

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

Report to PIRSA

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16 November 2006

**SARDI Publication Number RD 05/0025-2
SARDI Research Report Series Number 178**

This publication may be cited as:

Steer MA, McGarvey R, Feenstra JE, Fowler AJ (2006). South Australian Marine Scalefish Fishery – Stock Status Report. Report to PIRSA. South Australian Research and Development Institute (Aquatic Sciences), Adelaide, RD 05/0025–2.

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Printed in Adelaide 16 November 2006

SARDI Aquatic Science Publication No. RD 05/0025–2

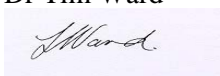
SARDI Research Report Series No. 178

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Date: 16 November 2006

Distribution : PIRSA Fisheries, Marine Scalefish Fishery Management Committee,
SARDI Aquatic Sciences library

Circulation: Public Domain

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Acknowledgements

We gratefully acknowledge Angelo Tsolos of the Fisheries Statistics Unit at SARDI (Aquatic Sciences) for providing catch and effort data from the GARFIS database. This report was reviewed by Dr Tim Ward and Dr Stephen Mayfield and formally released by Dr Tim Ward.

1.0 Introduction

This is the second annual stock status report produced for the Marine Scalefish Fishery of South Australia. The report summarises the status of the stocks of numerous species harvested in this fishery and is produced to provide timely information to contribute to planning research from 2007/08 onwards. The data presented were extracted from the commercial Marine Scalefish catch and effort database, which is based on the logbooks of the fishers. In addition, estimates of recreational catch from two State-wide surveys are also presented. Data were aggregated across the State, and no regional information is presented.

A total of 21 species, divided into three different categories, are considered in this report (Table 1.1). The categories are Primary, Secondary and Tertiary species, as identified in the Management Plan for the Marine Scalefish Fishery (Noell et al. 2005). The tertiary species included here were those whose average total catch over the past three years was >5 tonnes per year.

The level of data processing and reporting differed among the three categories. For the Primary species of King George whiting, snapper, calamary and garfish three performance indicators of total catch, targeted effort and targeted CPUE and the catch and summarised. Catch and effort data for rock lobster fishers was presented separately in response to a specific request made by the Marine Scalefish Fishery Management Committee. For the Secondary species, only total catch, targeted effort and targeted CPUE were reported. For the Tertiary species, the only performance indicator was total annual catch. In all cases the presentation of data was limited by the constraints of confidentiality, i.e. data was only presented when data from five or more fishers were included.

For each species, data are presented for the general performance indicators of total catch, targeted effort and targeted CPUE, for the reference period of 1983/84 to 2005/06. The selected time series for targeted effort and CPUE were gear-specific by species, and concentrated on those gear types that were considered most informative. These gear types were the same as those considered in the first Stock Status Report (Fowler 2005), and are identified in Table 1.1. Furthermore, estimates of performance indicators for 2005/06 were compared against limit reference points calculated for the 23-year reference period. The limit reference points that were calculated for each fishery performance indicator were:

- the 3rd highest and 3rd lowest values over the reference period;
- 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).

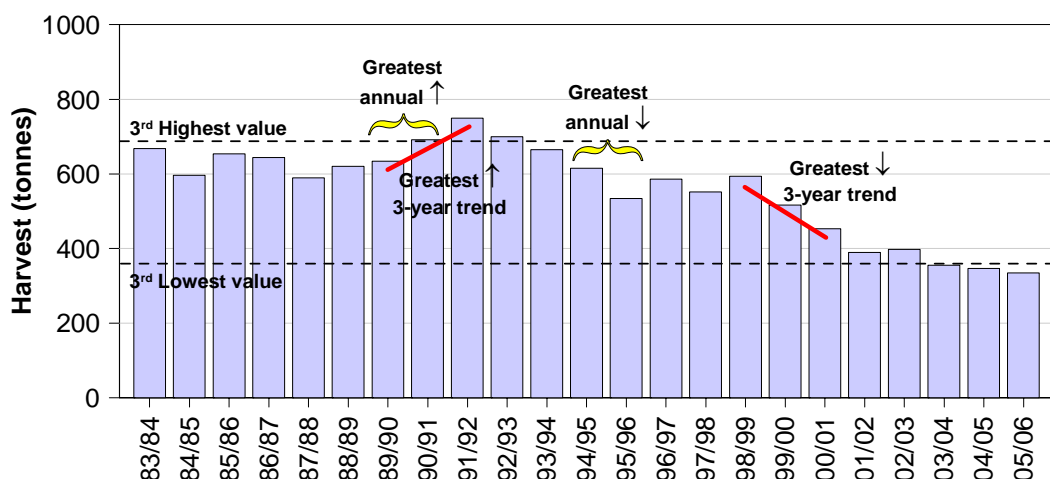


Figure 1.1. A schematic illustration of the prescribed limit reference points indicating the 3rd highest and 3rd lowest values over the 23-year reference period, the greatest inter-annual variation (+ and -) and the greatest rates of change (trend) over a three year period (+ and -).

Table 1.1. List of MSF species considered in this report. The table shows their categories according to the Management Plan (Noell et al. 2005), which determines the level of reporting and processing that was undertaken. Gear types for which annual targeted effort and CPUE were reported for each species are identified.

Category	Species/taxon	Targeted catch and effort categories
Primary	King George whiting Snapper Garfish Calamary	handline handline, longline haulnet, dabnet haulnet, jig
Secondary	Yellowfin whiting Australian salmon Australian herring Mud cockles Snook Sand crabs Yellow-eye mullet Mulloway Bronze and dusky whalers Ocean jackets	total target, haulnet haulnet, salmon net total target, haulnet total target haulnet, troll line total target, crab net total target, haulnet handline, fishing pole longline, shark net total target
Tertiary	Parrotfish Striped perch Trevally Leatherjacket Gummy shark Rays and skates Cuttlefish	n.a. n.a. n.a. n.a. n.a. n.a. n.a.

2.0 Methods

The catch and effort data were extracted from SARDI Aquatic Sciences' commercial fishery database, which is based on the fishers' logbook records. Two estimates of annual recreational catch were also reported, one from the recreational boat ramp creel survey that was done between 1994-96 (McGlennon and Kinloch 1997) and the second from the National Recreational and Indigenous Fishing Survey (Henry and Lyle 2003). Only the data from the commercial sector were used in the comparisons of fishery performance indicators and limit reference points.

For each species the annual totals of commercial catch, targeted effort and targeted CPUE were calculated. The limit reference points were derived from this performance indicator time series. Least squares regression analysis was used to calculate the greatest rate of change over the three or five year period. The estimates for 2005/06 were compared with the limit reference points determined for the whole time series.

Quality Assurance

- Commercial catch and effort data were crosschecked by a number of validation processes by the SARDI Fisheries Statistics Unit prior to delivery. These processes included:
 1. random cross checking of raw data transferred from commercial catch return forms;
 2. random cross checking of entered data by trained personnel;
 3. automated filters and structured queries built into the fisheries statistics database.
- Extracted commercial catch and effort data were graphed into their necessary species/gear/time categories and crosschecked with the time-series presented in last year's stock status report (Fowler 2005).
- Regular meetings of the authors were held to discuss data handling and interpretation.
- Calculation of the prescribed limit reference points was undertaken using the computer-programming package (S+). Outputs were printed for each species/category and the calculations crosschecked by hand and visual inspection against constructed graphs (e.g. Fig. 1.1).
- Tabulated results included in the report were further crosschecked against the computer output and by the authors before submission of the report into SARDI's formal review process.

3.0 Results

Of the 21 species or species groups considered in this report 18 were unaffected by confidentiality constraints relating to State-wide commercial catch. Of the 14 species or species groups that required gear specific comparisons, seven had complete datasets including the four primary species as well as Yellowfin whiting, Australian herring and Yellow-eye mullet.

There were large differences amongst the primary species with respect to the number of limit reference points breached. Southern calamary had the highest number and broadest range of breached limit reference points. These breaches were strongly influenced by record catches in the 2004/05 financial year. For the snapper fishery all three limit reference points relating to targeted longline CPUE were breached, relating to the rapid increase in both catch and catch rates within this sector over the past three years. Five breaches were also evident in the rock lobster fisher component of the snapper fishery and related specifically to reductions in total catch, handline CPUE and longline CPUE. Two breaches were evident in the King George whiting fishery, indicating that the State-wide catch in 2005/06 was lowest on record whilst the targeted handline CPUE was the second highest. Targeted haul net CPUE in the garfish fishery was the second highest on record and the only limit reference point breached for this species. The rock lobster licence holders recorded the lowest catch of garfish on record in 2005/06.

Of the secondary species, bronze and dusky whalers had the most breaches, with decreases in total commercial catch and targeted shark net CPUE and increases in targeted long line effort. Australian herring and mud cockles each breached four limit reference points. Three of the Australian herring breaches related to increases in targeted CPUE and targeted haul net CPUE and one identified 2005/06 commercial catch as the lowest on record. The four breaches in the mud cockle fishery identified significant increases in total commercial catch and targeted effort in 2005/06. Snook and ocean jackets each breached three limit reference points. Snook had low commercial catch and targeted CPUE in the troll line sector and high targeted CPUE in the haul net sector and ocean jackets had low catch and a decrease in targeted CPUE. Yellow-eye mullet breached two limited reference points; low commercial catch and high targeted CPUE. Australian salmon, mulloway and sand crabs each recorded one breach, whereas Yellowfin whiting remained within the reference limits

Parrotfish, striped perch, leather jackets and gummy sharks were the only tertiary species that breached the prescribed limit reference points.

