

The South Australian Lakes and Coorong Fishery

Fishery Stock Status Report for PIRSA



SARDI Publication No. F2009/000669-1

SARDI Research Report Series No. 421

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January 2010

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This publication may be cited as:

Ferguson. G (2010) The South Australian Lakes and Coorong Fishery. Fishery Stock Status Report for PIRSA Fisheries. South Australian Research and Development Institute (Aquatic Sciences), Adelaide, 15pp. SARDI Publication No. F2009/000669-1.

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Printed in Adelaide: January 2010

SARDI Publication No. F2009/000669-1

SARDI Research Report Series No. 421

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Date: 13 January 2010

Distribution: PIRSA Fisheries, Inland Fisheries Management Committee,
SARDI Aquatic Sciences Library

Circulation: Public Domain

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1 INTRODUCTION

This is the fifth report on the status of seven species in the South Australian Lakes and Coorong Fishery (LCF), and builds on a summary report provided by Pierce and Doonan (1999) and stock status reports by Ferguson (2006a, b, 2007, 2008).

This report assesses the performance of the Lakes and Coorong Fishery against the performance indicators (PI) 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 (Rec.) are included (Henry and Lyle 2003; Jones and Doonan 2005, Jones 2009). Estimates of catch from the Marine Scale Fishery (MSF) are also included for pipi and mulloway. Species considered are those prescribed in the management plan; black bream, golden perch, greenback flounder, mulloway, pipi, and yellow-eye mullet. Bony bream are also included in this report 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 25-year period from 1984-85 to 2008-09. Estimates of total catch are presented, as well as targeted catch, targeted effort and targeted CPUE for the dominant gear types. Finally, the status of the fishery is assessed based on comparison of the performance indicators (PIs) with the reference points (RP) in the Management Plan (Sloan 2005).

Performance indicators and reference points 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 RP for the catch and CPUE were estimated from highest and lowest values during the reference period. Upper and lower trend (rate-of-change) PI 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).

