

# MAHI MAHIS (2023)

*Coryphaena spp.*



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## STOCK STATUS OVERVIEW

Jurisdiction	Stock	Stock status	Indicators
Commonwealth, Queensland, New South Wales	Western and Central Pacific Ocean	Undefined	Catch
Commonwealth, Western Australia	Indian Ocean	Undefined	Catch

## 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.

Common Mahi Mahi are a highly migratory tropical and subtropical species that straddle multiple domestic and international jurisdictions. Stock structure is not well resolved [e.g. Díaz-Jaimes et al. 2010] and for practical purposes, Mahi Mahi in the Indian Ocean and the Western and Central Pacific Ocean are considered to constitute two distinct management units which are managed by separate regional fisheries management organisations: the Indian Ocean Tuna Commission and the Western and Central Pacific Fisheries Commission. The boundaries of these units occur at 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 management unit level—Western and Central Pacific Ocean and Indian Ocean.

## STOCK STATUS

### Indian Ocean

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

Total reported commercial catch for the Indian Ocean (FAO areas 51 and 57) has increased progressively from 2,700 t in the year 2000 to a peak of 22,205 t in 2019, with an average of 18,222 t from 2016 to 2020 [FAO 2020]. Most of this reported catch, and most of the increase, has come from the western Indian Ocean (FAO area 51, west of 80 degrees E).

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 (for Indian Ocean), longline, purse seine (particularly floating object sets) and pole-and-line.

For the Commonwealth part of the management unit, annual commercial landings are negligible and have not exceeded 2.1 t.

For the Western Australian part of the management unit, commercial and recreational landings are negligible with the stock generally not being subject to targeted fishing. The Western Australian commercial and charter catches from 2008–21 each averaged less than 0.25 t per annum. Mahi Mahi is not a major component of recreational landings, comprising less than 500 fish in the 2020–21 state-wide survey of boat based recreational fishing [Ryan et al. 2022].

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 the software FAO-ICLARM Stock Assessment Tools (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 at that time. 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 management unit is classified as an **undefined stock**.

### Western and Central Pacific Ocean

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

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).

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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 1980s and 1990s [FAO 2022]. Catch in 2020 was 19,614 t with an average of 22,291 t from 2016 to 2020. Recent reported catches have been predominantly from the northwest Pacific (FAO area 61, north of 20 degrees N) and the western central Pacific (FAO area 71, 20 degrees N to 25 degrees S), with minor commercial catches reported in the southwest Pacific (FAO area 81, south of 25 degrees 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.

In the Australian context, Mahi Mahi are not highly targeted by the Australian commercial sector, recreational catches are low and Australian catches form a small component of the total international Pacific Ocean catch.

For the Commonwealth part of the management unit, commercial landings over the period 2013 to 2022 peaked in 2016 at 268 t and have averaged about 116 t over the most recent five years. Pelagic tuna longline is the primary gear used to catch this species.

For the New South Wales part of the management unit, commercial landings are relatively minor, at about 2.3 t for 2021–22 and averaging 4.9 t over the 5 year period 2017–18 to 2021–22. The most recent recreational estimate was from a survey done in 2019–20 with less than 100 fish being harvested [Murphy et al. 2022]. This estimate was based on a survey of recreational fishing licence (RFL) households. RFL households were comprised of at least one member who possessed a long-term (1 and 3 years duration) fishing licence and included other fishers resident within these households. Catch from exempt fishers and short-term licence holders is unknown, but for Mahi Mahi long-term licence holders are estimated to be responsible for the vast majority of the catch. Mahi Mahi are also targeted by the offshore charter fishery, primarily around a series of fish attracting devices deployed by NSW DPI. The offshore charter fishery reported a landed catch of 1.6 t for 2021–22 and an average of 0.9 t for the 5 year period 2017–18 to 2021–22.

Queensland annual commercial landings have averaged around 2.3 t over the previous decade to 2021–22 while approximately 37 t were harvested recreationally in 2019–20 [Teixeira et al. 2021].

For the Northern Territory part of the biological stock landings have been very low (< 100 kg). Landings only relate to charter operators fishing offshore. The last recorded catch in this jurisdiction was of one individual Mahi Mahi in 2019.

Catches in Victoria and Tasmania are rare.

There has been no formal stock assessment of Mahi Mahi for the western central Pacific. A sustainability “overview” by Gilman et al. [2013] highlighted the lack of management of this species and information on management and stock status in the western and central Pacific Ocean (WCPO), but 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.

Other studies have examined standardised CPUE trends [Campbell 2016], size trends [Campbell 2016], ecological risk status [Sporcic et al. 2019] and depletion [Kindong et al. 2020] in the WCPO region. However, each of these studies

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assessed data at a very localised subregional scale and as such have limited applicability to assessing status, noting the uncertainty over stock structure and movement/mixing for this species in the WCPO region.

