

# The South Australian Lakes and Coorong Fishery

Fishery Stock Status Report for PIRSA



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## 1 INTRODUCTION

This is the fourth report on the status of seven species in the South Australian Lakes and Coorong Fishery, and builds on a summary report provided by Pierce and Doonan (1999) and stock status reports by Ferguson (2006a, b).

This report assesses the performance of the Lakes and Coorong Fishery against the performance indicators (PI's) prescribed in the Management Plan for the South Australian Lakes and Coorong Fishery (Sloan 2005). All data considered are fishery-dependent and, where available, estimates of recreational catch are included (Henry and Lyle 2003; Jones and Doonan 2005). Species considered are; black bream, golden perch, pipi (Goolwa cockle), greenback flounder, mulloway and yellow-eye mullet. Bony bream are also included at the request of PIRSA Fisheries, although there are no biological performance indicators prescribed for this species in the Management Plan (Anon, 2005; Sloan 2005).

Fisheries statistics for each species are presented by financial year for the 23-year period from 1984-85 to 2006-07. Estimates of total catch, targeted catch, targeted effort and targeted CPUE are presented for the dominant gear types. Finally, the status of the fishery is assessed based on comparison of the performance indicators with the reference points in the Management Plan (Sloan 2005).

Performance indicators and reference points (RP) were derived from catch and effort data for separate reference periods for finfish species (1984-85 to 2001-02) and pipi (1990-91 to 2000-01) (Sloan 2005). Upper and lower reference points for the catch and CPUE RP's were estimated highest and lowest values during the reference period. Upper and lower trend (rate-of-change) PI's for Catch and CPUE were estimated from highest and lowest slope of the linear relationships for 3 (pipi) or 4 year (finfish) periods within the reference period (Sloan 2005).

The final catch and effort returns from the Lakes and Coorong Fishery were submitted to SARDI – Aquatic Sciences on 21 November 2007.