2 FISHERY STATISTICS

2.1 Black bream (*Acanthopagrus butcheri*)

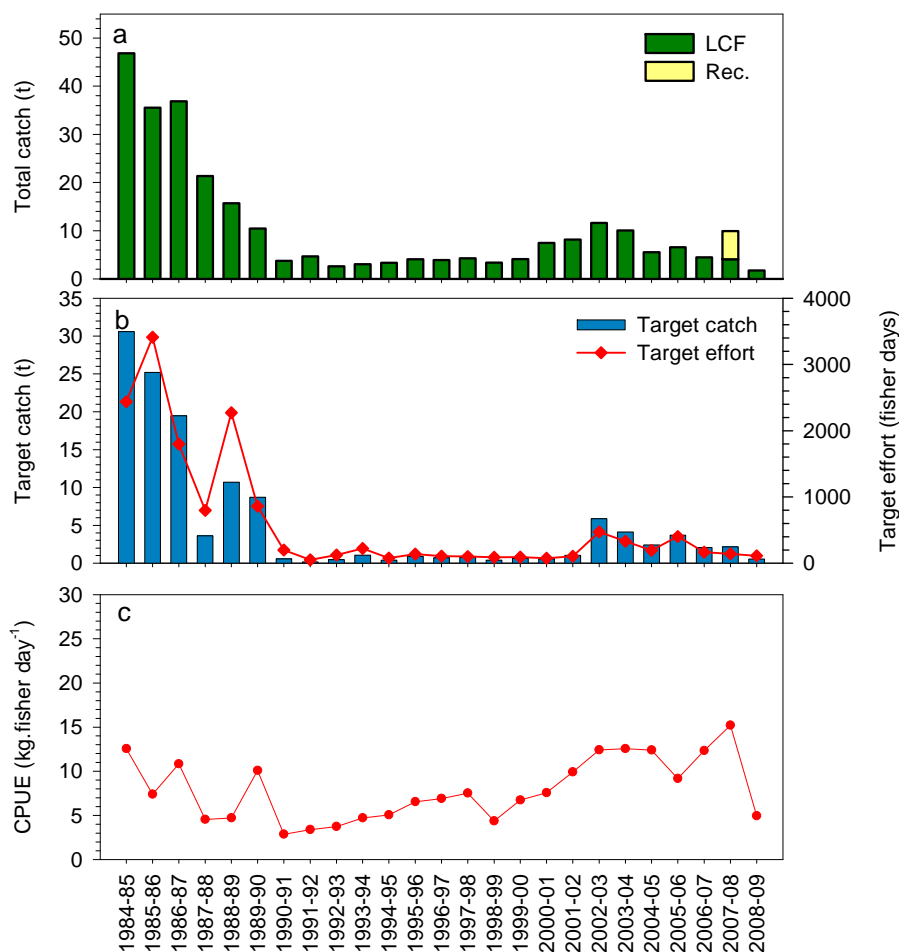


Figure 2-1. Inter-annual trends in catch and effort for black bream: (a) total catch; and for large mesh gill nets (b) target catch, target effort, and (c) CPUE. Estimate of recreational catch available for 2007-08.

Table 2-1. Performance indicators for black bream and current status levels for 2008-09 (yellow shading indicates biological performance indicator outside range of reference points).

Performance Indicator	Upper reference point	Lower reference point	2008-09	Within range of reference points
Total catch (t)	47	3	1.8	N
CPUE (kg.fisher day ⁻¹)	12	3	4.9	Y
4-year total catch trend (t.year ⁻¹)	+15	-15	-1.5	Y
4-year CPUE trend (kg.fisher day ⁻¹)	+4	-4	-1.2	Y

2.2 Golden perch (*Macquaria ambigua*)

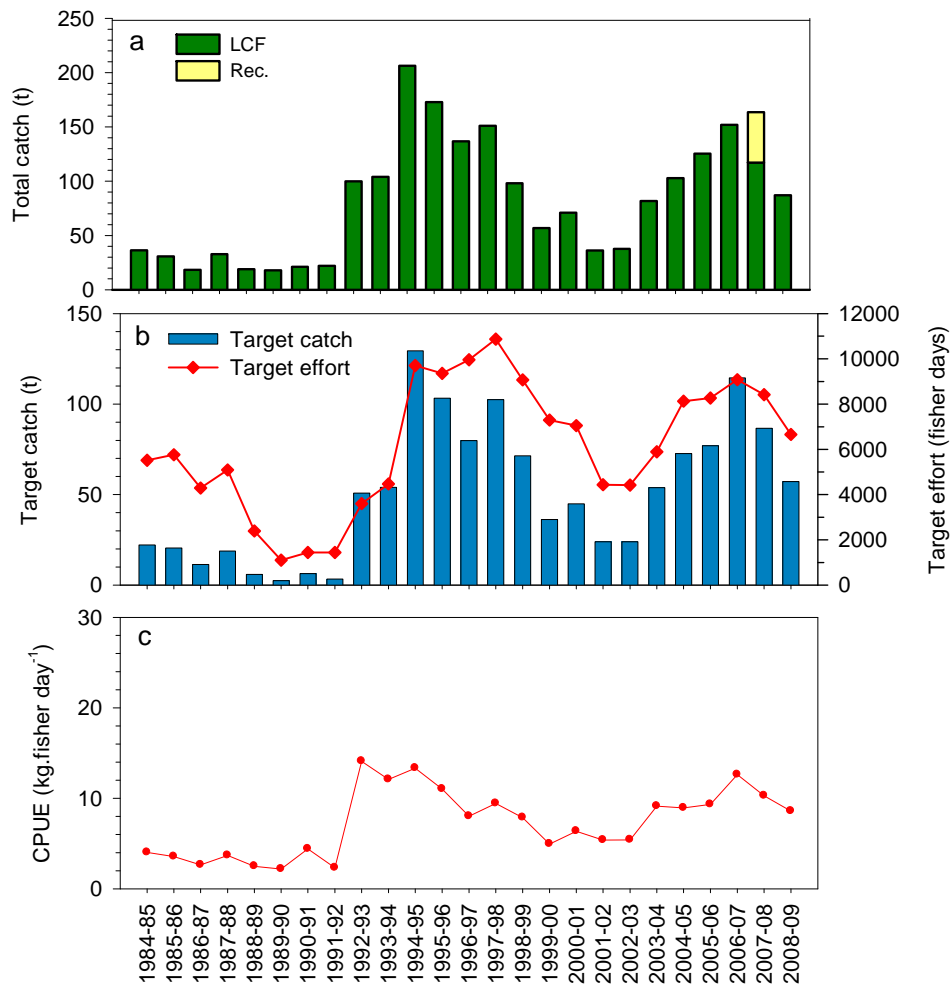


Figure 2-2. Inter-annual trends in catch and effort for golden perch showing: (a) total catch; and for large mesh gill nets (b) target catch, target effort, and (c) CPUE. Estimate of recreational catch available for 2007-08.

