

# Bigeye Tuna (2023)

*Thunnus obesus*



**Steph Blake:** Australian Bureau of Agricultural and Resource Economics and Sciences

## STOCK STATUS OVERVIEW

Jurisdiction	Stock	Stock status	Indicators
Commonwealth	Indian Ocean	Depleting	Spawning stock biomass, fishing mortality
Commonwealth	Western and Central Pacific Ocean	Sustainable	Spawning stock biomass, fishing mortality

## STOCK STRUCTURE

Bigeye Tuna in the Indian Ocean, and Western and Central Pacific Ocean are considered to be two distinct biological stocks and are managed by separate regional fisheries management organisations. The Indian Ocean stock falls under the jurisdiction of the Indian Ocean Tuna Commission (IOTC) while the Western and Central Pacific Ocean stock falls under the jurisdiction of the Western and Central Pacific Fisheries Commission (WCPFC). These two commissions are international organisations established to manage highly migratory fish species within their defined geographic ranges.

In the Indian Ocean, Bigeye Tuna is considered to be a single biological stock. This is based on genetic studies that indicate no evidence of intra-oceanic genetic differentiation within the Indian Ocean [Chiang et al. 2008; IOTC 2019; Davies et al. 2020; Diaz-Arce et al. 2020] and tagging studies that have demonstrated large-scale movements of Bigeye Tuna within the Indian Ocean [IOTC 2014].

In the Western and Central Pacific Ocean, defined as west of 150°W, genetic studies to date also indicate a single biological stock [Grewe and Hampton 1998; Evans et al. 2021] but further investigations are being planned [Moore et al 2020].

Here, stock status is presented at the biological stock level—Indian Ocean and Western and Central Pacific Ocean.

## STOCK STATUS

### Indian Ocean

The Indian Ocean biological stock of Bigeye Tuna is fished by Australian fishers endorsed to fish in the Western Tuna and Billfish Fishery (Commonwealth), and members of the Indian Ocean Tuna Commission. The assessments undertaken by the Indian Ocean Tuna Commission account for information from all jurisdictions that take Bigeye Tuna in this region.

In the Indian Ocean, the 2019 update to the 2016 assessment [IOTC 2021] estimates that spawning stock biomass in 2018 was 31% of the unfished level (80% confidence interval 21–34%). The biomass of this stock has declined, but the stock is not yet considered to be recruitment impaired. This assessment also estimated that 2018 fishing mortality was above the level associated with maximum sustainable yield (MSY) (120% of fishing mortality at MSY; 80% confidence interval 70–205%). This level of fishing mortality increases the likelihood of the stock becoming recruitment impaired.

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

### Western and Central Pacific Ocean

The Western and Central Pacific Ocean biological stock of Bigeye Tuna is fished by Australian fishers endorsed to operate in the Eastern Tuna and Billfish Fishery (Commonwealth), and members of the Western and Central Pacific Fisheries Commission. The assessments undertaken for the Western and Central Pacific Fisheries Commission account for information from all jurisdictions that take Bigeye Tuna in this region.

The Bigeye Tuna stock in the Western and Central Pacific Ocean was most recently assessed in 2020 [Ducharme-Barth et al. 2020]. This assessment was accepted as a basis for management advice however, noting a range of concerns raised around the biological data/inputs and model complexity, an independent peer review was recommended [WCPFC 2020].

Based on the 2020 assessment, the median recent (2015–18) spawning biomass was 41% of the levels predicted to occur in the absence of fishing (80% confidence interval 27–52% across the grid of models used) [WCPFC 2021]. There was zero probability that the recent spawning stock biomass had breached the limit reference point (LRP) of 20% of the unfished level. The biological stock is therefore not considered to be recruitment impaired.

The 2020 assessment also estimated that the median recent (2014–17) fishing mortality was 72% of the level associated with MSY (80% confidence interval 49–102% across the grid of models used). There was a 12.5% probability that the recent fishing mortality was above fishing mortality at MSY. This level of fishing mortality is unlikely to cause the stock to become recruitment impaired.

On the basis of the evidence provided above, the Western and Central Pacific Ocean biological stock is classified as a **sustainable stock**.

