

Spanish Mackerel (2016)

Scomberomorus commerson



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STOCK STATUS OVERVIEW

Jurisdiction	Stock	Fisheries	Stock status	Indicators
Commonwealth	Torres Strait Spanish Mackerel Fishery	TSSMF	Sustainable	Biomass, fishing mortality, catch and effort
Western Australia	Mackerel Managed Fishery	MMF	Sustainable	Catch, catch rate
Northern Territory	Northern Territory	DF, ONLF, SMF	Sustainable	Biomass
Queensland	Gulf of Carpentaria	GOCIFFF, GOCLF	Sustainable	Catch, catch rate, fishing mortality, length and age structure
Queensland, New South Wales	East Coast	ECSMF, OTLF	Sustainable	Biomass, fishing mortality, catch and catch rate, length and age structure, TAC

TSSMF Torres Strait Spanish Mackerel Fishery (CTH), OTLF Ocean Trap and Line (NSW), DF Demersal Fishery (NT), ONLF Offshore Net and Line Fishery (NT), SMF Spanish Mackerel Fishery (NT), ECSMF East Coast Spanish Mackerel Fishery (QLD), GOCIFFF Gulf of Carpentaria Inshore Fin Fish Fishery (QLD), GOCLF Gulf of Carpentaria Line Fishery (QLD), MMF Mackerel Managed Fishery (WA)

STOCK STRUCTURE

Genetic evidence indicates that there are three biological stocks of Spanish Mackerel across northern Australia[1]; however, evidence from otolith microchemistry, parasite analysis and limited adult movement (at scales greater than 100 km) indicates that there are likely to be a number of smaller biological stocks with limited interaction[1–3]. Each jurisdiction is likely to have multiple biological stocks within its boundaries; however, the difficulty in obtaining relevant biological, and catch and effort, information to assess each stock individually has meant that not all assessments are undertaken at the biological stock level. Those that are, are based on the

populations that receive the highest harvest rates; their status can be assumed to be representative of the highest level of exploitation that occurs on any population within each management unit or jurisdiction.

Here, assessment of stock status is presented at the biological stock level—Torres Strait Spanish Mackerel Fishery (Commonwealth) and East coast (Queensland and New South Wales); management unit level—Mackerel Managed Fishery (Western Australia), Gulf of Carpentaria (Queensland); and jurisdictional level—Northern Territory.

STOCK STATUS

East Coast The cross-jurisdictional East coast biological stock extends from Cape York in north Queensland waters, to its southern extent in northern New South Wales[13]. Each jurisdiction assesses and manages the part of the biological stock that occurs in its waters however, a combined stock assessment for the biological stock is conducted. The status presented here for the biological stock has been established using evidence from the two jurisdictions.

Total commercial and recreational landings for the biological stock (614 t in 2014–15[12]) over the past few years have been below the lowest sustainable yield estimate (yield that sustains a biomass of 1.2BMSY in the hyperstable model case) of 956 t, as well as below the lowest risk management yield estimate of 715 t[14]. The majority of the catch for the commercial line fisheries in both jurisdictions (337 t in 2014–15) is taken within Queensland waters (89 per cent) with a smaller seasonal fishery in northern New South Wales waters[15] during late summer–autumn. Almost a third of the total commercial catch is taken from a very small area off the coast of Townsville (North Queensland) and most of this during only a few months of the year[12], indicating potentially high localised fishing pressure. Recreational catch (estimated at 277 t in 2013 [11,15,16]) is similar to the commercial catch and is spread along the extent of the east coast in Queensland and northern New South Wales waters. In Queensland, a total allowable catch and individual transferable quotas introduced in 2004 for the commercial fishery substantially reduced participation to the lowest levels recorded in the past 25 years. Fishing effort has since increased from around 9000–13 500 tender vessel days, with fishing effort almost doubling on the main fishing grounds off Townsville (north Queensland) over the past 8 years[12].

The most recent assessment[14] estimates that biomass in 2008–09 ranged from 34–55 per cent of the unfished (1937) level. Research, using commercial Queensland catch and effort data, describes a contraction in the spatial and temporal presence of aggregations on the main commercial fishing grounds[17] in North Queensland, which may be a result of the vulnerable nature of transient spawning aggregations that form each year[18]. However, standardised commercial catch rates are relatively stable across the majority of the Queensland fishery and nominal catch rates in New South Wales vary but show no overall trends during the past 20 years[15]. The length and age frequencies in Queensland show annually variable, but continuous, recruitment into the fishery[12]. A strong recruitment year class (2-year-olds) in 2014–15 comprised around 60 per cent of the commercial and recreational catch in Queensland waters. The stock is not considered to be recruitment overfished.

