

Spotted Mackerel (2020)

Scomberomorus munroi



Alice Pidd: Department of Agriculture and Fisheries, Queensland, **John Stewart:** Department of Primary Industries, New South Wales, **Paul Lewis:** Department of Primary Industries and Regional Development, Western Australia, **Grant Johnson:** Department of Primary Industry and Resources, Northern Territory, **Lenore Litherland:** Department of Agriculture and Fisheries, Queensland

STOCK STATUS OVERVIEW

Jurisdiction	Stock	Stock status	Indicators
Western Australia, Northern Territory, Queensland	Northern Australia	Negligible	Catch, effort, current and historical fishing pressure
Queensland, New South Wales	Eastern Australia	Sustainable	Biomass, Catch, CPUE, Fishery-dependent length and age frequency, Estimates of total mortality rates

STOCK STRUCTURE

Spotted Mackerel occurs in continental shelf waters along Australia's western, northern and eastern coast between the Abrolhos Islands region to central New South Wales [Begg et al. 1998a, Cameron and Begg 2002]. In eastern Australian waters, Spotted Mackerel comprise a single stock (confirmed through genetic analysis, otolith microchemistry and tagging studies) that is genetically isolated from fish in the northern Arafura Sea [Begg et al. 1998a,b, Cameron and Begg 2002]. In northern and western Australian waters the delineation of stocks is less clear. Results from an otolith microchemistry study suggest that fish from Gove and Joseph Bonaparte Gulf may belong to separate stocks [Cameron and Begg 2002] although the biological stock boundaries are unknown. Here, assessment of stock status is presented at the biological stock level—Eastern Australia; and the management unit—Northern Australia.

STOCK STATUS

Eastern Australia

Spotted Mackerel is commonly fished throughout its distribution along the east coast of Australia. Queensland and New South Wales both access the part of the biological stock that occurs in their waters. Most of the fishery occurs in Queensland, with a smaller seasonal fishery in northern New South Wales [Stewart et al. 2015] during late summer–autumn. A 2005 stock assessment indicated that catches in 2002 were near, or above, the estimated maximum sustainable yield (MSY) and that the stock was at risk of being overfished [Begg

et al. 2005]. Management measures introduced in Queensland since 2002 have substantially reduced that risk [Litherland et al. 2018]. The measures included a limit on the commercial harvest, the prevention of fishing using ring nets, by-product possession limits for net fishers and a reduced recreational possession limit. As a result of these restrictions, the Queensland commercial net harvest has been stable, but low. A stock assessment in 2018 indicated that the total Queensland harvest sits below MSY, with unfished biomass estimates for 2016–17 sitting between 40–60% [Bessell-Browne et al. 2018]. In 2018–19, the Queensland commercial net and line harvest was 46 tonnes (t), which is below the 10-year average of 56 t and well below the annual commercial catch limit of 140 t [QFISH 2020]. The number of active licences and days fished in 2018–19 was below the 10-year average [QFISH 2020]. The Queensland recreational harvest of Spotted Mackerel decreased between 2000 and 2019 (120 000 fish to 31 000 fish) [Teixeira et al. 2021], reflecting in part the reduction in recreational line fishing effort between 2000 and 2011 [Taylor et al. 2012]. The New South Wales recreational harvest of Spotted Mackerel was similar during 2001 and 2013–14 at between 10 000 and 13 000 fish, estimated to weigh around 41 t [Stewart et al. 2015, West et al. 2015], but may have declined substantially to less than 2 000 fish during the most recent survey during 2017–18, noting that this survey estimate is not robust due to small sample sizes [Murphy et al. 2020].

