

# Redthroat Emperor (2023)

*Lethrinus miniatus*



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## STOCK STATUS OVERVIEW

Jurisdiction	Stock	Stock status	Indicators
Western Australia	Western Australia	Sustainable	Catch, effort, mean lengths, fishing mortality, relative spawning biomass
Queensland	East Coast Queensland	Sustainable	Catch, effort, standardised catch rate, stock assessment (integrated age and length structured model)

## STOCK STRUCTURE

While records of occurrence are known from the Torres Strait, Gulf of Carpentaria and the Northern Territory [[Atlas of living Australia](#)], the distribution of Redthroat Emperor in Australia appears to be discontinuous [Van Herwerden et al. 2009], ranging from south of Perth to the Montebello Islands on the west coast, and between approximately 17.5° S (Innisfail) to at least 31°S (Lord Howe Island) on the Australian east coast. Genetic analysis using mitochondrial genome hypervariable region 1, indicates that the biological stocks from Western Australia are different compared to eastern Australian populations [Van Herwerden et al. 2009]. Here, assessment of stock status is presented at the biological stock level—Western Australia and East Coast Queensland.

## STOCK STATUS

**East Coast Queensland** The stock assessment of East Coast Queensland Redthroat Emperor was updated in 2020. This assessment was based on data till 2019 and estimated the spawning biomass to be 72% of unfished levels [Northrop and Campbell 2020]. The maximum sustainable yield (MSY) was estimated to be 897 t per year. After significant management changes in 2004 including increased minimum landing

size, revised marine park zoning, introduction of a commercial catch quota and reduced recreational in-possession limits, the annual commercial catch has seen a stable reduction. From 2017–18 to 2021–22, the Queensland commercial harvest averaged 137 t per year with 114 t landed in 2021–22. The most recent recreational fishing survey in 2019–20 estimated the charter sector landed 62.8 t while the remainder of the recreational sector harvested an estimated 50.3 t [DAF 2022; Teixeira et al. 2021] which is a reduction from previously reported for these sectors. This reduction is likely attributed to COVID-19 restrictions, particularly on the operations of the charter fishing sector. The combined total Queensland harvest across all sectors for 2019–20 is an estimated 253 t, well below the estimated MSY. The above evidence indicates that the biomass of the stock is unlikely to be depleted and that recruitment is unlikely to be impaired.

Management reforms from 2004 appear to have reduced fishing mortality to above target levels [Northrop and Campbell 2020]. Given the Queensland long term target of 60% unfished biomass is lower than the current estimated spawning biomass, the stock should be able to sustain higher fishing mortality than presently occurs and remain above the long-term target biomass. In addition, zoning in the Great Barrier Reef Marine Park provides additional protection to the biomass of this stock. The evidence indicates that the current level of fishing mortality is unlikely to cause the stock to become recruitment impaired.

On the basis of the evidence provided above, the East Coast Queensland biological stock is classified as a **sustainable stock**.

## Western Australia

Redthroat Emperor are primarily caught by commercial line fishers in Western Australia, with this sector landing around 80% of the annual retained catches over the past decade. While early catch information for Redthroat Emperor is uncertain due to inconsistent reporting at the species level, available data suggest that total annual catches of the commercial and recreational sectors peaked above 200 t in the mid-2000s. Retained catches of this species in Western Australia have fluctuated around 40–80 t since 2010, after significant management action was taken to reduce fishing effort and catch of demersal scalefish in the West Coast Bioregion (WCB), where the majority of Redthroat Emperor are landed. A 20-year recovery plan is in place to monitor the recovery of the West Coast Demersal Scalefish Resource (WCDSR). In addition to periodic assessments of indicator species [Newman et al. 2018], annual reviews of retained catches and estimates of post-release mortality (PRM) for key species are also undertaken against recovery benchmarks for each sector to inform management of the resource [DPIRD 2021].