Queensland fishery-dependent monitoring data indicates a varied but continuous pattern of recruitment, and the estimate of total mortality rate in 2014–15 is less than twice the natural mortality rate[12]for this species. There is a minimum legal length of 750 mm total length for Spanish Mackerel for both jurisdictions, which protects a portion of juveniles. This level of fishing pressure is unlikely to cause the stock to become recruitment overfished.

On the basis of the evidence provided above, the East coast (Queensland and New South Wales) biological stock is classified as a **sustainable stock**.

Gulf of Carpentaria The Gulf of Carpentaria (Queensland) management unit has a line and net component—the Gulf of

Carpentaria Line Fishery and the Gulf of Carpentaria Inshore Fin Fish Fishery, respectively. The recreational fishery for this management unit is considered minor[11,12]. Nominal catch rates for both fisheries have decreased in the past 2 years, following a general increase since the mid-1990s[12]. Length and age frequencies from routine monitoring of commercial line catches since 2007 indicates relatively consistent recruitment and length and age compositions in the fishery, with the majority of catches since 2007 comprising fish between 2 and 6 years of age[12]. The above evidence indicates that the biomass of this stock is unlikely to be recruitment overfished.

Total commercial catch is within historical harvest levels (188 t in 2015) with a majority taken by the line fishery (76 per cent in 2015). Participation in the line fishery is the lowest since the early-1990s with 14 active licences in 2015[12]. Fishing effort has decreased from around 1500 primary vessel days in the mid-1990s to 730 days in 2015[12]. Participation in the net fishery increased in the late-1980s to a peak in 2011 at 710 fishing days and has since decreased, stabilising at around 550 fishing days[12]. Estimate of total mortality for 2015 based on fishery-dependent monitoring data of the line fishery is less than twice the natural mortality for this species[12]. The above evidence indicates that the current level of fishing pressure is unlikely to cause the stock to become recruitment overfished.

On the basis of the evidence provided above, the Gulf of Carpentaria (Queensland) management unit is classified as a **sustainable stock**.

Mackerel Managed Fishery Catch and fishing effort throughout the Mackerel Managed Fishery (Western Australia) have been relatively stable since 2006, following reductions in vessels due to management changes, with total catches within the target range (246–430 t). The high catch rates for the two main northern fishery areas (Kimberley and Pilbara, covering Onslow to the Northern Territory border), both above historical levels, indicate a relatively high abundance of Spanish Mackerel in these management areas. Catch rates in the southern area have also remained stable at relatively high levels since 2007. As the minimum legal size for Spanish Mackerel in Western Australia is 900 mm total length, which is similar to the size at maturity for this species[6], the spawning stock is essentially the same as the exploited stock. Previous assessment of Spanish Mackerel in Western Australia during 2002[6] using catch and effort, biological information, age structure and yield per recruit modelling indicated the stock was sustainable, when catches were higher than current levels. As catch rates are either continuing to increase, or are stable at, relatively high levels within each management area, this

suggests the overall spawning stock is stable. The above evidence indicates that the biomass of this stock is unlikely to be recruitment overfished.

The total commercial catch of Spanish Mackerel in Western Australia for 2015 was 302 t, which is the average since management changes in 2006, even though the total effort was slightly lower than in previous years. Additionally, the estimated boat based recreational fishing harvest weights of Spanish Mackerel were at similar low levels for the 2011–12 and 2013–14 surveys, at 57–79 t and 62–86 t (95 per cent confidence interval), respectively[7]. The above evidence indicates that the current level of fishing pressure is unlikely to cause the stock to become recruitment overfished.

On the basis of the evidence provided above, the Mackerel Managed Fishery (Western Australia) management unit is classified as a **sustainable stock**.

Northern Territory

Spanish Mackerel stocks have been assessed at a territory-wide level. The most recent assessment[8] estimates that biomass in 2015 was 72 per cent of the unfished level (1973). The results also indicated that stocks declined substantially because of high Taiwanese catches in the 1970s–80s, but have since recovered as a result of more stringent management. Current biomass levels are within sustainable limits, suggesting that increases in catch could occur[9,10]. The stock is not considered to be recruitment overfished. The above evidence indicates that the current level of fishing pressure is unlikely to cause the stock to become recruitment overfished.

On the basis of the evidence provided above, Spanish Mackerel in the Northern Territory is classified as a **sustainable stock**.

