

**The South Australian Marine Scalefish Fishery
Stock Status Report**

Report to PIRSA

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1.0 Introduction

This is the fifth annual stock status report produced for the Marine Scalefish Fishery of South Australia. The annual series of reports is prescribed in the Management Plan. Its aim is to provide an overview of the current status of the most significant taxa in the fishery, based on the assessment of key fishery performance indicators (Noell et al. 2006). The report considers 21 different species or taxonomic groups, most of which fall into the ‘Primary’ and ‘Secondary’ species categories, as defined in the Management Plan, but with some also from the ‘Tertiary’ category (Table 1.1). These categories were originally determined on the basis of the relative value of the different species, considering their values to the commercial, recreational and community sectors (Noell et al. 2006). The species considered in this report are the same as those considered in the last three stock status reports (Steer et al. 2006, Fowler et al. 2007, Fowler et al. 2008).

The determination of stock status for the various species or taxonomic groups was based only on consideration of the commercial catch and effort data, which were assessed by development of fishery performance indicators and comparison with limit reference points. It should be noted that the particular indicators and reference points that are specified in the Management Plan were not used in the analyses for this report. After the first few applications of those performance indicators and reference points in previous years, the Marine Scalefish Fishery Management Committee (MSFMC) considered that they should be revised. At a meeting of the MSFMC held on 17th February 2006, new performance indicators and reference points were adopted (Minutes of meeting No. 98 of MSFMC). They are; total commercial catch, targeted effort and targeted CPUE. The new limit reference points that relate to these indicators, which were used in the comparisons that underpin the results presented were:

- the 3rd highest and 3rd lowest values over the reference period (only 3rd highest considered for targeted effort);
- the greatest (%) inter-annual variation (+ and -) over the reference period;
- the greatest rate of change (trend) over periods of three or five years (+ and -) through the reference period, depending on the species (Fig 1.1).

Table 1.1. List of MSF species/taxa considered in this report. The table shows the three categories and the species/taxa that they include, as specified in the Management Plan (Noell et al. 2006). The level of reporting varied amongst the various taxa, as indicated (see Methods for definitions of ‘full’, ‘part’ and ‘minor’ reporting). The gear types for which annual targeted catch, effort and CPUE were reported for each species are also indicated.

Category	Species/taxon	Report Category	Targeted catch and effort categories
Primary	King George whiting	Full	handline
	Snapper	Full	handline, longline
	Southern garfish	Full	haulnet, dabnet
	Southern calamary	Full	jig, haulnet
Secondary	Yellowfin whiting	Part	total target, haulnet
	Australian salmon	Part	haulnet, salmon net
	Australian herring	Part	total target, haulnet
	Mud cockles	Part	total target
	Snook	Part	haulnet, troll line
	Sand crabs	Part	total target, crab net
	Bronze and dusky whalers	Part	longline, shark net
	Ocean jackets	Part	total target
	Parrotfish	Minor	n.a.
	Cuttlefish	Minor	n.a.
	Tertiary	Yelloweye mullet	Part
Mulloway		Part	handline, fishing pole
Western striped grunter		Minor	n.a.
Silver trevally		Minor	n.a.
Leatherjackets		Minor	n.a.
Gummy sharks		Minor	n.a.
Rays and skates		Minor	n.a.

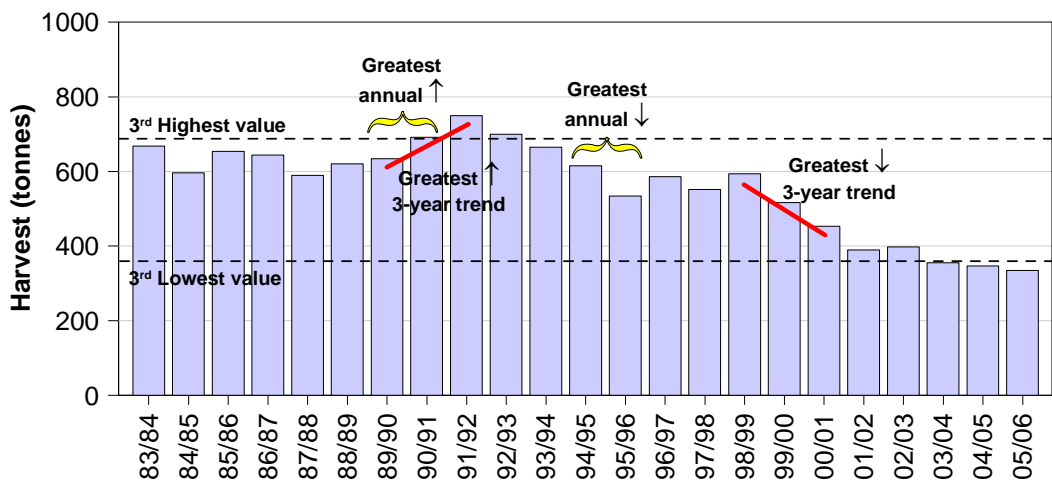


Figure 1.1. A schematic illustration of the limit reference points used in this study: 3rd highest and 3rd lowest values over the reference period; the greatest inter-annual variation (+ and -); and the greatest rates of change (trend) over a three-year period (+ and -) (five-year period used for snapper).

2.0 Methods

The commercial catch and effort data presented in this report were extracted from the commercial Marine Scalefish catch and effort database, which contains data from the catch returns that are submitted on a monthly basis by the commercial fishers. Furthermore, results from three recreational surveys are also reported. The first was the recreational boat ramp - creel survey that was done between 1994 and 1996 that provided estimates for seven Primary and Secondary species (McGlennon and Kinloch 1997). The second survey was the National Recreational and Indigenous Fishing Survey that collected data from May 2000 until April 2001 (Henry and Lyle 2003). The third survey was a State-wide telephone/diary survey of South Australian residents from November 2007 to October 2008 (Jones 2009).

Only data from the commercial sector were used in the comparisons between fishery performance indicators and limit reference points. For each of the 21 taxonomic groups that are specified in Table 1.1, annual totals of commercial catch and targeted catch, effort and CPUE by gear type(s) were calculated for each financial year from 1983/84 to 2008/09. The appropriate limit reference points were then derived from these different time-series of data. The estimates of indicators for 2008/09 were then compared with the limit reference points that had been calculated for the appropriate time series for each species or taxonomic group. For each taxon, several results tables were prepared that show the outcomes of the comparisons, with respect to whether the limit reference points were breached or not.

There were different levels of reporting and analysis undertaken for the different taxonomic groups (Table 1.1). For the four Primary species, full reporting was done. For these species, all the fishery performance indicators, i.e. State-wide estimates of total catch, targeted catch and effort and targeted CPUE were presented for the period of 1983/84 to 2008/09. The data on targeted effort and CPUE are gear-specific for the different species and the report has concentrated on those gear types that are considered most likely to be informative about the biomass for each particular taxon. These gear types are the same as those considered in the previous stock status reports (Fowler 2005, Steer et al. 2006, Fowler et al. 2007, Fowler et al. 2008) (Table 1.1). The estimates of performance indicators for 2008/09 were compared against limit reference points calculated for the 26-year period of 1983/84 to 2008/09. Furthermore, for these species, the specific commercial catch and effort data from the rock lobster fishers were extracted from the State-wide totals, and performance indicators and reference points were calculated for these sub-sets of data. These data and the results of the comparisons between indicators and reference points were presented separately. The separate analysis of catch and effort data from rock lobster fishers for the Primary Marine Scalefish species conforms to a request from the MSFMC that was made in 2006.

For those species for which only part-reporting was done, the data considered were the total State-wide estimates from the MSF fishery, but excluded the specific analysis of data from the rock lobster fishers. Furthermore, for some of these species data were not considered for the whole 26-year time-series, depending on when each species-specific fishery developed after 1983/84. In these cases, truncated time-series of data were considered in the comparisons between performance indicators and limit reference points. For example, for ocean jackets the reference period was 1988/89 to 2008/09, whilst for mud cockles it was 1985/86 to 2008/09.

For the species for which only a minor level of reporting was done, which were mostly Tertiary species, the only fishery performance indicator considered was total commercial catch.

For all species, regardless of whether full, partial or minor reporting was done, the presentation of data was limited by constraints of confidentiality, i.e. data were only presented when summarised from five or more fishers.

Various processes were implemented at each step during the data handling and processing as quality assurance measures to ensure the accuracy of the final output. These included:

- 1) commercial catch and effort data were cross-checked by a number of validation processes by the SARDI Fisheries Statistics Unit prior to delivery, including:
 - a) random cross-checking of raw data transferred from commercial catch returns;
 - b) random cross-checking of data entered to the database by trained personnel;
 - c) automated filters and structured queries built into the fisheries statistics database;
- 2) extracted commercial catch and effort data were graphed into their necessary species/gear/time categories and cross-checked with the time-series presented in the previous three stock status reports (Steer et al. 2006, Fowler et al. 2007, Fowler et al. 2008);
- 3) regular meetings of the authors were held to discuss data handling and interpretation;
- 4) calculation of the prescribed limit reference points was done using the computer-programming package (S+). Output was generated for each species/category and the calculations cross-checked by hand and visual inspection against graphs (e.g. Fig. 1.1);
- 5) tabulated results included in the report were further cross-checked against the computer output before the report was submitted to SARDI's formal review process;
- 6) the report was scrutinised by two internal reviewers before approval for publication.

3.0 Results

In 2008/09, there were at least two limit reference points breached for three of the four Primary species. For King George whiting (pg 6) there were two breaches of trigger points that reflected general declines in commercial catch and effort since 1992, although CPUE did attain its highest recorded level. For snapper (pg 8) there were six breaches of reference points; one reflected the highest ever commercial catch, whilst the others related to increases in longline effort, and handline and longline CPUE. For southern calamary (pg 10), the catch and effort data in 2008/09 did not differ markedly from previous years and there were no breaches of reference points. For sea garfish (pg 12), the 3rd lowest catch was recorded due to declining haul net and dab net effort, although the second highest haul net CPUE was recorded. For the fishery statistics from rock lobster fishers there were several breaches of limit reference points. For King George whiting (pg 7), increasing catch related to increasing effort and CPUE. Similarly, the snapper catch by rock lobster fishers (pg 9) increased due to higher longline effort. Their calamary catch decreased to a moderate level due to a drop in effort (pg 11), whilst in recent years their dab net effort for southern garfish has been minimal (pg 12).

