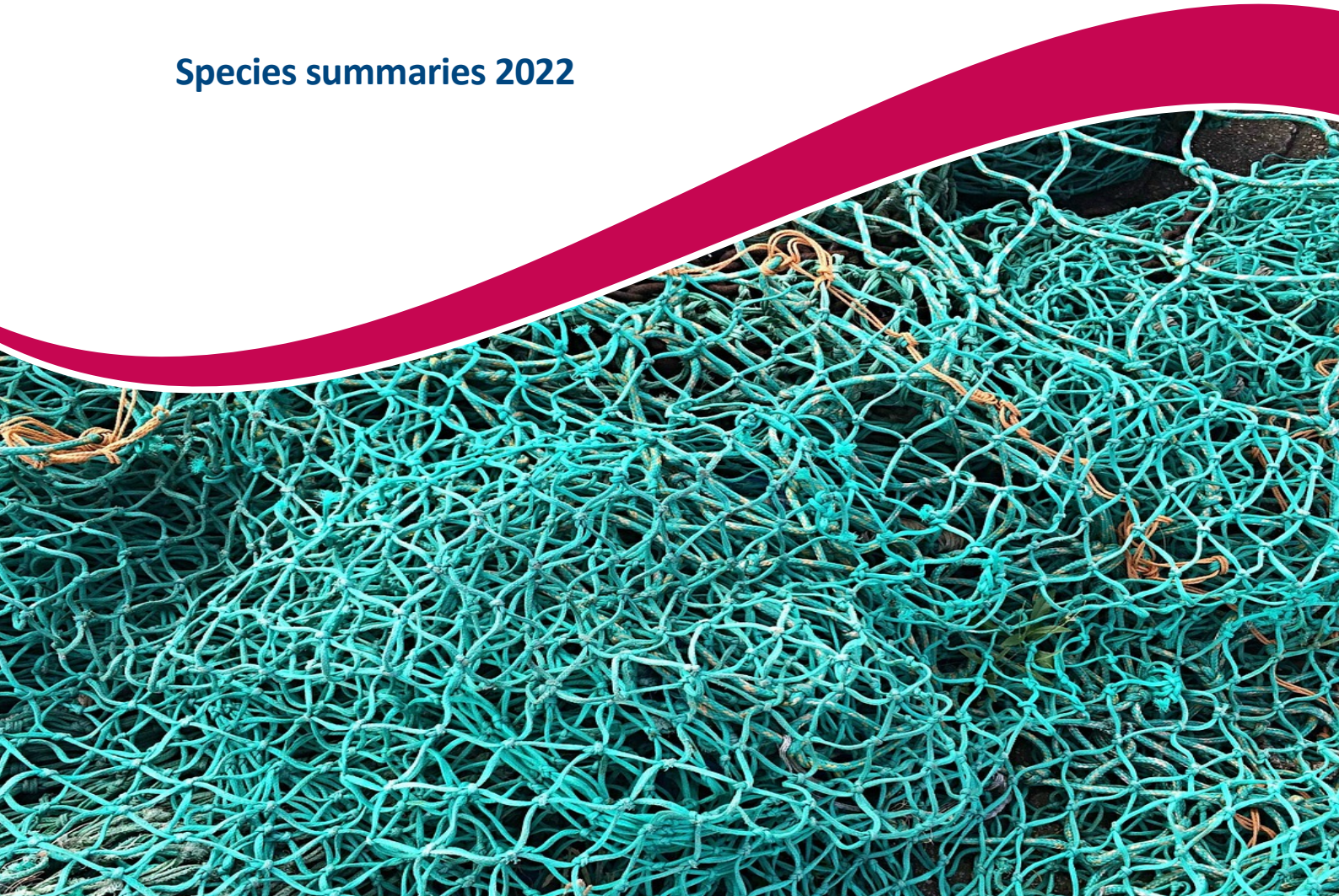
Australian Government

Australian Fisheries Management Authority

Small Pelagic Fishery (SPF)

SPFRAG Comments December 07-08 2021

Species summaries 2022



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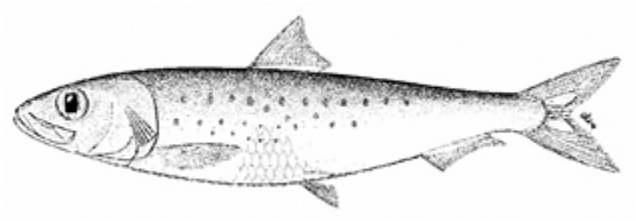
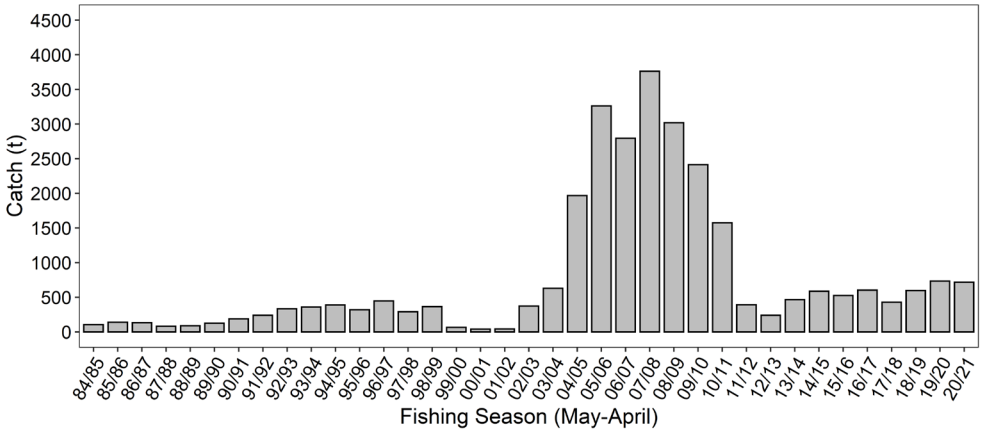
Australian sardine