Table 2-2. Performance indicators for golden perch and current status levels for 2008-09 (yellow shading indicates biological performance indicator outside range of reference points).

Performance Indicator	Upper reference point	Lower reference point	2008-09	Within range of reference points
Total catch (t)	177	20	87.0	Y
CPUE (kg.fisher day ⁻¹)	13	2	8.6	Y
4-year total catch trend (t.year ⁻¹)	+56	-56	-15.0	Y
4-year CPUE trend (kg.fisher day ⁻¹)	+4	-4	-0.5	Y

2.3 Greenback flounder (*Rhombosolea tapirina*)

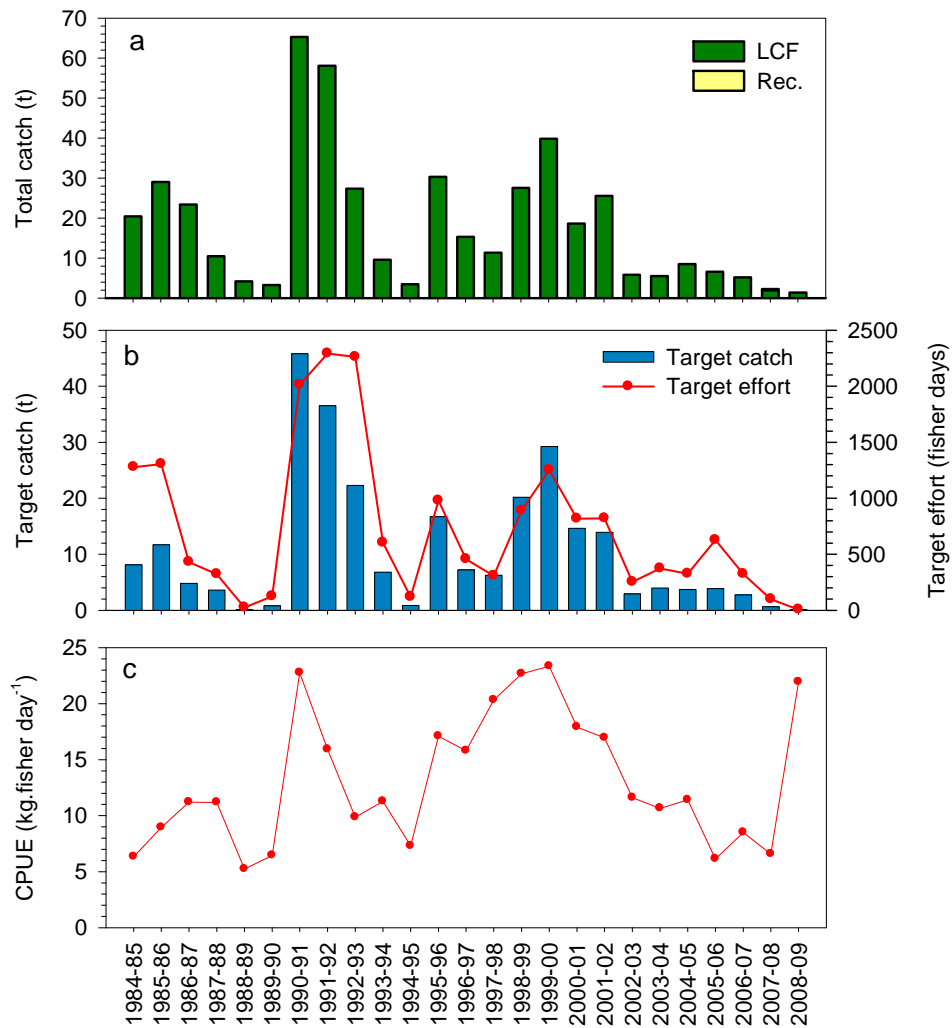


Figure 2-3. Inter-annual trends in catch and effort for greenback flounder showing: (a) total catch; and for large mesh gill nets (b) target catch, target effort, and (c) CPUE. NB estimate of CPUE may be unreliable due to low effort. Estimate of recreational catch available for 2007-08.

