.

Labour costs are often specified in fishers' accounts as wages. However, for the calculation of net returns, an estimate of the opportunity cost of labour is required. The opportunity cost of labour is the wage that could have been earned performing a similar role elsewhere. Where a market wage is paid it is assumed to represent the opportunity cost of labour and is included in the cash costs component of operating costs. The opportunity cost of owner and family labour is not easily identifiable in fishers' accounts. Often owners and their families are involved in the operation of a boat, either as skippers and crew or onshore as accountants and shore managers. While some will be paid the market value for their labour, some will not be paid at all and others paid very high amounts as 'director fees' or 'manager fees'. In these cases, ABARES survey officers ask respondents to estimate the market value of owner and family labour—that is, the amount that would need to be paid to employ a non-family member to fulfil the same position. This amount is entered as a component of operating costs (**OWNFL**).

Quota and licence leasing costs and interest expenses are included in cash costs. However, these costs must be removed from the calculation of net returns for the same reason they are excluded from income (see fish sale receipts above).

Capital costs

To calculate capital costs, an estimate of the value of capital is needed. ABARES survey officers ask fishers to provide information for all capital items associated with the fishing business, including hull, engine, onboard equipment, vehicles and sheds. Information collected for each item includes the year the capital item was manufactured and an estimate of what it would cost to replace that item with a new and equivalent item. By accounting for previous depreciation and inflation, these data are used to estimate the total value of capital invested in the fishery for the survey year.

As mentioned previously, capital costs include the opportunity cost of capital (**OppK**) and depreciation (**DEP**). The opportunity cost of capital is the return that could have been earned if capital was invested elsewhere, rather than in the fishery. This cost is not identifiable in fishers' accounts. A real interest rate that represents the rate of return that could be earned on

an investment elsewhere is applied to the value of capital in the fishery. For fisheries surveys, ABARES uses a rate of 7 per cent a year.

Depreciation expense is the cost of capital becoming less valuable over time owing to wear and tear and obsolescence. Depreciation expense is not consistently identifiable in fishers' accounts, so ABARES calculates the annual depreciation of boats based on the capital inventory list collected during the surveys (described above) and predetermined depreciation rates for each capital item type.

Management costs

Management costs are incurred to ensure the fishery continues to operate. It is therefore a cost associated with harvesting fish in the fishery. Management costs are made up of two components: recovered management costs and non-recovered management costs. Recovered management costs (**recMC**) are those costs that are recovered from fishers and appear in the accounts of fishers as payments of management fees or levies. Non-recovered management costs are those management costs that are not charged to fishers, but instead are covered by the managing body or government. The calculation of net economic returns requires the deduction of total management costs, which is the sum of these two components.

Total cash costs (**CC**) includes an estimate of recovered management costs based on management levy expenses that are contained in fishers' accounts. As this estimate of recovered management costs is based only on a sample of the fishery, it may not be consistent with the actual value of management costs recovered from the entire fishery. AFMA is able to provide an estimate of total management costs for each fishery—that is, the sum of both recovered and non-recovered management costs. For these reasons, recovered management costs from fishers' accounts are ignored, as indicated by +**recMC** in the net returns equation. Total management costs (**totM**) as supplied by AFMA are then used in the estimation of net economic returns.

Net economic returns and economic performance

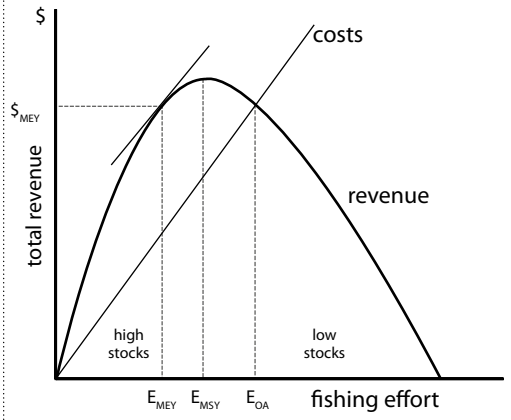
AFMA requires information on the performance of fisheries against the objective of maximising net economic returns from the use of fish stocks—an objective commonly referred to as maximum economic yield (MEY). If a fishery is operating at MEY, effort, catch and stocks are at levels where the difference between discounted revenues and costs, and therefore profits, are maximised. The term 'discounted' simply means that the difference in the value of a dollar earned today relative to a dollar in the future is accounted for. If income can be generated from a dollar today (for example, by putting it in a bank account to earn interest), the rate at which future revenues should be discounted is positive. Therefore, assuming a positive discount rate, revenue earned today (for example, from harvesting fish) is more valuable than revenue earned in the future.