Torres Strait Spanish Mackerel Fishery

A formal stock assessment of Spanish Mackerel in the Torres Strait Spanish Mackerel Fishery (Commonwealth) was conducted in 2006, informed by data to 2003[4]. The assessment used a sex-specific age-structured population dynamics model to estimate biomass. A range of biological and effort reference points were assessed to evaluate various potential management strategies for the fishery.

The 2006 assessment estimated that biomass in 2003 was 37 per cent (range 26–67 per cent) of the unfished level. The stock is therefore not considered to be recruitment overfished[5]. The assessment indicated that the base-case maximum sustainable yield (MSY) for Spanish Mackerel in the Torres Strait was 169 tonnes (t) per year, and annual catches of around 150 t per year would achieve a fishing mortality target of half of the natural mortality. The stock assessment concluded that the stock was likely to be harvested at levels near, or exceeding, MSY up to 2003. Catches since 2007–08 have been below both the base-case (169 t) and lower-risk estimates of MSY. This level of fishing pressure is unlikely to cause the stock to become recruitment overfished[5].

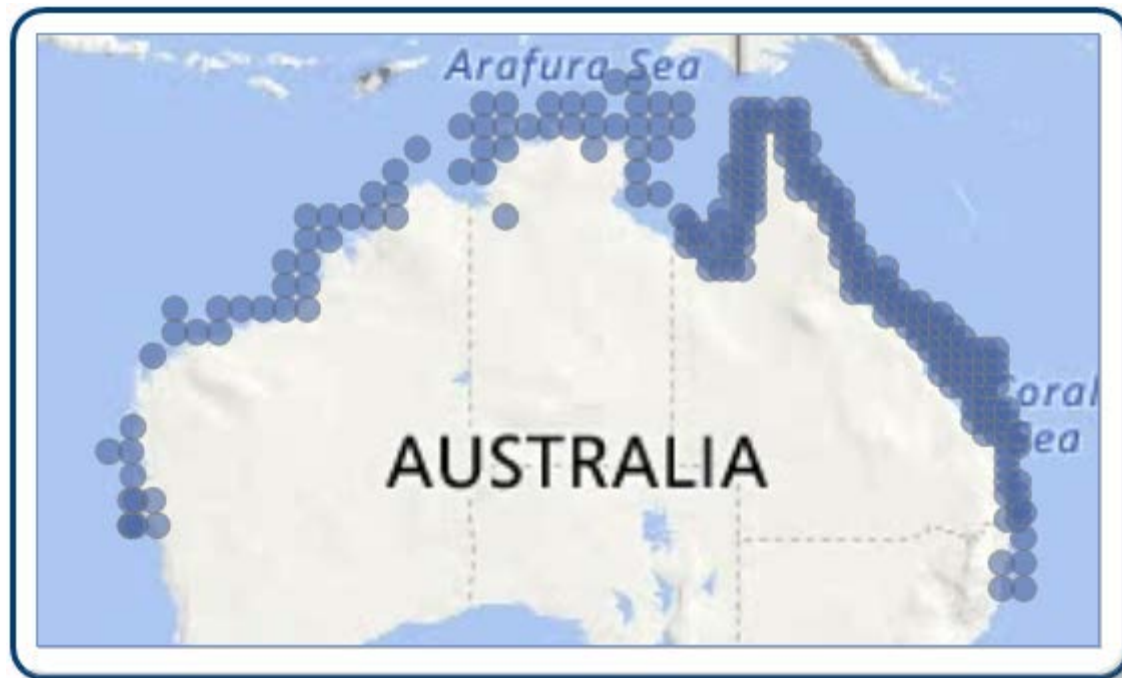
On the basis of the evidence provided above, the Torres Strait Spanish Mackerel Fishery (Commonwealth) biological stock is classified as a **sustainable stock**.

BIOLOGY

Spanish Mackerel biology[19–21]

Species	Longevity / Maximum Size	Maturity (50 per cent)
Spanish Mackerel	26 years; 2400 mm <u>FL</u>	~2 years; 800 mm <u>FL</u>

DISTRIBUTION



Distribution of reported commercial catch of Spanish Mackerel

TABLES

Commercial Catch Methods	Commonwealth	New South Wales	Northern Territory	Queensland	Western Australia
Gillnet			✓	✓	
Hand Line, Hand Reel or Powered Reels		✓			
Line	✓		✓	✓	
Otter Trawl			✓		
Trolling		✓			
Various		✓			✓

Fishing methods	Commonwealth	New South Wales	Northern Territory	Queensland	Western Australia
Commercial					
Gillnet			✓	✓	
Hand Line,		✓			