In 2008/09, there were notable trends in the catch and effort data for some Secondary species. For yellowfin whiting, recent trends of declining catch, effort and CPUE were reversed, but not dramatically enough to breach any reference points (pg 14). The catch of Australian salmon declined over the past six years to the second lowest level, even though haul net CPUE was 3rd highest (pg 15). For Australian herring, total catch and targeted catch and effort remained at relatively low historic levels despite marginal increases since 2006/07, whilst targeted CPUE has been highly variable (pg 16). In 2008/09, declines in targeted catch and effort for mud cockles triggered four limit reference points, whilst CPUE continued to decline (pg 17). For snook, the 3rd lowest catch was recorded, relating to recent decreases in haul net and troll line effort (pg 18). For sand crabs, the greatest increases in targeted and crab net CPUE were recorded in 2008/09 (pg 19). The 2nd lowest catch of yelloweye mullet was recorded due to long trends of declining fishing effort, whilst the 3rd highest haul net CPUE was recorded (pg 20). For mulloway, the 2nd lowest commercial catch was recorded (pg 21). For whaler sharks, there were four reference points breached, which related to declining longline effort, but high shark net effort (pg 22). For ocean jackets, the 2nd lowest commercial catch was taken (pg 23).

For the seven Tertiary species or taxa, there were no results in 2008/09 that varied dramatically from those in previous years. Moderate to high catches were recorded for parrot fish, western striped grunter, silver trevally and rays and skates. Alternatively, historically low catches of leatherjackets, gummy sharks and cuttlefish were recorded.

3.1a King George whiting (*Sillaginodes punctatus*) – State-wide total

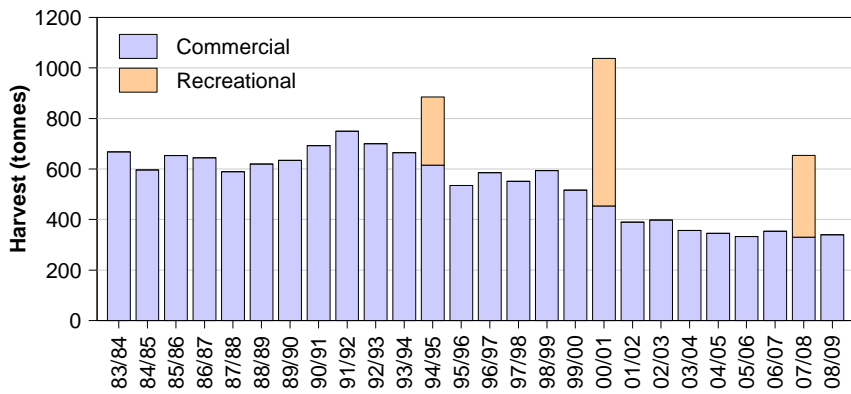


Figure 3.1 Total State-wide commercial and recreational catches of King George whiting.

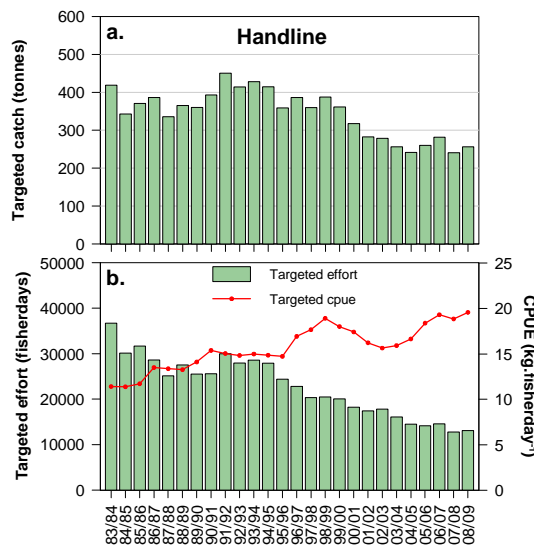


Figure 3.2 (a) Targeted handline catch of King George whiting; (b) Targeted handline effort and CPUE.

Table 3.1 Comparisons between performance indicators and limit reference points for King George whiting.

Performance Indicator	Limit Reference Point	Breached?	Details
A. Total commercial catch	3 rd lowest/3 rd highest	Yes	3 rd lowest (339 t)
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
B1. Targeted handline effort	3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
C1. Targeted handline CPUE	3 rd lowest/3 rd highest	Yes	Highest
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	

3.1b King George whiting (*Sillaginodes punctatus*) – rock lobster fishers

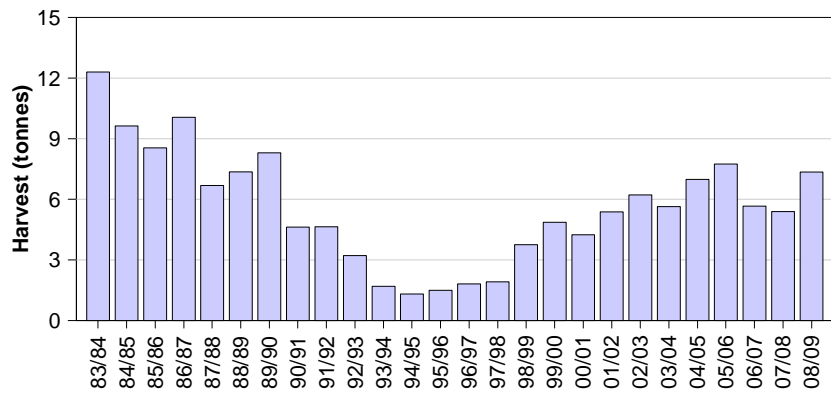


Figure 3.3 Total catch of King George whiting by rock lobster fishers.

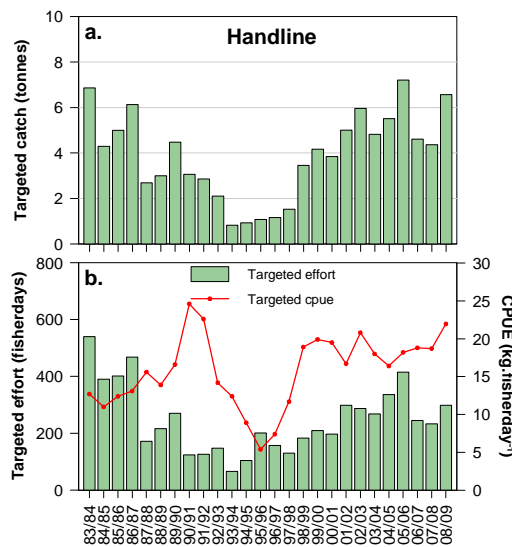


Figure 3.4 (a) Targeted handline catch of King George whiting by rock lobster fishers; (b) Targeted handline effort and CPUE.

Table 3.2 Comparisons between performance indicators and limit reference points for King George whiting by rock lobster fishers.

Performance Indicator	Limit Reference Point	Breached?	Details
A. Total commercial catch	3 rd lowest/3 rd highest	No	
	Greatest interannual change (±)	Yes	Highest
	Greatest 3-year trend (±)	No	
B1. Targeted handline effort	3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
C1. Targeted handline CPUE	3 rd lowest/3 rd highest	Yes	3rd Highest
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	

3.2a Snapper (*Chrysophrys auratus*) – State-wide total

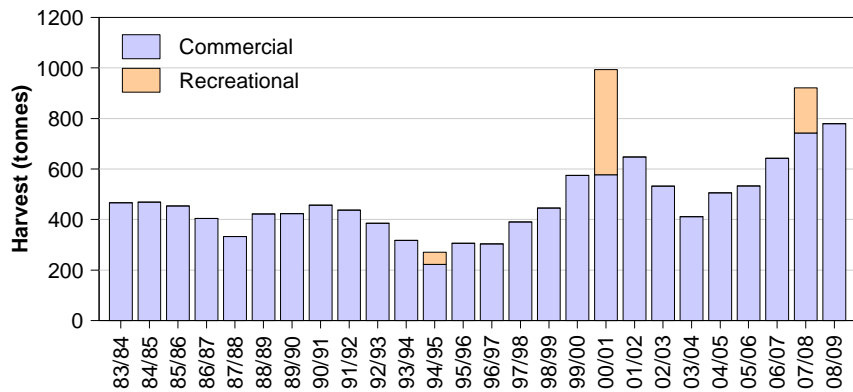


Figure 3.5 Total State-wide commercial and recreational catches of snapper.

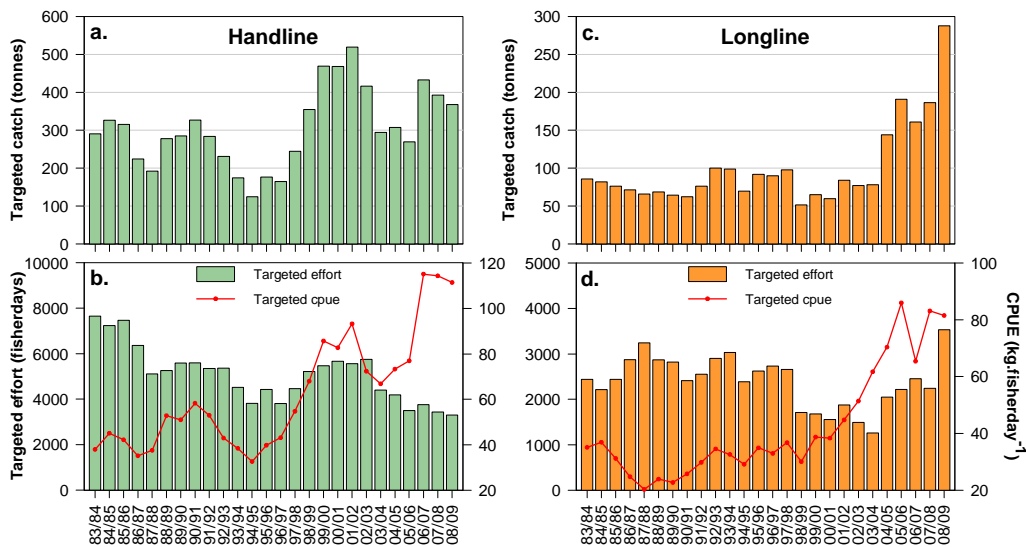


Figure 3.6 (a) Targeted handline catch of snapper; (b) Targeted handline effort and CPUE; (c) Targeted longline catch; (d) Targeted longline effort and CPUE.

Table 3.3 Comparisons between performance indicators and limit reference points for snapper.

Performance Indicator	Limit Reference Point	Breached?	Details
A. Total commercial catch	3 rd lowest/3 rd highest	Yes	Highest (780 t)
	Greatest interannual change (±)	No	
	Greatest 5-year trend (±)	No	
B1. Targeted handline effort	3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 5-year trend (±)	No	
B2. Targeted longline effort	3 rd highest	Yes	Highest
	Greatest interannual change (±)	Yes	Greatest increase
	Greatest 5-year trend (±)	Yes	Greatest increase
C1. Targeted handline CPUE	3 rd lowest/3 rd highest	Yes	2 nd highest
	Greatest interannual change (±)	No	
	Greatest 5-year trend (±)	No	
C2. Targeted longline CPUE	3 rd lowest/3 rd highest	Yes	3 rd highest
	Greatest interannual change (±)	No	
	Greatest 5-year trend (±)	No	

3.2b Snapper (*Chrysophrys auratus*) – rock lobster fishers

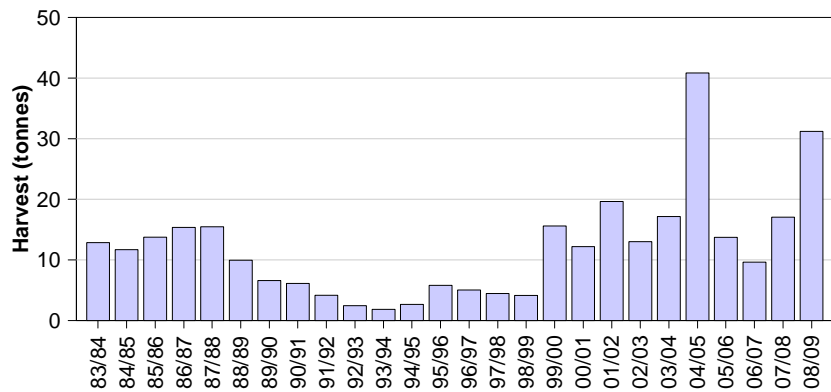


Figure 3.7 Total catch of snapper by rock lobster fishers.