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

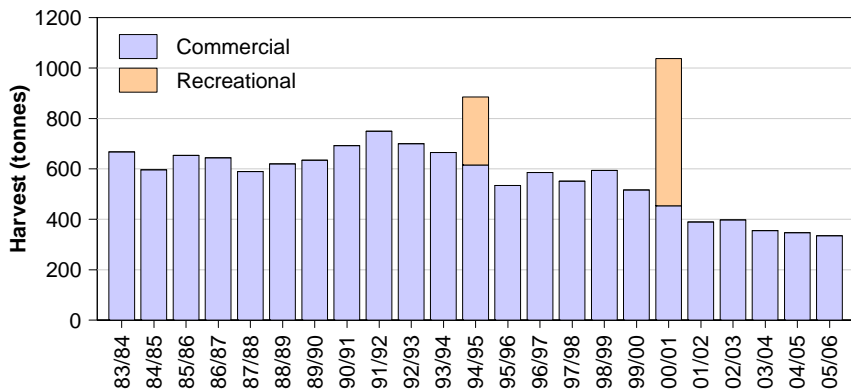


Figure 3.1 Total State-wide commercial and recreational catches of King George whiting.

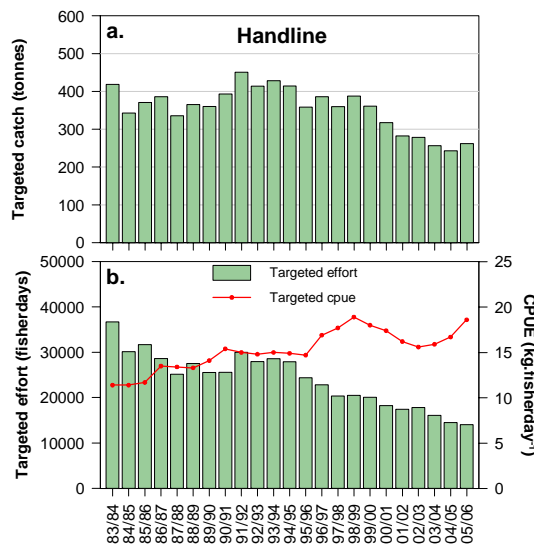


Figure 3.2 (a) Targeted handline catch of King George whiting; (b) Targeted handline effort and CPUE.

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	lowest
	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	2 nd highest
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	

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

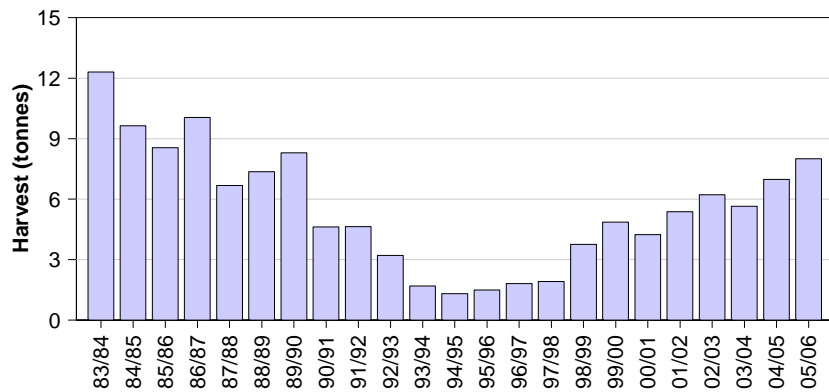


Figure 3.3 Total catch of King George whiting by rock lobster fishers.

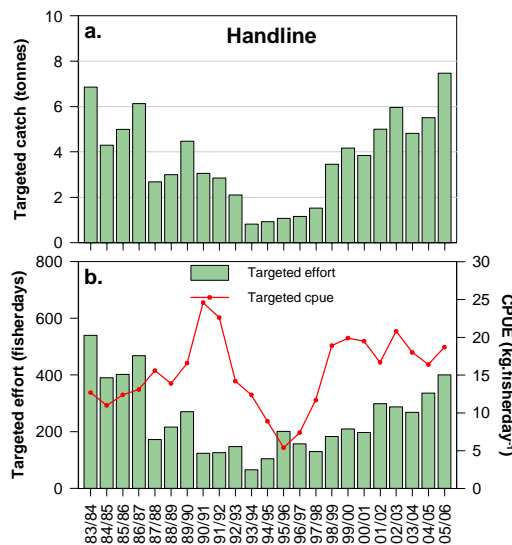


Figure 3.4 (a) Targeted handline catch of King George whiting by rock lobster fishers; (b) Targeted handline effort and CPUE.

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 (±)	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	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	

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

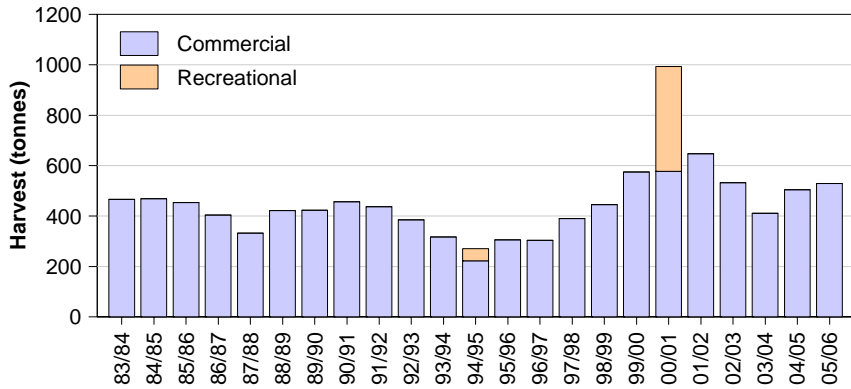


Figure 3.5 Total State-wide commercial and recreational catches of snapper.

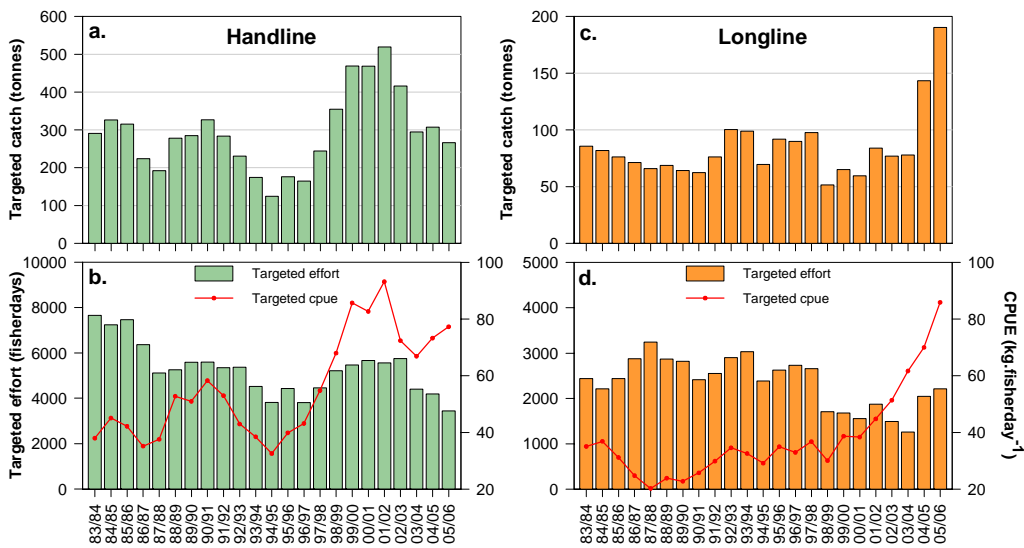


Figure 3.6 (a) Targeted handline catch of snapper; (b) Targeted handline effort and CPUE; (c) Targeted longline catch; (d) Targeted longline effort and CPUE.

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	No	
	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	No	
	Greatest interannual change (±)	No	
	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	highest
	Greatest interannual change (±)	Yes	↑ 22.7%
	Greatest 5-year trend (±)	Yes	↑ 10.1 kg.fday ⁻¹ .yr ⁻¹

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

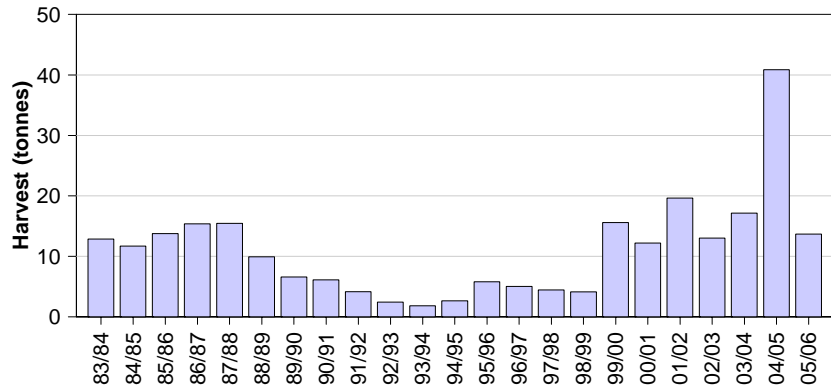


Figure 3.7 Total catch of snapper by rock lobster fishers.