The concept of MEY is best explained using a static single period model (box 2). A static model (as opposed to a dynamic model described above) is simplistic as it ignores the relative value

of future profits by assuming a discount rate of zero, and it does not account for the dynamic transition path to MEY or uncertainty (Kompas et al. 2008).

The major factors that influence MEY include costs (which are a function of input use and input prices), output prices, stock biomass, the stock–recruitment relationship and discount rates. Understanding how these factors vary over time and interact to affect the effort level associated with MEY is difficult. Consequently, estimating the level of effort that will lead to MEY in a given period typically requires a bioeconomic model that combines the economic, biological and management characteristics of a fishery (Gooday and Galeano 2003). Bioeconomic models are complex and data-intensive and in many cases will not be available.

box 2 **A static single period model of maximum economic yield**



The relationship between effort and catch in dollar terms (price multiplied by catch) is shown by the total revenue curve. This is derived from a biological stock – recruitment relationship, translated into effort units. Every point along this curve represents an effort and catch combination that is biologically sustainable. Setting effort at E_{MSY} means the maximum sustainable yield (MSY) is harvested, generating the largest total revenue. Although total revenue is maximised at E_{MSY} this is not where total profits are maximised.

The total cost curve gives the cost of applying each effort level. Maximum economic yield (MEY) is the level of catch that maximises profit—the difference between total revenue and total cost. This occurs at E_{MEY} with a corresponding catch revenue of $\$_{MEY}$. This is where net economic returns are maximised. It is also where the optimal amount of society's scarce resources are allocated to the fishery, including fishing boats and labour.

Typically, a fishery will not gravitate to the effort level associated with MEY without intervention from a management authority. Instead, effort is most likely to settle at a point known as the open access equilibrium (EOA). In an open access fishery, all fishers, acting in their own interest, are induced to fish more because they do not take into account the effect of their fishing activity on other fishers in the fishery. That is, one fisher's decision to increase fishing effort further depletes stocks so that harvesting costs increase for all. A fisher has no incentive to reduce effort to conserve stocks because the benefits of doing so will be captured by other fishers. At E_{OA}, net economic returns are zero and fish stock biomass is low relative to that associated with E_{MSY} and E_{MEY}.

MEY and E_{MEY} are influenced by changes in fish prices, which expand or compress the total revenue curve, and the costs of fishing, which pivot the total cost curve about the origin. Higher fish prices would shift MEY to the right and vice versa, while higher fishing costs per unit of effort would shift MEY to the left and vice versa.

In such cases, other indicators can be used to broadly assess a fishery's performance relative to MEY in a given period.

Estimates of net economic returns are an example of one such indicator. Estimates of net economic returns cannot be used in isolation to reveal how a fishery has performed relative to MEY. However, if the key drivers of change in net economic returns are understood, it may be possible to infer whether a fishery is moving toward or away from MEY. The major drivers of net economic returns are broadly the same factors that affect MEY.

Below are examples of different scenarios associated with a positive trend in a fishery's net economic return. The implications of that positive trend depend on what factors are driving the trend. If it is assumed that effort and/or catch limits in a fishery are binding and all other factors are held constant, then if net economic returns in a fishery are increasing:

- a reduction in effort (for example, boat numbers) will mean that a fishery has moved toward MEY
- a long-term increase in a fishery's stock biomass (as opposed to short-term increases because of natural stock variability) will mean that a fishery has moved toward MEY. Such a change could be driven by catch reductions that allow stocks to rebuild
- owing to an increase in catch prices or a decrease in input costs, then fishery performance relative to MEY cannot be determined unless it is known where the fishery was relative to MEY before the change, as is explained in box 3.