Table 2.3. Performance indicators for greenback flounder and current status levels for 2008-09 (yellow shading indicates biological performance indicator outside range of reference points).

Performance Indicator	Upper reference point	Lower reference point	2008-09	Within range of reference points
Total catch (t)	54	4	1.4	N
CPUE (kg.fisher day ⁻¹)	23	6	21.9	Y
4-year total catch trend (t.year ⁻¹)	+22	-22	-1.9	Y
4-year CPUE trend (kg.fisher day ⁻¹)	+5	-5	4.5	Y

2.4 Mulloway (*Argyrosomus japonicus*)

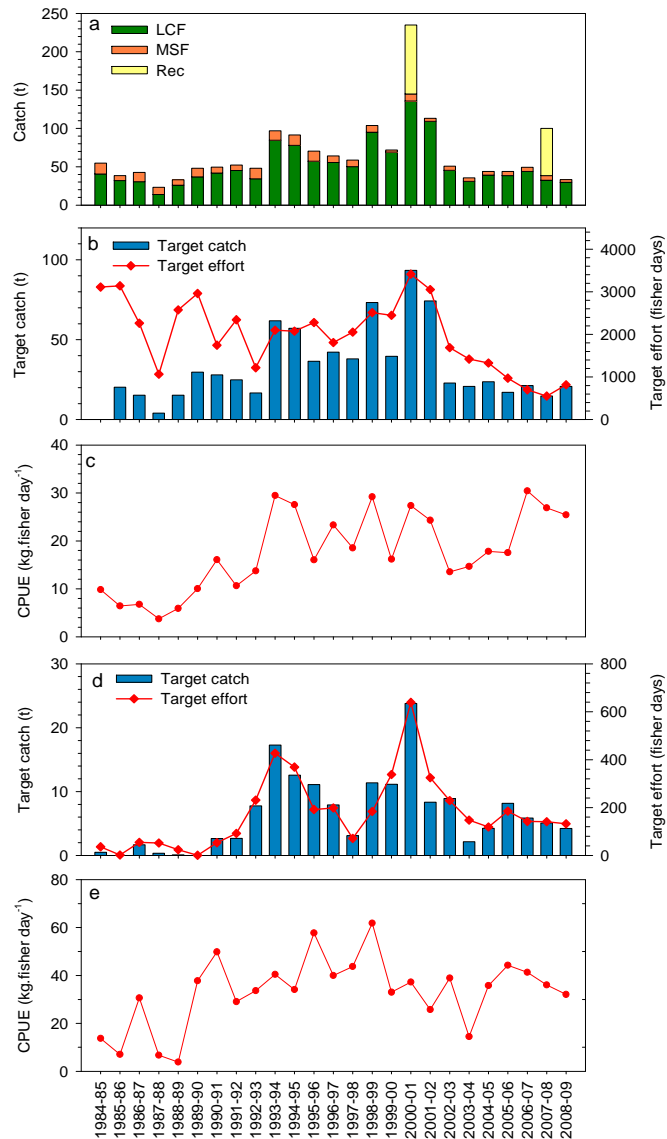


Figure 2-4. Inter-annual trends in catch and effort for mulloway showing: (a) total catch (MSF, LCF, recreational); and for large mesh nets (b) target catch, target effort, and (c) CPUE. For swinger nets; (d) target catch, target effort, and (e) CPUE. Estimates of recreational catch available for 2000-02 and 2007-08.

Table 2-4. Performance indicators for mullock and current status levels for 2008-09 (yellow shading indicates biological performance indicator outside range of reference points).

Performance Indicator	Upper reference point	Lower reference point	2008-09	Within range of reference points
Total catch (t)	118	31	33.4	Y
Total Catch: 4-year total catch trend (t)	+27	-27	-4.2	Y
Mesh net: CPUE (kg.fisher day ⁻¹)	28	5	25.4	Y
Mesh net: 4-year CPUE trend (kg.fisher day ⁻¹)	+7	-7	2.0	Y
Swinger net: CPUE (kg.fisher day ⁻¹)	57	6	32.1	Y
Swinger net: 4-year CPUE trend (kg.fisher day ⁻¹)	+16	-16	-4.2	Y