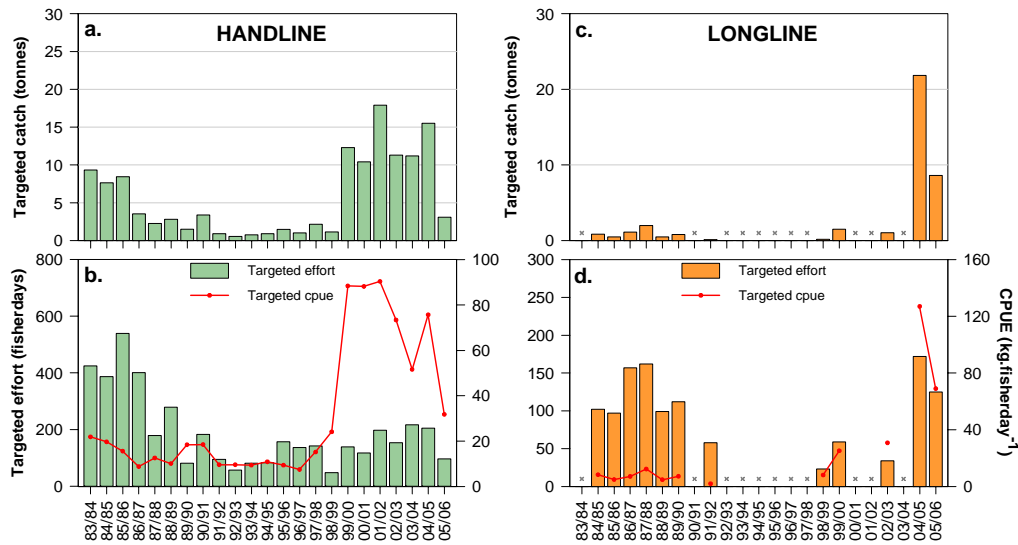


Figure 3.8 (a) Targeted handline catch of snapper by rock lobster fishers; (b) Targeted handline effort and CPUE; (c) Targeted longline catch; (d) Targeted longline effort and CPUE. Grey crosses indicate confidential data (<5 fishers).

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	No	
	Greatest interannual change (±)	Yes	↓ 66.5%
	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	No	
	Greatest interannual change (±)	No	
	Greatest 5-year trend (±)	No	
C1. Targeted handline CPUE	3 rd lowest/3 rd highest	No	
	Greatest interannual change (±)	Yes	↓ 58.0%
	Greatest 5-year trend (±)	Yes	↓ 11.5 kg.fday ⁻¹ .yr ⁻¹
C2. Targeted longline CPUE	3 rd lowest/3 rd highest	Yes	2 nd highest
	Greatest interannual change (±)	Yes	↓ 45.7%
	Greatest 5-year trend (±)	No	

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

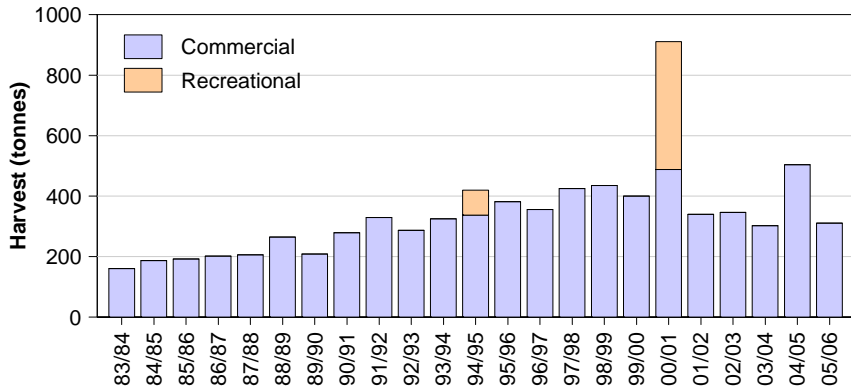


Figure 3.9 Total State-wide commercial and recreational catches of southern calamary.

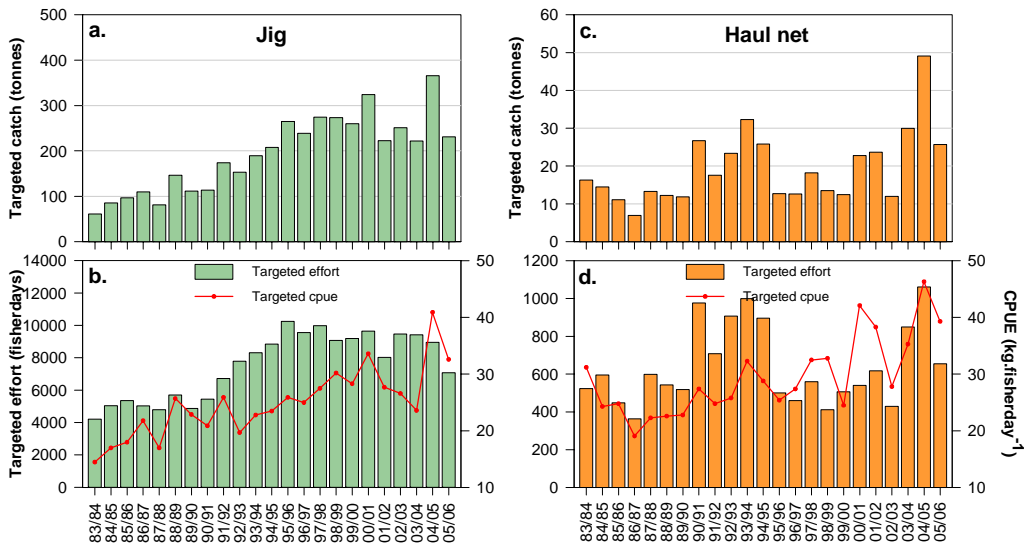


Figure 3.10 (a) Targeted jig catch of southern calamary; (b) Targeted jig effort and CPUE; (c) Targeted haul net catch; (d) Targeted haul net effort and CPUE.

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 (±)	Yes	↓ 38.3%
	Greatest 3-year trend (±)	No	
B1. Targeted jig effort	3 rd highest	No	
	Greatest interannual change (±)	Yes	↓ 21.0%
	Greatest 3-year trend (±)	Yes	↓ 1169.5 fdays.yr ⁻¹
B2. Targeted haul net effort	3 rd highest	No	
	Greatest interannual change (±)	Yes	↓ 38.4%
	Greatest 3-year trend (±)	No	
C1. Targeted jig CPUE	3 rd lowest/3 rd highest	Yes	3 rd highest
	Greatest interannual change (±)	Yes	↓ 20.1%
	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	

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

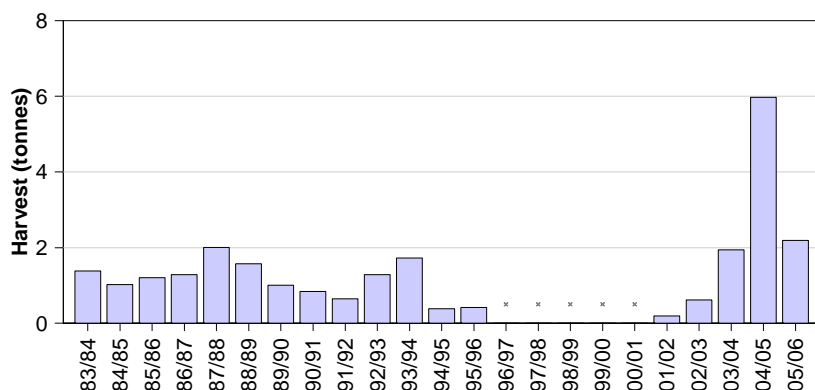


Figure 3.11 Total catch of southern calamary by rock lobster fishers. Grey crosses indicate confidential data (<5 fishers).

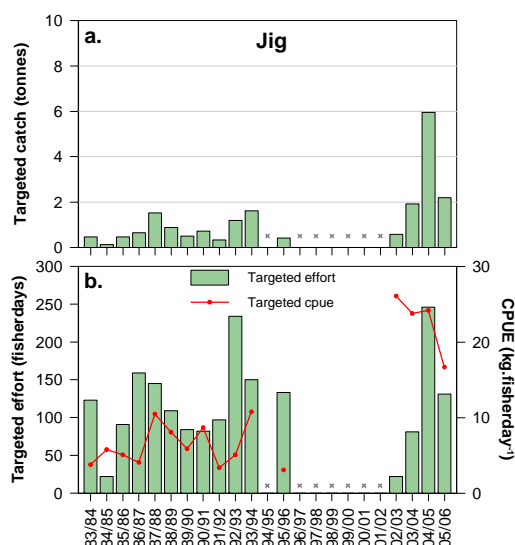


Figure 3.12 (a) Targeted jig catch of southern calamary by rock lobster fishers; (b) Targeted jig effort and CPUE. Grey crosses indicate confidential data (<5 fishers).

Table 3.6 Comparisons between performance indicators and limit reference points for southern calamary by rock lobster fishers. * Cannot be analysed due to zero effort data.

Performance Indicator	Limit Reference Point	Breached?	Details
A. Total commercial catch	3 rd lowest/3 rd highest	No	
	Greatest interannual change (±)	Yes	↓ 63.3%
	Greatest 3-year trend (±)	No	
B1. Targeted jig effort	3 rd highest	No	
	Greatest interannual change (±)	Yes	↓ 46.8%
	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	*	
	Greatest interannual change (±)	*	
	Greatest 3-year trend (±)	*	

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

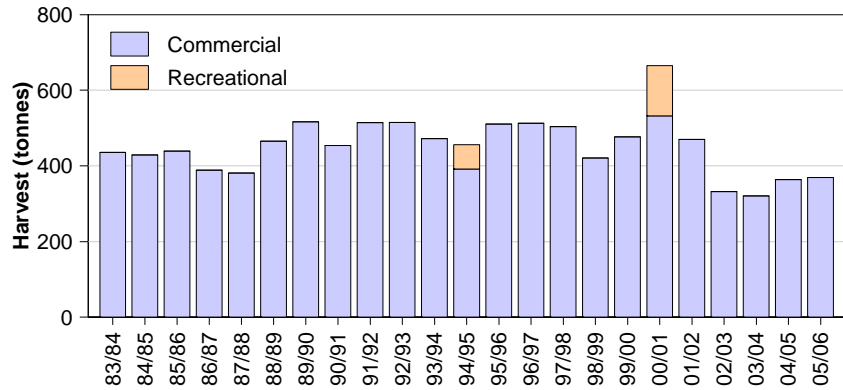


Figure 3.13 Total State-wide commercial and recreational catches of garfish.