Standardised catch rates for the Queensland commercial line fishery were below the 10-year average in 2016–17, and the lowest in a 30 year time series [Bessell-Browne et al. 2018]. Nominal catch rates in New South Wales have fluctuated, but show no overall trends over the past 20 years [Stewart et al. 2015, NSW DPI Unpublished data]. The minimum legal size in Queensland and New South Wales is set above the size at maturity for males and equal to the size at maturity for females, providing some protection of the spawning stock [Begg 1998, Begg and Sellin 1998]. Post-capture mortality of Spotted Mackerel is currently unknown. However, indications of at least 50% mortality in Spanish and Grey Mackerel as a result of recreational fishing activity [O'Neill et al. 2018, Bessell-Browne et al. 2019] suggests that other *Scomberomorus* species may experience a similar susceptibility to discarding. In Queensland, fishery-dependent monitoring of the recreational and commercial harvest shows relatively consistent length structures during the past 10 years [Bessell-Browne et al. 2018]. Fishery-dependent monitoring indicates that a broad range of ages, including older fish (4–10-year-olds) were present in the harvest, with 2–5-year-olds dominating the catch [Bessell-Browne et al. 2018]. Estimates of total mortality rate, derived from the fishery-dependent age composition data, indicate fishing mortality was lower than natural mortality in 2016–17 [Bessell-Browne et al. 2018]. These are positive indicators of a stable spawning biomass with continuing recruitment. The above evidence indicates that the biomass of the stock is unlikely to be depleted and that recruitment is unlikely to be impaired, and that the current level of fishing mortality is unlikely to cause the stock to become recruitment impaired.

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

Northern Australia

Spotted Mackerel is broadly distributed across northern Australia, with components occurring in Western Australia, Northern Territory and Queensland [Begg et al. 1998a, Cameron and Begg 2002]. Stock status for the Northern Australia management unit is reported as Negligible due to historically low catches and the stock has not been subject to targeted fishing [West et al. 2012, Webley et al. 2015, Teixeira et al. 2021, QFISH 2020].

Spotted Mackerel is not a major component of the commercial or recreational landings in any jurisdiction within the Northern Australia management units. In Western Australia, only the Mackerel Managed Fishery is licensed to land mackerel species and in 2019 the reported commercial catch of Spotted

Mackerel was less than 10 kg. The Western Australian Mackerel Managed Fishery predominantly targets Spanish Mackerel with gear, and in locations, not conducive to catching Spotted Mackerel. The species is not a major component of the recreational landings, estimated at 273 fish (+/- 84 se) in the 2017–18 boat based survey [Ryan et al. 2019] and the 2019 WA Charter catch was 61 kg. In the Northern Territory the recreational catch is < 2 t [West et al. 2012] and the commercial catch has averaged 326 kg over the last 10 years with a maximum harvest of 1,276kg in 2016. In Queensland Gulf of Carpentaria waters recreational and commercial catches are limited, with negligible commercial net and line harvests. There is a recreational possession limit of five Spotted Mackerel in both Northern Territory and Queensland waters. Fishing is unlikely to be having a negative impact on the stock.

BIOLOGY

Spotted Mackerel biology [Begg et al. 1998a, Cameron and Begg 2002, Begg et al. 2005, QDAF 2018]

Species	Longevity / Maximum Size	Maturity (50 per cent)
Spotted Mackerel	10 years, 1 230 mm TL	Females 1–2 years, 600 mm TL Males 1–2 years, 520 mm TL

DISTRIBUTION



Distribution of reported commercial catch of Spotted Mackerel

TABLES

Fishing methods	New South Wales	Northern Territory	Queensland	Western Australia
Charter				
Hook and Line	✓	✓	✓	✓

Commercial				
Gillnet		✓		
Line	✓		✓	
Net			✓	
Purse Seine		✓		
Trolling				✓
Various	✓			
Recreational				
Hook and Line	✓	✓	✓	
Spearfishing	✓		✓	

Management Methods		
	New South Wales	Queensland
Charter		
Bag and possession limits	✓	
Bag limits	✓	✓
Gear restrictions	✓	✓
Licence	✓	
Marine park closures	✓	✓
Possession limit		✓
Size limit	✓	✓
Spatial closures	✓	✓
Spatial zoning		✓
Commercial		
Fishery spatial closures		✓
Gear restrictions	✓	✓
Limited entry	✓	✓
Marine park closures	✓	✓
Size limit	✓	✓
Spatial closures	✓	✓
Spatial zoning		✓
Total allowable catch		✓
Vessel restrictions	✓	✓

Recreational		
Bag and possession limits	✓	
Bag limits	✓	✓
Gear restrictions	✓	✓
Licence	✓	
Marine park closures	✓	✓
Possession limit		✓
Size limit	✓	✓
Spatial closures	✓	✓
Spatial zoning		✓

Catch	New South Wales	Northern Territory	Queensland	Western Australia
Charter		0.2 t		< 0.5 t
Commercial	33.5573 t	0.084 t	46.7137 t	0 t
Indigenous	Unknown	Unknown	Unknown	
Recreational	1 602 fish (2017-18)	0.9 t (2015)	81.17 t (2013–14)	Insufficient data

Queensland – recreational (catch) Estimated from Teixeira et al. 2021 (31 219 fish retained by Queensland residents) and average weight of 2.6 kg.