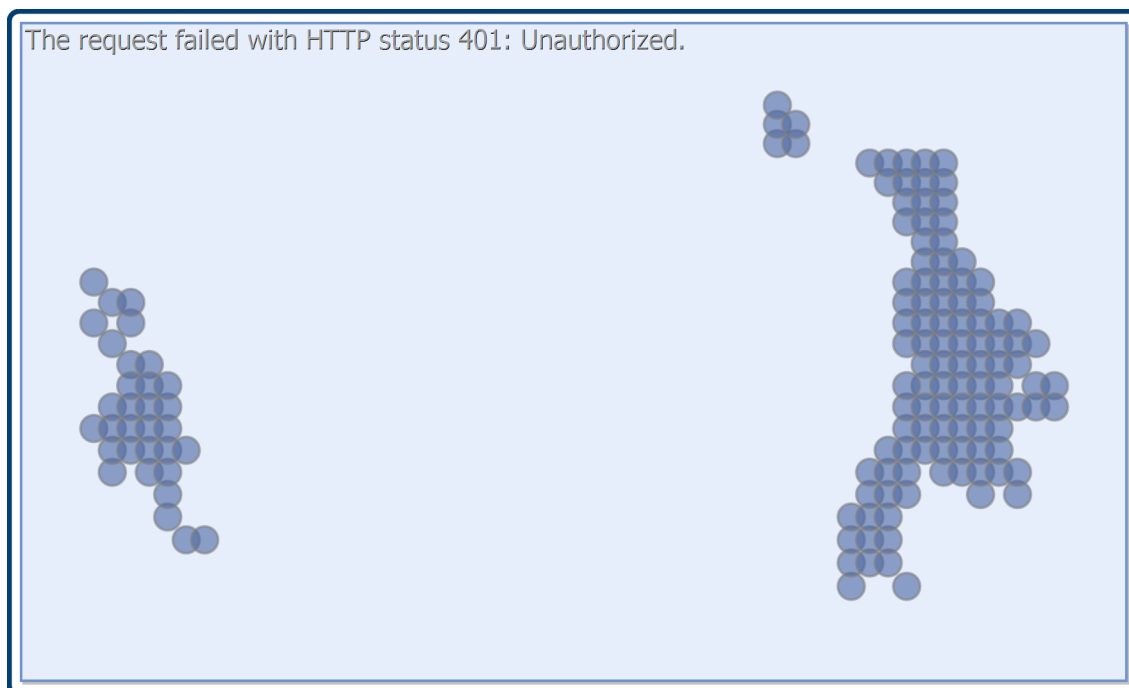
## BIOLOGY

**Bigeye Tuna biology** [Froese and Pauly 2009; Farley et al. 2017, 2018, 2020]

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Species	Longevity / Maximum Size	Maturity (50 per cent)
Bigeye Tuna	Approximately 16 years, approximately 2,000 mm FL	Approximately 3 years, approximately 1,000 mm FL

**DISTRIBUTION**



Distribution of reported Australian commercial catch of Bigeye Tuna in 2021

**TABLES**

Fishing methods	Commonwealth	New South Wales	Queensland	Victoria	Western Australia
<b>Commercial</b>					
Danish Seine	✓				
Gillnet	✓				
Handline	✓				
Handline (mechanised)	✓				
Haul Seine/Beach Seine	✓				
Hook and Line	✓				
Lift nets	✓				

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Longline (Unspecified)	✓				
Pole and Line	✓				
Purse Seine	✓				
Trawl	✓				
Trolling	✓				
Unspecified	✓				
Various	✓				
<b>Recreational</b>					
Hook and Line		✓	✓	✓	✓

Management Methods	
	Commonwealth
<b>Commercial</b>	
Area restrictions	✓
Catch limits	✓
Individual transferable quota	✓
Licence	✓
<b>Recreational</b>	
Bag limits	✓

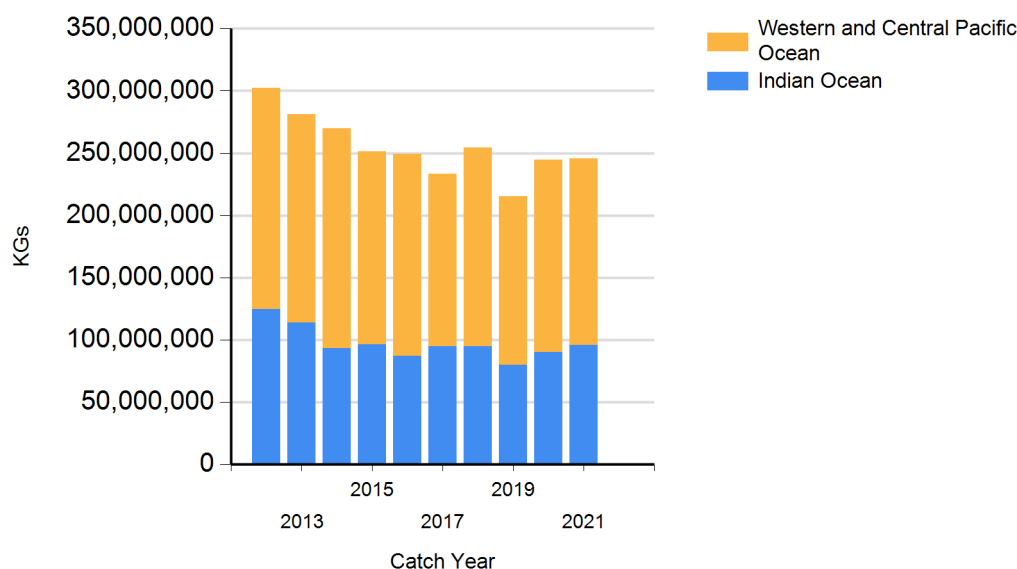
Catch	Commonwealth	New South Wales	Queensland	Victoria	Western Australia
<b>Commercial</b>	0 t				
<b>Recreational</b>		Unknown	Unknown	Unknown	Unknown

**Commonwealth – Commercial (catch).** Catches reported for the Indian Ocean Tuna Commission and Western and Central Pacific Fisheries Commission are for 2021, the most recent year available.

**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.

### CATCH CHART



Commercial catch of Bigeye Tuna - note confidential catch not shown

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