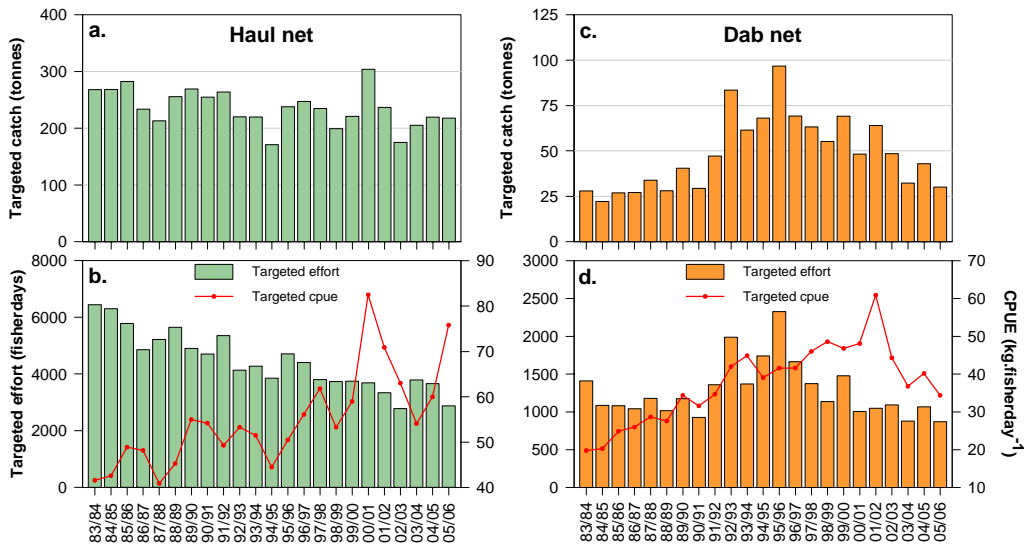


Figure 3.14 (a) Targeted haul net catch of garfish; (b) Targeted haul net effort and CPUE; (c) Targeted dab net catch; (d) Targeted dab net effort and CPUE.

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	No	
	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 Garfish (*Hyporhamphus melanochir*) – rock lobster fishers

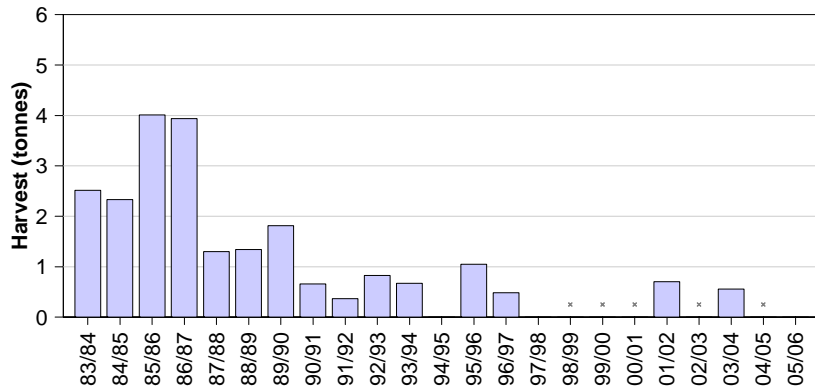


Figure 3.15 Total catch of garfish by rock lobster fishers. Grey crosses indicate confidential data (<5 fishers).

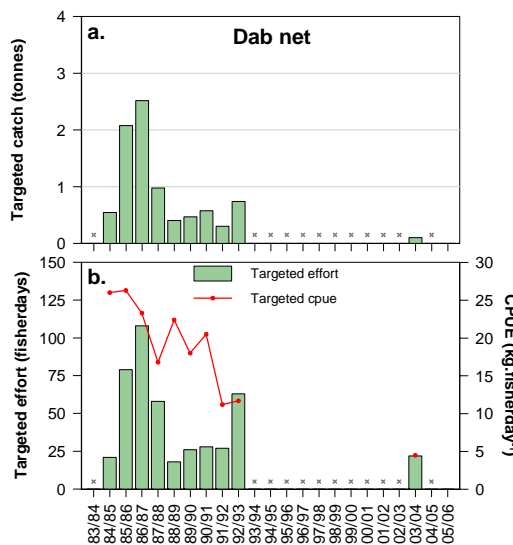


Figure 3.16 (a) Targeted dab net catch of garfish by rock lobster fishers; (b) Targeted dab net effort and CPUE. Grey crosses indicate confidential data (<5 fishers).

Table 3.8 Comparisons between performance indicators and limit reference points for garfish by rock lobster fishers. * Cannot be analysed due to zero effort data.

Performance Indicator	Limit Reference Point	Breached?	Details
A. Total commercial catch	3 rd lowest/3 rd highest	Yes	lowest
	Greatest interannual change (±)	Yes	↓ 98.8%
	Greatest 3-year trend (±)	No	
B1. Targeted dab net effort	3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
C1. Targeted dab net CPUE	3 rd lowest/3 rd highest	*	
	Greatest interannual change (±)	*	
	Greatest 3-year trend (±)	*	

3.5 Yellowfin whiting (*Sillago schomburgkii*)

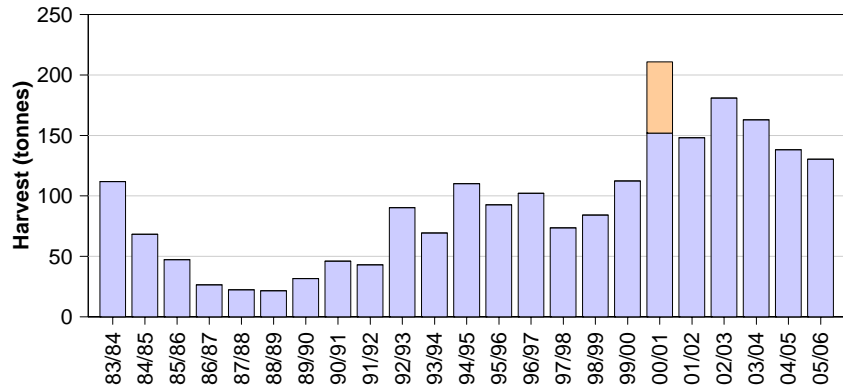


Figure 3.17 Total State-wide commercial and recreational catches of Yellowfin whiting.

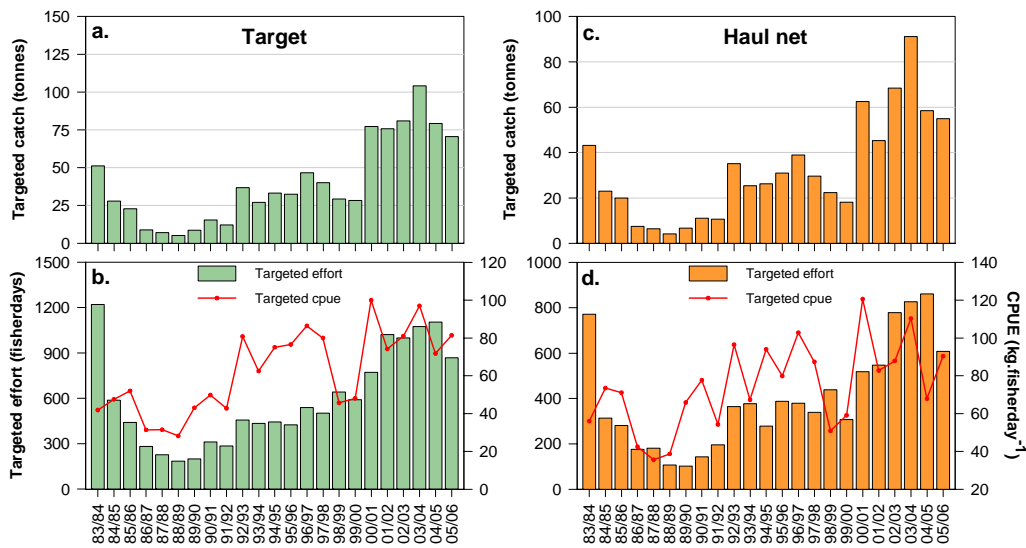


Figure 3.18. (a) Total targeted catch of Yellowfin whiting; (b) Total targeted effort and CPUE; (c) Targeted haul net catch; (d) Targeted haul net effort and CPUE.

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*)

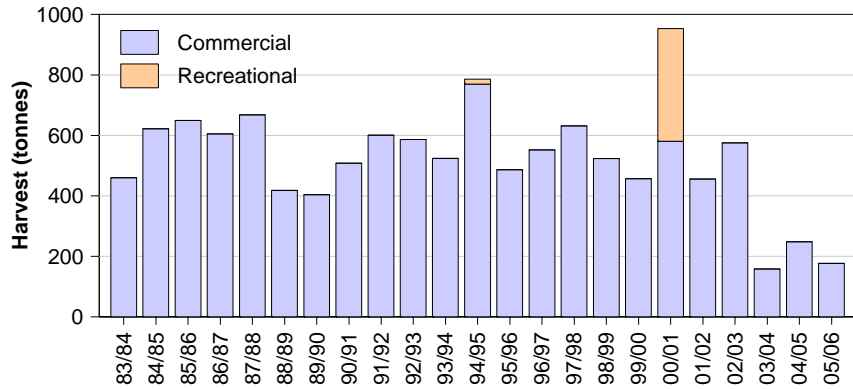


Figure 3.19 Total State-wide commercial and recreational catches of Australian salmon.