Queensland – Indigenous (management methods) for more information see <https://www.daf.qld.gov.au/business-priorities/fisheries/traditional-fishing>

New South Wales – Recreational (Catch) Murphy et al. [2020].

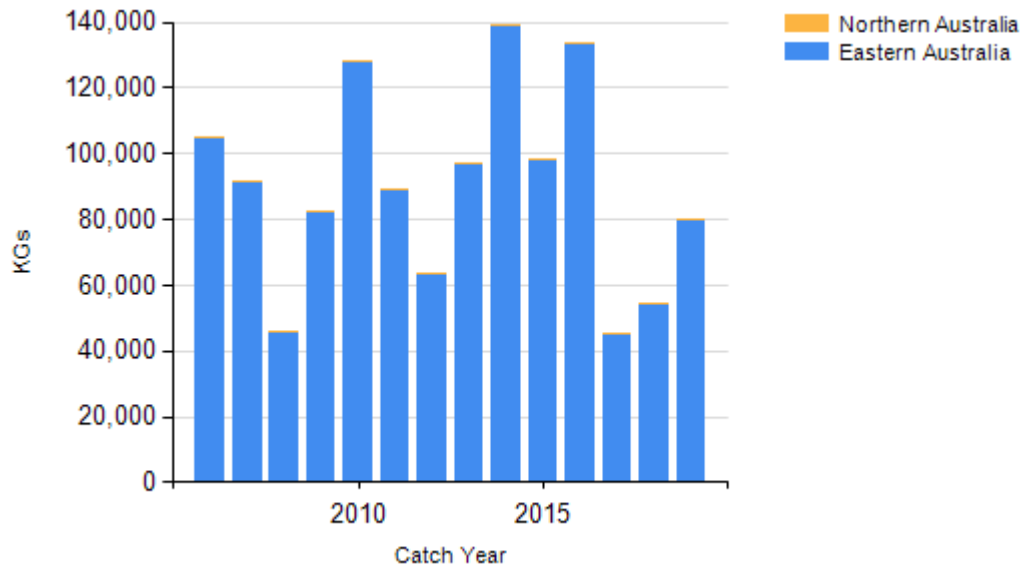
New South Wales – Indigenous (management methods)
(<https://www.dpi.nsw.gov.au/fishing/aboriginal-fishing>).

Western Australia – Recreational (Catch) Statewide survey of boat-based recreational fishing in Western Australia 2017/18 [Ryan et al. 2019]. Shore-based catch (if any) largely unknown.

Western Australia – Recreational (Management methods) Boat-based recreational fishing licence required.

Western Australia – Charter (Catch) The charter catch is an estimate based on numbers of fish caught multiplied by an average weight.