In the WCB, retained catches of Redthroat Emperor by the commercial and recreational fishing sectors in 2020–21 were 27 t and 4 t, respectively, with the latter (which includes all Emperor spp.) comprising 2 t landed by charter fishers and 2 t landed by private boat-based fishers [Ryan et al. 2022]. The combined retained catch and estimated PRM (referred to here as total fishing mortality) of Emperor spp. by the commercial sector has been below the original recovery benchmark of 102 t since 2009 (27 t in 2021–22). Total fishing mortality of Emperor spp. by the recreational sector has been below the original recovery benchmark of 11 t in all years that the Statewide Boat-Based Recreational Fishing Survey has been undertaken (2011–12, 2013–14, 2015–16, 2017–18, 2020–21). This suggests that management has been effective at maintaining catches of Redthroat Emperor at acceptable levels.

A 2021 assessment of the WCDSR, to which Redthroat Emperor belongs, showed

that declines in the spawning biomass of key indicator species (West Australian Dhufish and Snapper) at the bioregion level have been halted, but remain below the threshold reference level corresponding to BMSY [Fairclough et al. 2021]. In the case of Snapper, the estimated relative spawning biomass in the West Coast Bioregion in 2020 was still below the limit reference level of 0.2, with model projections indicating that fishing pressure has remained too high to allow stocks to recover above the threshold level by 2030. In response, new management measures for the WCDSR were implemented in early 2023, designed to further reduce retained catches and PRM of key demersal scalefish species in the WCB, to below 50% of the original recovery benchmarks specified in the WCDSR Harvest Strategy [DPIRD 2021]. The indicator species approach used is based on management being focused on species at highest risk of further depletion, to ensure the overall WCDSR is sustainably fished [Newman et al. 2018].

A data-limited Catch-MSY analysis of the Western Australian stock of Redthroat Emperor, based on available catch data from 1975 to 2022, predicts a Maximum Sustainable Yield (MSY) of 87 t (95% CLs: 63–107 t). Although annual catches between 2001 and 2008 substantially exceeded this range, recent management measures to recover the WCDSR resulted in catches of Redthroat Emperor below the predicted MSY since 2009. While uncertain and based on assumptions about the initial and final levels of depletion of the stock (0.4–0.8 and 0.15–0.7, respectively), the analysis indicates that the recent low catches have resulted in reduced fishing mortality ( $F$ ) being experienced by the stock (now below the predicted level of FMSY of 0.12 per year). The predicted relative stock biomass (i.e., the depletion level) in 2022 was 0.47 of the estimated unfished level (95% CLs: 0.19–0.68), just below the threshold reference level corresponding to BMSY (0.5).

Outputs from the Catch-MSY analysis are broadly consistent with available catch curve estimates of  $F$  for Redthroat Emperor, based on age composition data collected periodically from commercial catches in the Mid-west area of the WCB since the mid-2000s. The estimated long-term, average  $F$  of fully-selected fish in the population, derived from a catch curve model that accounts for variable recruitment between years [Fisher 2013], has reduced over time. While the most recent  $F$  estimate based on data from 2016–17 remains above the estimated value of natural mortality for Redthroat Emperor, the data indicate that individuals may not be fully selected by the fishery by the time they attain the minimum legal length of 280 mm. The mean lengths of Redthroat Emperor in charter catches since 2002 have remained well above the length at 50% female maturity [Crisafulli et al. in review], providing an indication of lower fishing pressure on the female component of the breeding stock. The estimated relative spawning biomass for both sexes combined in 2016–17, generated by a per-recruit model that incorporates a stock-recruitment relationship and accounts for age-based selectivity and female-to-male sex change, was around 0.5, i.e., above the proxy for BMSY of 0.3.