Complicating the link between changes in net economic returns and MEY is that, in most cases, all factors (including effort, stock biomass, prices and costs) change over time. Each factor's effect on net economic returns in terms of magnitude and direction also changes. If the magnitude of change in one factor outweighs all other changes (for example, a large effort reduction following a boat buyback scheme), it may be easier to draw some conclusions. But generally, interpretation will not be simple.

box 3 Interpreting changes in net economic returns when driven by changes in price or costs

It is assumed that fishery managers have effectively controlled effort at a given level. The effect of an increase in fish price is considered according to two scenarios as presented in the figure below.

Under the first scenario, effort levels are fixed at E_{S1}, below the level associated with MEY_0. This means that, under current economic conditions, if effort levels were to increase the fishery would move closer to MEY_0. Under the second scenario, the opposite is true and effort levels are set beyond MEY_0 at E_{S2}—net economic returns will increase with a reduction in effort.

An increase in fish price is represented by an upward expansion in the revenue curve from R_0 to R_1. A number of key changes occur following such a price increase. First, net economic return increases at any fixed effort level given that greater amounts of revenue can be earned for the same cost. Second, MEY also increases for the same reason, as indicated by MEY_1. However, the increased wedge between revenue and costs also means that MEY_1 is now associated with a higher level of effort (E_1). It is this change that has different implications for each of the two scenarios being considered.

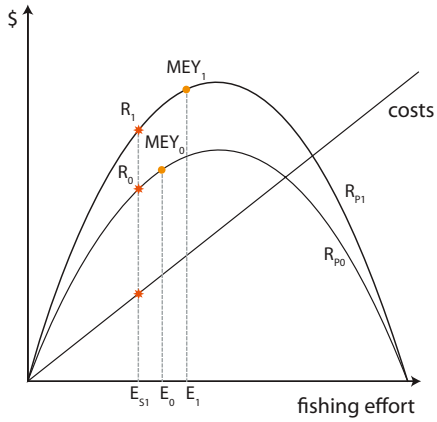
continued...

box 3 **Interpreting changes in net economic returns when driven by changes in price or costs** continued

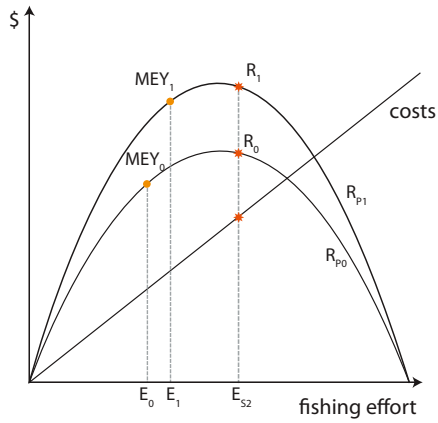
Under the first scenario, the increase in price results in MEY_1 being further away from the fixed effort level E_{S1}. However, under the second scenario the price increase results in the new MEY_1 being closer to the fixed effort level E_{S2}.

Change in costs produce similar results, with the change represented by a movement in the cost curve rather than the revenue curve.

Scenario 1



Scenario 2



To better assess a fishery's performance in the absence of a bioeconomic model, the analysis of net economic returns can be undertaken in conjunction with other economic and biological indicators. In particular, economic indicators such as productivity indices, profit decompositions and stochastic frontier analysis can provide greater clarity. For example, if biological indicators suggest that harvests are sustainable, a positive trend in both net economic returns and total factor productivity (the ratio of outputs produced to inputs used) over time would generally indicate that a fishery is moving toward MEY.

For further information on the concept of MEY and assessing fishery performance against the MEY objective, see Kompas et al. (2009) and Gooday and Galeano (2003).

appendix B Survey methods

Collecting economic survey data

ABARES (formerly ABARE) has conducted economic surveys of selected Commonwealth fisheries since the early 1980s and on a regular basis for particular fisheries since 1992. The current fisheries survey program involves surveying major Commonwealth fisheries every few years, or more frequently where the fishery is undergoing major changes and monitoring is particularly important. The aim is to develop a time series of economic information for each fishery. Such a database, in conjunction with scientific assessments of each fishery, is vital for assessing the economic performance of fisheries.

Information from the surveys is made publicly available so the performance of fisheries and the impact of management policies can be independently assessed.

Surveys are designed and samples selected on the basis of information supplied by AFMA. This information includes data on the size of the catch, fishing effort and boat characteristics.