Sardinops sagax



Species Summary			
Common Names	Sardine, pilchard		
Stock assessment	DEPM Survey conducted in 2019 – 2nd season at Tier 1 (noting it was at Tier 1 for the previous five years based on the 2015 DEPM).		
Exploitation Rate *** 2022-23 Tier Level**	***Tier 1 – 20% (5 seasons)**	Tier 2 – 10% (5 seasons)	Tier 3 – 5% (no limit)
Estimated biomass	**42,700 tonnes (2019 DEPM Survey, northern east coast stock)** 49,575 tonnes (2015 DEPM Survey)		
Stock Structure	Several studies have found evidence of stock structuring of Australian sardine across temperate and sub-tropical Australia (Dixon, Worland & Chan 1993; Izzo, Gillanders & Ward 2012; Yardin et al. 1998); however, the boundaries were not defined conclusively. Izzo et al. (2017), using an integrated assessment that included genetic, morphological, otolith, growth, reproductive and fishery data, found evidence for at least four isolated stocks. The Status of Australian Fish Stocks Reports (https://www.fish.gov.au/) recognises four Australian stocks: South-western (Western Australia), Southern (South Australia), South-eastern (Victoria, Tasmania and southern NSW), and eastern Australia (southern Queensland to central NSW). Since the Sardine subarea (off eastern Australia) is the only area of the SPF where SPF vessels take Australian sardine, the sardine sub-area is assessed and managed as a single management unit.		
Historical Catch data (State and Commonwealth fisheries)			

Catch and TAC (t) * incomplete season	Year	Agreed TAC (t)	TAC after unders/overs (t)	Catch(t) / % TAC Caught
	2021-22*	7,980	8,778	

	2020-21	9,190	10,109	102 / (1%)
	2019-20	9,050	10,001	232 / (2%)
	2018-19	9,510	10,465	136 / (1%)
	2017-18	9,550	9,738	104.239 / (1%)
ABARES Status	**Biomass: Not overfished**		**Fishing mortality: Not subject to overfishing**	

Assessment Summary

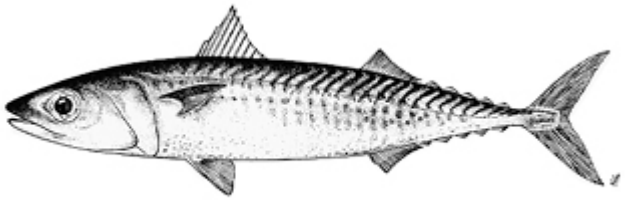
Key model technical assumptions/ parameters	The adult reproductive parameters used in the biomass calculation are based on the southern sardine stock, not the eastern stock. Ideally parameters are based on the stock being assessed however, sardine parameters are relatively consistent worldwide. As the Commonwealth catch is so low, addressing this knowledge gap is not a current research priority for the fishery. Furthermore, the exploitation rate of 20 per cent is conservative as shown by the MSE testing by Smith et al. (2015) and accounts for uncertainties in the assessment.
Weekly CPUE Trends	*The weekly CPUE is monitored for evidence of localised depletion. If a general decrease in CPUE occurs after consistent effort within a given grid cell, this may be evidence of localised depletion occurring. However, there are a number of factors, not just fishing effort, which can also influence CPUE. SPFRAG review this information annually.* There were no discernible trends in the CPUE data.
RAG Comments	• The SPF sardine sub-area includes both the entire eastern stock and the northern part of the SE stock (i.e. southern NSW). This means that the management unit does not align directly with the biological stocks. Total NSW catches are used to set the TAC for Sardine sub-area. • The annual assessment provided no basis to change previous advice for this stock which was that SPFRAG accepted the 2019 biomass estimate of 42,700 tonnes for Australian sardine and that it was appropriate to apply the Tier 1 exploitation rate for the 2022-23 season.

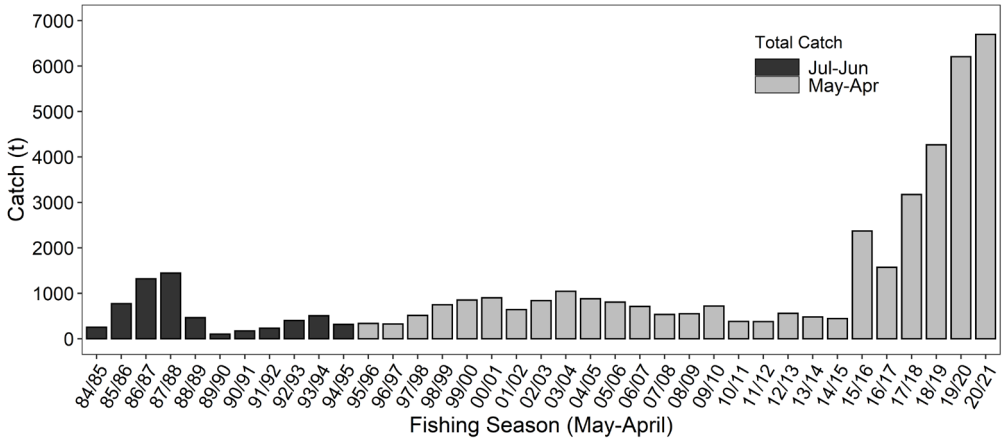
RAG Recommendations

Recommended Biological Catch (RBC)	2022-23	2nd Season at Tier 1 (2019 DEPM estimate) 42,700 x 20% = **8,540 tonnes**