## 2 FISHERY STATISTICS

### 2.1 Black bream (*Acanthopagrus butcheri*)

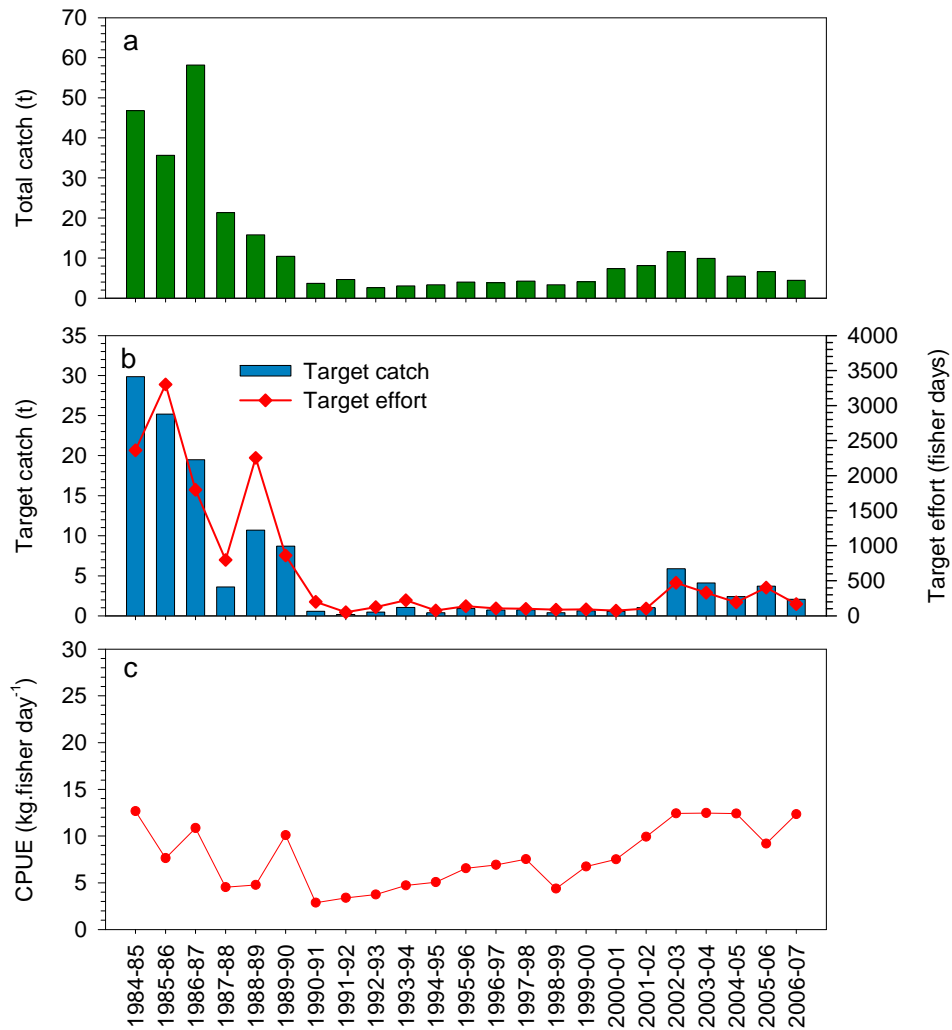


Figure 2-1. Inter-annual trends in catch and effort for black bream: (a) total catch; and for large mesh gill nets (b) target catch, target effort, and (c) CPUE.

Table 2-1. Performance indicators for black bream and current status levels for 2006-07 (yellow shading indicates biological performance indicator outside range of reference points).

Performance Indicator	Upper reference point	Lower reference point	2006-07	Within range of reference points
Total catch (t)	47	3	4.5	Y
CPUE (kg.fisher day <sup>-1</sup> )	12	3	12.3	N
4-year total catch trend (t.year <sup>-1</sup> )	+15	-15	-2.8	Y
4-year CPUE trend (kg.fisher day <sup>-1</sup> )	+4	-4	-0.1	Y

## 2.2 Golden perch (*Macquaria ambigua*)

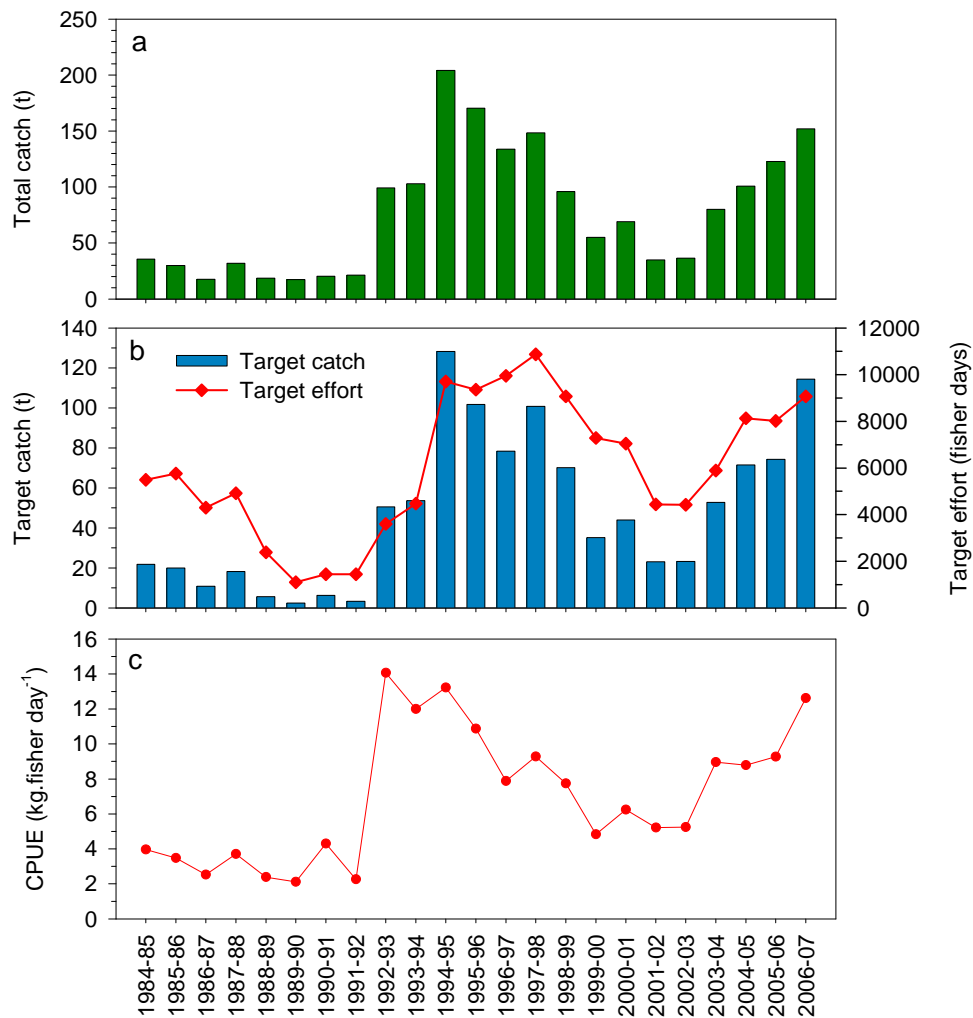


Figure 2-2. Inter-annual trends in catch and effort for golden perch showing: (a) total catch; and for large mesh gill nets (b) target catch, target effort, and (c) CPUE.