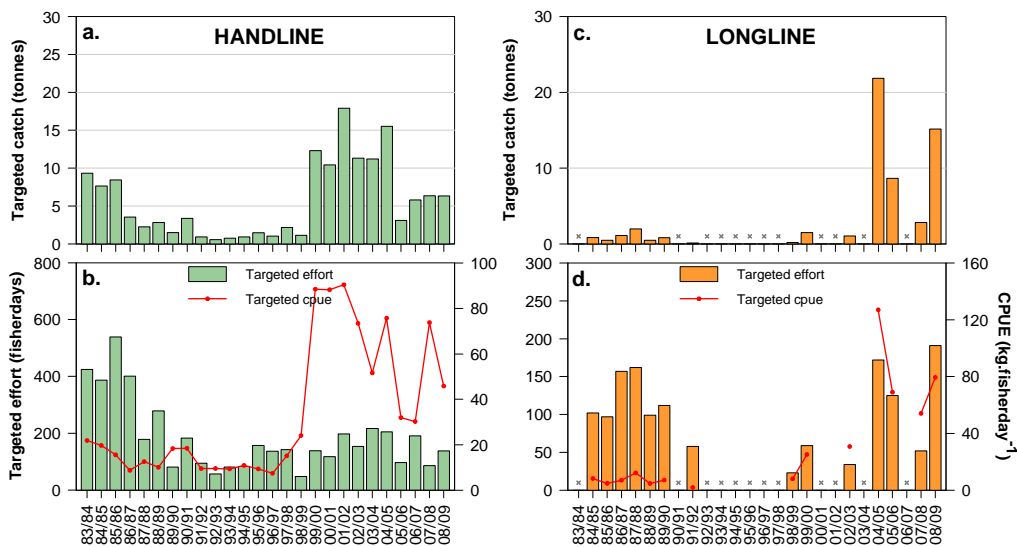


Figure 3.8 (a) Targeted handline catch of snapper by rock lobster fishers; (b) Targeted handline effort and CPUE; (c) Targeted longline catch; (d) Targeted longline effort and CPUE. Grey crosses indicate confidential data (<5 fishers).

Table 3.4 Comparisons between performance indicators and limit reference points for snapper by rock lobster fishers.

Performance Indicator	Limit Reference Point	Breached?	Details
A. Total commercial catch	3 rd lowest/3 rd highest	Yes	2 nd highest (31.2 t)
	Greatest interannual change (±)	No	
	Greatest 5-year trend (±)	No	
B1. Targeted handline effort	3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 5-year trend (±)	No	
B2. Targeted longline effort	3 rd highest	Yes	Highest
	Greatest interannual change (±)	Yes	Greatest increase
	Greatest 5-year trend (±)	No	
C1. Targeted handline CPUE	3 rd lowest/3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 5-year trend (±)	No	
C2. Targeted longline CPUE	3 rd lowest/3 rd highest	Yes	3 rd highest
	Greatest interannual change (±)	No	
	Greatest 5-year trend (±)	Yes	Greatest decrease

3.3a Southern calamary (*Sepioteuthis australis*) – State-wide total

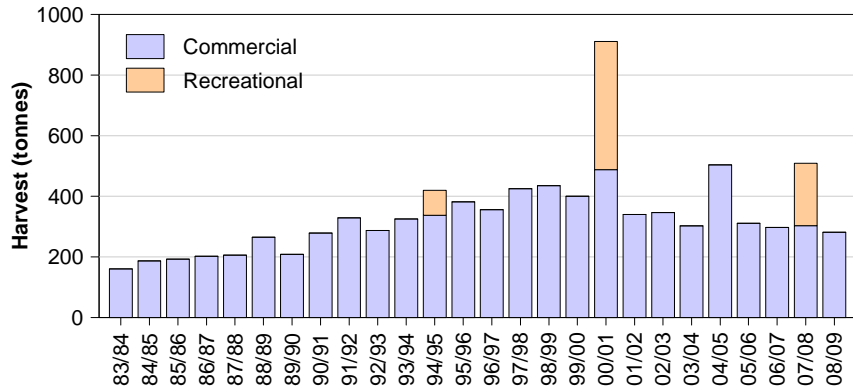


Figure 3.9 Total State-wide commercial and recreational catches of southern calamary.

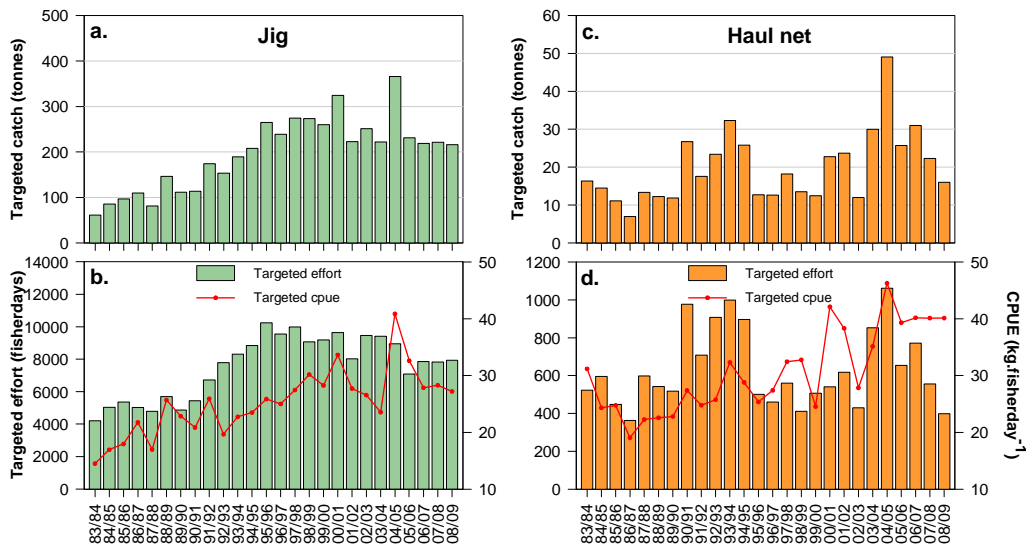


Figure 3.10 (a) Targeted jig catch of southern calamary; (b) Targeted jig effort and CPUE; (c) Targeted haul net catch; (d) Targeted haul net effort and CPUE.

Table 3.5 Comparisons between performance indicators and limit reference points for southern calamary.

Performance Indicator	Limit Reference Point	Breached?	Details
A. Total commercial catch	3 rd lowest/3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
B1. Targeted jig effort	3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
B2. Targeted haul net effort	3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
C1. Targeted jig CPUE	3 rd lowest/3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
C2. Targeted haul net CPUE	3 rd lowest/3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	

3.3b Southern calamary (*Sepioteuthis australis*) – rock lobster fishers

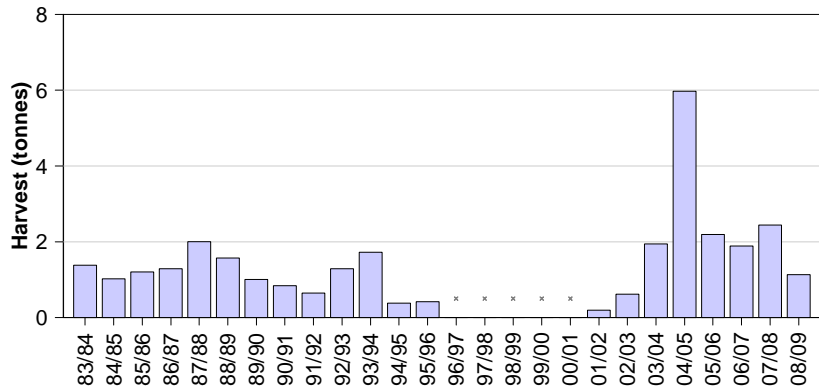


Figure 3.11 Total catch of southern calamary by rock lobster fishers. Grey crosses indicate confidential data (<5 fishers).

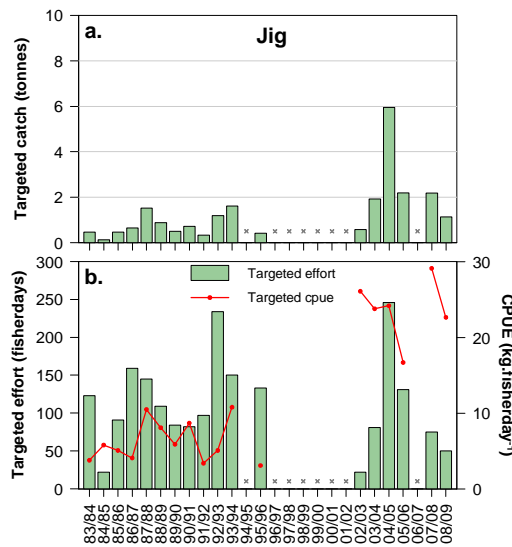


Figure 3.12 (a) Targeted jig catch of southern calamary by rock lobster fishers; (b) Targeted jig effort and CPUE. Grey crosses indicate confidential data (<5 fishers).

Table 3.6 Comparisons between performance indicators and limit reference points for southern calamary by rock lobster fishers.

Performance Indicator	Limit Reference Point	Breached?	Details
A. Total commercial catch	3 rd lowest/3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
B1. Targeted jig effort	3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
C1. Targeted jig CPUE	3 rd lowest/3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	

3.4a Southern garfish (*Hyporhamphus melanochir*) – State-wide total

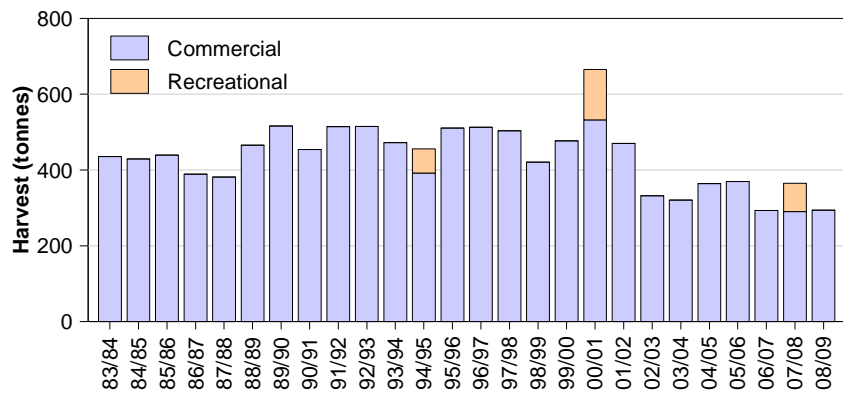


Figure 3.13 Total State-wide commercial and recreational catches of garfish.