Blue mackerel east

Scomber australasicus



Species Summary			
Common Names	Pacific mackerel, common mackerel, English mackerel, school mackerel, spotted chub mackerel, spotted mackerel, chub mackerel, Japanese mackerel, southern mackerel, slimy mackerel, slimies		
Stock assessment	DEPM Survey conducted in 2019 – 2nd season at Tier 1 (noting it was at Tier 1 for the previous five years based on the 2015 DEPM).		
Exploitation Rate * 2022-23 Tier Level	***Tier 1 - 15% (5 seasons)**	Tier 2 – 7.5% (5 seasons)	Tier 3 – 3.75% (no limit)
Estimated biomass	**80,000 tonnes (2019 DEPM Survey)** 83,000 tonnes (2015 DEPM survey)		
Stock Structure	The stock structure of blue mackerel is uncertain. Genetic analysis of samples from southern Queensland, Western Australia and New Zealand indicates population subdivisions. Genetic differences were detected between Western Australia and Queensland, and between Western Australia and New Zealand, but not between Queensland and New Zealand (Schmarr et al. 2012). No finer-scale analyses of blue mackerel have been undertaken to further define stock structure. Blue mackerel within the SPF is assessed and managed as separate stocks in the eastern and western subareas		
Historical Catch data (State and Commonwealth fisheries)			

	Year	Agreed TAC (t)	TAC after unders/overs (t)	Catch(t) / % TAC Caught

Catch and TAC (t) * incomplete season	2021-22*	11,440	12,584	
	2020-21	11,970	13,167	5,994 / (46%)
	2019-20	11,970	13,179	5,715 / (43%)
	2018-19	12,090	13,299	9,297 / (30%)
	2017-18	12,090	12,249	2,891 / (24%)
ABARES Status	**Biomass: Not overfished**		**Fishing Mortality: Not subject to overfishing**	

Annual Fishery Assessment Summary

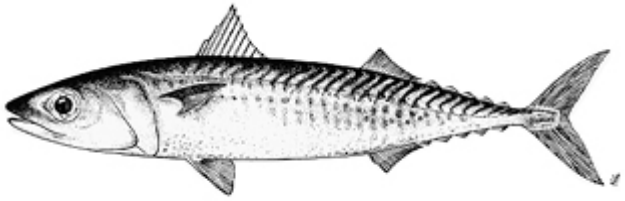
Key model technical assumptions/ parameters	Adult parameters used in the biomass calculation for the blue mackerel (east) stock are from blue mackerel samples collected from South Australia in 2002-06. These samples are used due to difficulties in catching large, adult spawning blue mackerel on the east coast. Resolving this knowledge gap before the next DEPM is undertaken is a high priority.
Weekly CPUE Trends	*The weekly CPUE is monitored for evidence of localised depletion. If a general decrease in CPUE occurs after consistent effort within a given grid cell, this may be evidence of localised depletion occurring. However, there are a number of factors, not just fishing effort, which can also influence CPUE. SPFRAG review this information annually.* There were no discernible trends in the CPUE data.
RAG Comments	• In the 2020/21 SPF fishing season, the catch was the highest for the entire history of fishery. • CPUE appears to be correlated with catch, indicating it is an index of availability rather than abundance. The no reason to be concerned about the status of this stock or the increases in catch. • The fishery is taking small (juvenile) fish, which are not part of the spawning biomass estimate. • SPFRAG noted the need for better estimates of adult parameters. • The annual assessment provided no basis to change previous advice for this stock which was that SPFRAG accepted the 2019 biomass estimate of 80,000 tonnes for blue mackerel east and that it was appropriate to apply the Tier 1 exploitation rate for the 2022-23 season.

