

Redfish (2018)

Centroberyx affinis



Fay Helidoniotis: Australian Bureau of Agricultural and Resource Economics and Sciences, **Bradley Moore:** Institute for Marine and Antarctic Studies, University of Tasmania, **Geoff Liggins:** Department of Primary Industries, New South Wales

STOCK STATUS OVERVIEW

Jurisdiction	Stock	Fisheries	Stock status	Indicators
Commonwealth, New South Wales, Tasmania	South Eastern Australia	N/A, OTF, OTLF, SESSF (CTS), SESSF (GHTS), SF	Depleted	Estimated spawning stock biomass, fishing mortality rate, catch

SESSF (CTS) Southern and Eastern Scalefish and Shark Fishery (Commonwealth Trawl Sector) (CTH), SESSF (GHTS) Southern and Eastern Scalefish and Shark Fishery (Gillnet Hook and Trap Sector) (CTH), N/A Not Applicable (NSW), OTF Ocean Trawl Fishery (NSW), OTLF Ocean Trap and Line Fishery (NSW), SF Scalefish Fishery (TAS)

STOCK STRUCTURE

No stock delineation studies of Redfish have been undertaken in Australia. Tagging studies suggested a single stock of Redfish off New South Wales [Morison et al. 2013]. However, studies of mean length at age suggest differences in growth rates of Redfish from the ‘northern’ and ‘southern’ sectors of the fishery off eastern Australia [Morison et al. 2013]. Previous Redfish assessments have assumed that the fishery exploits two separate populations, with the boundary between these being 36°S (immediately north of Montague Island in New South Wales) [Morison et al. 2013]. However, following a review of the evidence for separate stocks, ShelfRAG considered the evidence to be insufficient, and the most recent stock assessment [Tuck and Day 2014] assumes a single stock across regions. Status is determined for a single stock in the east coast of the SESSF (southern New South Wales and eastern Tasmania).

Here, assessment of stock status is presented at the biological stock level—South Eastern Australia.

STOCK STATUS

South Eastern Australia

In the Commonwealth, catches of Redfish peaked in the late 1970s and early 1980s, with significant discards recorded on top of landed catch. Landed catch has decreased steadily since the late 1990s. The catch in 2017 was 26.037 tonnes (t). Estimated discards were 226 t in 2009, but have returned to lower levels in recent years, being usually between 20 t and 70 t since 2010 [Castillo-Jordán et al. 2018]. Weighted average discards between 2013 and 2016 were 41.77 t [Castillo Jordán et al. 2018]. The Redfish TAC has been progressively reduced since 2000. The TAC was 276 t in the 2011–12 to 2013–14 seasons,

138 t in 2014–15 and 100 t in the 2015–16 to 2017–18 seasons. Annual catches have remained below the TAC since 2000

Redfish has only been sporadically fished in Tasmanian waters, with a zero catch in 2016 and 2017. The average annual catch for the period 2010–11 to 2016–17 was 0.002 t, while the total catch over this period was 0.0165 t. Historical catches in Tasmanian waters have been similarly low. The average annual commercial catch for the 10 year period 1995–96 to 2004–05 was 0.047 t. Redfish is not harvested recreationally in Tasmania, and was not reported in the 2007–08 or 2012–13 surveys of recreational fishing in the State [Lyle et al. 2009, Lyle et al. 2014].

The annual commercial catch from New South Wales waters has declined during the past decade from 28.4 t in 2007–08 to 6.5 t in 2016–17. These catches have represented between 12 per cent and 21 per cent of total commercial landings during this decade. Annual catches from the OTLF have been between 2 and 6 t over this decade while catches from the OTF (not to be confused with OTLF) have declined from about 26 t in 2007–08 to 3.5 t in 2016–17. In contrast to 10 years ago, catches from the OTLF now represent 44 per cent of New South Wales commercial landings. The majority of commercial catches from New South Wales waters come from areas adjacent to the Commonwealth fishery, inside 3 nm on the south coast of New South Wales and to the north of Barrenjoey Headland on the mid-north coast of New South Wales. Given this proximity to the Commonwealth fishery and the New South Wales catch representing about 20 per cent of the total fishing mortality, assessment status for the component of the Redfish stock under New South Wales jurisdiction is based on the Commonwealth assessment, which includes catch data from New South Wales.