2.5 Pipi (*Donax deltoides*)

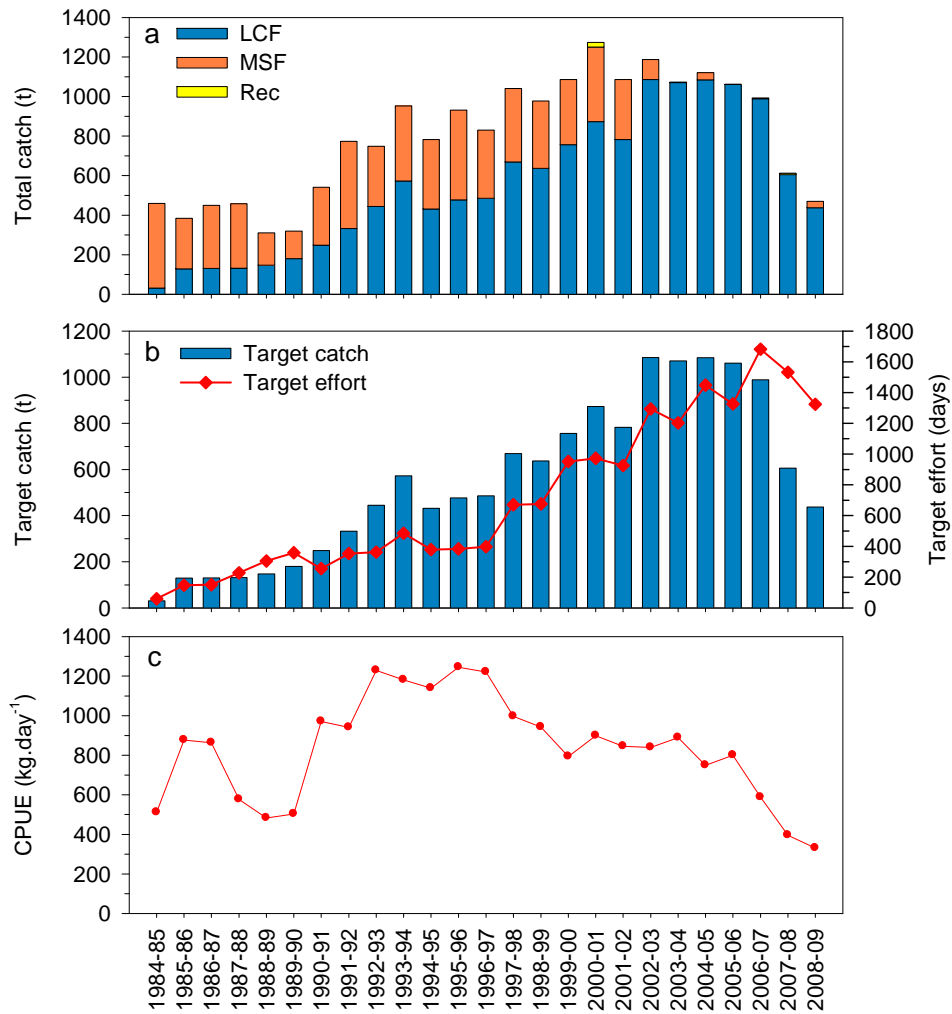


Figure 2-5. Inter-annual trends in catch and effort for pipi showing; (a) total catch (MSF, LCF, recreational); and for the LCF (b) target catch, target effort, and (c) CPUE. Estimate of recreational catch available for 2000-01 (<5 t).

Table 2-5. Performance indicators for pipi and current status levels for 2008-09 (yellow shading indicates biological performance indicator outside range of reference points).

Performance Indicator	Upper reference point	Lower reference point	2008-09	Within range of reference points
Total catch (t)	1500	800	469.7	N
CPUE (kg.day ⁻¹)	1200	850	330.4	N
3-year total catch trend (t.year ⁻¹)	226	-226	-261.9	N
3-year CPUE trend (kg.day ⁻¹)	240	-240	-122.5	Y