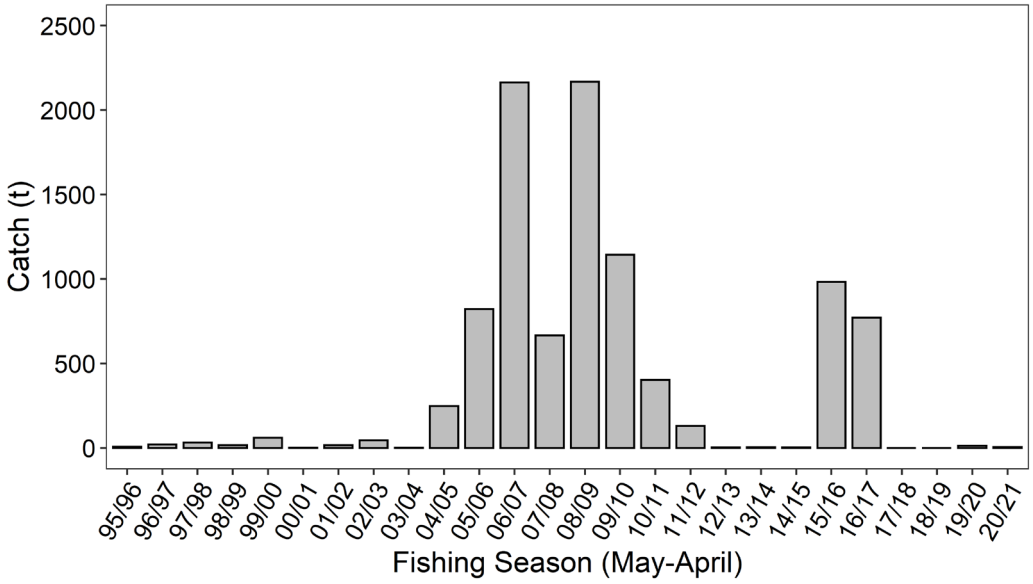
RAG Recommendations

Recommended Biological Catch (RBC)	2022-23	2nd Season at Tier 1 (2019 DEPM) 80,000 x 15% = **12,000 tonnes**

Blue mackerel west

Scomber australasicus



Species Summary			
Common Names	Pacific mackerel, common mackerel, English mackerel, school mackerel, spotted chub mackerel, spotted mackerel, chub mackerel, Japanese mackerel, southern mackerel, slimy mackerel, slimies		
Stock assessment	DEPM survey last conducted in 2005 and 2006 (6th season at Tier 3)		
Exploitation Rate * 2022-23 Tier Level	Tier 1 – 15% (5 seasons)	Tier 2 – 7.5% (5 seasons)	***Tier 3 - 3.75% (no time limit)**
Estimated biomass	86,500 tonnes (2005/2006 DEPM)		
Stock Structure	The stock structure of blue mackerel is uncertain. Genetic analysis of samples from southern Queensland, Western Australia and New Zealand indicates population subdivisions. Genetic differences were detected between Western Australia and Queensland, and between Western Australia and New Zealand, but not between Queensland and New Zealand (Schmarr et al. 2012). No finer-scale analyses of blue mackerel have been undertaken to further define stock structure. Blue mackerel within the SPF is assessed and managed as separate stocks in the eastern and western subareas		
Historical Catch data (State and Commonwealth fisheries)			
Catch and TAC (t)	**Year**	**Agreed TAC (t)**	**TAC after unders/overs (t)**	**Catch(t) / % TAC Caught**

*** incomplete season**	2021-22*	3,210	3,534	
	2020-21	3,210	3,534	0 / (0%)
	2019-20	3,240	3,563	12 / (0%)
	2018-19	3,230	3,850	0 / (0%)
	2017-18	3,230	3,850	0 / (0%)
ABARES Status	**Biomass: Not overfished**		**Fishing Mortality:** **Not subject to overfishing**	

Annual Fisheries Assessment Summary

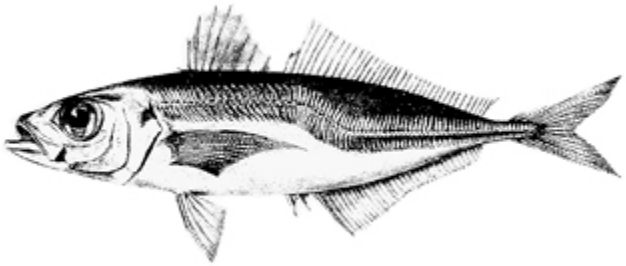
Key model technical assumptions/ parameters	The most recent DEPM surveys for the Blue mackerel was in 2005/06. The 2005 Survey gave a biomass estimate of 56,228 tonnes. A survey was completed in 2006 off Western Australia (out of Esperance) where almost all samples had eggs and larvae. SPFRAG agreed the biomass to be greater than that of the 2005 survey and agreed to an estimate of 86,500 tonnes.
Weekly CPUE Trends	*The weekly CPUE is monitored for evidence of localised depletion. If a general decrease in CPUE occurs after consistent effort within a given grid cell, this may be evidence of localised depletion occurring. However, there are a number of factors, not just fishing effort, which can also influence CPUE. SPFRAG review this information annually.* There was no data to review trends in the CPUE.
RAG Comments	• There was no new data for this stock presented to SPFRAG at the December 2021 meeting given there had been limited fishing in the 2020-21 SPF season in the western sub-area. • The annual assessment provided no basis to change previous advice for this stock which was that SPFRAG accepted the 2005/06 biomass estimate of 86,500 tonnes for blue mackerel west and that it was appropriate to apply the Tier 3 exploitation rate for the 2022-23 season.