Redfish have been depleted to below the limit reference point (0.2B₀) since 1999 (Tuck and Day 2014) and are managed under the Redfish stock rebuilding strategy 2016–21 [AFMA 2016], the main objective of which is to rebuild Redfish to the limit reference point (0.2B₀) within 27 years (one mean generation time—16.7 years [Tuck and Day 2014]—plus 10 years). The rebuilding strategy prescribes that the TAC will be set at the minimum incidental catch allowance required to cover the catch of Redfish taken incidentally while targeting other species. This amount has been set at 100 t since 2015–16 fishing season [AFMA 2017, AFMA 2015].

Redfish are assessed using an integrated statistical catch-at-age model, incorporating State catches to the extent that these are known. To provide some context of the development of the incidental catch allowance, two assessments are informative: the 2014 assessment [Tuck and Day 2014] and the 2017 assessment [Tuck et al. 2017], and these two assessments need to be considered in combination. The most recent assessment of 2017 [Tuck et al. 2017] was an update of the previous full assessment of 2014 [Tuck and Day 2014]. The 2014 assessment estimated that the stock should rebuild to above the limit reference point by 2018 or 2019 under a total fishing mortality of up to 150 t [Tuck and Day 2014, AFMA 2016].

However the base-case model in the 2017 assessment predicted spawning biomass in 2018 to be only 8 per cent per cent of unexploited levels, a decrease from the 2014 assessment which predicted spawning biomass of 11 per cent (0.11B₀) in 2015. The 2014 assessment estimated that below-average recruitment occurred between 2001 and 2009. While age composition data at the time suggested three recent years of improved recruitment: 2011 and 2012 [Tuck and Day 2014], and 2013 [Thomson et al. 2015], the magnitude of the 2011 recruitment in the 2014 assessment was substantially revised downwards in the 2017 assessment [Tuck et al. 2017]. It is now estimated that there has been only one year of above-average recruitment since 2001.

Standardised Redfish CPUE (excluding discards) has declined steadily since 2000, and has remained low in recent years [Haddon and Sporcic 2017]. The most recent assessment of Tuck et al. [2017] estimates that biomass in 2018 to

be 8 per cent per cent of the unfished level. The stock is considered to be recruitment impaired.

The incidental catch allowance for the 2017–18 fishing season under the Redfish Rebuilding Strategy was 100 t. Total landings for 2017 were 26.04 t for the Commonwealth and 13.177 t from New South Wales (including recreational), and the weighted average discards were 41.77 t, giving a total of 80.987 t. The level of discarding of Redfish has been variable in recent years, reaching 68.9 t in 2015 (49.7 per cent of the total Commonwealth and state catch) to 23 t in 2016 (30.8 per cent of the total Commonwealth and state catch) [Castillo-Jordán et al. 2018]. Although mortality of 80.987 t was less than the incidental catch allowance of 100 t, the estimation of discards is uncertain. The current level of fishing mortality is expected to allow the stock to recover from its recruitment impaired state; however measurable improvements in biomass are yet to be detected.

On the basis of the evidence provided above, the South Eastern Australia biological stock is classified as a **depleted stock**.

BIOLOGY

Redfish biology [Kailola et al. 1993]

Species	Longevity / Maximum Size	Maturity (50 per cent)
Redfish	Males 11 years, 330 mm FL Females 16 years, 380 mm FL	4 years, 200–250 mm

DISTRIBUTION



Distribution of reported commercial catch of Redfish

TABLES

Commercial Catch Methods	Commonwealth	New South Wales	Tasmania
Danish Seine	✓		
Demersal Gillnet	✓		

Demersal Longline	✓		
Dropline	✓		
Fish Trap		✓	
Handline (mechanised)	✓		
Hook and Line		✓	
Midwater Trawl	✓		
Otter Trawl	✓	✓	
Rod and reel	✓		
Unspecified		✓	✓

Fishing methods			
	Commonwealth	New South Wales	Tasmania
Charter			
Hook and Line		✓	
Rod and reel		✓	
Commercial			
Danish Seine	✓		
Demersal Gillnet	✓		
Demersal Longline	✓		
Dropline	✓		
Fish Trap		✓	
Handline (mechanised)	✓		
Hook and Line		✓	
Otter Trawl	✓	✓	
Unspecified		✓	✓
Indigenous			
Hook and Line		✓	
Rod and reel		✓	
Recreational			
Hook and Line		✓	
Rod and reel		✓	
Management Methods			
	Commonwealth	New South Wales	Tasmania
Charter			
Bag and possession limits		✓	
Bag limits		✓	