Table 2-2. Performance indicators for golden perch and current status levels for 2006-07 (yellow shading indicates biological performance indicator outside range of reference points).

Performance Indicator	Upper reference point	Lower reference point	2006-07	Within range of reference points
Total catch (t)	177	20	151.9	Y
CPUE (kg.fisher day <sup>-1</sup> )	13	2	12.6	Y
4-year total catch trend (t.year <sup>-1</sup> )	+56	-56	23.8	Y
4-year CPUE trend (kg.fisher day <sup>-1</sup> )	+4	-4	1.1	Y

### 2.3 Greenback flounder (*Rhombosolea tapirina*)

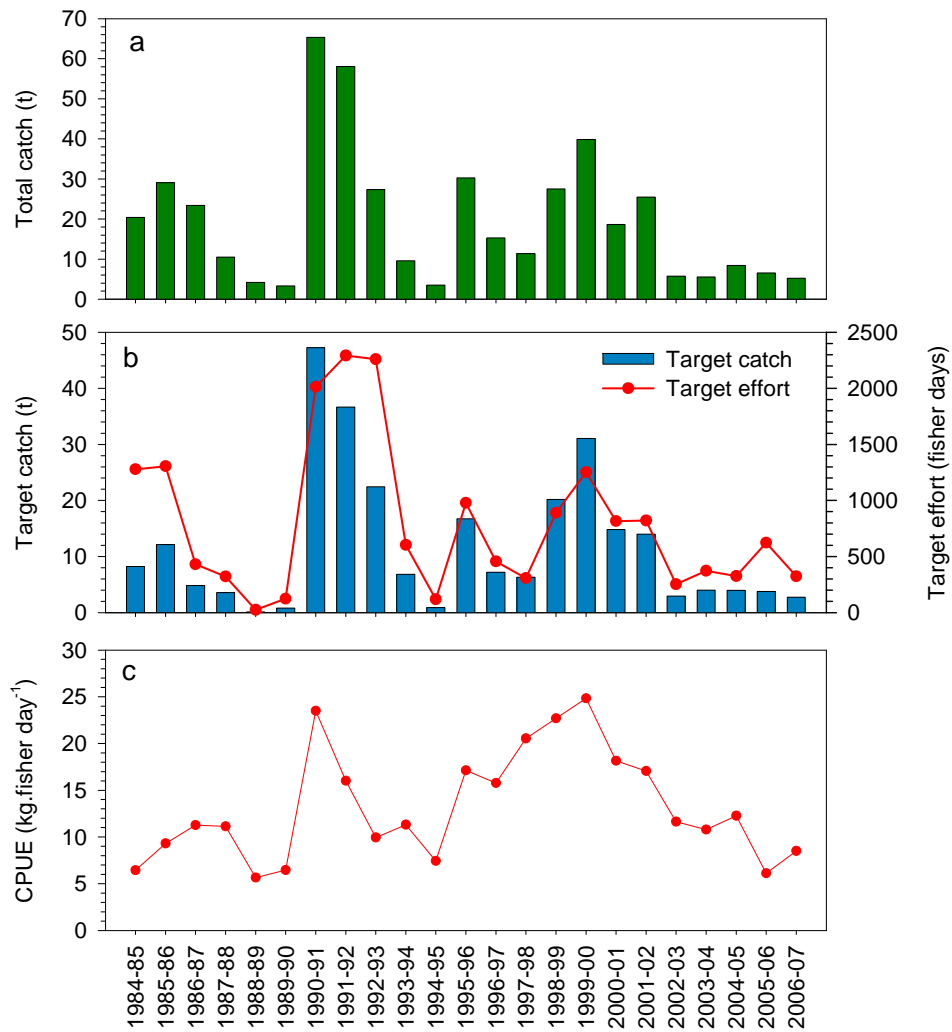


Figure 2-3. Inter-annual trends in catch and effort for greenback flounder showing: (a) total catch; and for large mesh gill nets (b) target catch, target effort, and (c) CPUE.

Table 2.3. Performance indicators for greenback flounder and current status levels for 2006-07 (yellow shading indicates biological performance indicator outside range of reference points).

