Grey Mackerel (2016)

Scomberomorus semifasciatus

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STOCK STATUS OVERVIEW

Jurisdiction	Stock	Fisheries	Stock status	Indicators
Western Australia	Western Australia	MMF	Sustainable	Catch
Northern Territory	North West Northern Territory	ONLF	Sustainable	Stock Reduction Analysis, fishing mortality, catch, catch effort
Northern Territory, Queensland	Gulf of Carpentaria	GOCIFFF, ONLF	Sustainable	Stock Reduction Analysis, catch, catch effort
Queensland	North East Queensland	ECIFFF	Sustainable	Quantitative stock assessment, biomass, fishing mortality, catch, effort
Queensland	South East Queensland	ECIFFF	Sustainable	Quantitative stock assessment, biomass, fishing mortality, catch, effort

ONLF Offshore Net and Line Fishery (NT), ECIFFF East Coast Inshore Fin Fish Fishery (QLD), GOCIFFF Gulf of Carpentaria Inshore Fin Fish Fishery (QLD), MMF Mackerel Managed Fishery (WA)

STOCK STRUCTURE

There are at least five Grey Mackerel biological stocks across northern Australia, with a possible additional stock in the north-east Gulf of Carpentaria[1–5].

Here, assessment of stock status is presented at the biological stock level—Western Australia, North-west Northern Territory (Timor/Arafura), Gulf of Carpentaria, North-east Queensland and South-east Queensland.

STOCK STATUS

Gulf of Grey Mackerel in the Gulf of Carpentaria is primarily a commercial gillnet-caught

Carpentaria

species. Queensland and the Northern Territory share management of the Gulf of Carpentaria biological stock through the Queensland Fisheries Joint Authority. Queensland took the majority (88 per cent) of the commercial harvest in 2015 and has averaged 80–90 per cent of the harvest in recent years.

There has been a rising trend in commercial catch rate since targeted fishing for Grey Mackerel began in the Gulf of Carpentaria in the late-1990s. Queensland catches and catch rates reached record levels in 2010 and 2012, respectively. Although the Queensland catch rate dropped in 2013 (60 kg per 100 m net), it has steadily risen in 2014 (68 kg per 100 m net) and again in 2015 (86 kg per 100 m net)[14]. The most recent assessment estimates that the biomass in 2011 was 74 per cent of the unfished biomass[11]. The stock is not considered recruitment overfished. Stock reduction analysis of Grey Mackerel in the Gulf of Carpentaria, using Queensland and Northern Territory catches also concluded that the harvest rate is at 26 per cent of that required to achieve MSY[11]. The above evidence indicates the biomass of this stock is unlikely to be recruitment overfished.

Queensland introduced changes to the net fishery at the commencement of the 2012 season to reduce pressure on Grey Mackerel. These measures decreased the total length of available net by two-thirds, from 27–9 km in the offshore component of the fishery. Changes made for the Queensland inshore fishery (within 7 nautical miles of the coast) also reduced the capacity for boats to target Grey Mackerel. Commercial effort (days fished) and catch rates (kg per 100 m net) in 2015 were equal to the 5-year average for the Queensland component of the Gulf of Carpentaria stock. This 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 biological stock is classified as a **sustainable stock**.

North East Queensland

The North-east Queensland biological stock is managed as part of a Queensland east coast fishery. The most recent stock assessment[15] did not detect any trend in east coast Grey Mackerel abundance that might indicate overfishing of the management unit. Uncertainty in the model, particularly in the case of the North-east Queensland stock, prompted a conservative approach to sustainable yield estimates and subsequent TACC for this stock. The stock model estimated that the MSY ranged from 100–150 t and recommended a TACC of 100 t (with flexibility) for the North-east Queensland stock. The stock assessment estimated the biomass in 2011 of the North-east Queensland stock was at levels close to the biomass associated with MSY (BMSY), noting the uncertainty in the model outputs. Commercial net catches were above the recommended TACC in 2014–15 (121 t) and within the range of MSY; and annual catches of the North-east Queensland biological stock have averaged close to the recommended TACC since 2009–10 (118 t), following the introduction of the fishery-wide TACC of 250 t on 1 July 2009[14]. The above evidence indicates the biomass of this stock is unlikely to be recruitment overfished.

Fishing pressure on the north-east coast has been lower in recent years, following the introduction of the current fishery-wide financial year TACC of 250 t. Prior to the introduction of the TACC, nominal fishing effort (days when Grey Mackerel were caught) averaged 1031 net fishing days between 2004 and

2009, after which it decreased to an average of 571 net fishing days between 2010 and 2014. Fishing efficiencies are likely to have increased during this period and while this has not been quantified, it is unlikely to account for all of the reported decrease in effort. Fishery-dependent biological monitoring of North-east Queensland Grey Mackerel indicates consistent recruitment in the fishery, with stable length and age frequencies evident, since monitoring commenced in 2008–09[14,15]. Estimates of total mortality have been below the threshold (double the natural mortality) since 2008–09. This suggests stable levels of fishing pressure since 2008–09[15]. This level of fishing pressure is unlikely to cause the stock to become recruitment overfished.