Gear restrictions		✓	
Licence		✓	
Marine park closures		✓	
Commercial			
Bag and possession limits			✓
Catch limits		✓	✓
Gear restrictions	✓	✓	
Individual transferable quota	✓		
Limited entry	✓	✓	✓
Marine park closures		✓	
Mesh size regulations		✓	
Quota	✓		
Spatial closures		✓	
Total allowable catch	✓		
Vessel restrictions		✓	
Indigenous			
Bag limits		✓	
Native Title		✓	
Section 37 (1d)(3)(9), Aboriginal cultural fishing authority		✓	
Recreational			
Bag and possession limits		✓	
Bag limits		✓	
Gear restrictions		✓	
Licence		✓	
Marine park closures		✓	
Active Vessels			
	Commonwealth	New South Wales	Tasmania
	2 Fishina	33 Fishina	0 Fishina

	Business in SESSF (GABTS), 12 Fishing Business in SESSF (GHST), 26 Fishing Business in SESSF (CTS),	Business in OTF, 52 Fishing Business in OTLF,	Business in SF,
--	--	--	-----------------

SESSF (CTS) Southern and Eastern Scalefish and Shark Fishery (Commonwealth Trawl Sector)(CTH)

SESSF (GABTS) Southern and Eastern Scalefish and Shark Fishery (Great Australian Bight Trawl Sector)(CTH)

SESSF (GHST) Southern and Eastern Scalefish and Shark Fishery (Gillnet Hook and Trap Sector)(CTH)

OTF Ocean Trawl Fishery(NSW)

OTLF Ocean Trap and Line Fishery(NSW)

SF Scalefish Fishery(TAS)

Catch			
	Commonwealth	New South Wales	Tasmania
Commercial	25.9892t in SESSF (CTS), 0.04876t in SESSF (GHST),	0.095t in N/A, 3.762t in OTF, 2.82t in OTLF,	0t in SF,
Indigenous	No Catches	Negligible (2013–14)	Unknown
Recreational	No catches	6.5 t (2013–14)	Unknown

SESSF (CTS) Southern and Eastern Scalefish and Shark Fishery (Commonwealth Trawl Sector) (CTH), SESSF (GHST) Southern and Eastern Scalefish and Shark Fishery (Gillnet Hook and Trap Sector) (CTH), N/A Not Applicable (NSW), OTF Ocean Trawl Fishery (NSW), OTLF Ocean Trap and Line Fishery (NSW), SF Scalefish Fishery (TAS),

Commonwealth – Commercial (Management Methods/ Catch) Data provided for the Commonwealth align with the Commonwealth Southern and Eastern Scalefish and Shark Fishery for the 2017 calendar year.

Commonwealth – Recreational The Commonwealth does not manage recreational fishing in Commonwealth waters. Recreational fishing in Commonwealth waters is managed by the state or territory immediately adjacent to those waters, under its management regulations.

Commonwealth – Indigenous The Australian government does not manage non-commercial Indigenous fishing in Commonwealth waters, with the exception of Torres Strait. In general, non-commercial Indigenous fishing in Commonwealth waters is managed by the state or territory immediately adjacent to those waters.

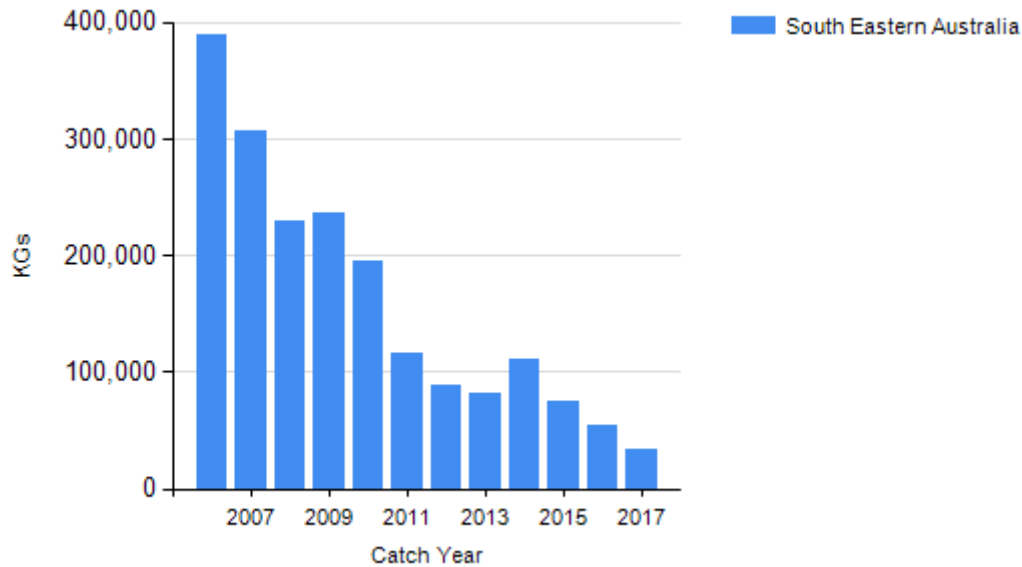
New South Wales - Indigenous (a) The Aboriginal Cultural Fishing Interim Access Arrangement allows an Indigenous fisher in New South Wales to take in excess of a recreational bag limit in certain circumstances - for example, if they are doing so to provide fish to other community members who cannot harvest themselves; (b) The Aboriginal Cultural Fishing Authority is the authority that Indigenous persons can apply to take catches outside the recreational limits under the *Fisheries Management Act 1994* (NSW), Section 27 (1d)(3)(9); and (c) In cases where the *Native Title Act 1993* (Cth) applies fishing activity can be undertaken by the person holding native title in line with S.211 of that Act, which provides for fishing activities for the purpose of satisfying their personal, domestic or non-commercial communal needs. In managing the resource where native title has been formally recognised, the native title holders are engaged with to ensure their native title rights are respected and inform management of the State's fisheries resources.