Performance Indicator	Upper reference point	Lower reference point	2006-07	Within range of reference points
Total catch (t)	54	4	5.2	Y
CPUE (kg.fisher day <sup>-1</sup> )	23	6	8.5	Y
4-year total catch trend (t.year <sup>-1</sup> )	+22	-22	-0.3	Y
4-year CPUE trend (kg.fisher day <sup>-1</sup> )	+5	-5	-1.2	Y



## 2.4 Mulloway (*Argyrosomus japonicus*)

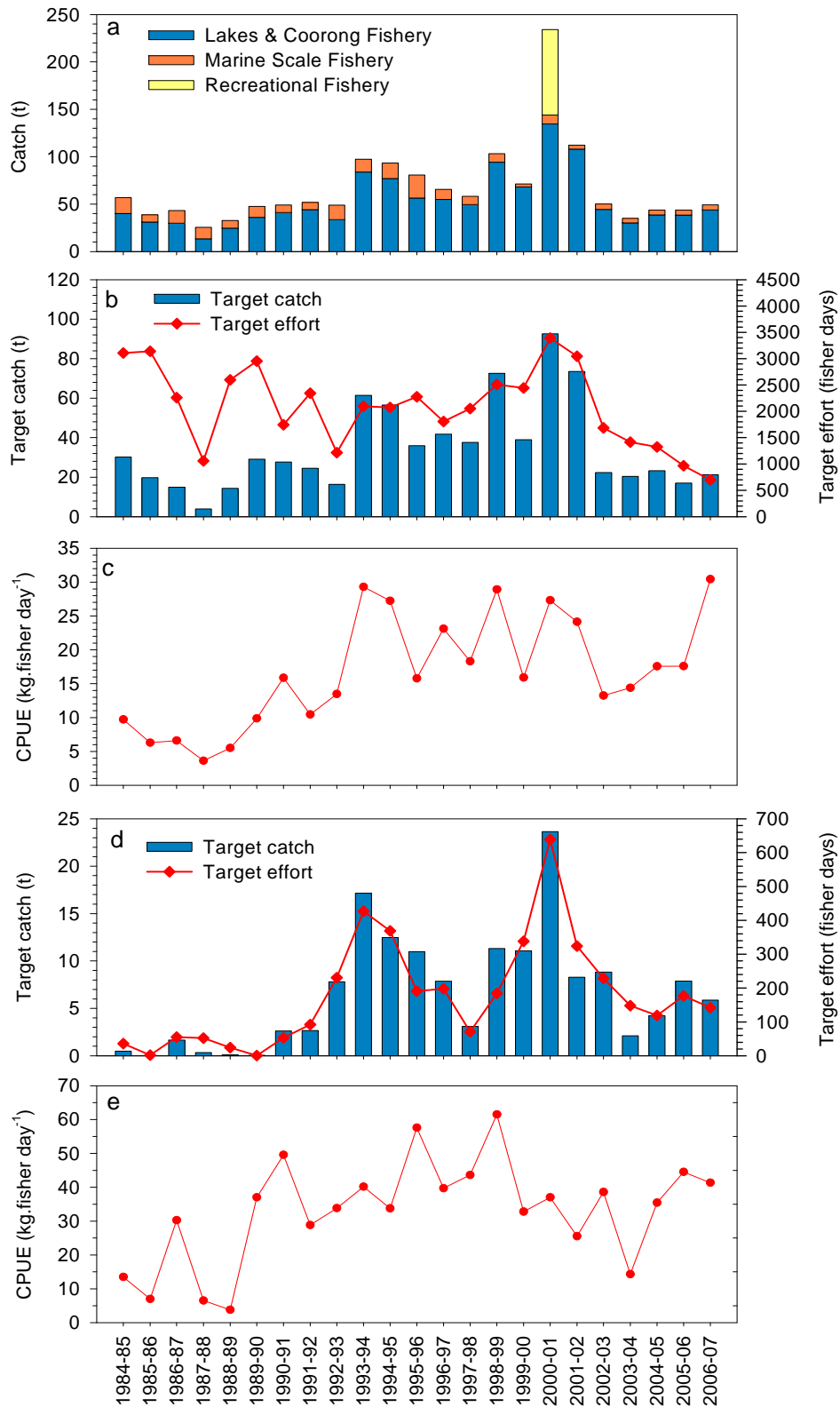


Figure 2-4. Inter-annual trends in catch and effort for mulloway showing: (a) total catch (MSF, LCF, recreational); and for large mesh nets (b) target catch, target effort, and (c) CPUE. For swinger nets; (d) target catch, target effort, and (e) CPUE.

Table 2-4. Performance indicators for mullo way and current status levels for 2006-07 (yellow shading indicates biological performance indicator outside range of reference points).