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Hand Reel or Powered Reels					
Line	✓		✓	✓	
Otter Trawl			✓		
Trolling		✓			
Various		✓			✓
Indigenous					
Hand Line, Hand Reel or Powered Reels		✓	✓	✓	✓
Recreational					
Hand Line, Hand Reel or Powered Reels		✓	✓	✓	✓
Spearfishing		✓	✓	✓	✓
Management Methods					
	Commonwealth	New South Wales	Northern Territory	Queensland	Western Australia
Commercial					
Catch restrictions	✓		✓	✓	✓
Effort limits			✓		
Limited entry	✓	✓	✓	✓	✓
Size limit	✓	✓		✓	✓
Spatial closures	✓	✓		✓	✓
Vessel restrictions	✓	✓	✓	✓	✓
Indigenous					
Bag limits		✓			
Gear restrictions		✓			
Section 31 (1)(c1), Aboriginal cultural fishing authority		✓			
Size limit		✓			
Spatial closures		✓			
Recreational					
Bag limits		✓			✓

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Gear restrictions		✓	✓	✓	
Licence		✓		✓	✓
Possession limit		✓	✓	✓	✓
Size limit		✓		✓	✓
Spatial closures		✓	✓	✓	✓
Spatial zoning			✓		✓

Active Vessels					
	Commonwealth	New South Wales	Northern Territory	Queensland	Western Australia
		67 License in OTLF,	8 Vessel in DF, 5 Vessel in ONLF, 15 Vessel in SMF,	183 License in ECSMF, 24 License in GOCIFFF, 15 License in GOCLF,	11 License in MMF,

OTLF Ocean Trap and Line(NSW)

DF Demersal Fishery(NT)

ONLF Offshore Net and Line Fishery(NT)

SMF Spanish Mackerel Fishery(NT)

ECSMF East Coast Spanish Mackerel Fishery(QLD)

GOCIFFF Gulf of Carpentaria Inshore Fin Fish Fishery(QLD)

GOCLF Gulf of Carpentaria Line Fishery (QLD)

MMF Mackerel Managed Fishery(WA)

Catch					
	Commonwealth	New South Wales	Northern Territory	Queensland	Western Australia
Commercial	83.7414t in TSSMF,	38.5561t in OTLF,	0.39t in DF, 28.13t in ONLF, 328.626t in SMF,	298.489t in ECSMF, 40.388t in GOCIFFF, 149.067t in GOCLF,	301.707t in MMF,
Indigenous	Unknown	Unknown	Unknown	Negligible	Unknown
Recreational	Unknown	26 t (in 2013–14)	27 t (in 2010), 9 t by FTO	256 t (in 2013)	74 t (7 se) (2013–14), 15.1 t (charter)

TSSMF Torres Strait Spanish Mackerel Fishery (CTH), OTLF Ocean Trap and Line (NSW), DF Demersal Fishery (NT), ONLF Offshore Net and Line Fishery (NT), SMF Spanish Mackerel Fishery (NT), ECSMF East Coast Spanish Mackerel Fishery (QLD), GOCIFFF Gulf of Carpentaria Inshore Fin Fish Fishery (QLD), GOCLF Gulf of Carpentaria Line Fishery (QLD), MMF Mackerel Managed Fishery (WA),

a Commonwealth and Queensland The reporting period for the Commonwealth (Torres Strait Spanish Mackerel Fishery) and Queensland (East coast [Queensland]) is the 2014–15 financial year.

b Commonwealth – Recreational The Australian Government does not manage recreational fishing, including charter fishing, in Commonwealth waters. Recreational and charter fishing in

Commonwealth waters is managed by the state or territory immediately adjacent to those waters, under its management regulations.

c Commonwealth – Indigenous The Australian Government does not manage non-commercial Indigenous fishing in Commonwealth waters, with the exception of the Torres Strait. In general, non-commercial Indigenous fishing in Commonwealth waters is managed by the state or territory immediately adjacent to those waters. In the Torres Strait, both commercial and non-commercial Indigenous fishing is managed by the Torres Strait Protected Zone Joint Authority (PZJA) through the Australian Fisheries Management Authority (Commonwealth); the Department of Agriculture, Fisheries and Forestry (Queensland); and the Torres Strait Regional Authority. The PZJA also manages non-Indigenous commercial fishing in the Torres Strait.

d Queensland – Indigenous Under the Fisheries Act 1994 (Qld), Indigenous fishers in Queensland are entitled to use prescribed traditional and non-commercial fishing apparatus in waters open to fishing. Size and possession limits, and seasonal closures do not apply to Indigenous fishers. Further exemptions to fishery regulations may be applied for through permits.

e Indigenous Subject to the defence that applies under Section 211 of the Native Title Act 1993 (Cth), and the exemption from a requirement to hold a recreational fishing licence, the non-commercial take by indigenous fishers is covered by the same arrangements as that for recreational fishing.