In the Australian region, 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. The same study 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. [2019] 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.

Overall, however, there is therefore insufficient information available to confidently classify the status of this stock.

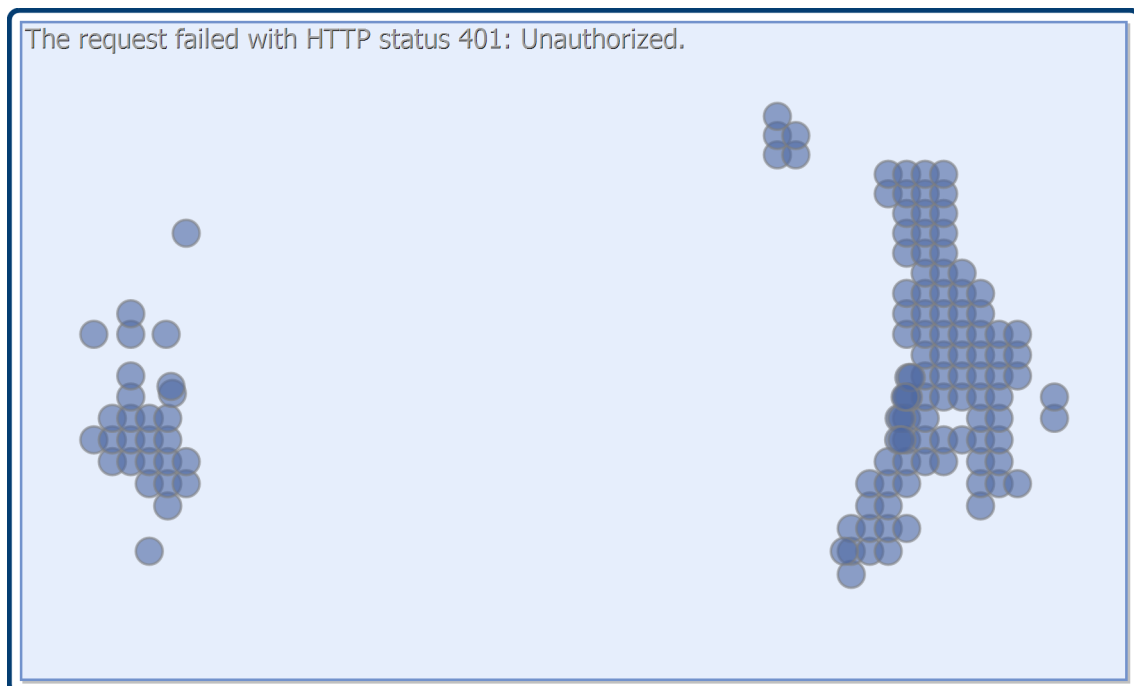
On the basis of the evidence provided above, the Western and Central Pacific Ocean management unit is classified as an **undefined stock**.

## BIOLOGY

**Mahi Mahi biology** [Uchiyama et al. 1986; Massuti and Morales-Nin 1997; Castro et al. 1999; Massuti and Morales-Nin 1999; Uchiyama and Boggs 2006]

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

## DISTRIBUTION



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Distribution of reported Australian commercial catch of Mahi Mahi

**TABLES**

<b>Fishing methods</b>					
	<b>Commonweal th</b>	<b>New South Wales</b>	<b>Northern Territory</b>	<b>Queensland</b>	<b>Western Australia</b>
<b>Charter</b>					
Hook and Line		✓	✓	✓	✓
Spearfishing					✓
<b>Commercial</b>					
Demersal Longline	✓				
Hand Line, Hand Reel or Powered Reels					✓
Hook and Line		✓			
Line				✓	
Pelagic Longline	✓				
Trolling		✓			
Various		✓			
<b>Recreational</b>					
Hook and Line		✓		✓	✓
Spearfishing		✓		✓	✓

<b>Management Methods</b>					
	<b>Commonweal th</b>	<b>New South Wales</b>	<b>Northern Territory</b>	<b>Queensland</b>	<b>Western Australia</b>
<b>Charter</b>					
Bag limits		✓			
Bag/possession limits				✓	
Gear restrictions			✓	✓	
Licence					✓
Limited entry		✓	✓		
Possession limit		✓	✓		✓

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Seasonal or spatial closures				✓	
Size limits		✓		✓	✓
Spatial closures		✓	✓		✓
<b>Commercial</b>					
Area restrictions	✓				
Catch restrictions					✓
Gear restrictions	✓			✓	
Limited entry	✓			✓	✓
Seasonal or spatial closures				✓	
Size limit					✓
Size limits				✓	
Spatial closures		✓			✓
Vessel restrictions				✓	
<b>Recreational</b>					
Bag limits		✓			
Bag/possession limits				✓	
Gear restrictions				✓	
Licence					✓
License		✓			
Possession limit		✓			✓
Seasonal or spatial closures				✓	
Size limit		✓			✓
Size limits				✓	
Spatial closures		✓			✓

