

Mahi Mahi (2018)

Coryphaena hippurus



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STOCK STATUS OVERVIEW

Jurisdiction	Stock	Fisheries	Stock status	Indicators
Commonwealth, Queensland, New South Wales	Western and Central Pacific Ocean	ETBF, OTLF, RRFFF	Undefined	Catch
Commonwealth, Western Australia	Indian Ocean	CILF, CILF PLF WCDSIMF, PLF, WCDSIMF, WTBF	Undefined	Catch

ETBF Eastern Tuna and Billfish Fishery (CTH), WTBF Western Tuna Billfish Fishery (CTH), OTLF Ocean Trap and Line Fishery (NSW), RRFFF Rocky Reef Fin Fish Fishery (QLD), PLF Pilbara Line Fishery (WA), WCDSIMF West Coast Demersal Scalefish (Interim) Managed Fishery (WA), CILF Christmas Island Line Fishery (WA), CILF || PLF || WCDSIMF Various Fisheries combined due to 3 boat rule (WA)

STOCK STRUCTURE

There are two species of Mahi Mahi in Australian waters; Common Mahi Mahi (*Coryphaena hippurus*) and Pompano Mahi Mahi (*Coryphaena equiselis*). Commercial and recreational catch is thought to be almost exclusively common Mahi Mahi and consequently it is the only species assessed here.

Mahi Mahi are a highly migratory tropical and subtropical species that straddle multiple domestic and international jurisdictions. Stock structure is not well resolved and for practical purposes, Mahi Mahi in the Indian Ocean and the Western and Central Pacific Ocean are considered to constitute two distinct biological stocks which are managed by separate regional fisheries management organisations: the Indian Ocean Tuna Commission and the Western and Central Pacific Fisheries Commission. The boundary between the two stocks is assumed to occur around the longitude of the Western Australia-Northern Territory border in northern Australia, and at the South Australia-Victoria border in southern Australia, reflecting the jurisdictional boundaries of these two RFMOs. The distribution of Mahi Mahi does not extend south of the Australian land mass.

Here, assessment of stock status is presented at the biological stock level— Western and

Central Pacific Ocean and Indian Ocean.

STOCK STATUS

Indian Ocean

This cross-jurisdictional biological stock has components in the Commonwealth, Western Australia and international and foreign waters. The status presented here for the entire biological stock has been established using evidence from all jurisdictions.

Total reported commercial catch for the Indian Ocean (FAO areas 51 and 57) were stable around 7000 t until 2012 when catches began an increasing trend to a peak of 20 000 t in 2016 [FAO 2018]. Recent reported catches, and most of the increase, has come from the western Indian Ocean Pacific (FAO area 51, west of 80°E).

There are likely to be significant artisanal, and to a lesser extent recreational, landings of Mahi Mahi, particularly through the northern Indian Ocean rim and in south east Asia, that are not included in the estimates above. In addition, Mahi Mahi may be discarded in some fisheries, although discard mortality levels are unknown.

In the Indian Ocean, the majority of Mahi Mahi are thought to be taken using a variety of artisanal fishing methods (such as troll and gillnet). In the industrial fisheries, catches are taken by all the major sectors including gillnet (notably for Indian Ocean), longline, purse seine (particularly floating object sets) and pole-and-line.

For the Commonwealth part of the biological stock, commercial landings are negligible and have fluctuated without trend, peaking in 2014 at 2.4 t.

For the Western Australian part of the biological stock, commercial and recreational landings are negligible with the stock generally not being subject to targeted fishing. The Western Australian commercial and charter catches from 2008–17 each averaged less than 0.2 t per annum. Mahi Mahi is not a major component of recreational landings, comprising less than 1 000 fish in the 2015-16 state-wide boat based recreational fishing survey [Ryan et al. 2017].

Catches in South Australia are rare.

There has been no formal stock assessment of Mahi Mahi for the Indian Ocean area encompassing the Australian Fishing Zone. Benjamin and Karup [2012] undertook a virtual population analysis stock assessment using FiSAT that was confined to the southwest coast of India and used data to 2009. They estimated fishing mortality at 0.37 which, in the context of natural mortality assumed to be 1.0 [Aires-da-Silva et al. 2016] indicates a relatively light level of exploitation in that region. Australian catches form a small component of the total international Indian Ocean catch and no other indicators of biomass level are available. There is therefore insufficient information available to confidently classify the status of this stock.

On the basis of the evidence provided above, the Indian Ocean biological stock is classified as an **undefined stock**.