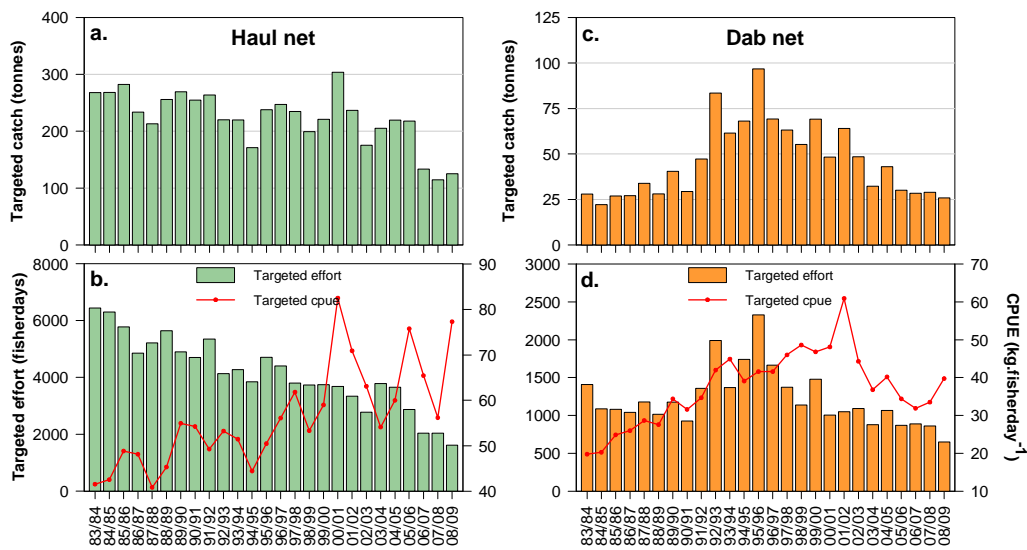


Figure 3.14 (a) Targeted haul net catch of garfish; (b) Targeted haul net effort and CPUE; (c) Targeted dab net catch; (d) Targeted dab net effort and CPUE.

Table 3.7 Comparisons between performance indicators and limit reference points for garfish.

Performance Indicator	Limit Reference Point	Breached?	Details
A. Total commercial catch	3 rd lowest/3 rd highest	Yes	3 rd lowest (294 t)
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
B1. Targeted haul net effort	3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
B2. Targeted dab net effort	3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
C1. Targeted haul net CPUE	3 rd lowest/3 rd highest	Yes	2 nd highest
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
C2. Targeted dab net CPUE	3 rd lowest/3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	

3.4b Southern garfish (*Hyporhamphus melanochir*) – rock lobster fishers

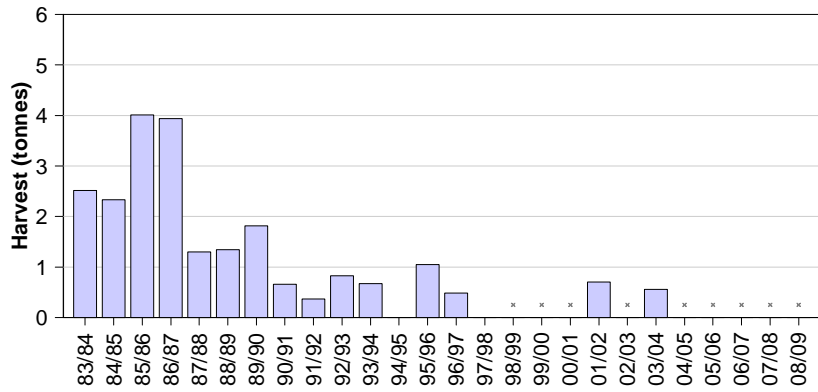


Figure 3.15 Total catch of garfish by rock lobster fishers. Grey crosses indicate confidential data (<5 fishers).

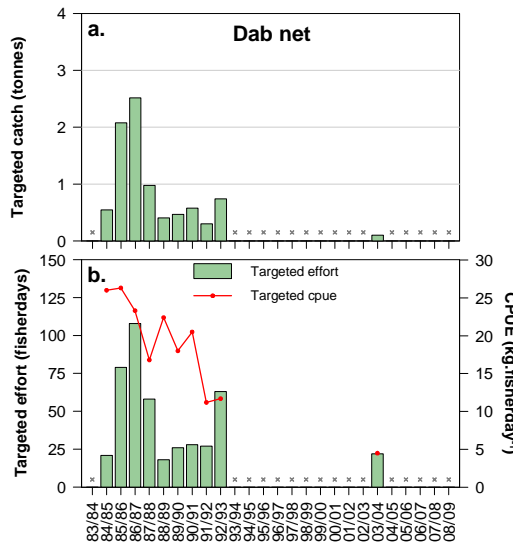


Figure 3.16 (a) Targeted dab net catch of garfish by rock lobster fishers; (b) Targeted dab net effort and CPUE. Grey crosses indicate confidential data (<5 fishers).

Table 3.8 Comparisons between performance indicators and limit reference points for garfish by rock lobster fishers. Crosses indicate that that relevant data are confidential.

Performance Indicator	Limit Reference Point	Breached?	Details
A. Total commercial catch	3 rd lowest/3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
B1. Targeted dab net effort	3 rd highest	x	Zeros in data
	Greatest interannual change (±)	x	
	Greatest 3-year trend (±)	x	
C1. Targeted dab net CPUE	3 rd lowest/3 rd highest	x	
	Greatest interannual change (±)	x	
	Greatest 3-year trend (±)	x	

3.5 Yellowfin whiting (*Sillago schomburgkii*)

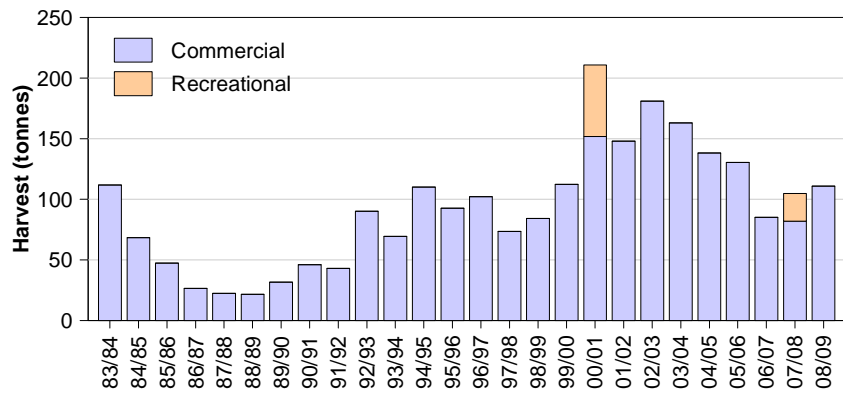


Figure 3.17 Total State-wide commercial and recreational catches of Yellowfin whiting.

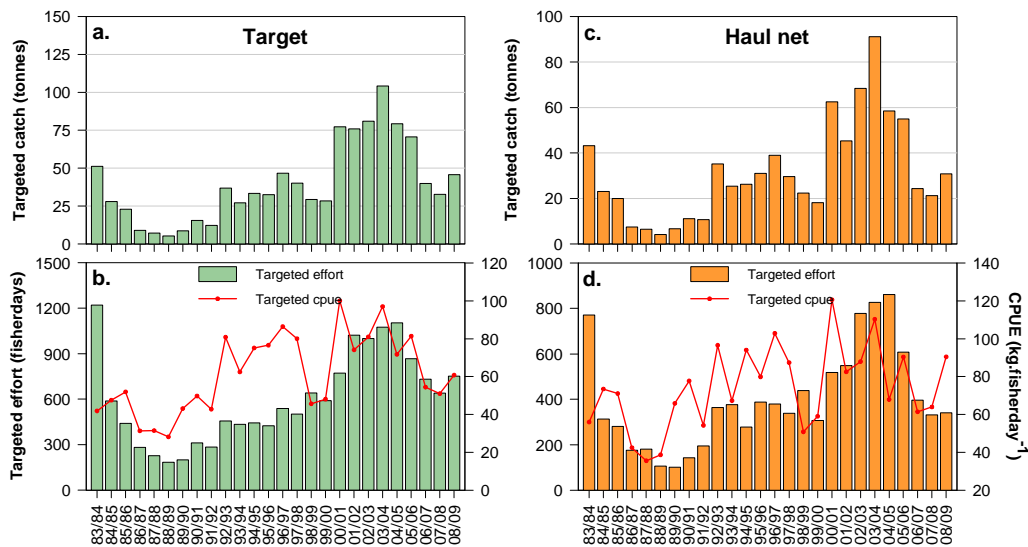


Figure 3.18. (a) Total targeted catch of Yellowfin whiting; (b) Total targeted effort and CPUE; (c) Targeted haul net catch; (d) Targeted haul net effort and CPUE.

Table 3.9. Comparisons between performance indicators and limit reference points for Yellowfin whiting.

Performance Indicator	Limit Reference Point	Breached?	Details
A. Total commercial catch	3 rd lowest/3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
B1. Targeted effort	3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
B2. Targeted haul net effort	3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
C1. Targeted CPUE	3 rd lowest/3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
C2. Targeted haul net CPUE	3 rd lowest/3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	

3.6 Australian salmon (*Arripis truttaceus*)

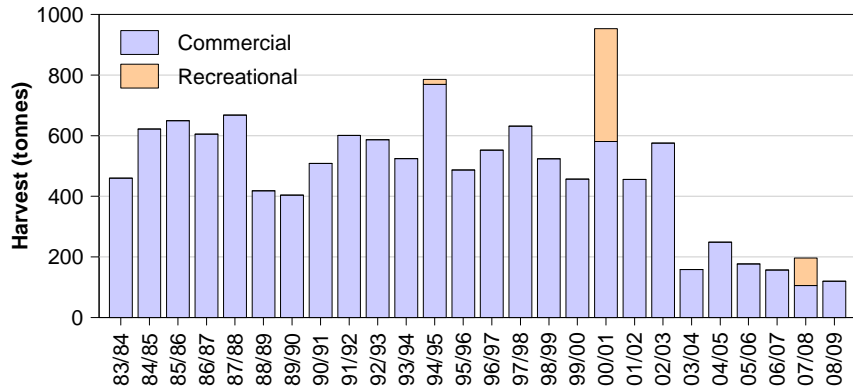


Figure 3.19 Total State-wide commercial and recreational catches of Australian salmon.