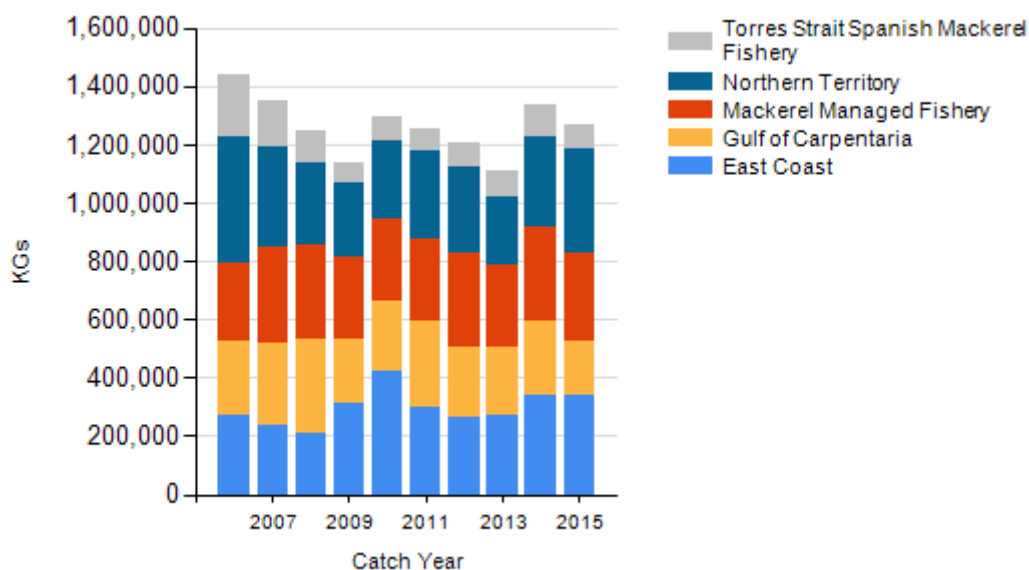
f New South Wales – Indigenous (management methods) Aboriginal Cultural Fishing Interim Access Arrangement - allows an Indigenous fisher in New South Wales to take in excess of a recreational bag limit in certain circumstances, for example, if they are doing so to provide fish to other community members who cannot harvest themselves.

g New South Wales – Indigenous (management methods) Aboriginal Cultural Fishing Authority - the authority that Indigenous persons can apply for to take catches outside the recreational limits under the Fisheries Management Act 1994 (NSW), Section 37 (1)(c1), Aboriginal cultural fishing authority.

h Commonwealth – Commercial (active vessels) Total number of TIB licences; this is not an indicator of licence activity.

i Western Australia – Recreational (catch) Western Australian boat-based recreational catch from 1 May 2013–30 April 2014. **j Queensland – Recreational (catch)** Survey of Queensland residents only from August 2013–October 2014 11.

CATCH CHART



Commercial catch of Spanish Mackerel - note confidential catch not shown

EFFECTS OF FISHING ON THE MARINE ENVIRONMENT

- Targeted fishing for all Spanish Mackerel in Western Australia and most Spanish

Mackerel fishing in the other jurisdictions uses trolled lines. This method has almost no direct impact on the habitats where it is used and results in little bycatch[22–25].

- Commercial gillnets interact with threatened, endangered and protected species. Although reported interactions are low, the impact on the populations of these species is unknown.
- Commercial trawl gear used in the Northern Territory has the potential to impact on the benthic habitat. However, trawl nets in the Northern Territory have been designed to fish off the seabed, reducing interaction with benthic habitats[26]. The trawl fishery in the Northern Territory comprises a small fleet and only fishes around seven per cent of the available area[26].
- An analysis of community structure of finfish in the bioregions in Western Australia[6]where mackerel fishing has been undertaken has found no evidence of any significant shift over the past 30 years[27].

ENVIRONMENTAL EFFECTS on Spanish Mackerel

- Annual recruitment strength of Spanish Mackerel appears to be negatively correlated with spring sea surface temperature, with cooler years positively influencing recruitment on the Queensland east coast[28]. In addition, marine heatwave events in late-2010 and early-2011 off the south-western coast of Western Australia appear to have temporarily shifted Spanish Mackerel distribution southward[29]. It is currently unclear if this is a one-off event or a longer-term regime shift in the system.

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