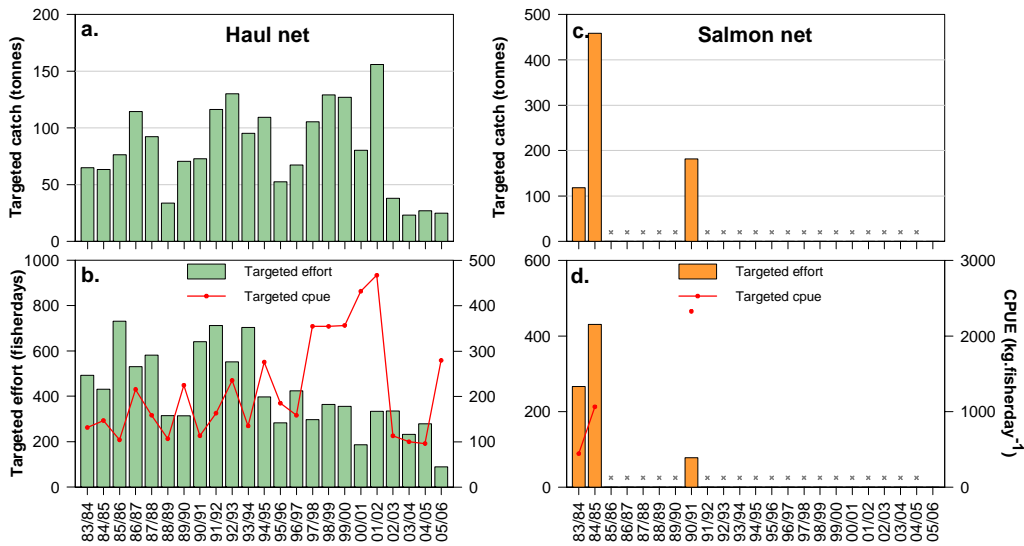


Figure 3.20 (a) Targeted haul net catch of Australian salmon; (b) Targeted haul net effort and CPUE; (c) Targeted salmon net catch; (d) Targeted salmon net effort and CPUE. Grey crosses indicate confidential data (<5 fishers).

Table 3.10 Comparisons between performance indicators and limit reference points for Australian salmon. * Cannot be analysed due to zero effort data.

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 haul net effort	3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
B2. Targeted salmon 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	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
C2. Targeted salmon net CPUE	3 rd lowest/3 rd highest	*	
	Greatest interannual change (±)	*	
	Greatest 3-year trend (±)	*	

3.7. Australian herring (*Arripis georgianus*)

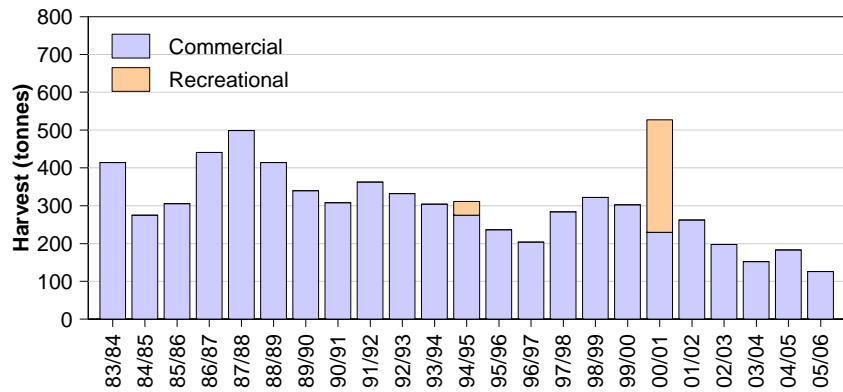


Figure 3.21 Total State-wide commercial and recreational catches of Australian herring.

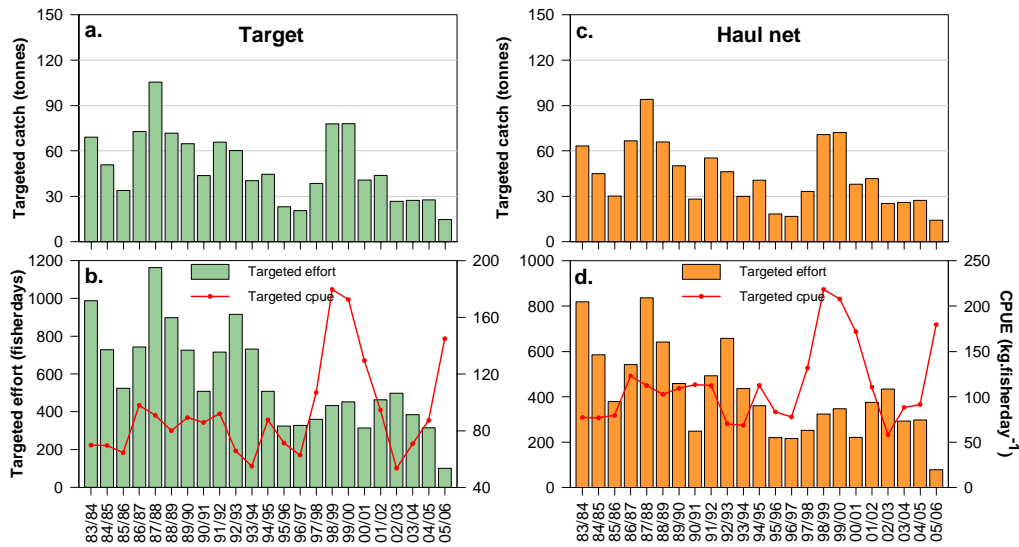


Figure 3.22 (a) Total targeted catch of Australian herring; (b) Total targeted effort and CPUE; (c) Targeted haul net catch; (d) Targeted haul net effort and CPUE.

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	Yes	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	
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	Yes	3 rd highest
	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 (±)	Yes	↑ 96.3%
	Greatest 3-year trend (±)	No	

3.8. Mud cockles (*Katelysia* spp.)

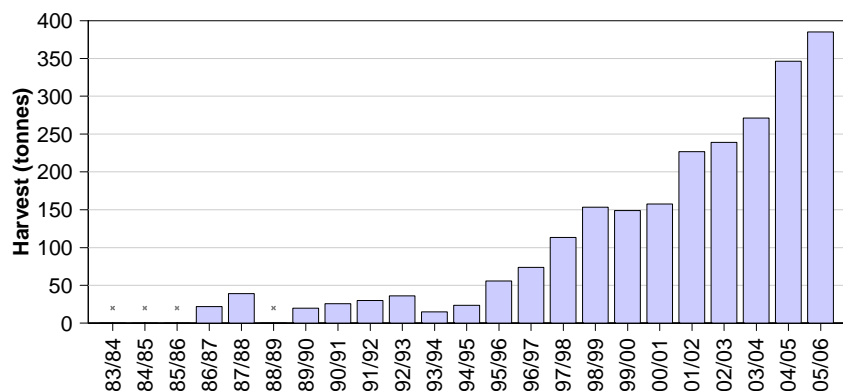


Figure 3.23 Total State-wide commercial catch of mud cockles. Grey crosses indicate confidential data (<5 fishers).

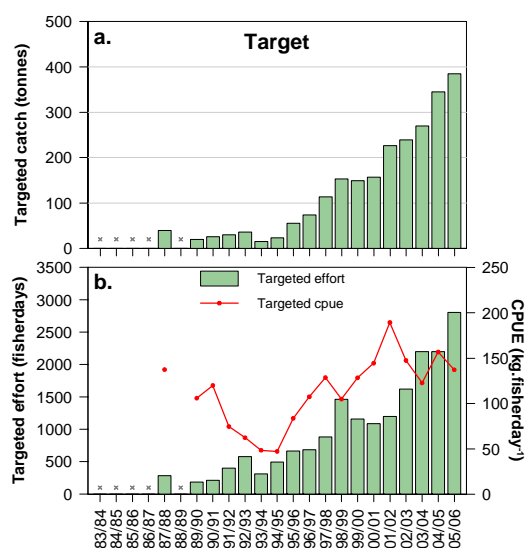


Figure 3.24 (a) Total Targeted catch of mud cockles; (b) Total targeted effort and CPUE. Grey crosses indicate confidential data (<5 fishers).

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	Yes	highest
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	Yes	↑ 56.9 t.yr ⁻¹
B1. Targeted effort	3 rd highest	Yes	highest
	Greatest interannual change (±)	Yes	↑ 27.5 fdays.yr ⁻¹
	Greatest 3-year trend (±)	No	
C1. Targeted CPUE	3 rd lowest/3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	

3.9 Snook (*Sphyraena novaehollandiae*)

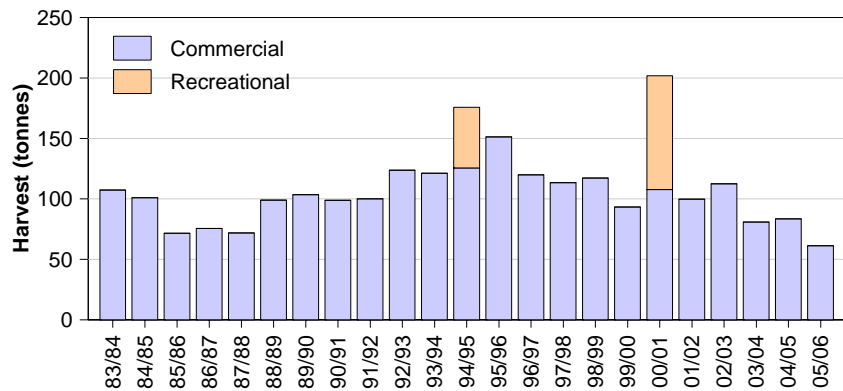


Figure 3.25 Total State-wide commercial and recreational catches of snook.