Because it is not possible to survey all the boats in a fishery, a sample of boats is selected based on how representative they are. Where possible, boats are classified into subgroups based either on the fishing method used (for example, longline, purse seine or trawl) or the size of operations (typically small, medium and large producers). A number of representative boats from each subgroup are then targeted for the survey.

In practice, this sample is seldom fully realised. Non-response is relatively high across fishery surveys, reflecting the difficulty in contacting some operators and a reluctance of others to participate. Sample design and weighting systems have been developed that reduce the effect of non-response, but care is still required when interpreting the information from the surveys.

Between February and June an ABARES officer visits the owner of each boat selected in the sample. 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 obtained from various sources is reconciled to produce the most accurate description possible of the financial characteristics of each sample boat in the survey. To ensure the details of survey respondents remain confidential, this boat-level information is never released.

Sample weighting

All population estimates presented in this report are calculated from the weighted survey data of sample boats. A weight is calculated for each boat in the sample based on how representative that boat is in the population. Sample weights are calculated so that the weights sum to the population of boats that the sample is representing, and the weighted sum of catch reported by the sample boats equals the total catch for the fishery according to AFMA logbook data.

That is,

$$\sum w_i = P \qquad \text{and} \qquad \sum w_i x_i = X$$

where:

w_i is the weight for the i^{th} boat

P is the number of boats in the population

x_i is the catch for the i^{th} boat

X is the total catch for the target population.

Technical details of the method of weighting used are given in Bardsley and Chambers (1984).

Reliability of estimates

A relatively small number of boats out of the total number of boats in a particular fishery are surveyed. Estimates derived from these boats are likely to be different from those that would have been obtained if information had been collected from a census of all boats. How closely the survey results represent the population is influenced by the number of boats in the sample, the variability of boats in the population and, most importantly, the design of the survey and the estimation procedures used.

To give a guide to the reliability of the survey estimates, measures of sampling variation have been calculated. These measures, expressed as percentages of the survey estimates and termed 'relative standard errors', are given next to each estimate in parentheses. In general, the smaller the relative standard error, the more reliable the estimate.

Use of relative standard errors

Relative standard errors can be used to calculate 'confidence intervals' for the survey estimate. First, the standard error is calculated by multiplying the relative standard error by the survey estimate and dividing 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' (the value that 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 19 in 20 chance that the census value is within two standard errors of the survey estimates. Thus, in this example, there is approximately a two in three chance that the census value is between $94 000 and $106 000, and approximately a 19 in 20 chance that the census value is between $88 000 and $112 000.

Comparing estimates

When comparing estimates across groups or years, it is important to recognise that the differences are also subject to sampling error. As a rule of thumb, a conservative estimate of the standard error of the difference can be constructed by adding the squares of the estimated standard errors of the component estimates and then taking the square root of the result.

For example, suppose the estimates of total cash receipts were $100 000 in one year and $125 000 in the previous year—a difference of $25 000—and the relative standard error is given as 6 per cent for each estimate. The standard error of the difference can be estimated as:

$$\sqrt{(0.06 \times \$100\,000)^2 + (0.06 \times \$125\,000)^2} = \$9605$$

The relative standard error of the difference is:

($9605 / $25 000) x 100= 38%

There may be changes in the population of a fishery from one year to the next. If these population changes are substantial, differences in estimates may be caused more by the changes in population than by changes in the variables themselves.

Non-sampling errors

The values obtained in a survey may be affected by errors other than those directly related to the sampling procedure. For example, it may not be possible to obtain information from certain respondents, respondents may provide inaccurate information or respondents may differ from non-respondents for a particular variable being surveyed.

In conducting surveys, ABARES draws on a depth of experience. The survey staff are generally experienced and undergo rigorous pre-survey training, aimed at minimising non-sampling errors. However, when drawing inferences from estimates derived from sample surveys, users should bear in mind that both sampling and non-sampling errors occur.

appendix C Non-survey–based estimation of net economic returns

Background

The ABARES fisheries economic survey program involves the collection of survey data on a biannual basis. An implication of this approach is that there is a delay associated with reporting survey results for individual fisheries. Fishing business operators are given an extended time to submit their fishing business income details to the Australian Taxation Office for a given financial year. As a result, a boat's financial statements will often not be finalised for up to nine months after the end of a given financial year. Additionally, considerable time is required to collect financial data and estimate survey results. As a result, the normal delay for publication of survey results is either one or two years, depending on whether a financial year is the first or second year in a given survey.