Performance Indicator	Upper reference point	Lower reference point	2006-07	Within range of reference points
Total catch (t)	118	31	49.3	Y
<b>Total Catch:</b> 4-year total catch trend (t)	+27	-27	4.3	Y
<b>Mesh net:</b> CPUE (kg.fisher day <sup>-1</sup> )	28	5	30.4	N
<b>Mesh net:</b> 4-year CPUE trend (kg.fisher day <sup>-1</sup> )	+7	-7	4.8	Y
<b>Swinger net:</b> CPUE (kg.fisher day <sup>-1</sup> )	57	6	41.3	Y
<b>Swinger net:</b> 4-year CPUE trend (kg.fisher day <sup>-1</sup> )	+16	-16	9.0	Y

## 2.5 Pipi (*Donax deltoides*)

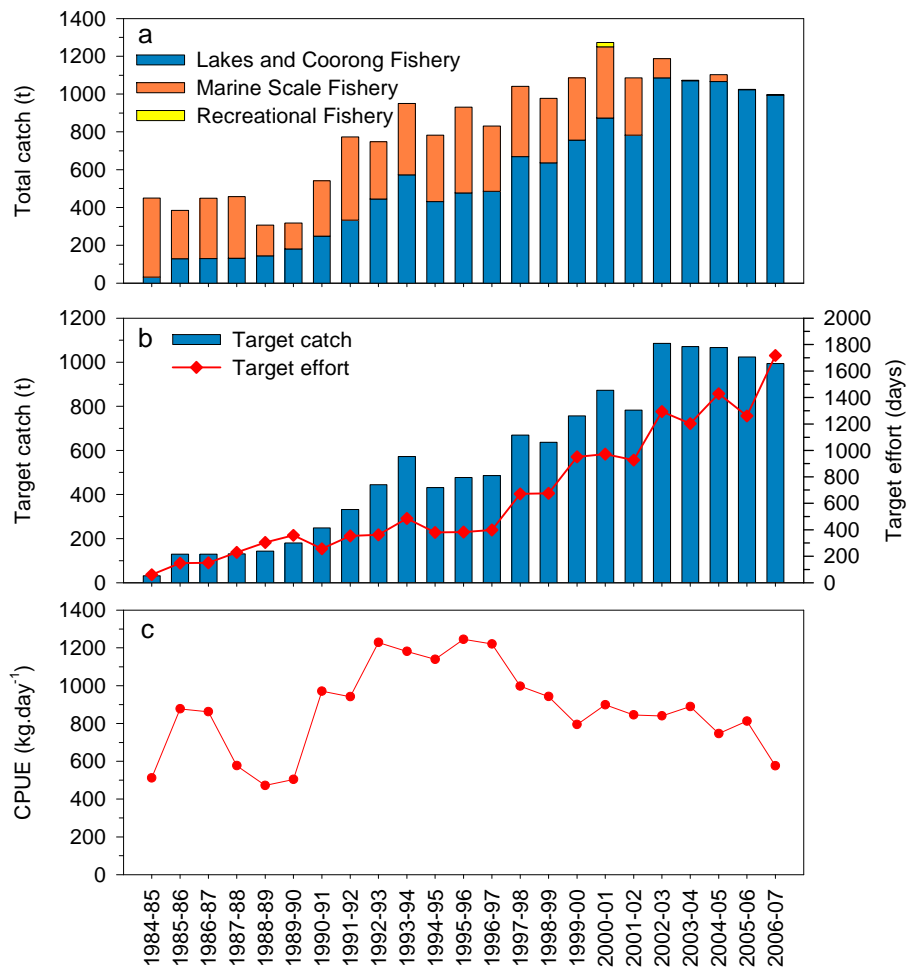


Figure 2-5. Inter-annual trends in catch and effort for pipi showing; (a) total catch (MSF, LCF, recreational); and for the LCF (b) target catch, target effort, and (c) CPUE.

Table 2-5. Performance indicators for pipi and current status levels for 2006-07 (yellow shading indicates biological performance indicator outside range of reference points).

Performance Indicator	Upper reference point	Lower reference point	2006-07	Within range of reference points
Total catch (t)	1500	800	993.7	Y
CPUE (kg.day <sup>-1</sup> )	1200	850	575.5	N
3-year total catch trend (t.year <sup>-1</sup> )	226	-226	-54.4	Y
3-year CPUE trend (kg.day <sup>-1</sup> )	240	-240	-85.2	Y