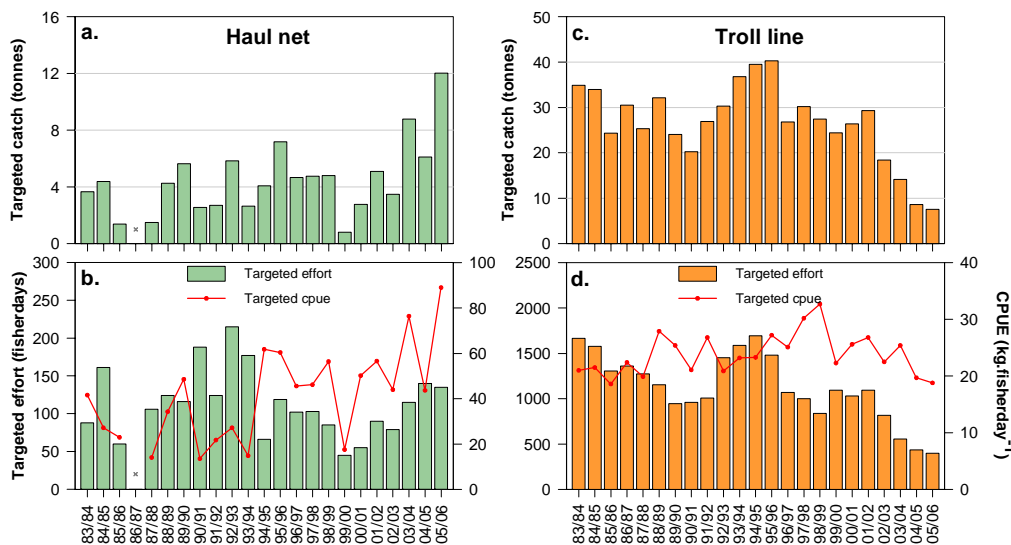


Figure 3.26 (a) Targeted haul net catch of snook; (b) Targeted effort and CPUE; (c) Targeted troll line catch; (d) Targeted haul net effort and CPUE.

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	lowest
	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	Yes	highest
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
C2. Targeted troll line CPUE	3 rd lowest/3 rd highest	Yes	2 nd lowest
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	

3.10 Sand crabs (*Ovalipes australiensis*)

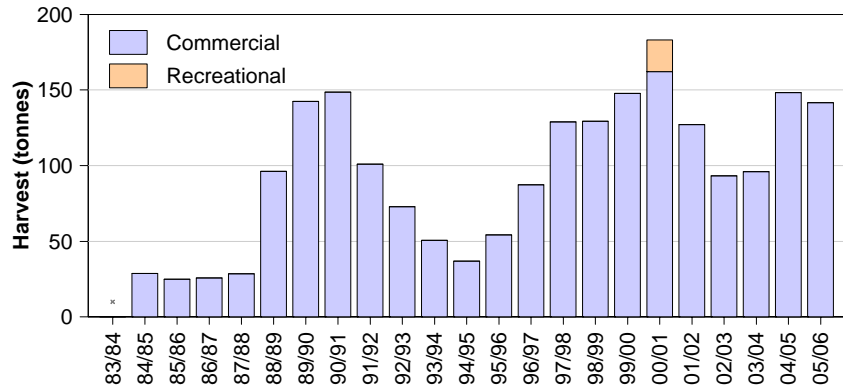


Figure 3.27 Total State-wide commercial and recreational catches of sand crabs. Grey cross indicates confidential data (<5 fishers).

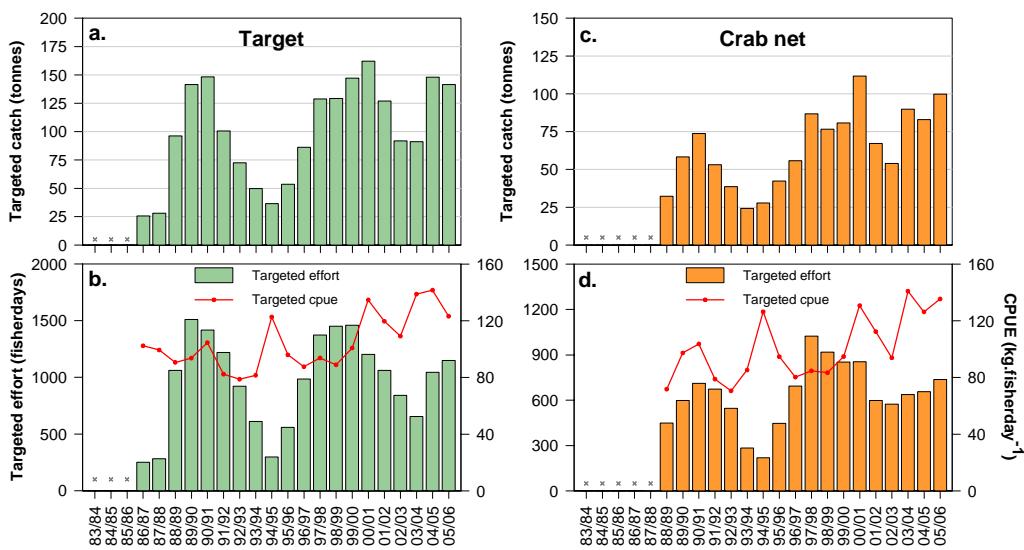


Figure 3.28 (a) Total targeted catch of sand crabs; (b) Total targeted effort and CPUE; (c) Targeted crab net catch; (d) Targeted crab net effort and CPUE. Grey crosses indicate confidential data (<5 fishers).

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 (±)	No	
	Greatest 3-year trend (±)	No	
C2. Targeted crab net CPUE	3 rd lowest/3 rd highest	Yes	2 nd highest
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	

3.11 Yellow-eye mullet (*Aldrichetta forsteri*)

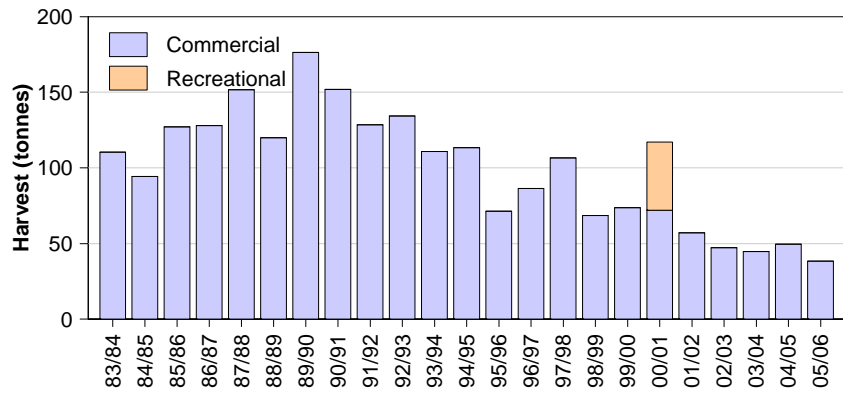


Figure 3.29 Total State-wide commercial and recreational catches of Yellow-eye mullet.

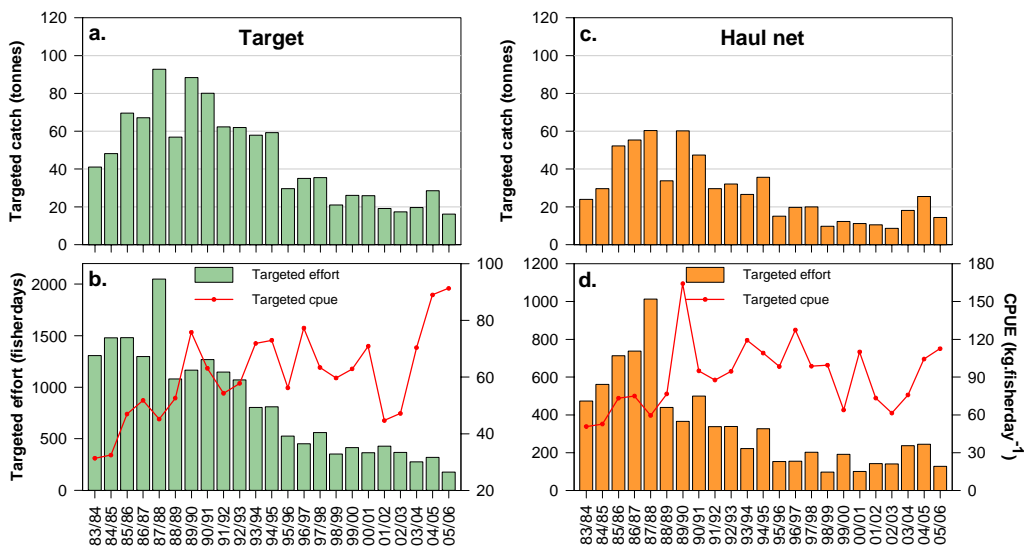


Figure 3.30 (a) Total targeted catch of Yellow-eye mullet; (b) Total targeted effort and CPUE; (c) Targeted haul net catch; (d) Targeted haul net effort and CPUE.

Table 3.15 Comparisons between performance indicators and limit reference points for Yellow-eye mullet.

Performance Indicator	Limit Reference Point	Breached?	Details
A. Total commercial catch	3 rd lowest/3 rd highest	Yes	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	
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	Yes	highest
	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	

3.12 Mulloway (*Argyrosomus japonicus*)

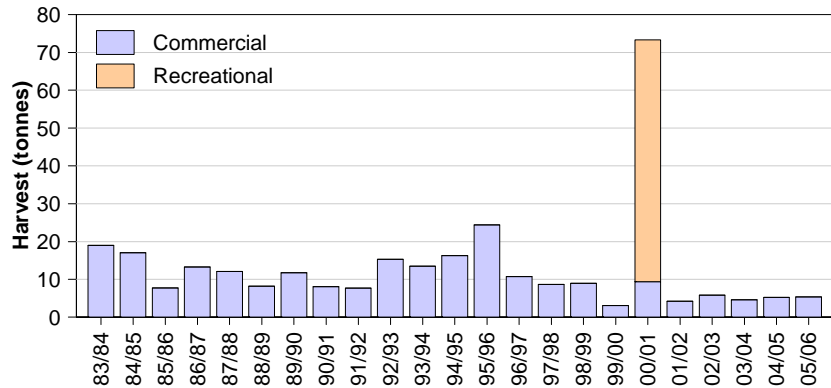


Figure 3.31 Total State-wide commercial and recreational catches of mulloway.