CATCH CHART



Commercial catch of Spotted Mackerel - note confidential catch not shown

References	
Begg 1998	Begg, GA 1998, 'Reproductive biology of school mackerel (<i>Scomberomorus queenslandicus</i>) and spotted mackerel (<i>S. munroi</i>) in Queensland east-coast waters', <i>Marine and Freshwater Research</i> , 49(3): 261–270.
Begg and Sellin 1998	Begg, GA and Sellin, MJ 1998, 'Age and growth of school mackerel (<i>Scomberomorus queenslandicus</i>) and spotted mackerel (<i>S. munroi</i>) in Queensland east-coast waters with implications for stock structure', <i>Marine and Freshwater Research</i> , 49(2): 109–120.
Begg et al 1998a	Begg, G, Keenan, C and Sellin, M 1998, Genetic variation and stock structure of school mackerel and spotted mackerel in northern Australian waters, <i>Journal of Fish Biology</i> , 53: 543–559.
Begg et al 1998b	Begg, GA, Cappo, M, Cameron, DS, Boyle, S, and Sellin, MJ 1998, 'Stock discrimination of school mackerel, <i>Scomberomorus queenslandicus</i> , and spotted mackerel, <i>Scomberomorus munroi</i> , in coastal waters of eastern Australia by analysis of minor and trace elements in whole otoliths', <i>Fishery Bulletin</i> , 96(4): 653–666.
Begg et al 2005	Begg, GA, O'Neill, MF, Cadrin, SX and Bergenius, MAJ 2005, <i>Stock Assessment of the Australian East Coast Spotted Mackerel Fishery</i> , CRC Reef Research Centre, Townsville.
Cameron and Begg 2002	Cameron, D and Begg, G 2002, <i>Fisheries biology and interaction in the northern Australian small mackerel fishery. Final report to Fisheries Research and Development Corporation, Projects 92/144 and 92/144.02</i> , Department of Primary Industries, Queensland.
Stewart et al 2015	Stewart, J, Hegarty, A, Young, C, Fowler, AM and Craig, J 2015, <i>Status of Fisheries Resources in NSW 2013–14</i> , NSW Department of Primary Industries, Mosman.
Taylor et al 2010	Taylor, S, Webley, J and McInnes, K 2012, <i>2010 statewide recreational fishing survey</i> , Department of Agriculture, Fisheries and Forestry, Brisbane, Australia.
Webley et al 2015	Webley, J, McInnes, K, Teixeira, D, Lawson, A and Quinn, R 2015, <i>Statewide Recreational Fishing Survey 2013–14</i> . Department of Agriculture and Fisheries, Queensland.
West et al 2012	West, LD, Lyle, JM, Matthews, SR, Stark, KE and Steffe, AS 2012, <i>Survey of Recreational Fishing in the Northern Territory, 2009–10</i> , Fishery Report 109, Department of Primary Industry and Fisheries, Darwin.
West et al 2015	West, LD, Stark, KE, Murphy, JJ, Lyle JM and Doyle, FA 2015, <i>Survey of recreational fishing in New South Wales and the ACT, 2013/14</i> . Fisheries Final Report Series No. 149. NSW Department of Primary Industries, Wollongong.
Bessell-Browne et al 2018	Bessell-Browne, P, O'Neill, MF, and Litherland, L 2018, <i>Stock assessment of the Australian east coast spotted mackerel (<i>Scomberomorus munroi</i>) fishery (2018)</i> . Department of Agriculture and Fisheries, Queensland Government. Brisbane, Queensland.
Murphy et al 2020	Murphy, JJ, Ochwada-Doyle, FA, West, LD, Stark, KE and Hughes, JM 2020, <i>The NSW Recreational Fisheries Monitoring Program - survey of recreational fishing, 2017/18</i> . NSW DPI - Fisheries Final Report Series No. 158.
QFISH 2020	QFish, Department of Agriculture and Fisheries, www.qfish.gov.au
Teixeira et al. 2021	Teixeira, D, Janes, R, and Webley, J 2021, <i>2019–20 Statewide Recreational Fishing Survey Key Results</i> . Project Report. State of Queensland, Brisbane.

STATUS OF AUSTRALIAN FISH STOCKS REPORT
Spotted Mackerel (2020)

Ryan et al. 2019	Ryan, KL, Hall, NG, Lai, EK, Smallwood, CB, Tate, A, Taylor, SM, Wise, BS 2019, State-wide survey of boat based recreational fishing in Western Australia 2017/18, Fisheries Research Report 297, Department of Primary Industries and Regional Development, Western Australia.
Litherland et al 2018	Litherland, L, Johnson, G, Stewart, J, Lewis, P, 2018, Spotted Mackerel, <i>Scomberomorus munroi</i> , in Carolyn Stewardson, James Andrews, Crispian Ashby, Malcolm Haddon, Klaas Hartmann, Patrick Hone, Peter Horvat, Stephen Mayfield, Anthony Roelofs, Keith Sainsbury, Thor Saunders, John Stewart, Simon Nicol and Brent Wise (eds) 2018, Status of Australian fish stocks reports 2018, Fisheries Research and Development Corporation, Canberra.
O'Neill et al. 2018	O'Neill MF, Langstreth J, Buckley SM, Stewart J 2018 Stock assessment of Australian east coast Spanish mackerel: Predictions of stock status and reference points. Department of Agriculture and Fisheries, Brisbane, Queensland 103 pp.
Bessell-Browne et al. 2019	Bessell-Browne, P., Lovett, R., Leigh, G., O'Neill, M. F. & Campbell, A. (2019). Stock assessment of the Australian east coast grey mackerel (<i>Scomberomorus semifasciatus</i>) fishery (2019). Department of Agriculture and Fisheries, Queensland Government. Brisbane, Queensland.