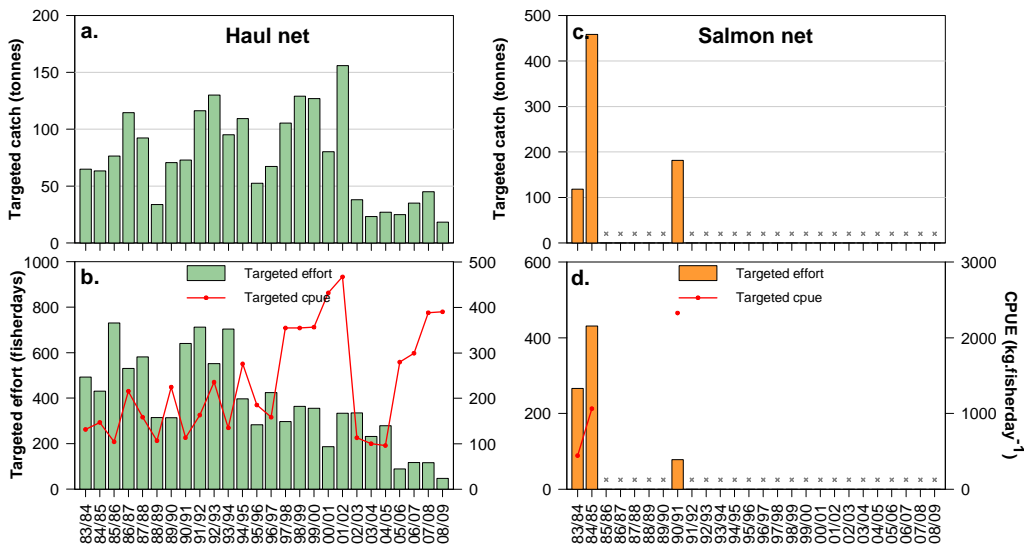


Figure 3.20 (a) Targeted haul net catch of Australian salmon; (b) Targeted haul net effort and CPUE; (c) Targeted salmon net catch; (d) Targeted salmon net effort and CPUE. Grey crosses indicate confidential data (<5 fishers).

Table 3.10 Comparisons between performance indicators and limit reference points for Australian salmon. Crosses indicate zero effort in recent years, thus comparisons are meaningless.

Performance Indicator	Limit Reference Point	Breached?	Details
A. Total commercial catch	3 rd lowest/3 rd highest	Yes	2 nd lowest (120.2 t)
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
B1. Targeted haul net effort	3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
B2. Targeted salmon net effort	3 rd highest	x	Zeros in data
	Greatest interannual change (±)	x	
	Greatest 3-year trend (±)	x	
C1. Targeted haul net CPUE	3 rd lowest/3 rd highest	Yes	3 rd highest
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
C2. Targeted salmon net CPUE	3 rd lowest/3 rd highest	x	
	Greatest interannual change (±)	x	
	Greatest 3-year trend (±)	x	

3.7. Australian herring (*Arripis georgianus*)

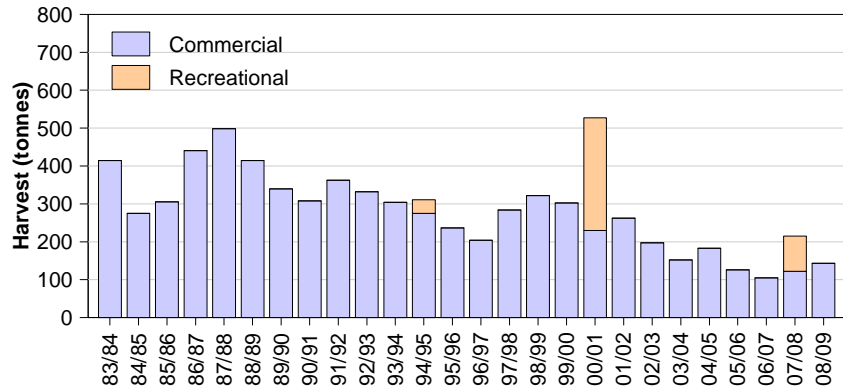


Figure 3.21 Total State-wide commercial and recreational catches of Australian herring.

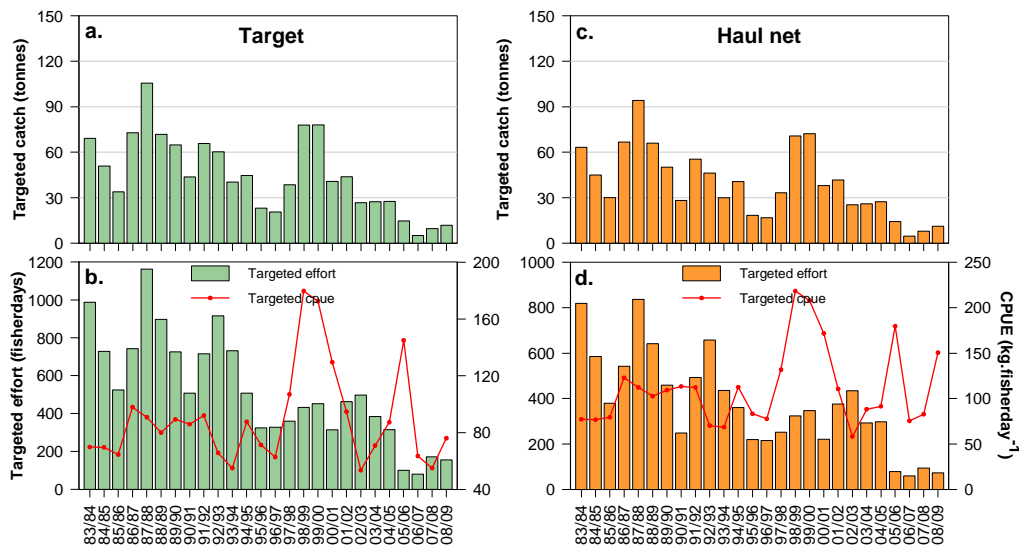


Figure 3.22 (a) Total targeted catch of Australian herring; (b) Total targeted effort and CPUE; (c) Targeted haul net catch; (d) Targeted haul net effort and CPUE.

Table 3.11 Comparisons between performance indicators and limit reference points for Australian herring.

Performance Indicator	Limit Reference Point	Breached?	Details
A. Total commercial catch	3 rd lowest/3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
B1. Targeted effort	3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
B2. Targeted haul net effort	3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
C1. Targeted CPUE	3 rd lowest/3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
C2. Targeted haul net CPUE	3 rd lowest/3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	

3.8. Mud cockles (*Katelysia* spp.)

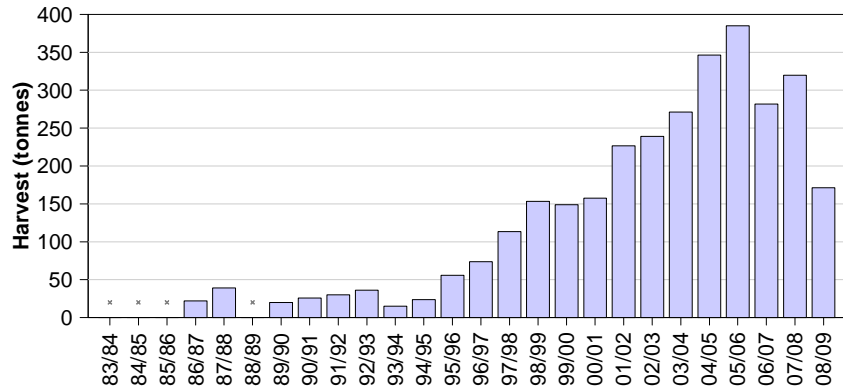


Figure 3.23 Total State-wide commercial catch of mud cockles. Grey crosses indicate confidential data (<5 fishers). Estimates of recreational catch are not available for this species.

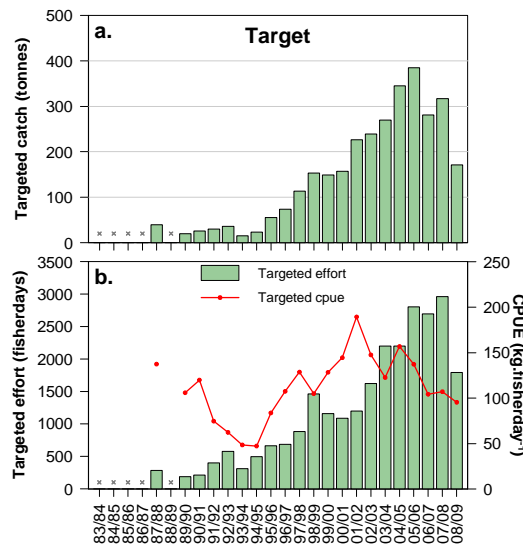


Figure 3.24 (a) Total Targeted catch of mud cockles; (b) Total targeted effort and CPUE. Grey crosses indicate confidential data (<5 fishers).

Table 3.12 Comparisons between performance indicators and limit reference points for mud cockles.

Performance Indicator	Limit Reference Point	Breached?	Details
A. Total commercial catch	3 rd lowest/3 rd highest	No	
	Greatest interannual change (±)	Yes	Greatest decrease
	Greatest 3-year trend (±)	Yes	Greatest decrease
B1. Targeted effort	3 rd highest	Yes	
	Greatest interannual change (±)	Yes	Greatest decrease
	Greatest 3-year trend (±)	Yes	Greatest decrease
C1. Targeted CPUE	3 rd lowest/3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	

3.9 Snook (*Sphyraena novaehollandiae*)

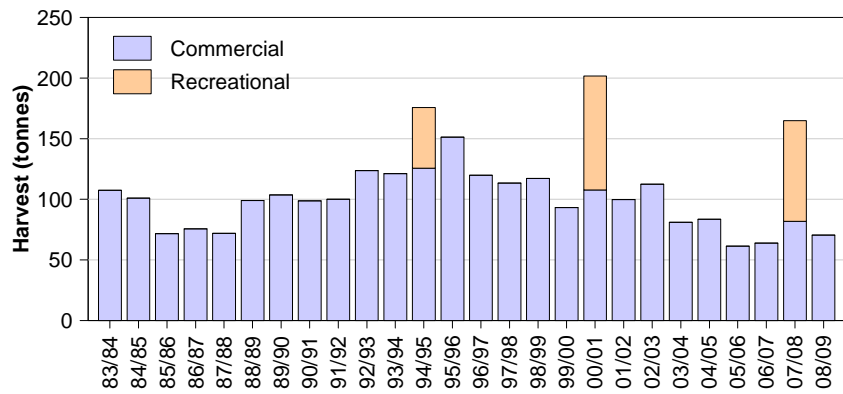


Figure 3.25 Total State-wide commercial and recreational catches of snook.