To address this issue, ABARES has developed a non-survey–based method of estimating net economic returns for financial years where survey data are not yet available. It allows more timely estimation and reporting of net economic return estimates that can better inform industry and government decision-making. This method is intended to complement the collection of data and publication of results normally undertaken through the fisheries surveys.

The method first involves defining the revenue and cost components in the calculation of net economic returns. Historical survey data are then used to establish relationships between each component and more readily available indicators such as fish prices and fishery catch and effort. In cases where no significant relationships can be estimated, component trends over time are used. These relationships are then used to calculate preliminary estimates of each component for the non-survey year. The calculation of net economic returns is the same as outlined in the previous chapter. Further detail on the calculation of each component is below.

Method

The method used to calculate non-survey–based estimates of net economic returns for a non-survey year (that is, a year for which no survey data are available) is similar to that used by Wood et al. (2008). Following this general method, varying approaches are used to calculate each component of net economic return. Estimation approaches may also differ across fisheries given the unique characteristics of individual fisheries. In all cases, each component is estimated based on an assumed sample of the population and a set of corresponding assumed weights. This assumed sample represents those boats that are expected to be sampled for the 2009–10 financial year in the next survey in 2012.

Details of the estimation process that were unique to the calculation of 2009–10 estimates for the Eastern Tuna and Billfish Fishery (ETBF), the Commonwealth Trawl Sector (CTS) and the Gillnet Hook and Trap Sector (GHTS) are below. Where relevant, summary statistics related to these estimations are provided in appendix D.

Cash receipts

Gross value of production (GVP) can be used as a proxy for cash receipts in the calculation of net economic returns in a non-survey year. ABARES calculates GVP at the end of every financial year for all Commonwealth fisheries. This calculation uses landings data provided by AFMA and average yearly prices of key species obtained from fish markets and industry contacts. The product of estimated landings and beach prices by species is an approximation of the GVP.

Fish sales receipts, net of freight and associated marketing costs, are approximately equal to an operator's GVP. As a result, GVP is a viable proxy for cash receipts. For some fisheries, a consistent discrepancy between historical estimates of fish sale receipts and GVP exists. In such cases, GVP is used to estimate fish sale receipts under the assumption that a similar discrepancy will prevail in the non-survey year.

For all three surveyed fisheries, GVP per boat was estimated using boat-level catch disposal records (CDRs) and the average annual prices for key species that form the basis of fishery GVP estimates. Using a historical relationship between boat-level GVP and boat-level cash receipts, 2009–10 boat-level cash receipts are estimated based on boat-level GVP estimates for boats in the assumed sample.

Operating costs

The accurate calculation of operating costs for a non-survey year is highly dependent on obtaining preliminary estimates of three key expenses: fuel, labour and repairs and maintenance. These three cost items on average account for between 75 and 80 per cent of a boat operator's total operating costs.

Fuel

Fuel is typically the most expensive cost item for a boat operator. Accurately estimating fuel expenditure in a non-survey year requires information on fuel consumption and the price at which the fuel was purchased. The quantity of fuel consumed by a boat in a given period will be influenced by effort, gear size and boat characteristics such as hull size and engine power. The survey program does not collect information on fuel consumption. Instead a sampled boat's fuel expense (as obtained from profit and loss figures) can be divided by an average fuel price to calculate a fuel consumption estimate. A relationship between boat-level fuel consumption and boat-level effort (data on the latter variable is provided by AFMA) can then be derived using regression analysis. Once observed, this relationship is used to predict fuel use given total effort expended in the non-survey year. This estimate is then multiplied by the year's average fuel price, and provides a proxy for the survey's normal calculation of fuel expenditure.

As the CTS is a trawl-based fishery, trawl hours can be used as an indicator of effort. Accordingly, a relationship between historical fuel use for surveyed boats and their trawl hours was estimated as outlined above. This relationship, together with 2009–10 trawl-hours data was used to estimate 2009–10 fuel use.