## 2.6 Yellow-eye mullet (*Aldrichetta forsteri*)

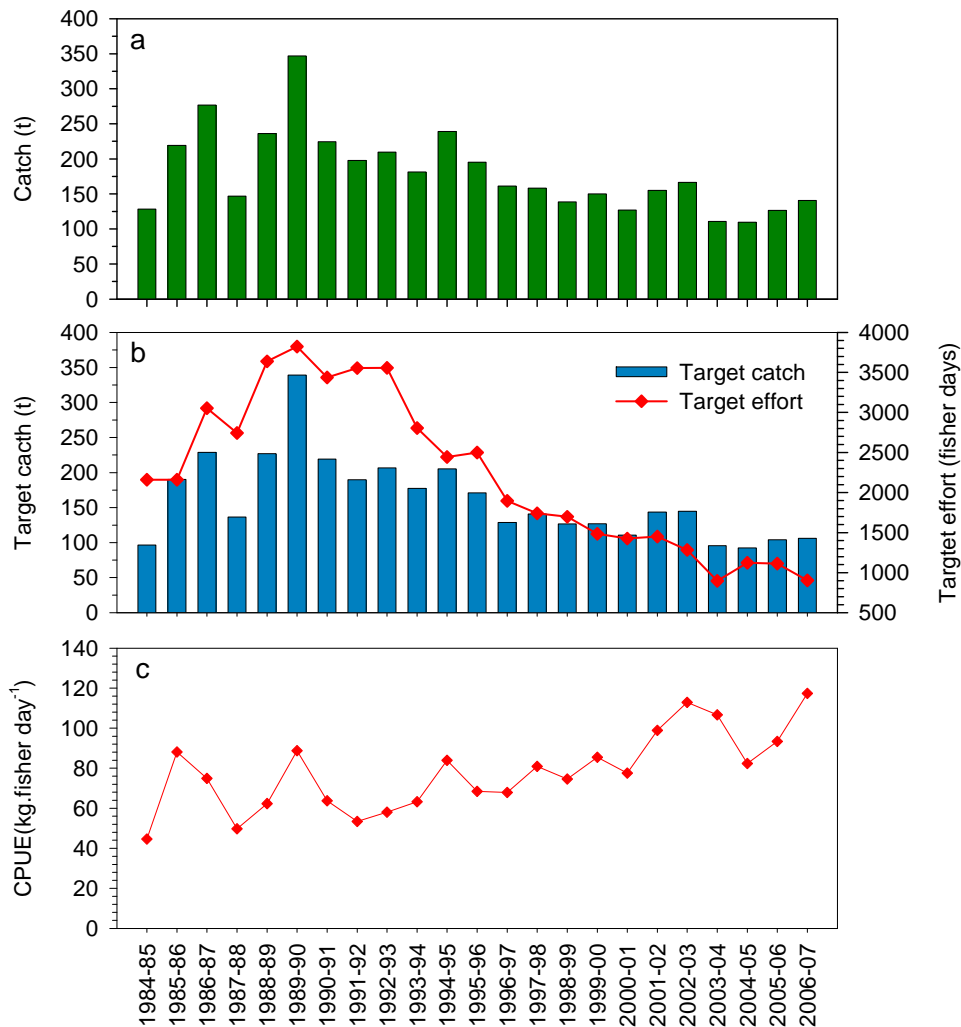


Figure 2-6. Inter-annual trends in catch and effort for yellow-eye mullet showing: (a) total catch; and for small mesh gill nets (b) target catch, target effort, and (c) CPUE.

Table 2-6. Performance indicators for yellow-eye mullet and current status levels for 2006-07 (yellow shading indicates biological performance indicator outside range of reference points).

Performance Indicator	Upper reference point	Lower reference point	2006-07	Within range of reference points
Total catch (t)	312	124	140.6	Y
CPUE (kg.fisher day <sup>-1</sup> )	93	47	117.4	N
4-year total catch trend (t.year <sup>-1</sup> )	+45	-45	10.6	Y
4-year CPUE trend (kg.fisher day <sup>-1</sup> )	+13	-13	4.3	Y