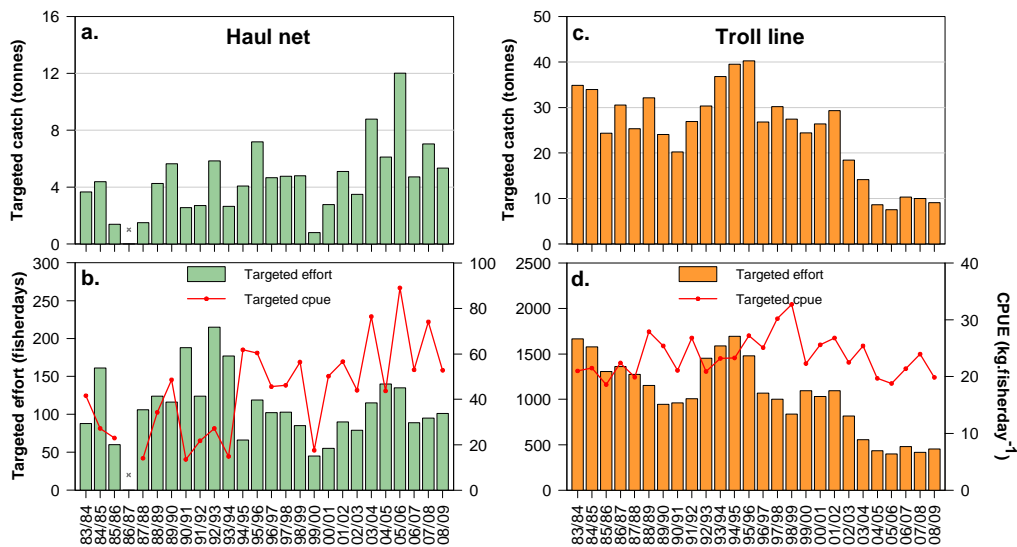


Figure 3.26 (a) Targeted haul net catch of snook; (b) Targeted effort and CPUE; (c) Targeted troll line catch; (d) Targeted troll line effort and CPUE.

Table 3.13 Comparisons between performance indicators and limit reference points for snook.

Performance Indicator	Limit Reference Point	Breached?	Details
A. Total commercial catch	3 rd lowest/3 rd highest	Yes	3 rd lowest (70.5 t)
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
B1. Targeted haul net effort	3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
B2. Targeted troll line effort	3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
C1. Targeted haul net CPUE	3 rd lowest/3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
C2. Targeted troll line CPUE	3 rd lowest/3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	

3.10 Sand crabs (*Ovalipes australiensis*)

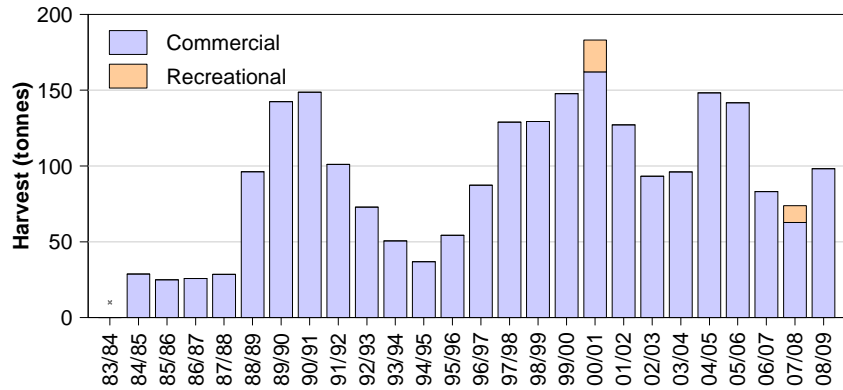


Figure 3.27 Total State-wide commercial and recreational catches of sand crabs. Grey cross indicates confidential data (<5 fishers). No estimate of recreational catch is available for 1994/95.

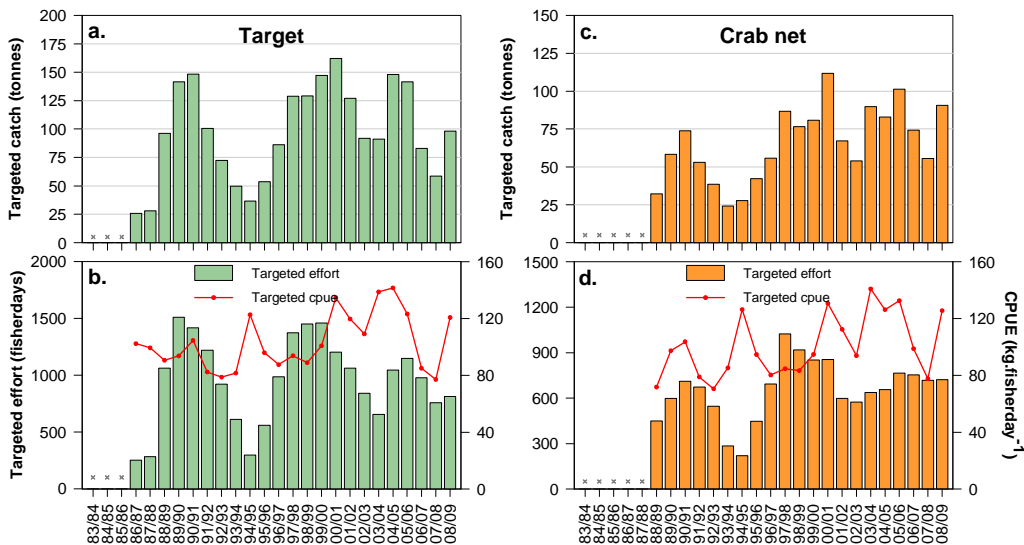


Figure 3.28 (a) Total targeted catch of sand crabs; (b) Total targeted effort and CPUE; (c) Targeted crab net catch; (d) Targeted crab net effort and CPUE. Grey crosses indicate confidential data (<5 fishers).

Table 3.14 Comparisons between performance indicators and limit reference points for sand crabs.

Performance Indicator	Limit Reference Point	Breached?	Details
A. Total commercial catch	3 rd lowest/3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
B1. Targeted effort	3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
B2. Targeted crab net effort	3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
C1. Targeted CPUE	3 rd lowest/3 rd highest	No	
	Greatest interannual change (±)	Yes	Greatest increase
	Greatest 3-year trend (±)	No	
C2. Targeted crab net CPUE	3 rd lowest/3 rd highest	No	
	Greatest interannual change (±)	Yes	Greatest increase
	Greatest 3-year trend (±)	No	

3.11 Yelloweye mullet (*Aldrichetta forsteri*)

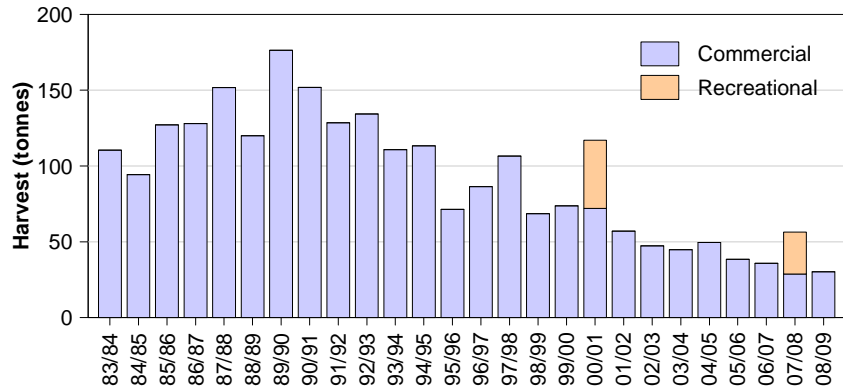


Figure 3.29 Total State-wide commercial and recreational catches of Yelloweye mullet. No estimate of recreational catch is available for 1994/95.

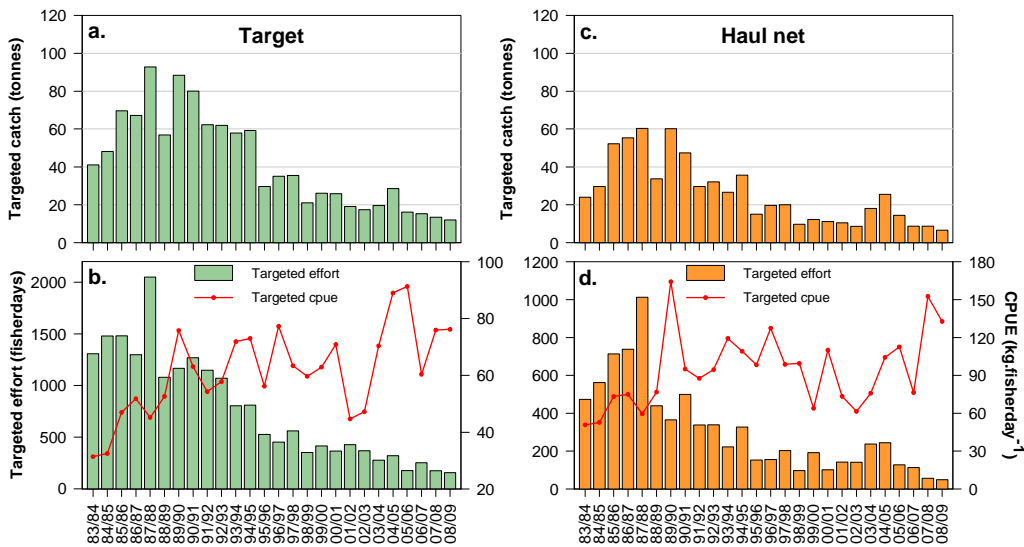


Figure 3.30 (a) Total targeted catch of Yelloweye mullet; (b) Total targeted effort and CPUE; (c) Targeted haul net catch; (d) Targeted haul net effort and CPUE.

Table 3.15 Comparisons between performance indicators and limit reference points for Yelloweye mullet.

Performance Indicator	Limit Reference Point	Breached?	Details
A. Total commercial catch	3 rd lowest/3 rd highest	Yes	2 nd lowest (30.3 t)
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
B1. Targeted effort	3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
B2. Targeted haul net effort	3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
C1. Targeted CPUE	3 rd lowest/3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
C2. Targeted haul net CPUE	3 rd lowest/3 rd highest	Yes	3 rd highest
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	

3.12 Mulloway (*Argyrosomus japonicus*)

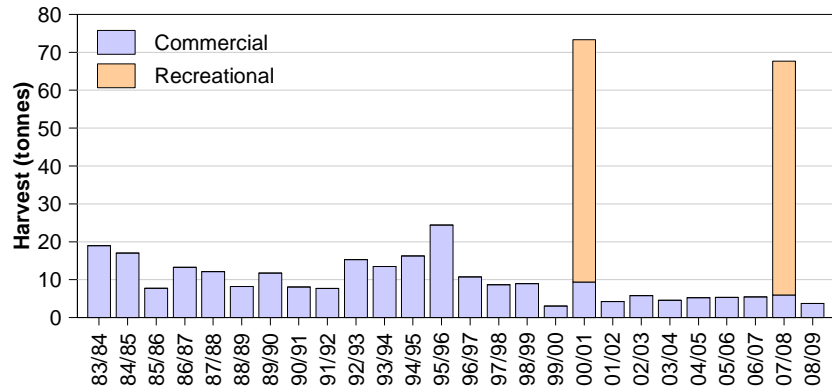


Figure 3.31 Total State-wide commercial and recreational catches of mulloway. No estimate of recreational catch is available for 1994/95.