2.6 Yellow-eye mullet (*Aldrichetta forsteri*)

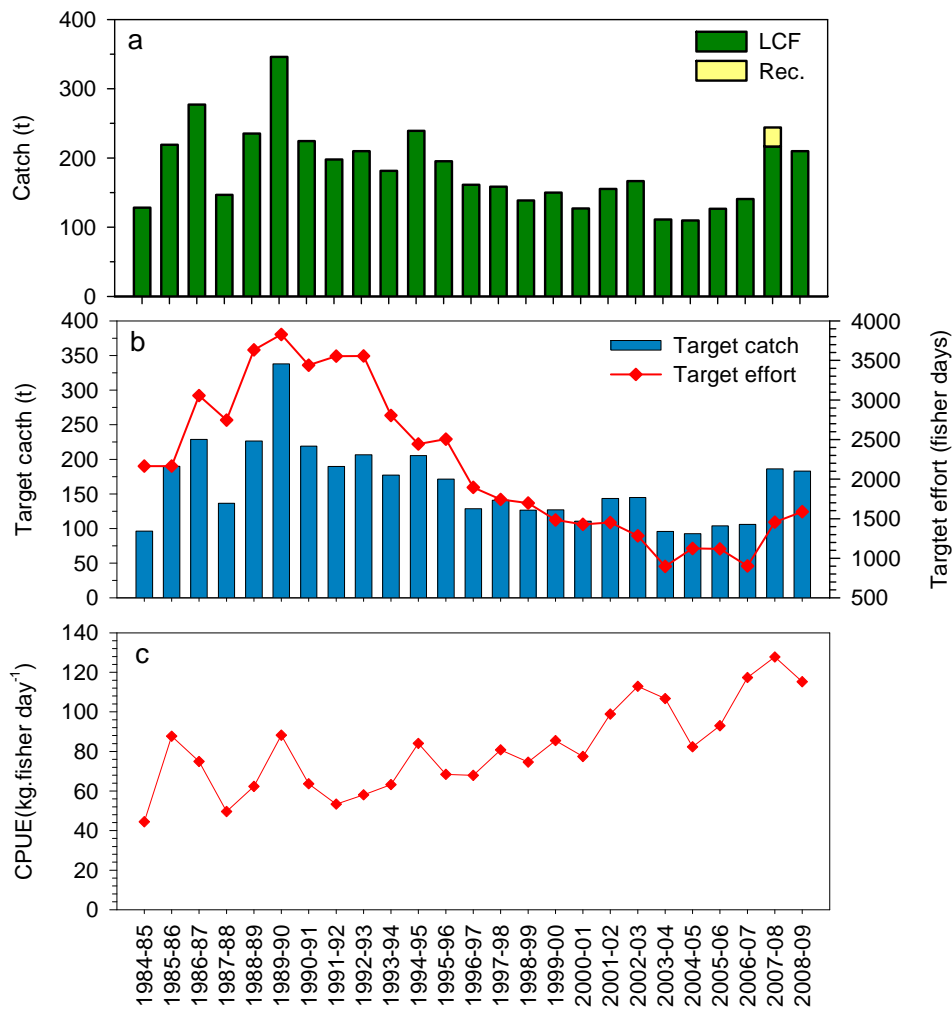


Figure 2-6. Inter-annual trends in catch and effort for yellow-eye mullet showing: (a) total catch (LCF, recreational); and for small mesh gill nets (b) target catch, target effort, and (c) CPUE. Estimate of recreational catch available for 2007-08.

Table 2-6. Performance indicators for yellow-eye mullet and current status levels for 2008-09 (yellow shading indicates biological performance indicator outside range of reference points).

Performance Indicator	Upper reference point	Lower reference point	2008-09	Within range of reference points
Total catch (t)	312	124	209.8	Y
CPUE (kg.fisher day ⁻¹)	93	47	115.2	N
4-year total catch trend (t.year ⁻¹)	+45	-45	32.6	Y
4-year CPUE trend (kg.fisher day ⁻¹)	+13	-13	7.7	Y