Tasmania – Commercial (catch) Catches reported for the Tasmanian Scalefish Fishery are for the period 1 July to 30 June the following year. The most recent assessment available is for

2016–17.

Tasmania – Commercial (Management Methods) The holder of a fishing licence (personal) who is not operating in accordance with a Commonwealth authority must not take, or be in possession of, more than 50 kg of Redfish.

CATCH CHART



Commercial catch of Redfish - note confidential catch not shown. Discards are not included

EFFECTS OF FISHING ON THE MARINE ENVIRONMENT

ENVIRONMENTAL EFFECTS on Redfish

References	
1109	Lyle, JM, Stark, KE and Tracey, SR 2014, 2012–13 survey of recreational fishing in Tasmania. Institute for Marine and Antarctic Studies, Hobart.
1102	AFMA Catchwatch Southern and Eastern Scalefish and Shark Fishery 2015
1103	AFMA 2016, Redfish (<i>Centroberyx affinis</i>) stock rebuilding strategy 2016–2021, AFMA, Canberra.
1104	AFMA 2017a, SESSF Total Allowable Catch recommendations for the 2017–18 fishing year AFMA
1105	Castillo-Jordán C, Althaus F and Thomson R. 2018, SESSF catches and discards for TAC purposes. CSIRO Oceans and Atmosphere for AFMA, Canberra
1106	Haddon M and Sporcic M 2017, Statistical CPUE Standardizations for selected SESSF species (data to 2016). CSIRO Oceans and Atmosphere, 31 July 2017, Prepared for the SESSFrag Data Meeting, 7–8 August 2017, Hobart, for the Australian Fisheries Management Authority
1107	Kailola PJ, Williams MJ, Stewart PC, Reichelt R.E, McNee A and Grieve C, 1993. Australian Fisheries Resources. Australian Bureau of Resource Sciences. Canberra
1108	Lyle, JM, Tracey, SR, Stark, KE and Wotherspoon, S, 2009, 2007-08 survey of recreational fishing in Tasmania. Tasmanian Aquaculture and Fisheries Institute, Hobart
1110	Morison A, Knuckey IA, Simpfendorfer CA and Buckworth RC 2013, South East Scalefish and Shark Fishery: draft 2012 stock assessment summaries for species assessed by GABRAG, ShelfRAG and Slope/DeepRAG, Report for AFMA, Canberra
1111	Sporcic, M, Klaer, N, Fuller, M, Krucic-Golub, K & Upston, J 2015, Data summary
1112	for the Southern and Eastern Scalefish and Shark Fishery: logbook, landings and observer
1113	data to 2014, draft report to AFMA, CSIRO Wealth from Oceans Flagship
1114	Tuck G and Day J 2014, Stock assessment for redfish <i>Centroberyx affinis</i> based on data up to 2013, CSIRO Oceans and Atmosphere Flagship, Hobart.

1115	Tuck GN, Day J, Haddon M. and Castillo-Jordan C 2017, DRAFT - Redfish (<i>Centroberyx affinis</i>) stock assessment based on data up to 2016, CSIRO Oceans and Atmosphere. Technical paper presented for discussion at SERAG, December 2017, Hobart, Tasmania for the Australian Fisheries Management Authority
1116	West LD, Stark KE, Murphy JJ, Lyle JM and Doyle FA 2015, Survey of recreational fishing in New South Wales and the ACT, 2013/14, Fisheries Final Report Series No. 149, NSW Department of Primary Industries.