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Catch					
	Commonwealth	New South Wales	Northern Territory	Queensland	Western Australia
<b>Charter</b>				Unknown	0.14 t in Tour Operator
<b>Commercial</b>	50.4263 t	1.7961 t		0 t	0.047 t
<b>Indigenous</b>				Unknown	Unknown
<b>Recreational</b>		25,400 (numbers-2017–18)	Unknown	37 t (2019–20)	1.0 t (se +/- 0.5 t; 2020–21)

**Commonwealth – Recreational.** The Australian Government 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 the Torres Strait. In general, non-commercial Indigenous fishing in Commonwealth waters is managed by the state or territory immediately adjacent to those waters.

**Commonwealth – Commercial (Catch).** Catches reported for the Eastern Tuna and Billfish Fishery and Western Billfish and Tuna Fishery are for 2021–22, the most recent year available.

**Western Australia – Recreational (Catch).** Statewide survey of boat-based recreational fishing in Western Australia 2020–21 [Ryan et al. 2022]. 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).** For more information see <https://www.daf.qld.gov.au/business-priorities/fisheries/traditional-fishing>

**Queensland – Recreational Fishing (Catch).** Data are based at the whole of Queensland level and derived from statewide recreational fishing surveys. Where possible, estimates have been converted to weight (tonnes) using best known conversion multipliers. Conversion factors may display regional or temporal variability. In the absence of an adequate conversion factor, data presented as number of fish.

**Queensland – Commercial (Catch).** Queensland commercial and charter data have been sourced from the commercial fisheries logbook program. Further information available through the Queensland Fisheries Summary Report <https://www.daf.qld.gov.au/business-priorities/fisheries/monitoring-research/data/queensland-fisheries-summary-report>

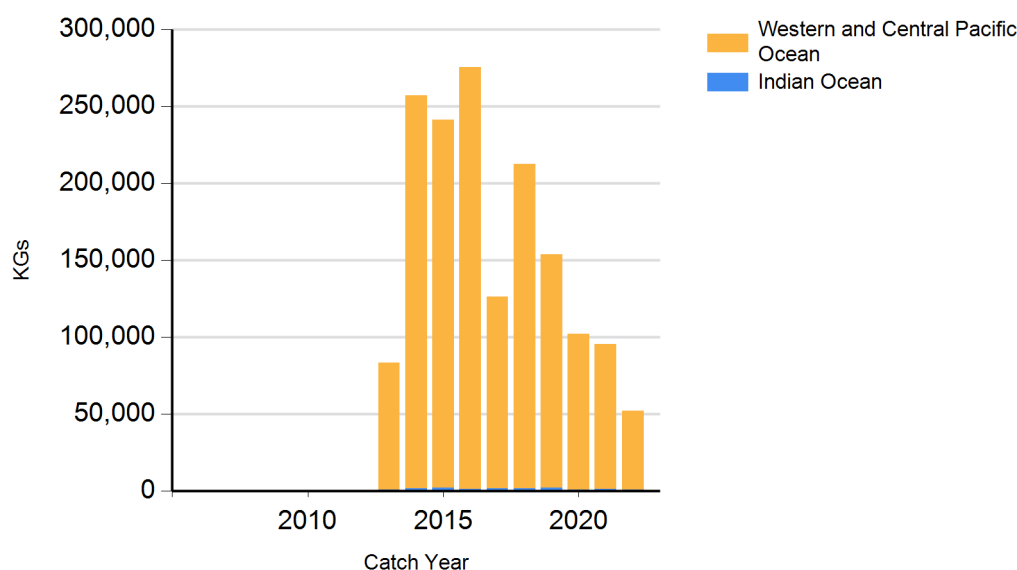
**New South Wales - Recreational Catch.** The most recent estimate of the recreational harvest of Mahi Mahi in NSW was approximately 25,400 fish during 2017–18 [Murphy et al. 2022]. This estimate was based on a survey of Recreational Fishing Licence (RFL) households. RFL households were comprised of at least one member who possessed a long-term (1 and 3 years duration) fishing licence and included other fishers resident within their households. Catch from exempt fishers and short-term licence holders is unknown but for Mahi Mahi long-term licence holders are estimated to be responsible for most of the catch.

**Northern Territory – Charter (Management Methods).** In the Northern Territory, charter operators are regulated through the same management methods as the recreational sector but are subject to additional limits on licence and passenger numbers.

## CATCH CHART



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

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