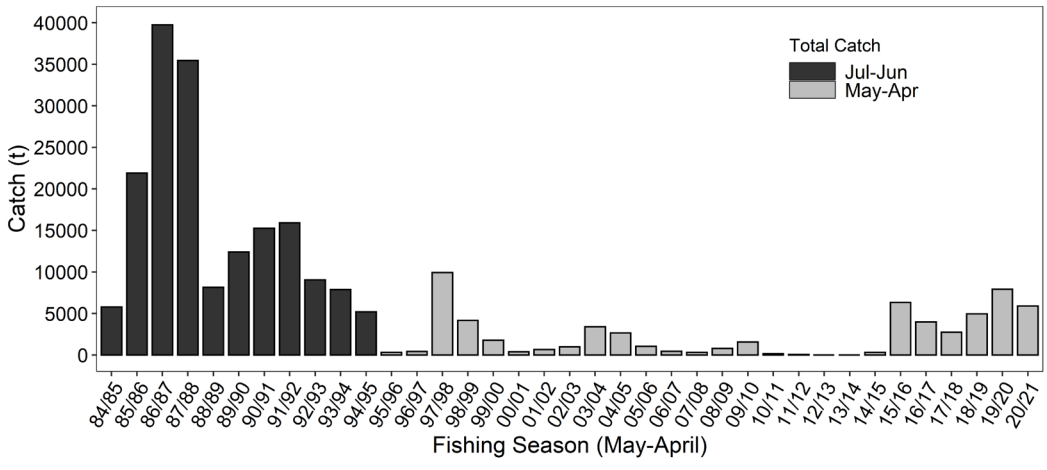
RAG Recommendations

Recommended Biological Catch (RBC)	2022-23	6th Season at Tier 3 86,500 x 3.75% = **3,243 tonnes**

Jack mackerel east

Trachurus declivis



Species Summary			
Common Names	Cowanyoung, greenback horse mackerel, scaly mackerel, scad, common jack mackerel.		
Stock assessment	DEPM survey for jack mackerel conducted in 2018 (3rd Season at Tier 1)		
Exploitation Rate* 2022-23 Tier Level	***Tier 1 - 12% (5 Seasons)**	Tier 2 – 6% (10 seasons)	Tier 3 – 3% (no limit)
Estimated biomass	**156,300 tonnes (2018 biomass estimate)** 157,800 tonnes (2014 biomass estimate)		
Stock Structure	The stock structure of jack mackerel is unclear. Richardson (1982) found evidence of population subdivision between Western Australia, including the Great Australia Bight, and eastern Australia. Richardson (1982) also found evidence of a Wahlund effect (where multiple populations are detected in a single sample) in east coast samples, suggesting some additional structuring. Similarly, Smolenski, Ovenden & White (1994) found evidence of structuring between New South Wales and south-eastern Tasmania, although the differences appeared not to be temporally consistent. A DEPM survey of western jack mackerel appeared to show some stock separation around the Bonney Coast west of Bass Strait (AFMA 2017d). Recent evidence from DEPM surveys showing that jack mackerel spawns throughout Bass Strait suggest that further investigation of stock structure is warranted. Currently, jack mackerel in the SPF is assessed and managed as separate stocks in the eastern and western subarea		
Historical Catch data (State and Commonwealth fisheries)			

	Year	Agreed TAC (t)	TAC after unders/overs (t)	Catch(t) / % TAC Caught
Catch and TAC (t) *** incomplete season**	2021-22*	18,630	20,493	
	2020-21	18,580	20,453	5076 / (28%)
	2019-20	18,730	20,619	7,464 / (36%)
	2018-19	18,890	20,778	4,930 / (24%)
	2017-18	18,880	20,747	2,699 / (13%)
ABARES Status	**Biomass: Not overfished**		**Fishing Mortality:** **Not subject to overfishing**	

Annual Fisheries Assessment Summary

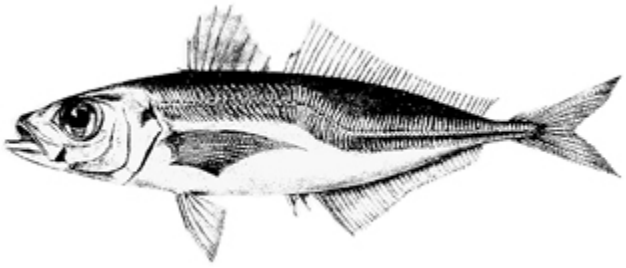
Key model technical assumptions/ parameters	The DEPM and associated adult sampling provided robust estimates of key parameters for this stock.
Weekly CPUE Trends	*The weekly CPUE is monitored for evidence of localised depletion. If a general decrease in CPUE occurs after consistent effort within a given grid cell, this may be evidence of localised depletion occurring. However, there are a number of factors, not just fishing effort, which can also influence CPUE. SPFRAG review this information annually.* There were no discernible trends in the CPUE data.
RAG Comments	• The catch in 2019/20 was the highest over the last 20 years • CPUE appears to be correlated with catch, indicating it is an index of availability rather than abundance. • The RAG saw no reason to be concerned over the status of this stock. • The annual assessment provided no basis to change previous advice for this stock which was that SPFRAG accepted the 2018 biomass estimate of 156,292 tonnes for jack mackerel east and that it was appropriate to apply the Tier 1 exploitation rate for the 2022-23 season.