On the basis of the evidence provided above, the North-east Queensland biological stock is classified as a **sustainable stock**.

North West Northern Territory

Assessments indicate that Grey Mackerel stocks in the Northern Territory declined substantially as a result of the high Taiwanese gillnet catches in the 1970s–80s, but have since recovered with the cessation of foreign fishing and more stringent management of the domestic fishery. The most recent assessment[11] estimates that the biomass in 2011, was 81 per cent of the unfished level. The stock is not considered to be recruitment overfished. Furthermore, the current harvest rate is 12 per cent of that required to achieve maximum sustainable yield (MSY)[11]. Supporting this assessment is that catch per unit effort has increased over the past 10 years, while catches have remained relatively consistent[11–13]. This current level of fishing pressure is unlikely to cause the stock to become recruitment overfished.

On the basis of the evidence provided above, the North-west Northern Territory biological stock is classified as a **sustainable stock**.

South East Queensland

The South-east Queensland biological stock is managed as part of a Queensland east coast-wide fishery. Grey Mackerel is primarily a commercial gillnet-caught species[15], with an annual average of two per cent of catches taken by line fishing since 2005. The most recent stock assessment[15](2011 data) did not detect any trend in east coast Grey Mackerel abundance that might indicate overfishing at the east coast-wide level or evidence to advocate against the current fishery-wide TACC of 250 t. The latest stock assessment for the South-east Queensland stock estimated the MSY at approximately 90 t (80 per cent confidence interval: 70–130 t) and recommended a TACC of 70 t. The stock assessment estimated the biomass in 2011 of the South-east Queensland stock was at levels equal to the BMSY. Catches for the commercial net fishery since 2010–11 (57 t in 2012; 53 t in 2013, 69 t in 2014 and 63 t in 2015) were lower than the estimated MSY and the recommended TACC. The above evidence indicates the biomass of this stock is unlikely to be recruitment overfished.

Fishing pressure on the south east coast has been low in recent years, following the introduction of the current fishery-wide financial year TACC of 250 t. Prior to the introduction of the TACC, nominal fishing effort (days when Grey Mackerel were caught) averaged 1374 net fishing days between 2004 and 2009, after which it decreased to an average of 746 net fishing days between 2010 and 2014. Fishing efficiencies are likely to have increased during this period and while this has not been quantified, it is unlikely to account for all of the reported decrease in effort. Fishery-dependent biological monitoring of east coast Queensland Grey Mackerel indicates consistent recruitment in the fishery, with

stable length and age frequencies evident since 2008–09[14,15]. Estimates of total mortality have been below the threshold (double the natural mortality) since 2008–09. This level of fishing pressure is unlikely to cause the stock to become recruitment overfished.

On the basis of the evidence provided above, the South-east Queensland biological stock is classified as a **sustainable stock**.

Western Australia

Grey Mackerel is exploited as a component of the Mackerel Managed Fishery (Western Australia) (MMF)[2]. The primary target species of the Mackerel Managed Fishery is Spanish Mackerel (*Scomberomorus commerson*). As such, Grey Mackerel is assessed on the basis of the status of the indicator species (Spanish Mackerel) that represents the pelagic suite of species. A stock assessment of Spanish Mackerel, examining catch and effort data, biological information, biomass and yield per recruit modelling indicated that this stock is sustainable[6]. Since management changes in 2006, the catch and effort in the MMF have remained stable. In addition, Grey Mackerel are fast growing and have a young age at sexual maturity (less than 2 years old)[4,7,8], indicating some resilience to fishing pressure. The above evidence indicates that the biomass of this stock is unlikely to be recruitment overfished.

Furthermore, Grey Mackerel catch levels in the MMF in 2000–15 have been low, ranging between 3.5 and 24 tonnes (t), with catches only reported from a small area of their range[6]. This level of catch is well below the total allowable commercial catch (TACC; 60 t for each of the three management areas) for Grey Mackerel. The low levels of catch are likely reflective of the limited targeting of the species in the fishery. In addition, there is a low recreational catch of the species, estimated at less than 3 t for both the 2011–12 and 2013–14 boat-based surveys[9,10], which is also likely due to low targeting. Thus, the low commercial and recreational catch most likely result in a low level of fishing mortality. The above evidence indicates that the current level of fishing pressure is unlikely to cause the stock to become recruitment overfished.