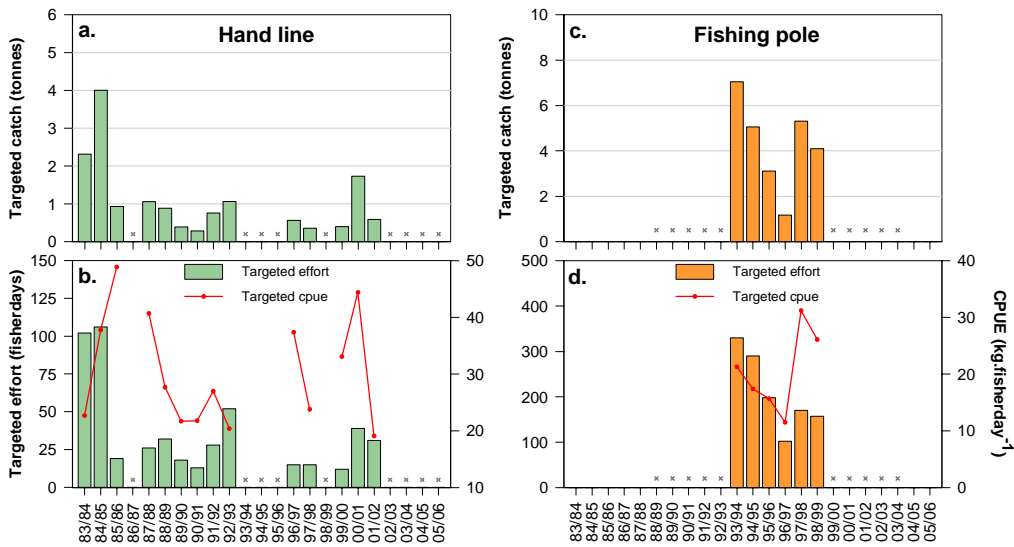


Figure 3.32 (a) Targeted handline catch of mulloway; (b) Targeted handline effort and CPUE; (c) Targeted fishing pole catch; (d) Targeted fishing pole effort and CPUE. Grey crosses indicate confidential data (<5 fishers).

Table 3.16. Comparisons between performance indicators and limit reference points for mulloway. * Cannot be analysed due to zero effort data.

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 handline effort	3 rd highest	No	
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
B2. Targeted fishing pole 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	3 rd lowest
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	
C2. Targeted fishing pole CPUE	3 rd lowest/3 rd highest	*	
	Greatest interannual change (±)	*	
	Greatest 3-year trend (±)	*	

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

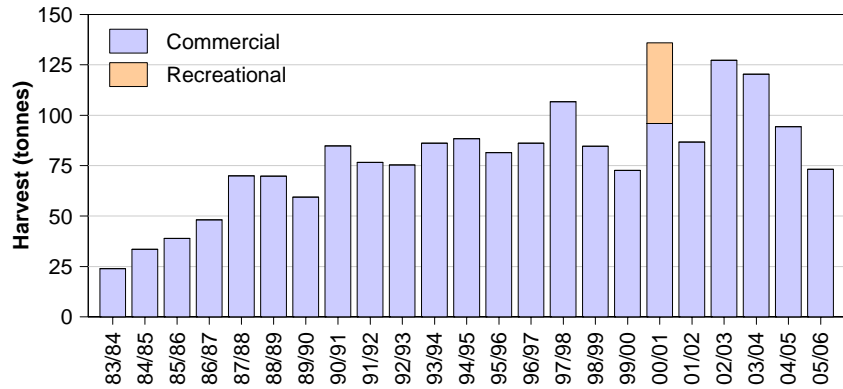


Figure 3.33 Total State-wide commercial and recreational catches of whaler sharks.

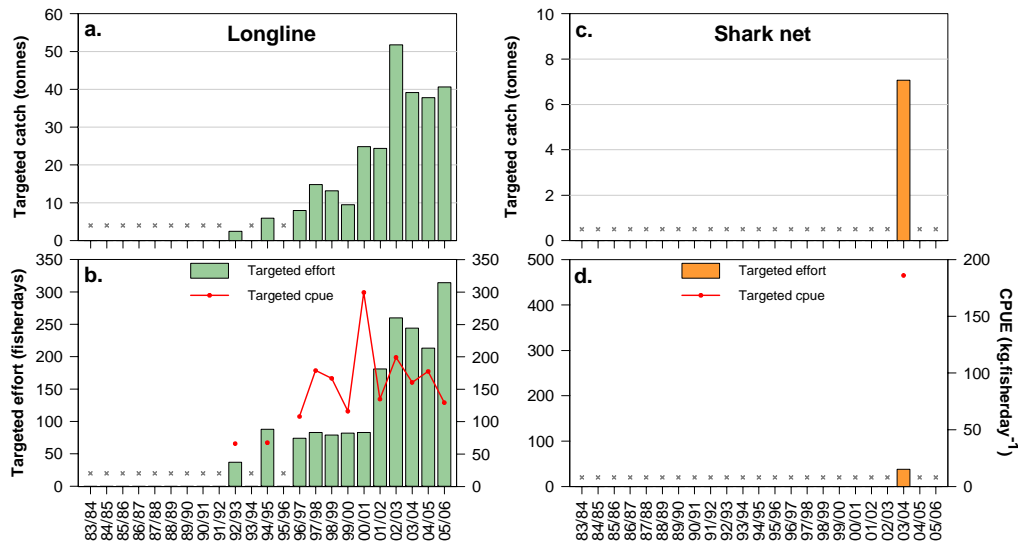


Figure 3.34 (a) Targeted longline catch of whaler sharks; (b) Targeted longline effort and CPUE; (c) Targeted shark net catch; (d) Targeted shark net effort and CPUE. Grey crosses indicate confidential data (<5 fishers).

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 (±)	Yes	↓ 23.6 t.yr ⁻¹
B1. Targeted longline effort	3 rd highest	Yes	highest
	Greatest interannual change (±)	Yes	↑ 47.4%
	Greatest 3-year trend (±)	No	
B2. Targeted shark net effort	3 rd highest	No	
	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	3 rd lowest
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	Yes	↓ 65.5 kg.fday ⁻¹ .yr ⁻¹

3.14 Ocean jackets (*Nelusetta ayraudi*)

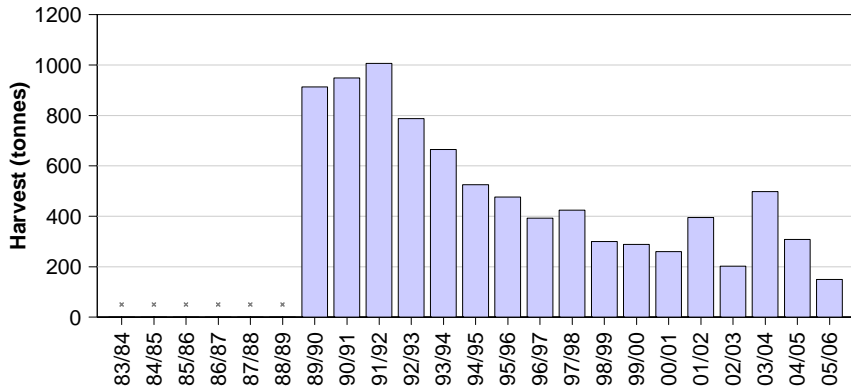


Figure 3.35 Total State-wide commercial catch of ocean jackets. Grey crosses indicate confidential data (<5 fishers).

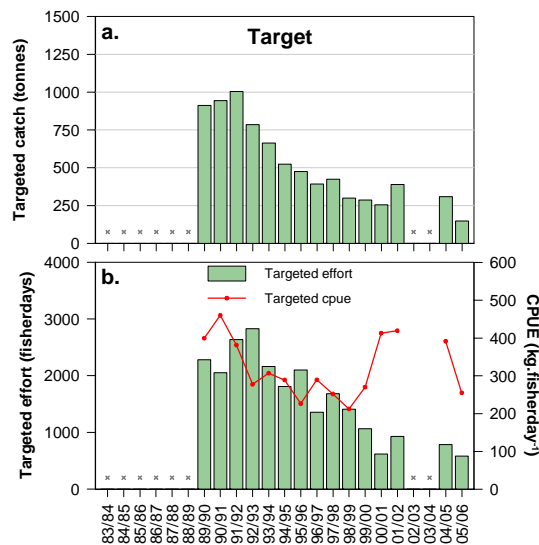


Figure 3.36 (a) Total targeted catch of ocean jackets; (b) Total targeted effort and CPUE. Grey crosses indicate confidential data (<5 fishers).