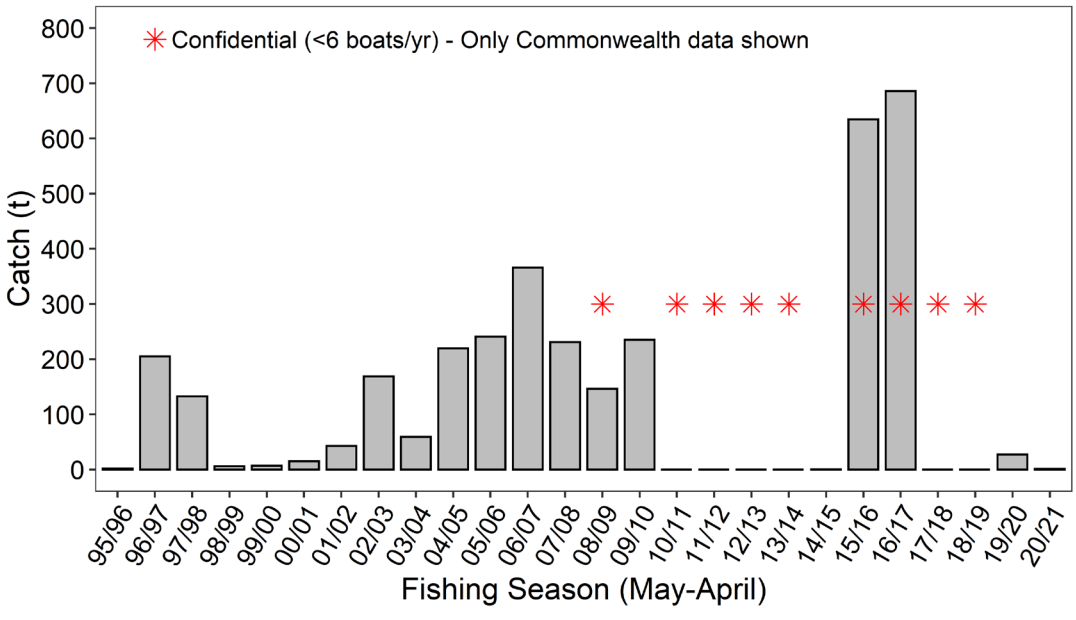
RAG Recommendations

Recommended Biological Catch (RBC)	2022-23	3rd season at Tier 1 156,300 x 12% =**18,756 tonnes**

Jack mackerel west

Trachurus declivis



Species Summary			
Common Names	Cowanyoung, greenback horse mackerel, scaly mackerel, scad, common jack mackerel.		
Stock assessment	DEPM survey for jack mackerel conducted in 2017 (5th Season at Tier 1)		
Exploitation Rate * 2022-23 Tier Level	***Tier 1 - 12% (5 seasons)**	Tier 2 – 6% (10 seasons)	Tier 3 – 3% (no limit)
Estimated biomass	35,000 tonnes		
Stock Structure	The stock structure of jack mackerel is unclear. Richardson (1982) found evidence of population subdivision between Western Australia, including the Great Australia Bight, and eastern Australia. However, DEPM surveys suggest that jack mackerel spawns throughout Bass Strait and that separation of eastern and western stocks may occur around the Bonney Coast (AFMA 2017c). Richardson (1982) also found evidence of a Wahlund effect (where multiple populations are detected in a single sample) in east coast samples, suggesting some additional structuring. Smolenski, Ovenden & White (1994) also found evidence of structuring between New South Wales and south-eastern Tasmania, although the differences were not temporally consistent. These studies suggest that further investigation of stock structure in jack mackerel is warranted. Currently, jack mackerel in the SPF is assessed and managed as separate stocks in the eastern and western subareas.		
Historical Catch data (State and Commonwealth fisheries)			

	Year	Agreed TAC (t)	TAC after unders/overs (t)	Catch(t) / % TAC Caught
Catch and TAC (t) *** incomplete season**	2021-22*	4,180	4,598	
	2020-21	4,170	4,590	0 / (0%)
	2019-20	4,200	4,619	14 / (0%)
	2018-19	4,190	4,282	0 / (0%)
	2017-18	920	1,280	0 / (0%)
ABARES Status	**Biomass: Not overfished**		**Fishing Mortality:** **Not subject to overfishing**	

Annual Fisheries Assessment Summary

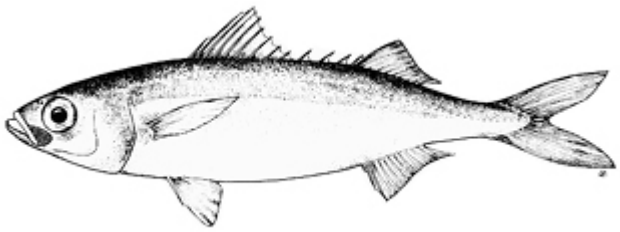
Key model technical assumptions/ parameters	Since only a limited number of adult samples were collected during the 2017 jack mackerel west DEPM survey, adult parameters obtained from the 2014 eastern jack mackerel survey were used to input into the biomass calculation for the western stock.
Weekly CPUE Trends	*The weekly CPUE is monitored for evidence of localised depletion. If a general decrease in CPUE occurs after consistent effort within a given grid cell, this may be evidence of localised depletion occurring. However, there are a number of factors, not just fishing effort, which can also influence CPUE. SPFRAG review this information annually.* There was no data to review trends in the CPUE.
RAG Comments	• There was no new data for this stock presented to SPFRAG at the December 2021 meeting given there had been limited fishing in the 2020 SPF season in the western sub-area. • The annual assessment provided no basis to change previous advice for this stock which was that the DEPM survey for jack mackerel conducted in 2017 provided a best estimate of biomass of 34,978 tonnes (which is the 31,069 plus the Bass Strait estimate) which was considered to be conservative given that the stock extends west of Kangaroo Island and a large amount of spawning activity was detected in Bass Strait which was not extensively sampled (and therefore the biomass estimate is an underestimate). • Due to limited information on the stock structure of jack mackerel west, if catch in the grids south of Kangaroo Island (G54 and G55) reach 20 per cent of the TAC this area will be closed to fishing for the rest of the fishing year. Catch will continue to be restricted to 20 per cent of the TAC in these grids as a precautionary measure until more is known about the stock structure of jack mackerel west in this area.