## 2.7 Bony bream (*Nematalosa erebi*)

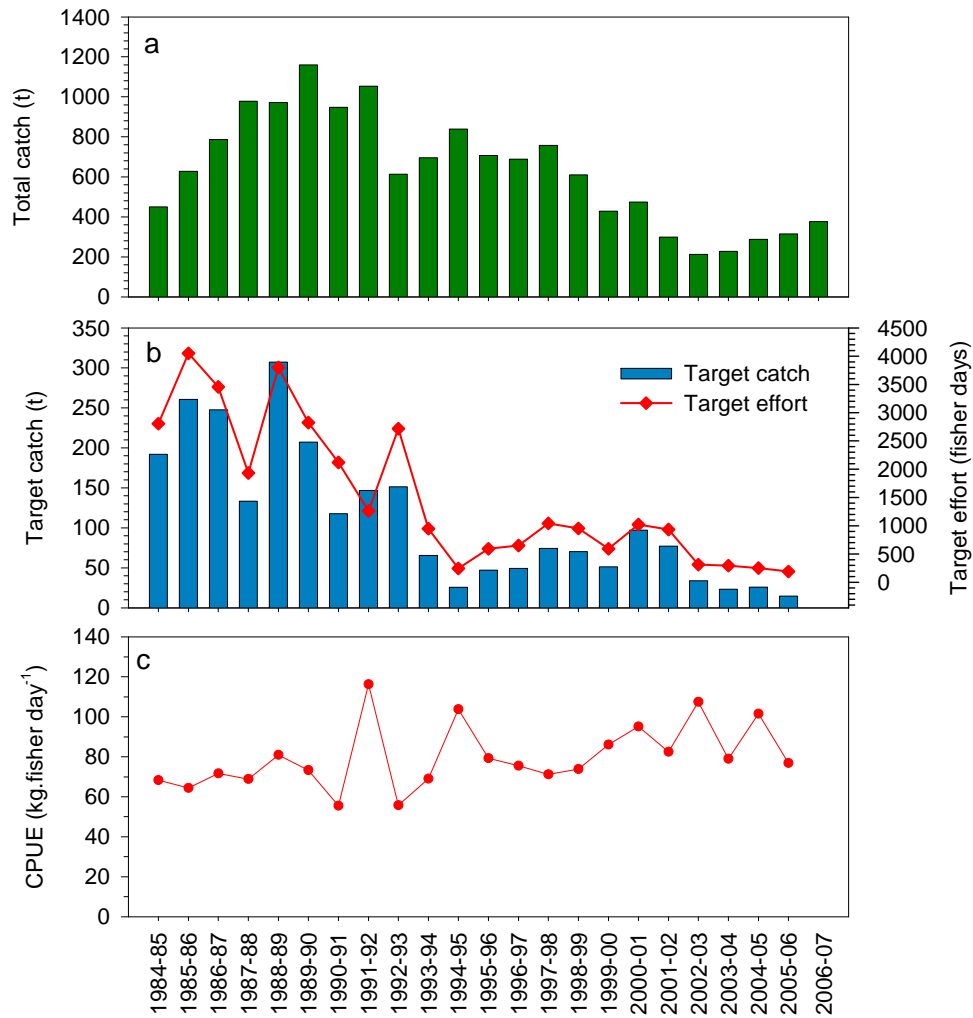


Figure 2-7. Inter-annual trends in catch and effort for bony bream showing: (a) total catch; and for large mesh gill nets (b) target catch, target effort, and (c) CPUE. There was no effort targeted at bony bream in 2006-07.

### 3 OTHER PERFORMANCE INDICATORS

The contribution to the total catch, for the years 2002-03 to 2006-07, by each of the key species is shown in Table 3-1. The contribution to the total catch of finfish species (excludes pipi) is shown in Table 3-2. Mean annual flows (MSM BIGMOD, 10-December-2008, Murray-Darling Basin Commission) are shown in Figure 3-1.

Table 3-1. Annual commercial catch composition (%) for the Lakes and Coorong Fishery. The estimates for pipi and mullocky include catches from both the LCF and MSF.

Year	Black bream	Greenback flounder	Golden perch	Mullocky	Yellow-eye mullet	Goolwa cockles
	%	%	%	%	%	%
2002-03	0.8	0.4	2.5	3.4	11.4	81.5
2003-04	0.8	0.4	6.1	2.7	8.4	81.7
2004-05	0.4	0.6	7.3	3.2	8.0	80.5
2005-06	0.5	0.5	9.2	3.3	9.5	77.0
2006-07	0.3	0.4	11.3	3.3	10.5	74.2

Table 3-2. Annual commercial catch composition of finfish (%) for the South Australian Lakes and Coorong Fishery. The estimate for mullocky includes catches from both the LCF and MSF.