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 (±)	Yes	↓ 174.4 t.yr ⁻¹
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 (±)	Yes	↓ 123.3 kg.fday ⁻¹

3.15 Parrot fish (*Notolabrus* spp.)

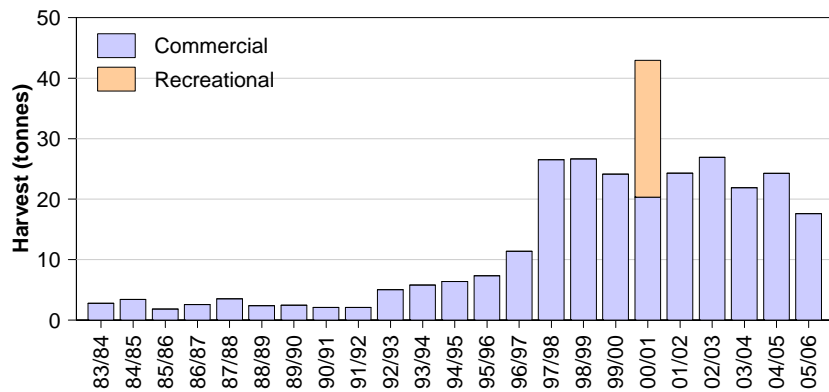


Figure 3.37 Total State-wide commercial and recreational catches of parrot fish.

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 (±)	Yes	↓ 27.6%
	Greatest 3-year trend (±)	No	

3.16 Striped perch (*Pelates octolineatus*)

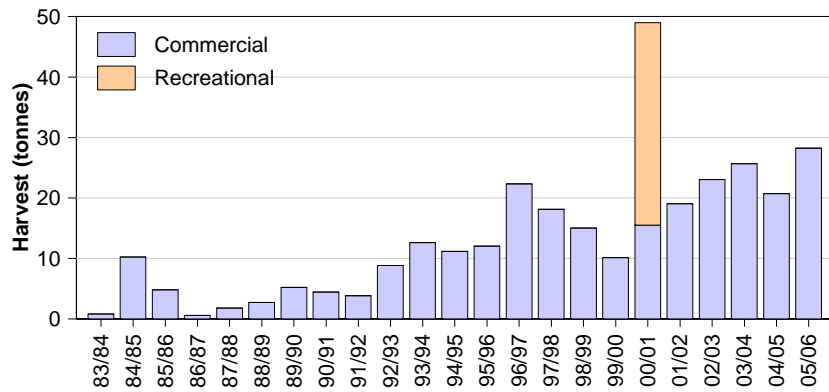


Figure 3.38 Total State-wide commercial and recreational catches of striped perch.

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

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

3.17 Trevally (*Usacaranx georgianus*)

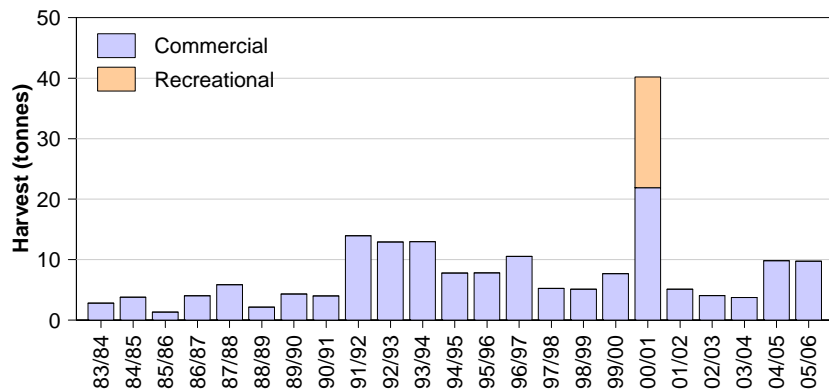


Figure 3.39 Total State-wide commercial and recreational catches of trevally.

Table 3.21 Comparisons between performance indicators and limit reference points for 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 Aluteridae)

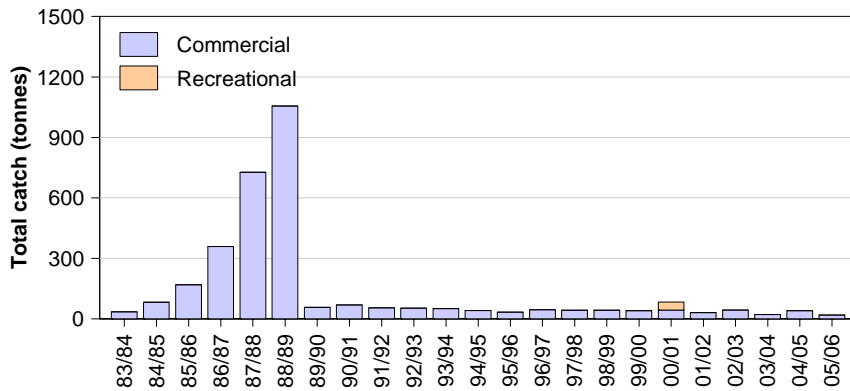


Figure 3.40 Total State-wide commercial and recreational catches of leatherjackets.

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	Yes	lowest
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	

3.19 Gummy sharks (Family Triakidae)

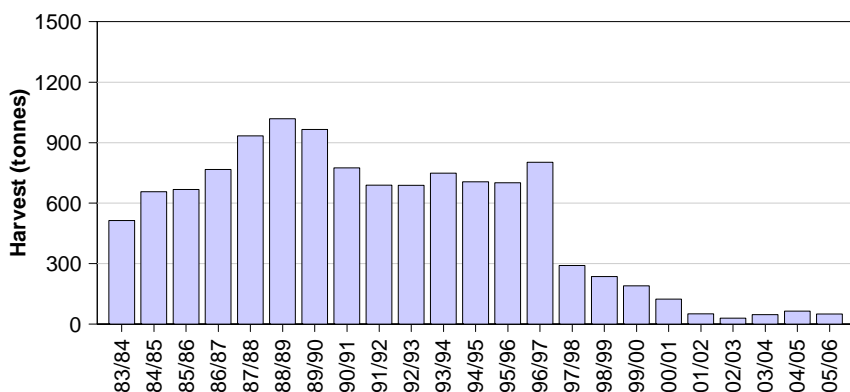


Figure 3.41 Total State-wide commercial catch of gummy sharks.

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	Yes	2 nd lowest
	Greatest interannual change (±)	No	
	Greatest 3-year trend (±)	No	

3.20 Rays and Skates (Class Elasmobranchii)

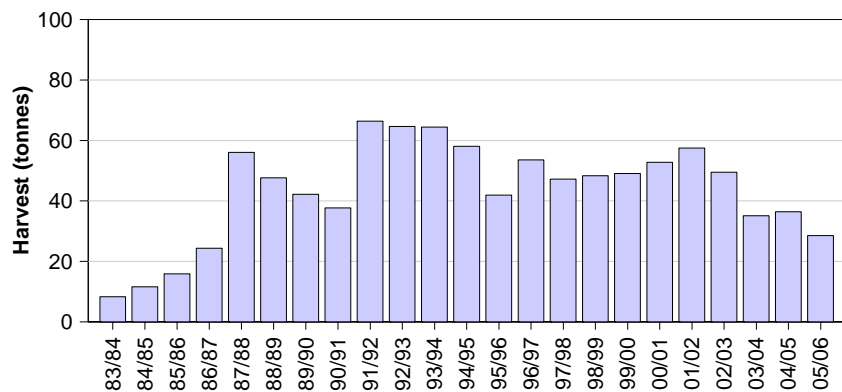


Figure 3.42 Total State-wide commercial catch of rays and skates.

Table 3.23 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*)

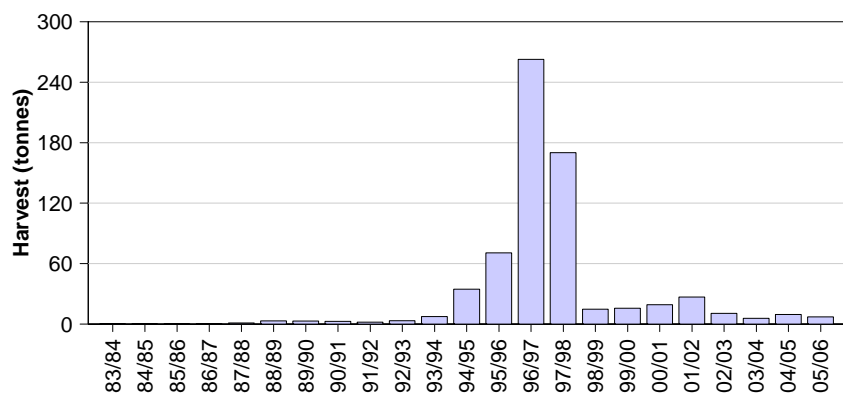


Figure 3.43 Total State-wide commercial catch of cuttlefish.

Table 3.24 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 (\pm)	No	
	Greatest 3-year trend (\pm)	No	

4.0 Discussion

Multi-species comparisons of the 2005/06 commercial catch and effort data against the prescribed limit reference points identified significant breaches for southern calamary, snapper, King George whiting, whaler sharks and mud cockles.

Southern calamary was the species for which the most limit reference points were breached. Frequent erratic breaches in this fishery are a result of the extreme inter-annual variation in catches and catch rates, which is typical for species with an extremely short lifespan (Steer et al 2006). The limit reference points breached in 2005/06 were largely influenced by the record catches and catch rates observed in both the jig and haul net sectors in 2004/05.

Breached limit reference points in the snapper fishery were associated with the recent substantial increases in catch rates by the longline sector. CPUE in this sector has escalated over the past six years with catch rates in 2005/06 the highest on record. This, however, was not reflected by data from rock lobster fishers whose catch rates by both longline and haul net gear types were significantly reduced in 2005/06.

State-wide commercial catch of King George whiting has declined to a record low in 2005/06. A full stock assessment is planned for this species in 2007/08 and will address whether this decline is a function of trends in commercial effort or related to changes in stock structure. Record low catches were also identified for three secondary species (Australian herring, Yellow-eye mullet and snook) and one tertiary species (Leatherjacket). Record high catches were identified for whaler sharks and mud cockles in association with significantly high levels of targeted effort.

5.0 References

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