2.7 Bony bream (*Nematalosa erebi*)

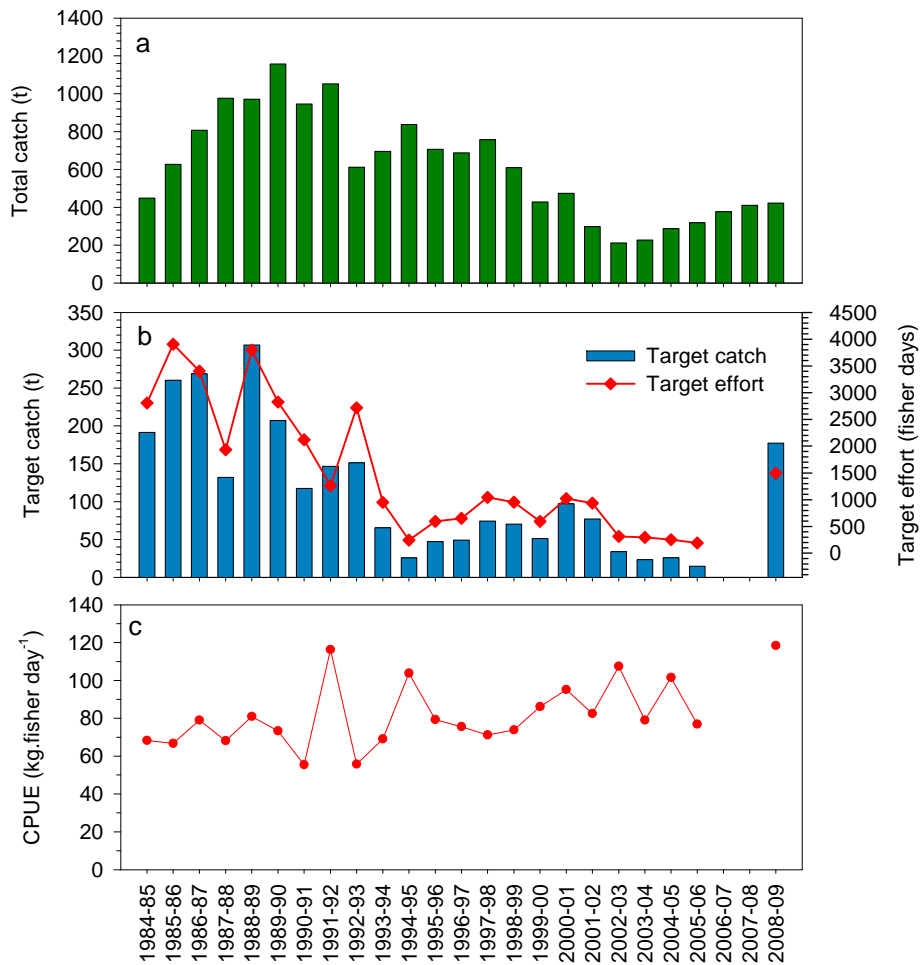


Figure 2-7. Inter-annual trends in catch and effort for bony bream showing: (a) total catch; and for large mesh gill nets (b) target catch, target effort, and (c) CPUE. There was no effort targeted at bony bream in 2006-07. NB. No target catch from 2005-06 to 2006-07.

3 OTHER PERFORMANCE INDICATORS

The contribution to the total catch, for the years 2004-05 to 2008-09, by each of the key species is shown in Table 3-1. The contribution to the total catch of finfish species (excluding pipi) is shown in Table 3-2.

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

Year	Black bream	Golden perch	Greenback flounder	Mullock	Pipi	Yellow-eye mullet
	%	%	%	%	%	%
2004-05	0.4	7.4	0.6	3.2	80.6	7.9
2005-06	0.5	9.2	0.5	3.2	77.5	9.2
2006-07	0.3	11.3	0.4	3.7	73.9	10.5
2007-08	0.4	11.9	0.2	3.9	61.6	22.0
2008-09	0.2	10.8	0.2	4.2	58.5	26.1

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

Year	Black bream	Golden perch	Greenback flounder	Mullock	Yellow-eye mullet
	%	%	%	%	%
2004-05	2.0	38.0	3.2	16.3	40.5
2005-06	2.1	40.6	2.1	14.2	40.9
2006-07	1.3	43.2	1.5	14.0	40.0
2007-08	1.1	31.0	0.5	10.1	57.3
2008-09	0.5	26.1	0.4	10.0	62.9

Net freshwater flow into the Coorong lagoons is also a PI in the Management Plan (Anon 2005). Mean annual flows (MSM BIGMOD, 10-November-2009, Murray-Darling Basin Commission) are shown in Figure 3-1. The RP associated with this PI is triggered when freshwater inflow is less than 500 GL.year⁻¹ for three consecutive years as has occurred between 2006-07 and 2008-09.