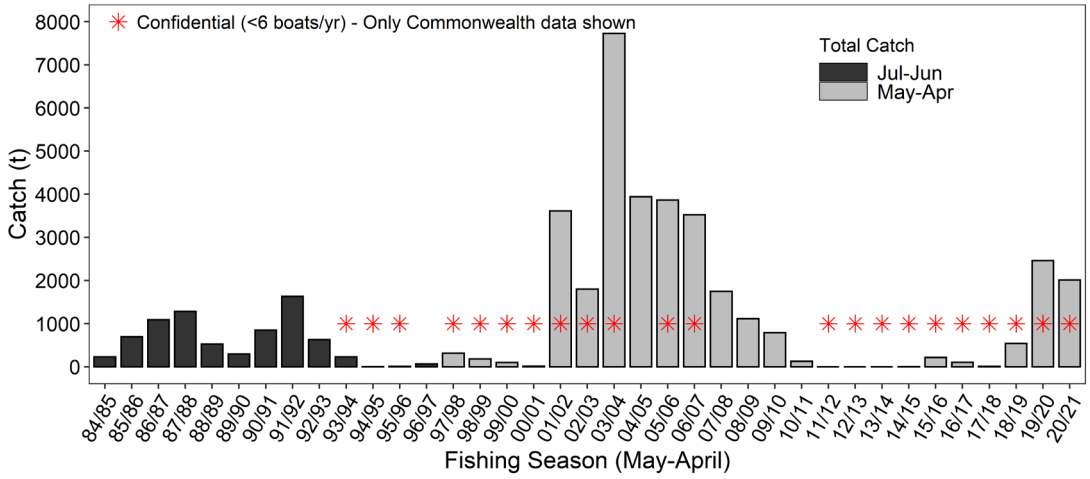
RAG Recommendations

Recommended Biological Catch (RBC)	2022-23	5th Season at Tier 1 35,000 x 12% = **4,200 tonnes**

Redbait east

Emmelichthys nitidus



Species Summary			
Common Names	Pearl fish, picarel, red baitfish, red herring, southern rover, cape bonnetmouth		
Stock assessment	DEPM conducted in 2020 (Tier 1 –1st Season)		
Exploitation Rate * 2022-23 Tier Level	***Tier 1 – 10% (5 Seasons)**	Tier 2 – 5% (10 Seasons)	Tier 3 – 2.5% (no limit)
Estimated biomass	54,000 tonnes (2021 DEPM survey)		
Stock Structure	The stock structure of redbait in Australia has not been studied. Recent DEPM surveys that suggest redbait spawns continuously around southern Tasmania indicate that the stock structure of this species needs to be investigated. Redbait within the SPF is assessed and managed as separate stocks in the eastern and western subareas		
Historical Catch data (State and Commonwealth fisheries)			

Catch and TAC (t) * incomplete season

Year	Agreed TAC (t)	TAC after unders/overs (t)	Catch(t) / % TAC Caught
2021-22*	3,440	3,784	
2020-21	3,420	3,735	1992 / (53%)
2019-20	3,150	3,492	2,445 / (70%)
2018-19	3,420	3,761	319 / (15%)
2017-18	3,410	3,741	15 / (0%)

ABARES Status	Biomass: Not overfished	Fishing Mortality: Not subject to overfishing

Annual Fisheries Assessment Summary

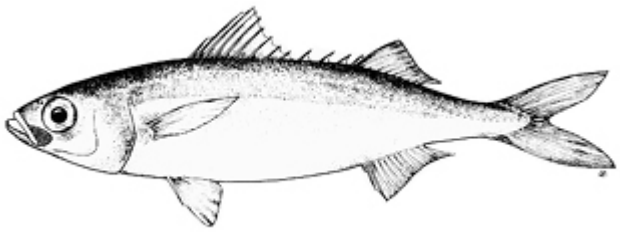
Key model technical assumptions/ parameters	The most recent DEPM survey results for the redbait east stock is from 2020 (RBC 54,000 tonnes) The previous DEPM survey results are from 2005 and 2006. The DEPM surveys gave biomass estimates of 86,990 tonnes (2005) and 50,782 tonnes (2006). The biomass estimate for this stock was the average biomass estimate from the 2005 and 2006 DEPM surveys (68,886 tonnes).
Weekly CPUE Trends	*The weekly CPUE is monitored for evidence of localised depletion. If a general decrease in CPUE occurs after consistent effort within a given grid cell, this may be evidence of localised depletion occurring. However, there are a number of factors, not just fishing effort, which can also influence CPUE. SPFRAG review this information annually.* No discernible trend in weekly CPUE data.
RAG Comments	• SPFRAG agreed to a new biomass estimate of 54,000 tonnes from the 2020 DEPM survey. • Fishing practises have not changed in recent years but there has been a large increase in the catch of redbait. This may be due to an influx of redbait into the fishing area.