Western and Central Pacific Ocean

This cross-jurisdictional biological stock has components in the Commonwealth, New South Wales, Queensland, the Northern Territory and international and foreign waters. The status presented here for the entire biological stock has been established using evidence from all jurisdictions.

Total reported commercial catch for the Western and Central Pacific Ocean (FAO areas 61, 71 and 81) peaked at over 30 000 tonnes (t) on a number of occasions during the 1990's [FAO 2018]. Catch in 2016 was 23 539 t and has

averaged 19 659 t over the most recent five years. Recent reported catches have been predominantly from the northwest Pacific (FAO area 61, north of 20[o]N) and the western central Pacific (FAO area 71, 20[o]N–25[o]S), with minor commercial catches reported in the southwest Pacific (FAO area 81, south of 25[o]S).

There are likely to be significant artisanal, and to a lesser extent recreational, landings of Mahi Mahi throughout south east Asia and Oceania that are not included in the estimates above. In addition, Mahi Mahi may be discarded in some fisheries, although discard mortality levels are unknown.

For the Commonwealth part of the biological stock, commercial landings over the period 2006 to 2017 peaked in 2010 at 301 t and have averaged 196 t over the most recent five years. Pelagic tuna longline is the primary gear used to catch this species.

For the New South Wales commercial landings are relatively minor, at less than 10 t. Queensland annual commercial landings have averaged around 3 t over the previous decade while approximately 75 t were harvested recreationally in 2013–14 [Webley et al. 2015].

For the Northern Territory part of the biological stock, landings have been very low (< 70 kg) and only relate to charter operators fishing offshore. The last catch of Mahi Mahi recorded in this jurisdiction was in 2015.

Catches in Victoria and Tasmania are rare.

In the western central Pacific, the majority of Mahi Mahi are taken using hook methods such as pelagic longline and troll, as well as significant bycatches by tuna purse seine fishing using fish aggregating devices (FADs).

There has been no formal stock assessment of Mahi Mahi for the western central Pacific. Gilman et al. [2013] undertook a sustainability overview of fisheries that supply Mahi Mahi in the western central Pacific and concluded that, overall, it was relatively “poorly managed” and “high risk” due to a lack of management and a lack of information on management and stock status. However they concluded that there was a “medium risk” relating to current biomass and fishing mortality due to the highly productive life history characteristics of Mahi Mahi.

Campbell [2016] standardised Eastern Tuna and Billfish Fishery (ETBF) pelagic longline catch rates to develop an index of abundance for Mahi Mahi within the Australian area of operations. For the period 1998–2014 the abundance index showed moderately high year-to-year variability and little, if any, overall trend through this period. Campbell [2016] also examined time-series of Mahi Mahi size data and found strong seasonal changes in the mean weights of Mahi Mahi caught in the ETBF but no long term trend over the same period. Sporcic et al. [2017] undertook ecological risk assessment of the ETBF and found Mahi Mahi to be a low risk species in the context of ETBF interactions and within its operating area.

However, Mahi Mahi are not highly targeted by the Australian commercial sector and Australian catches form a small component of the total international Pacific Ocean catch. There is therefore insufficient information available to confidently classify the status of this stock.

On the basis of the evidence provided above, the Western Central Pacific Ocean biological stock is classified as an **undefined stock**.

BIOLOGY

Mahi Mahi biology [Castro et al. 1999, Massuti and Morales-Nin 1997, Massuti and Morales-

Nin 1999, Uchiyama et al. 1986, Uchiyama and Boggs 2006]

Species	Longevity / Maximum Size	Maturity (50 per cent)
Mahi Mahi	4 years, > 1 490 mm	Females 550 mm FL Males 620 mm FL

DISTRIBUTION



Distribution of reported Australian commercial catch of Mahi Mahi

TABLES

Commercial Catch Methods	Commonwealth	New South Wales	Northern Territory	Queensland	Western Australia
Demersal Longline	✓				
Dropline			✓		
Hand Line, Hand Reel or Powered Reels					✓
Handline (mechanised)	✓				
Hook and Line	✓	✓		✓	
Pelagic Longline	✓				
Trolling	✓	✓			✓
Unspecified		✓			✓