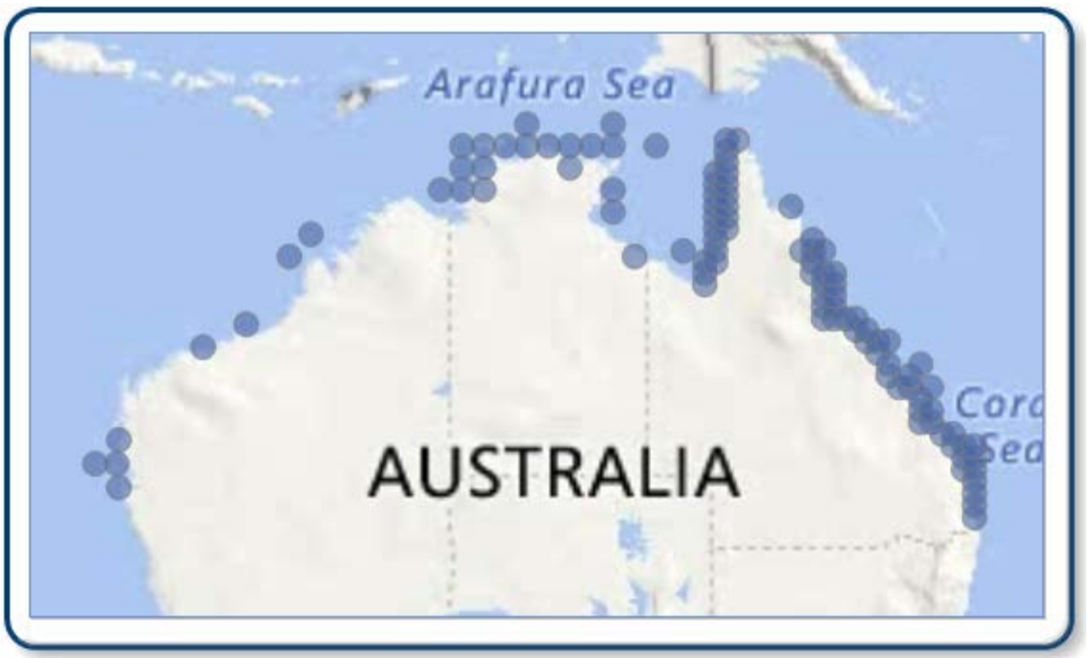
On the basis of the evidence provided above, the Western Australian biological stock is classified as a **sustainable stock**.

BIOLOGY

Grey Mackerel biology[7,16]

Species	Longevity / Maximum Size	Maturity (50 per cent)
Grey Mackerel	14 years; 1200 mm FL	Females: 2 years; 650–700 mm FL Males: 1–2 years; 550–600 mm FL

DISTRIBUTION



Distribution of reported commercial catch of Grey Mackerel

TABLES

Commercial Catch Methods	Northern Territory	Queensland	Western Australia
Gillnet	✓	✓	
Line		✓	
Various			✓

Fishing methods			
	Northern Territory	Queensland	Western Australia
Commercial			
Gillnet	✓	✓	
Line		✓	
Various			✓
Indigenous			
Hand Line, Hand Reel or Powered Reels	✓	✓	✓
Spearfishing		✓	✓
Recreational			
Hand Line, Hand Reel or Powered Reels	✓	✓	✓
Spearfishing		✓	✓

Management Methods			
	Northern Territory	Queensland	Western Australia
Commercial			
Fishery spatial closures	✓	✓	
Gear restrictions	✓	✓	✓
Limited entry	✓	✓	✓
Marine park closures		✓	
Size limit		✓	✓
Spatial zoning	✓	✓	✓
Total allowable catch		✓	✓
Total allowable effort	✓		
Vessel restrictions	✓	✓	✓
Indigenous			
Laws of general application			✓
No limits on customary catch	✓		
Recreational			
Bag limits			✓
Gear restrictions	✓	✓	
Licence			✓
Limited entry	✓		✓
Marine park closures		✓	
Passenger restrictions			✓
Possession limit	✓	✓	✓
Size limit		✓	✓
Spatial zoning		✓	✓

Active Vessels			
	Northern Territory	Queensland	Western Australia
	8 Vessel in ONLF,	124 License in ECIFFF, 30 License in	11 Vessel in MMF,

		GOCIFFF,	

ONLF Offshore Net and Line Fishery(NT)

ECIFFF East Coast Inshore Fin Fish Fishery(QLD)

GOCIFFF Gulf of Carpentaria Inshore Fin Fish Fishery(QLD)