RAG Recommendations

Recommended Biological Catch (RBC)	2022-23	1st Season at Tier 1 54,000 x 10% = **5,400 tonnes**

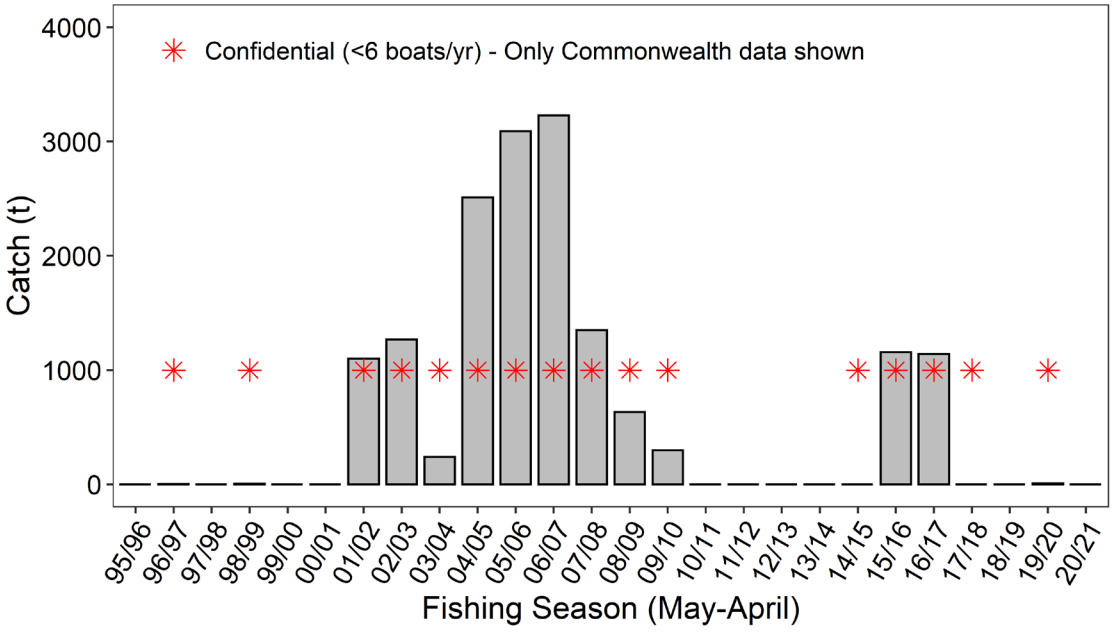
Redbait west

Emmelichthys nitidus



Species Summary			
Common Names	Pearl fish, picarel, red baitfish, red herring, southern rover, Cape bonnetmouth		
Stock assessment	DEPM survey conducted in 2017 (4th Season Tier 1)		
Exploitation Rate * 2022-23 Tier Level	***Tier 1 - 10 % (5 Seasons)**	Tier 2 – 5 % (10 seasons)	Tier 3 – 2.5 % (No limit)
Estimated biomass	66,800 tonnes (2017 DEPM Survey)		
Stock Structure	The stock structure of redbait in Australia has not been studied. Recent DEPM surveys that suggest redbait spawns continuously around southern Tasmania indicate that the stock structure of this species needs to be investigated. Redbait within the SPF is assessed and managed as separate stocks in the eastern and western subareas.		

Historical Catch data (State and Commonwealth fisheries)



Catch and TAC (t) * incomplete season

Year	Agreed TAC (t)	TAC after unders/overs (t)	Catch(t) / % TAC Caught
2021-22*	6,680	7,348	
2020-21	6,640	7,308	0 / (0%)

	2019-20	6,680	6,762	9 / (0%)
	2018-19	820	1,108	0 / (0%)
	2017-18	820	1,108	0 / (0%)
ABARES Status	**Biomass: Not overfished**		**Fishing Mortality: Not subject to overfishing**	

Assessment Summary	
Key model technical assumptions/ parameters	The most plausible model biomass estimate ranged between 51,765 tonnes and 102,867 tonnes. With no solid reason to reject either estimate and for consistency with the approach taken with other stocks, the median biomass estimate of 66,787 tonnes was used as the basis for the Scientific Panel's (now replaced by SPFRAG) recommended biological catch level.
Weekly CPUE Trends	*The weekly CPUE is monitored for evidence of localised depletion. If a general decrease in CPUE occurs after consistent effort within a given grid cell, this may be evidence of localised depletion occurring. However, there are a number of factors, not just fishing effort, which can also influence CPUE. SPFRAG review this information annually.* There was no data to review trends in the CPUE.
RAG Comments	• There was very little new data for this stock presented to SPFRAG at the December 2021 meeting given there had been limited fishing in the 2020 SPF season in the western sub-area. • The annual assessment provided no basis to change previous advice for this stock which was to recommend the spawning biomass estimate of 66,787 tonnes be used for the RBC based on the weight of evidence provided by the survey.

RAG Recommendations		
Recommended Biological Catch (RBC)	2022-23	4th season at Tier 1 66,800 x 10% = **6,680 tonnes**

References

AFMA. (2017). Small Pelagic Fishery Scientific Panel meeting 8, minutes, 16 and 17 November 2017. *Australian Fisheries Management Authority, Canberra*.

Anthony D.M. Smith, T.M. Ward, F. Hurtado, N. Klaer, E. Fulton, A.E. Punt . (2015). Review and update of harvest strategy settings for the Commonwealth Small Pelagic Fishery. *FRDC Project No 2013/028* .

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