For the ETBF and GHTS, the most readily available indicators of effort are hook numbers and gear length, respectively. However, there is no significant relationship between these indicators and estimated fuel use per boat. To resolve this, ABARES uses logbook shot data combined with CDR-based port of landing data to calculate an approximate indicator of distance travelled by boats in each fishery. This approach takes latitude and longitude coordinate data for each shot and each port unloaded at by each boat and converts it to distance measurements. These measurements are compared with historical boat-level fuel use estimates to check for consistency. For both fisheries, there are significant relationships between these distance travelled proxies and fuel use. This relationship was then applied to distance travelled proxies for 2009–10 to estimate fuel use for boats in the assumed sample.

Labour

Labour is often the second most expensive cost item for a boat operator. In most fisheries, the skipper and the crew are paid a share of the boat's fishing revenues. Therefore, the historical relationship between cash receipts and labour costs can be used to estimate labour costs at the boat level in a non-survey year once cash receipts have already been estimated for that year.

Repairs and maintenance

Repairs and maintenance are generally addressed by boat operators as needed. Significant repairs or major overhauls are unlikely to be undertaken annually. At the boat level, repairs and maintenance costs can be expected to vary considerably from year to year. At the fishery level it is reasonable to expect that the aggregate repairs and maintenance costs will be more stable and the number of operators undertaking major overhauls will be approximately constant from year to year. Often, there is no obvious relationship between this expense item and other key variables such as catch or effort. As a result, trends in historical repairs and maintenance costs over time can be used to estimate this cost item.

When estimates of repairs and maintenance were constructed for the fisheries surveyed in 2010, a variety of explanatory relationships were tested according to a number of hypotheses. For the ETBF, a relationship between repairs and maintenance costs, fuel use and number of shots was estimated and included dummy variables for four individual boats. For the CTS, a relationship between repairs and maintenance costs and hours trawled was used. A relationship between repairs and maintenance costs and total catch was used for the GHTS, which included a dummy variable for all gillnet boats and three separate dummy variables for three individual boats that were identified as exhibiting unique characteristics in their repairs and maintenance expenditure.

Other material costs

Other material costs relate to items such as bait, ice, electricity and packing materials, but exclude fuel costs and repairs and maintenance costs that are estimated separately. A relationship between boat-level other material costs and both boat-level catch and number of shots was estimated and applied for the ETBF. For the CTS, a relationship between historical material costs per boat and catch per boat was estimated, which included a dummy variable for boats that caught greater than 400 tonnes. Similarly, for the GHTS, a relationship between material costs and catch was estimated at the boat level. This relationship included a dummy variable for gillnet boats and four individual dummy variables for four unique boats in the fishery.

Other service costs

Other service costs include items such as freight, marketing, packing charges and aerial spotting fees, but exclude interest, leasing and management fees. Relationships between other service costs and catch were estimated and used for both the ETBF (including six dummy variables for individual boats) and the CTS. For the GHTS, a relationship between boat-level revenue and boat-level catch was used.

Interest, leasing and management fees

Interest and leasing fees represent a redistribution of profits to investors in the fishery. As such, they are not costs at the fishery level and are removed from the calculation of net economic returns. Management fees are those management costs recovered from industry that appear in the profit and loss accounts of fishers. These are also removed from the calculation of net economic returns so that total management costs (recovered management fees and non-recovered management costs) can be deducted. As a result, for the purpose of estimating net economic returns in non-survey years, these costs and fees are not estimated and are excluded from the estimation of operating costs.

Opportunity cost of capital and depreciation

Capital values, the opportunity cost of capital and depreciation expenses were estimated for each boat in the assumed sample for each fishery, assuming a depreciation rate equal to that in the most recent survey year and a capital upgrade rate (an assumed capital investment amount). All boat-level estimates were then weighted up to a total estimate for the fishery using weights calculated for individual boats in the 2009–10 assumed sample.

Management costs

Total management costs (recovered and non-recovered) for 2009–10 were based on budgeted estimates supplied by AFMA.

appendix D Non-survey–based estimates: regression results

Below are the summary statistics for regressions formulated to estimate individual components of net economic returns in 2009–10. Relationships were estimated using data from years up to and including the 2008–09 financial year. The estimated relationships were then used to extrapolate to 2009–10, given known or assumed values of the relevant explanatory variables for 2009–10. For a given relationship, dummy variables may be used to indicate a boat or boat type that exhibits different characteristics to the population that influences the given relationship for that boat or boat type.