Year	Black bream	Greenback flounder	Golden perch	Mullocky	Yellow-eye mullet
	%	%	%	%	%
2002-03	4.3	2.1	13.5	18.6	61.6
2003-04	4.1	2.3	33.2	14.5	46.0
2004-05	2.0	3.1	37.6	16.3	40.9
2005-06	2.2	2.2	40.8	12.7	42.1
2006-07	1.3	1.5	43.9	12.7	40.6

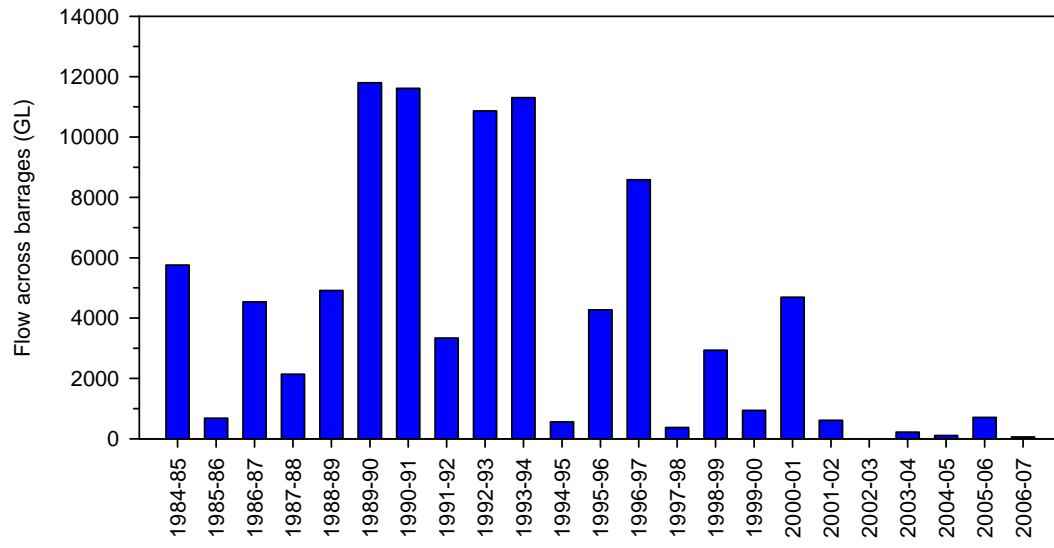


Figure 3-1. Mean annual flows across the Murray River Barrages (source MSM Bigmod, Murray Darling Basin Commission).

## 4 DISCUSSION

For the key species in the Lakes and Coorong Fishery in 2006-07 there was one PI below the lower RP (Table 2-5) and three that were above the upper RP (Tables 2-1, 2-4, 2-6);

- CPUE (kg.day<sup>-1</sup>) for pipi was 32% below the lower RP,
- CPUE (kg.fisher day<sup>-1</sup>) for black bream was 3% above the upper RP,
- CPUE (large mesh net, kg.fisher day<sup>-1</sup>) for mulloway was 9% above the upper RP, and
- CPUE (kg.fisher day<sup>-1</sup>) for yellow-eye mullet was 26% above the upper RP.

Additionally, CPUE (kg.fisher day<sup>-1</sup>) for golden perch was 3% below the upper RP (Table 2-2).

In 2006-07, pipi comprised 74% of the total catch of all key species (Table 3-1). The catch of key finfish species comprised, in order of decreasing contribution; golden perch (44%), yellow-eye mullet (41%), mulloway (13%), greenback flounder (2%) and black bream (1%) (Table 3-2). From 2002-03 to 2006-07 the contribution by golden perch increased from 14 to 44 %, while that for mulloway declined from 19 to 13 %.

The most significant source of uncertainty around the PI's is the reliance on fishery-dependent data. The only estimate of relative abundance for each of the key species is provided by estimates of CPUE from the commercial fishery. Additionally, data on recreational catches are limited to those provided for 2000-01 by the National Recreational and Indigenous Fishing Survey (Henry and Lyle 2003, Jones and Doonan 2005). Biological information on reproduction, growth, mortality and population age structures for some target species is limited i.e. black bream, golden perch. RP's are estimated from a fixed reference period (Sloan 2005) and do not include additional data from later years. The PI's catch-trend and CPUE-trend have widely separated upper and lower RP's and should be reviewed.

The data presented here must be considered within the context of the stock assessment for each species and the Management Plan (Ferguson and Ward 2003; Ye 2004; Higham et al. 2005; Sloan 2005; Ferguson and Mayfield 2006; Ferguson 2007).

CPUE estimates for mulloway, black bream and golden perch were historically high in 2006-07. CPUE for mulloway (small mesh nets) increased from 2002-03 and was the highest ever recorded in 2006-07, when catch was historically low. Similarly CPUE for golden perch increased after 2002-03. This may indicate hyper-stability of CPUE due to aggregation of individuals of these species in response to environmental conditions caused by the current drought. A time series of annual age structures is essential for interpreting trends in CPUE for these species.



Based on the assessment of specific PI's against the range of RP's defined in the Management Plan, golden perch, black bream and mulloway are the species for which there should be most concern. Supplementary information on distribution and relative abundance of pipi will be collected during the 2007-08 season to address concerns regarding the long term downward trend in CPUE.

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