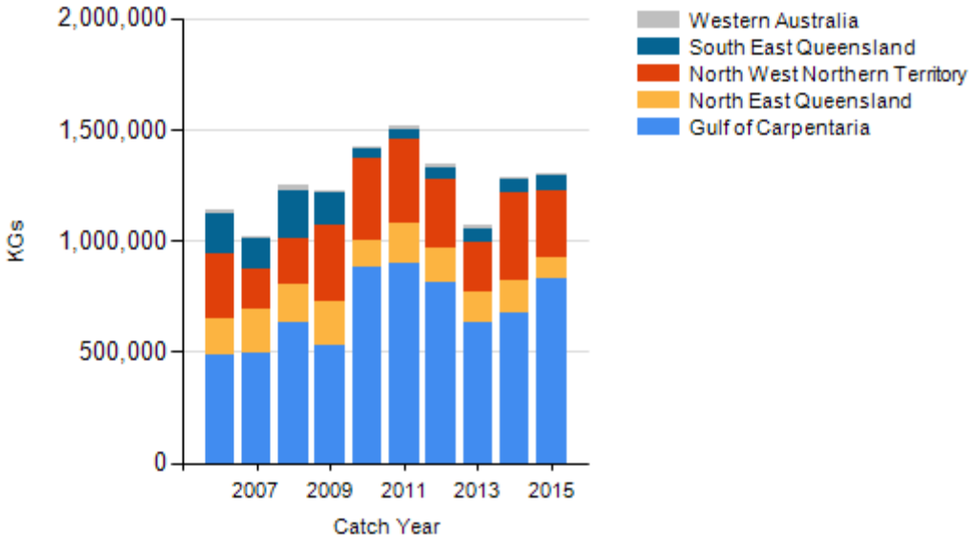
MMF Mackerel Managed Fishery(WA)

Catch			
	Northern Territory	Queensland	Western Australia
Commercial	410.657t in ONLF,	164.335t in ECIFFF, 717.756t in GOCIFFF,	6.74854t in MMF,
Indigenous	Unknown	Unknown	Unknown
Recreational	409 fish (<2 t)	Unknown	<0.1 t

ONLF Offshore Net and Line Fishery (NT), ECIFFF East Coast Inshore Fin Fish Fishery (QLD), GOCIFFF Gulf of Carpentaria Inshore Fin Fish Fishery (QLD), MMF Mackerel Managed Fishery (WA),

a Indigenous The reporting period for the Commonwealth (Torres Strait) and Queensland (east coast [Queensland]) is the 2012–13 financial year.
b Queensland – Commercial (catch) With reference to the East Coast Inshore Fin Fish Fishery; in Queensland, under the Fisheries Act 1994 (Qld), Indigenous fishers are able to use prescribed traditional and non-commercial fishing apparatus in waters open to fishing. Size and in possession limits and seasonal closures do not apply to Indigenous fishers. Further exemptions to fishery regulations may be applied for through permits.
c Queensland – Commercial (catch) With reference to the East Coast Inshore Fin Fish Fishery; Queensland east coast stock only—limits applied to the combined catch of the two east coast stocks.
d Queensland – Commercial (catch) With reference to the East Coast Inshore Fin Fish Fishery; includes minor levels of catch from the Bowen region which is not considered part of the North-east Queensland and South-east Queensland biological stocks.
e Western Australian – Recreational (catch) Western Australian boat-based recreational catch from 1 May 2013–30 April 2014 9.

CATCH CHART



Commercial catch of Grey Mackerel - note confidential catch not shown

EFFECTS OF FISHING ON THE MARINE ENVIRONMENT

- Commercial gillnets have almost no impact on coastal habitat and are selective with high proportions of fish being caught marketed, with bycatch making up only a small proportion of the catch[18]. However, commercial gillnets do interact with threatened, endangered and protected (TEP) species. Although reported interactions are low, the impact on the populations of TEP species is unknown. Mitigation measures include spatial closures to protect ecological significant areas, fisher voluntary code of conduct (Northern Territory Offshore Net and Line Fishery [ONLF] and Queensland Gulf of Carpentaria), training of fishers in endangered species awareness (Queensland) and net attendance regulations (Northern Territory and Queensland). Bottom set gillnets are banned in the ONLF, to reduce turtle interactions.
- The targeted fishing method of trolled lines used exclusively in Western Australia and by fisheries in other jurisdictions has very little direct impacts on the marine environment and results in little bycatch or TEPs interactions[13,19,20].

ENVIRONMENTAL EFFECTS on Grey Mackerel

- The duration and magnitude of the wet season is likely to impact the overall biomass of coastal stocks like Grey Mackerel that are dependent on nearshore waters for breeding and feeding[21,22]. The fine-scale stock structure evident on the Queensland east coast may limit adaptability to changing environmental conditions, if stocks are unable to move in response to changing conditions[21].

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