Results for the Eastern Tuna and Billfish Fishery

	coefficient	standard error	t-statistic	P-value
Survey receipts ($)				
$R^2 = 0.87$				
F p value = 0.000				
Real GVP by boat ($)	1.28	0.03	44.72	0.00
Boat dummy: A	349 885.10	103 143.70	3.39	0.00
Boat dummy: B	–307 252.40	101 878.50	–3.02	0.00
Boat dummy: C	–237 929.40	100 594.90	–2.37	0.02
Fuel cost ($)				
$R^2 = 0.78$				
F p value = 0.000				
Intercept	19 701.73	6 155.71	3.20	0.00
Distance travelled by boat (km)	2.99	0.21	14.13	0.00
Boat dummy: A	–56 443.19	13 065.02	–4.32	0.00
Boat dummy: B	61 861.45	12 735.47	4.86	0.00
Boat dummy: C	141 707.28	18 423.45	7.69	0.00
Boat dummy: D	82 101.93	17 919.76	4.58	0.00
Labour ($)				
$R^2 = 0.88$				
F p value = 0.001				
Intercept	28 488.74	6 614.70	4.31	0.00
Real GVP by boat ($)	0.21	0.01	27.73	0.00
Boat dummy: A	57 051.01	17 014.84	3.35	0.00
Boat dummy: B	–152 161.25	24 768.19	–6.14	0.00
Boat dummy: C	83 561.69	17 176.34	4.86	0.00

continued...

Results for the Eastern Tuna and Billfish Fishery continued

	coefficient	standard error	t-statistic	P-value
Repairs and maintenance cost ($)				
R^2 = 0.56				
F p value = 0.000				
Intercept	35 194.04	11 843.47	2.97	0.00
Distance travelled by boat (km)	0.79	0.09	8.91	0.00
Shots per boat	–191.54	89.12	–2.15	0.03
Boat dummy: A	97 810.36	32 065.81	3.05	0.00
Boat dummy: B	157 926.96	32 080.78	4.92	0.00
Boat dummy: C	95 192.93	32 059.00	2.97	0.00
Boat dummy: D	105 965.97	32 037.58	3.31	0.00
Materials costs ($)				
R^2 = 0.50				
F p value = 0.000				
Intercept	16 635.61	6 348.00	2.62	0.01
Catch per boat (kg)	0.18	0.04	5.07	0.00
Shots per boat	190.96	50.08	3.81	0.00
Service costs ($)				
R^2 = 0.90				
F p value = 0.000				
Catch per boat (kg)	1.94	0.07	26.20	0.00
Boat dummy: A	247 307.07	48 069.08	5.14	0.00
Boat dummy: B	214 689.49	48 926.78	4.39	0.00
Boat dummy: C	–137 884.98	47 586.94	–2.90	0.00
Boat dummy: D	145 973.44	46 849.81	3.12	0.00
Boat dummy: E	–125 860.58	47 530.11	–2.65	0.01
Boat dummy: F	–203 344.49	48 613.06	–4.18	0.00