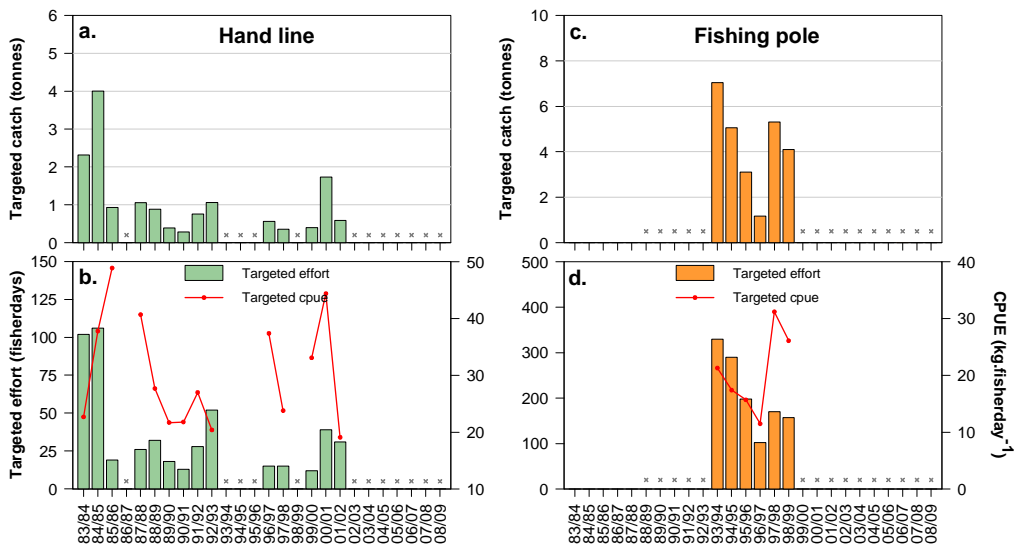


Figure 3.32 (a) Targeted handline catch of mulloway; (b) Targeted handline effort and CPUE; (c) Targeted fishing pole catch; (d) Targeted fishing pole effort and CPUE. Grey crosses indicate confidential data (<5 fishers).

Table 3.16. Comparisons between performance indicators and limit reference points for mulloway. Crosses indicate that relevant data are confidential.

Performance Indicator	Limit Reference Point	Breached?	Details
A. Total commercial catch	3 rd lowest/3 rd highest	Yes	2 nd lowest (3.7 t)
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
B1. Targeted handline effort	3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
B2. Targeted fishing pole effort	3 rd highest	x	Zeros in data
	Greatest interannual change (±)	x	
	Greatest 3-year trend (±)	x	
C1. Targeted handline CPUE	3 rd lowest/3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
C2. Targeted fishing pole CPUE	3 rd lowest/3 rd highest	x	
	Greatest interannual change (±)	x	
	Greatest 3-year trend (±)	x	

3.13 Bronze whaler (*Carcharhinus brachyurus*) and dusky whaler (*C. obscurus*)

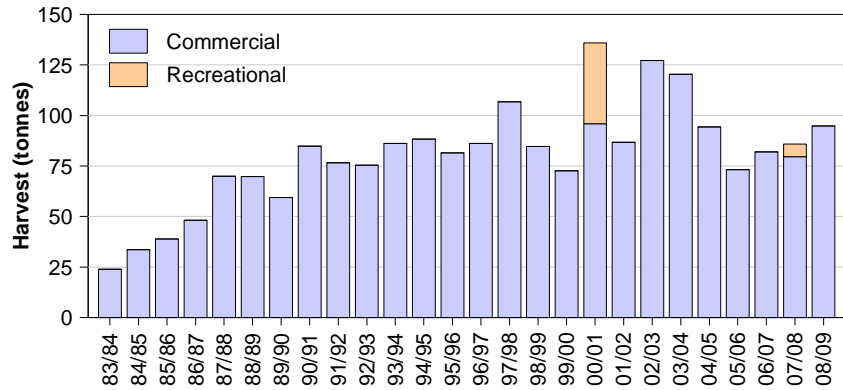


Figure 3.33 Total State-wide commercial and recreational catches of whaler sharks. No estimate of recreational catch is available for 1994/95.

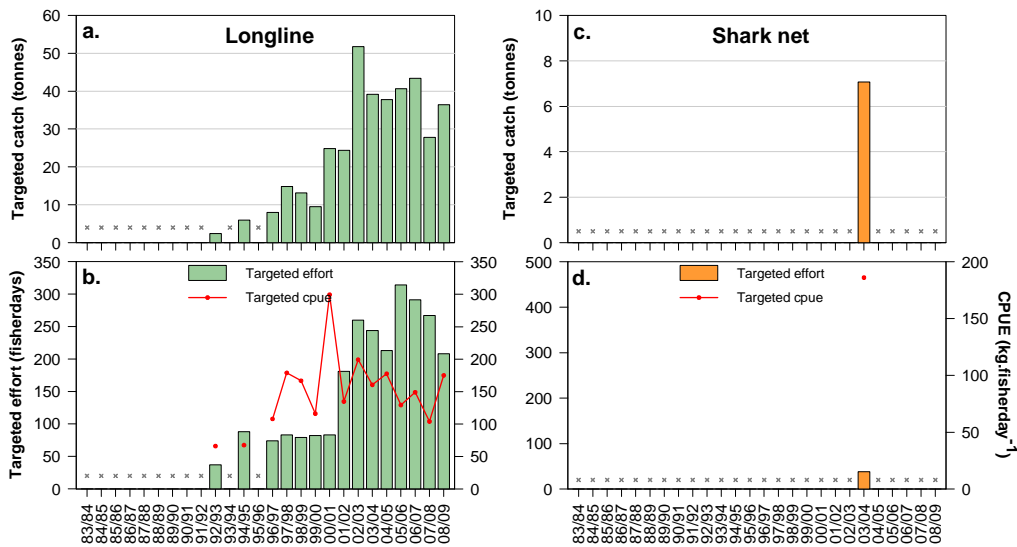


Figure 3.34 (a) Targeted longline catch of whaler sharks; (b) Targeted longline effort and CPUE; (c) Targeted shark net catch; (d) Targeted shark net effort and CPUE. Grey crosses indicate confidential data (<5 fishers).

Table 3.17. Comparisons between performance indicators and limit reference points for whaler sharks.

Performance Indicator	Limit Reference Point	Breached?	Details
A. Total commercial catch	3 rd lowest/3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
B1. Targeted longline effort	3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	Yes	Greatest decrease
B2. Targeted shark net effort	3 rd highest	Yes	Highest
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
C1. Targeted longline CPUE	3 rd lowest/3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
C2. Targeted shark net CPUE	3 rd lowest/3 rd highest	Yes	Highest
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	Yes	Greatest increase

3.14 Ocean jackets (*Nelusetta ayraud*)

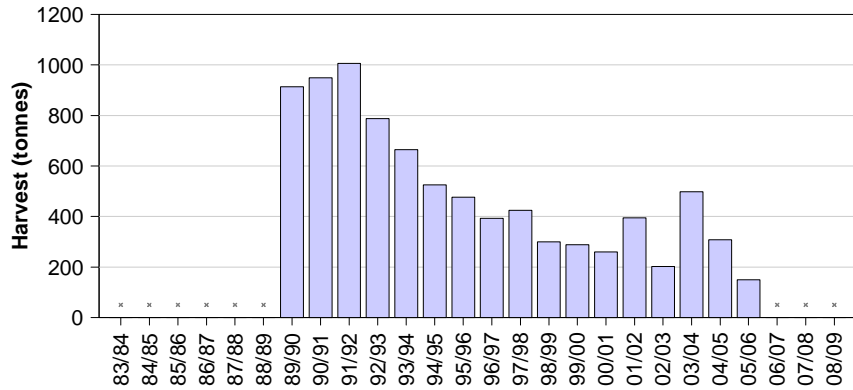


Figure 3.35 Total State-wide commercial catch of ocean jackets. Grey crosses indicate confidential data (<5 fishers).

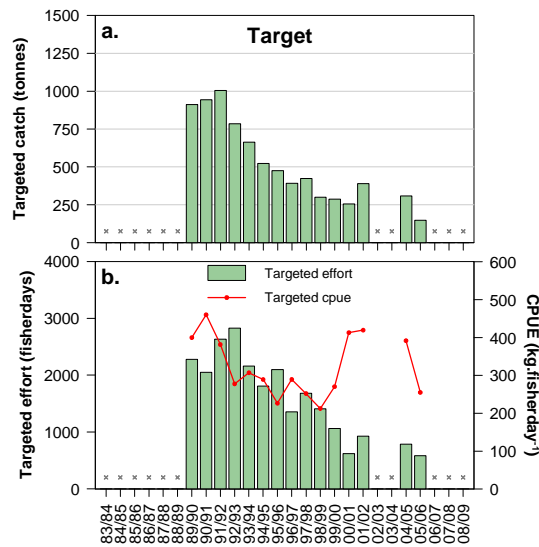


Figure 3.36 (a) Total targeted catch of ocean jackets; (b) Total targeted effort and CPUE. Grey crosses indicate confidential data (<5 fishers).

Table 3.18 Comparisons between performance indicators and limit reference points for ocean jackets.

Performance Indicator	Limit Reference Point	Breached?	Details
A. Total commercial catch	3 rd lowest/3 rd highest	Yes	2 nd lowest
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
B1. Targeted effort	3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
C1. Targeted CPUE	3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	

3.15 Parrot fish (*Notolabrus* spp.)

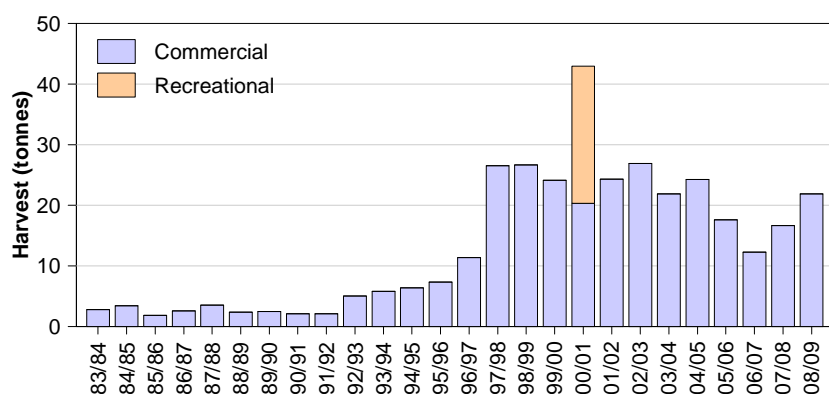


Figure 3.37 Total State-wide commercial and recreational catches of parrot fish. No estimate of recreational catch is available for 1994/95, whilst estimate for 2007/08 was unreliable.