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

Hand Line, Hand Reel or Powered Reels					✓
Hook and Line		✓		✓	
Pelagic Longline	✓				
Trolling		✓			✓
Unspecified		✓			✓
Indigenous					
Hook and Line					✓
Recreational					
Hook and Line		✓		✓	✓
Spearfishing				✓	✓
Management Methods					
	Commonwealth	Northern Territory	Queensland	Western Australia	
Charter					
Catch restrictions			✓		
Gear restrictions		✓			
Licence				✓	
Limited entry		✓			
Possession limit		✓		✓	
Size limit			✓	✓	
Spatial closures		✓		✓	
Commercial					
Area restrictions	✓				
Catch restrictions				✓	
Gear restrictions	✓		✓		
Limited entry	✓		✓	✓	
Size limit			✓	✓	
Spatial closures				✓	
Indigenous					
Laws of general application apply				✓	
Recreational					
Catch			✓		

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

Active Vessels	Commonwealth	New South Wales	Queensland	Western Australia
	38 Vessels in ETBF, 2 Vessels in WTBF,	28 Fishing Business in OTLF,	43 Fisher in RRFFF,	4 in PLF, &3 in WCDSIMF, 14 in Charter, &3 in CILF,

ETBF Eastern Tuna and Billfish Fishery(CTH)

WTBF Western Tuna Billfish Fishery(CTH)

OTLF Ocean Trap and Line Fishery(NSW)

RRFFF Rocky Reef Fin Fish Fishery(QLD)

PLF Pilbara Line Fishery(WA)

WCDSIMF West Coast Demersal Scalefish (Interim) Managed Fishery(WA)

Charter Tour Operator(WA)

CILF Christmas Island Line Fishery(WA)

Catch	Commonwealth	New South Wales	Northern Territory	Queensland	Western Australia
Charter					0.14t in Tour Operator
Commercial	168.091t in ETBF, 1.493t in WTBF,	2.281t in OTLF,		5.262t in RRFFF,	0.117t in CILF PLF WCDSIMF,
Indigenous	Unknown			Unknown	Unknown
Recreational	Unknown		Unknown	75t (2013/14)	<2 t (2015/16)

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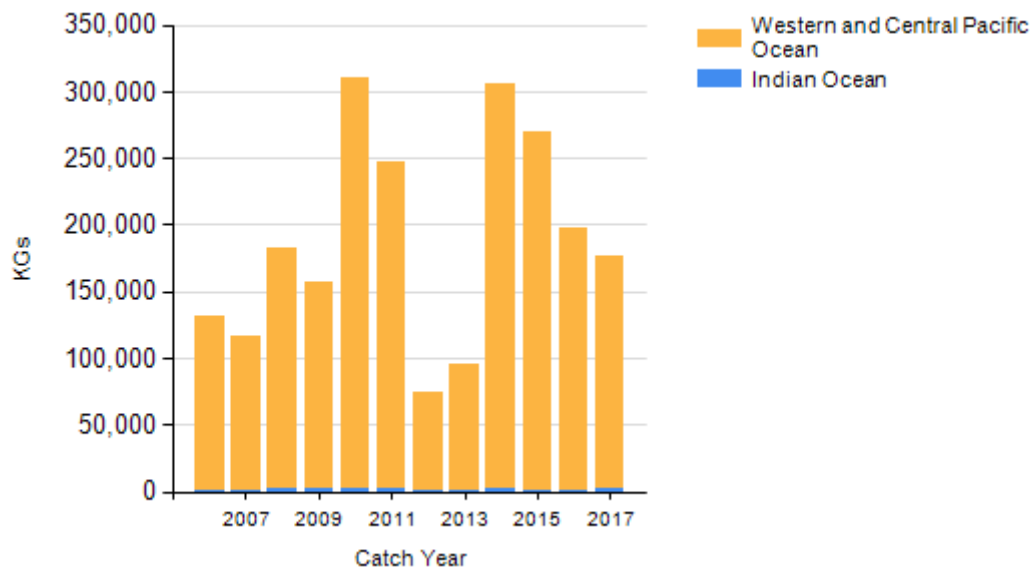
Western Australia – Recreational (Catch) Statewide survey of boat-based recreational fishing in Western Australia 2015–16 [Ryan et al. 2017]. Shore-based catch (if any) largely unknown.

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.

Queensland – Indigenous (Management Methods) 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 bag limits and seasonal closures do not apply to Indigenous fishers. Further exemptions to fishery regulations can be obtained through permits.

CATCH CHART



Australian commercial catch of Mahi Mahi - note confidential catch not shown

EFFECTS OF FISHING ON THE MARINE ENVIRONMENT

ENVIRONMENTAL EFFECTS on Mahi Mahi

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