Results for the Commonwealth Trawl Sector

	coefficient	standard error	t-statistic	P-value
Survey receipts ($)				
R^2 = 0.94				
F p value = 0.000				
Intercept	26 197.17	26 238.63	1.00	0.32
Real GVP by boat ($)	1.11	0.03	33.59	0.00
Fuel cost ($)				
R^2 = 0.94				
F p value = 0.000				
Intercept	4 361.19	4 954.72	0.88	0.38
Distance travelled by boat (km)	77.74	4.11	18.93	0.00
Boat dummy: A	255 723.62	19 871.64	12.87	0.00
Boat dummy: B	117 257.85	20 075.06	5.84	0.00
Boat dummy: C	–51 403.04	17 759.40	–2.89	0.01
Boat dummy: D	159 249.65	27 822.04	5.72	0.00
Boat dummy: E	83 672.70	16 324.16	5.13	0.00
Boat dummy: F	74 380.64	15 737.76	4.73	0.00
Labour ($)				
R^2 = 0.93				
F p value = 0.001				
Intercept	14 999.42	8 201.08	1.83	0.07
Real GVP by boat ($)	0.27	0.01	28.49	0.00
Boat dummy: A	–73 164.51	23 375.71	–3.13	0.00
Boat dummy: B	103 982.22	22 672.74	4.59	0.00
Boat dummy: C	–120 773.43	31 607.42	–3.82	0.00
Boat dummy: D	102 425.76	26 177.60	3.91	0.00
Repairs and maintenance cost ($)				
R^2 = 0.69				
F p value = 0.000				
Intercept	18 540.70	6 277.15	2.95	0.00
Hours trawled (hr)	41.29	4.10	10.08	0.00
Materials costs ($)				
R^2 = 0.52				
F p value = 0.000				
Intercept	3 347.42	2 279.84	1.47	0.15
Catch per boat (kg)	0.09	0.01	6.37	0.00
Type dummy: A	–25 170.63	6 172.78	–4.08	0.00
Service costs ($)				
R^2 = 0.85				
F p value = 0.000				
Intercept	16 344.20	13 027.54	1.25	0.22
Catch per boat (kg)	0.80	0.05	16.17	0.00

Results for the Gillnet, Hook and Trap Sector

	coefficient	standard error	t-statistic	P-value
Survey receipts ($)				
R^2 = 0.97				
F p value = 0.000				
Intercept	–2 339.66	11 848.18	–0.20	0.84
Real GVP by boat ($)	0.89	0.02	36.70	0.00
Boat dummy: A	288 452.18	37 553.67	7.68	0.00
Fuel cost ($)				
R^2 = 0.91				
F p value = 0.000				
Intercept	1 121.71	1 582.65	0.71	0.48
Distance travelled by boat (km)	2.46	0.16	15.36	0.00
Boat dummy: A	37 813.89	4 563.41	8.29	0.00
Boat dummy: B	–12 922.30	4 108.01	–3.15	0.00
Boat dummy: C	33 604.78	6 147.01	5.47	0.00
Boat dummy: D	24 692.06	4 178.85	5.91	0.00
Labour ($)				
R^2 = 0.91				
F p value = 0.000				
Intercept	18 256.82	5 830.87	3.13	0.00
Real GVP by boat ($)	0.28	0.01	19.73	0.00
Boat dummy: A	–65 878.76	21 018.63	–3.13	0.00
Boat dummy: B	123 192.48	24 735.47	4.98	0.00
Boat dummy: C	94 558.60	20 444.51	4.63	0.00
Repairs and maintenance cost ($)				
R^2 = 0.85				
F p value = 0.000				
Intercept	2 547.52	4 544.23	0.56	0.58
Catch per boat (kg)	0.90	0.05	18.29	0.00
Type dummy: A	–10 571.79	5 455.24	–1.94	0.06
Boat dummy: A	–53 385.36	10 878.59	–4.91	0.00
Boat dummy: B	–24 335.02	11 584.97	–2.10	0.04
Boat dummy: C	70 435.47	10 874.68	6.48	0.00
Materials costs ($)				
R^2 = 0.89				
F p value = 0.000				
Intercept	1 542.50	2 313.98	0.67	0.51
Catch per boat (kg)	0.40	0.05	8.71	0.00
Type dummy: A	–6 695.56	3 254.60	–2.06	0.04
Boat dummy: A	–25 875.59	5 893.42	–4.39	0.00
Boat dummy: B	47 319.68	9 426.23	5.02	0.00
Boat dummy: C	40 416.54	7 029.54	5.75	0.00
Boat dummy: D	–17 216.03	8 032.60	–2.14	0.03

continued...

Results for the Gillnet, Hook and Trap Sector continued

	coefficient	standard error	t-statistic	P-value
Service costs ($)				
$R^2 = 0.91$				
F p value = 0.000				
Intercept	4 415.69	2 750.30	1.61	0.11
Real GVP by boat ($)	0.08	0.01	12.96	0.00
Boat dummy: A	–25 240.42	8 494.41	–2.97	0.00
Boat dummy: B	140 856.41	9 778.58	14.40	0.00

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Western Tuna and Billfish Fishery

(formerly the Southern and Western Tuna and Billfish Fishery)

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