Table 3.19 Comparisons between performance indicators and limit reference points for parrot fish.

Performance Indicator	Limit Reference Point	Breached?	Details
A. Total commercial catch	3 rd lowest/3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	

3.16 Western striped grunter (*Pelates octolineatus*)

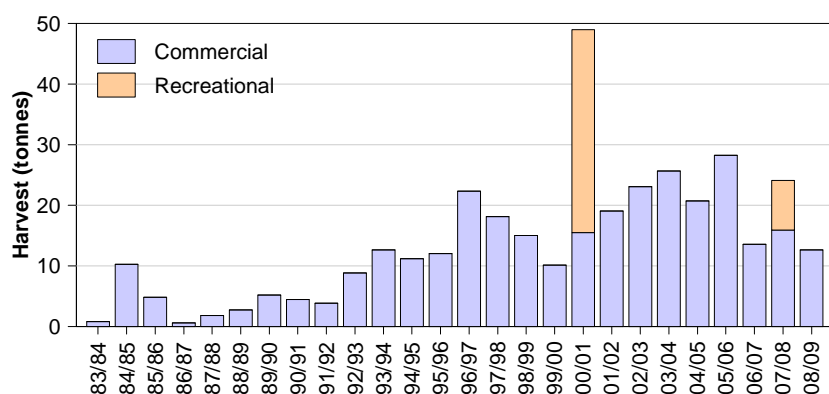


Figure 3.38 Total State-wide commercial and recreational catches of western striped grunter. No estimate of recreational catch is available for 1994/95.

Table 3.20 Comparisons between performance indicators and limit reference points for western striped grunter.

Performance Indicator	Limit Reference Point	Breached?	Details
A. Total commercial catch	3 rd lowest/3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	

3.17 Silver trevally (*Pseudocaranx georgianus*)

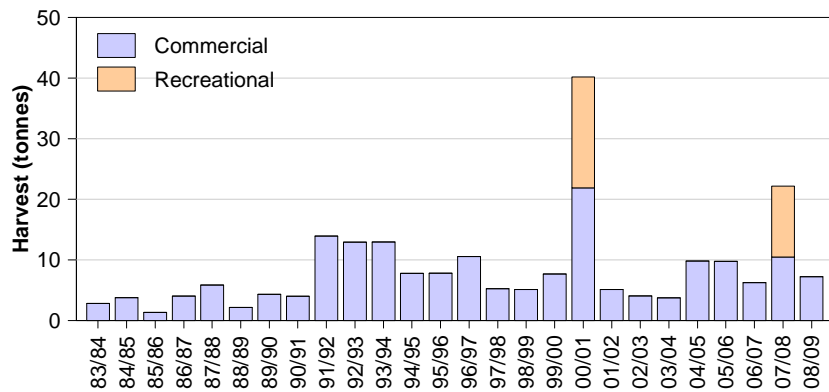


Figure 3.39 Total State-wide commercial and recreational catches of silver trevally. No estimate of recreational catch is available for 1994/95.

Table 3.21 Comparisons between performance indicators and limit reference points for silver trevally.

Performance Indicator	Limit Reference Point	Breached?	Details
A. Total commercial catch	3 rd lowest/3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	

3.18 Leatherjackets (Family Monacanthidae)

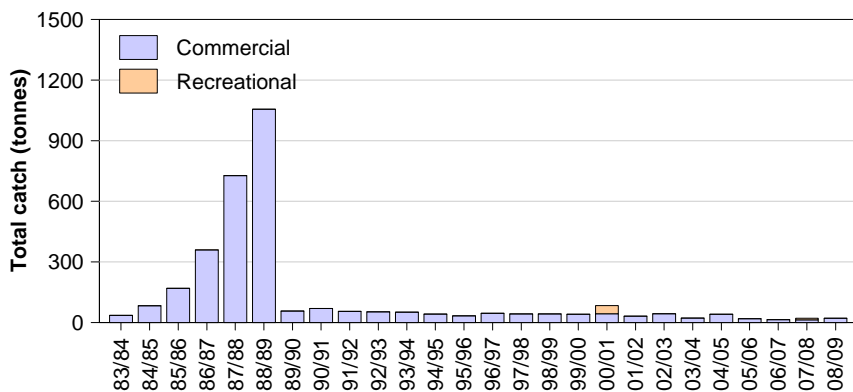


Figure 3.40 Total State-wide commercial and recreational catches of leatherjackets. No estimate of recreational catch is available for 1994/95.

Table 3.22 Comparisons between performance indicators and limit reference points for leatherjackets.

Performance Indicator	Limit Reference Point	Breached?	Details
A. Total commercial catch	3 rd lowest/3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	

3.19 Gummy sharks (Family Triakidae)

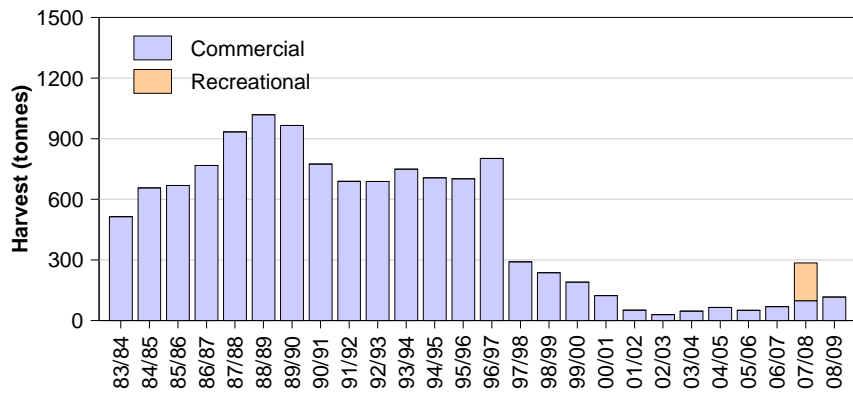


Figure 3.41 Total State-wide commercial catch of gummy sharks. No estimate of recreational catch is available for 1994/95.

Table 3.23 Comparisons between performance indicators and limit reference points for gummy sharks.

Performance Indicator	Limit Reference Point	Breached?	Details
A. Total commercial catch	3 rd lowest/3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	

3.20 Rays and Skates (Class Elasmobranchii)

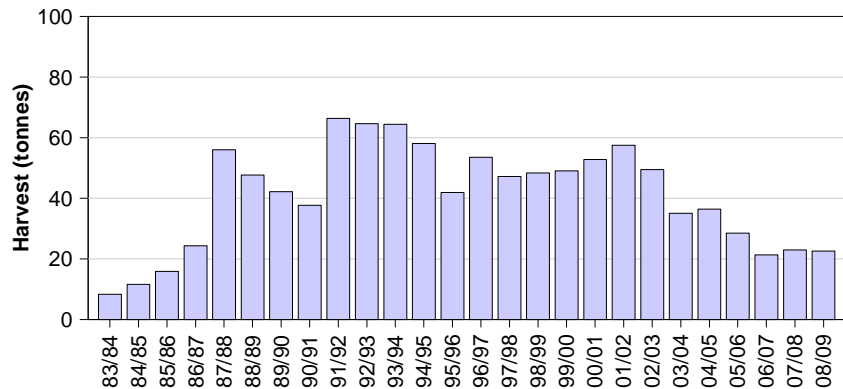


Figure 3.42 Total State-wide commercial catch of rays and skates. No estimates of recreational catch available.

Table 3.24 Comparisons between performance indicators and limit reference points for rays and skates.

Performance Indicator	Limit Reference Point	Breached?	Details
A. Total commercial catch	3 rd lowest/3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	

3.21 Cuttlefish (*Sepia apama*)

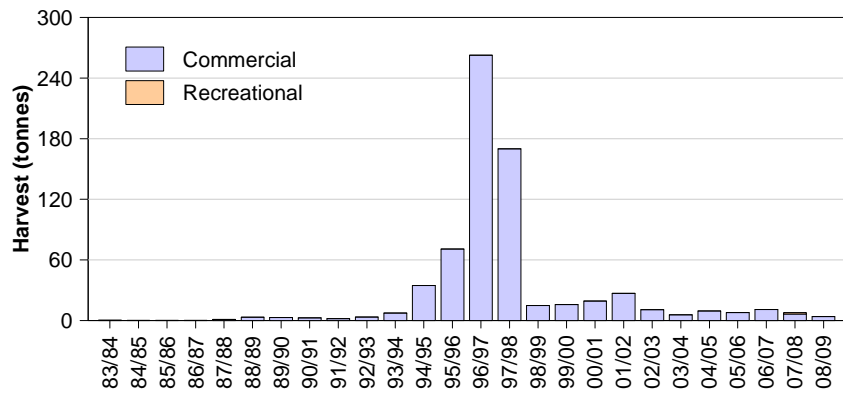


Figure 3.43 Total State-wide commercial catch of cuttlefish. No estimates of recreational catch available for 1994/95 or 2000/01.

Table 3.25 Comparisons between performance indicators and limit reference points for cuttlefish.

Performance Indicator	Limit Reference Point	Breached?	Details
A. Total commercial catch	3 rd lowest/3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	

4.0 Discussion

In this report, the annual State-wide fishery statistics were presented for the 26-year period of 1983/84 to 2008/09 for 21 different taxa taken in the South Australian Marine Scalefish fishery. The data from the commercial sector for 2008/09 were then compared against limit reference points calculated from the data for this 26-year time period, or appropriate shorter reference periods, depending on the species. There were some obvious trends in the fishery statistics for some species as well as numerous breaches of limit reference points identified.

For three of the four Primary species there were several breaches of limit reference points. For King George whiting, commercial catch has declined over numerous years reflecting declines in fishing effort, whilst catch rates have continued to increase to their highest ever recorded levels (Fowler et al. 2008). For snapper, catches have increased since 2003/04, now surpassing the record levels of the early 2000s. They reflect recent substantial increases in longline effort as well as increases in longline and handline CPUE (Fowler et al. 2007). For southern calamary, the catch, effort and CPUE declined in 2008/09 to more typical levels after the record catch and catch rates of 2004/05. In 2008/09, the 3rd lowest catch of southern garfish for the 26-year period was taken, reflecting substantial declines in both haul net and dab net effort and recent erratic catch rates, particularly for haul nets (McGarvey et al. 2009).

Some of the Secondary species, such as yellowfin whiting, Australian salmon, Australian herring, snook and yelloweye mullet are important for the haul net sector. Of these, yellowfin whiting, Australian herring and yelloweye mullet showed accelerated trends of decreasing catch and effort since the net sector restructure in 2005/06. Some, however, do show recent increases in CPUE in the past year or two. Other Secondary taxa for which CPUE has increased in 2008/09 include the sand crabs and whaler sharks. Alternatively, mud cockles demonstrated significant declines in commercial catch, effort and CPUE in 2008/09.

There were no breaches of limit reference points for any of the seven Tertiary taxa. Several of these experienced reductions in commercial catch that might be associated with the net sector restructure of 2005/06, including the western striped grunter, and rays and skates.

5.0 References

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