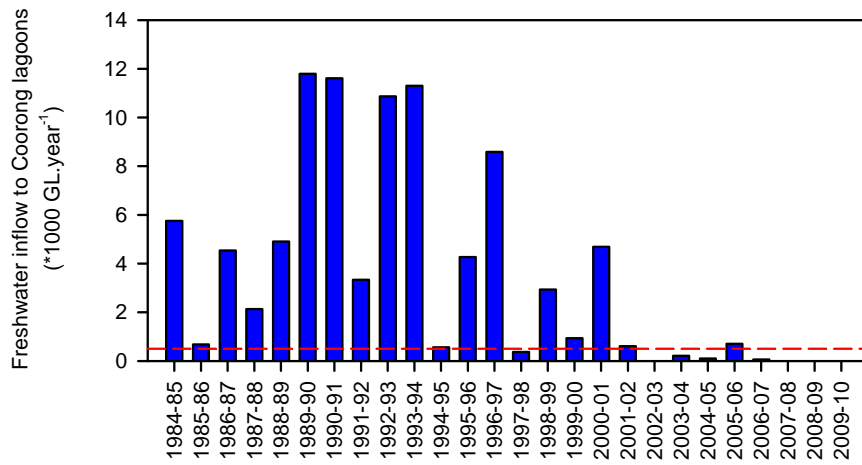


Figure 3-1. Mean annual flows across the Murray River Barrages into the Coorong lagoons (source MSM BIGMOD hydrological model, Murray Darling Basin Commission, November 2009). Red dashes indicate RP for net freshwater flow RP.

4 DISCUSSION

For the key species in the Lakes and Coorong Fishery in 2008-09 there were four PI's below the lower RP (Tables 2-1, 2-3, 2-5) and one above the upper RP (Table 2-6);

- Catch (t) for pipi was 41% below the lower RP,
- CPUE (kg.day⁻¹) for pipi was 61% below the lower RP,
- Catch (t) for black bream was 55% below the lower RP,
- Catch (t) for greenback flounder was 65% below the lower RP,
- Catch (t) of yellow-eye mullet was 24% above the upper RP.

Additionally, several PIs were close to their respective RP. For mullet, catch (t) was 8% above the lower RP, and CPUE (small mesh nets, kg.fisher day⁻¹) was 9% below the upper RP. CPUE (kg.fisher day⁻¹) for greenback flounder was 4.8% below the upper RP, although this should be interpreted with caution due to low effort (6 days) (Table 2-3). In addition to PIs associated with individual species the RP for net annual freshwater flow was also triggered.

In 2008-09, pipi comprised 58% of the total catch of all key species (Table 3-1) and had declined from 81% of total catch reported for 2004-05. The catch of key finfish species comprised, in order of decreasing contribution; yellow-eye mullet (63%), golden perch (26%), mullet (10%), greenback flounder (<1%) and black bream (<1%) (Table 3-2). From 2004-05 to 2008-09 the contribution by yellow-eye mullet increased while that of all other finfish species declined.

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

Uncertainty around PIs used to assess the performance of the fishery centres about several key areas. The most significant source of uncertainty around the PIs 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 several years ie 2000-01, 2007-08, and estimates are not available for all species in these years (Henry and Lyle 2003, Jones and Doonan 2005, Jones 2009). Biological information on reproduction, growth, mortality and population age structures for target species is limited. Finally the structure of the PI and RP within the Management Plan provide limited scope for accurate assessment. RPs are limited to a fixed time period (Sloan 2005) and do not allow for the inclusion of data from later years. Further, the catch-trend and CPUE-trend PIs have widely separated upper and lower RPs that do not provide informative criteria for the accurate

assessment of the species. Consequently, the assessment of these species would be improved through a review of these PI and RPs.

Definitive assessments of fish stocks based on changes in patterns of fishery-dependent measures of catch, effort and CPUE are problematic. Additional sources of information including a time series on the biological and demographic status of these stocks e.g. age structures and estimates of growth would reduce the uncertainty in these assessments and is essential for more accurately interpreting trends in CPUE for mullock, black bream, greenback flounder and golden perch

Historically high CPUE for mullock, combined with historically low catch (small mesh nets, kg.day⁻¹) may indicate hyper-stability of CPUE. This may have occurred as individuals aggregate in response to environmental conditions caused by the current drought.

Based on the assessment of specific PIs against the range of RP defined in the Management Plan, the status of all species, except yellow-eye mullet is of concern. Supplementary information on distribution and relative abundance of pipi, collected during the 2008-09 season as a consequence of increasing concerns regarding the long-term downward trend in CPUE, will provide further information to assess these stocks in the future.

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