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

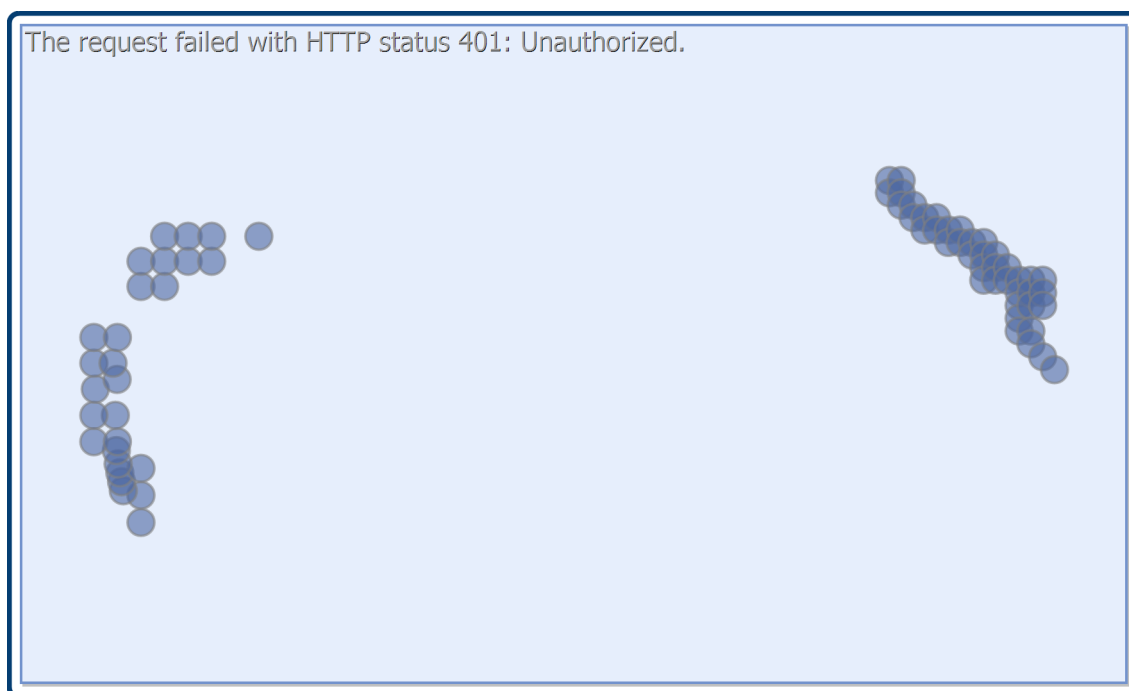
## BIOLOGY

**Redthroat Emperor biology** [Williams 2003; Williams et al. 2003; Van Herwerden et al. 2009]

STATUS OF AUSTRALIAN FISH STOCKS REPORT  
Redthroat Emperor (2023)

Species	Longevity / Maximum Size	Maturity (50 per cent)
Redthroat Emperor	20 years, 650 mm TL	Protogynous-variant sequential hermaphrodite with large overlap in size and ages  Females mature: 1.2 years, 310 mm TL (east coast)

**DISTRIBUTION**



Distribution of reported commercial catch of Redthroat Emperor

**TABLES**

Fishing methods	Queensland	Western Australia
<b>Charter</b>		
Hook and Line	✓	✓
Spearfishing	✓	✓
<b>Commercial</b>		
Dropline		✓
Fish Trap		✓
Gillnet		✓

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Hand Line, Hand Reel or Powered Reels		✓
Line	✓	✓
<b>Recreational</b>		
Hook and Line	✓	✓
Spearfishing	✓	✓

<b>Management Methods</b>		
	<b>Queensland</b>	<b>Western Australia</b>
<b>Charter</b>		
Bag/possessi on limits	✓	✓
Gear restrictions	✓	✓
Licence		✓
Limited entry		✓
Marine park closures	✓	✓
Passenger restrictions		✓
Processing restrictions	✓	
Seasonal or spatial closures	✓	
Size limits	✓	✓
Spatial zoning		✓
<b>Commercial</b>		
Effort limits		✓
Gear restrictions	✓	✓
Harvest Strategy	✓	
Individual transferable quota	✓	
Limited entry	✓	✓
Marine park closures	✓	✓

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Processing restrictions	✓	
Seasonal or spatial closures	✓	✓
Size limits	✓	✓
Spatial zoning		✓
Total allowable catch	✓	
Total allowable effort		✓
Vessel restrictions	✓	✓
<b>Recreational</b>		
Bag/possession limits	✓	✓
Gear restrictions	✓	✓
Licence (boat-based sector)		✓
Marine park closures	✓	✓
Processing restrictions	✓	
Seasonal or spatial closures	✓	
Size limits	✓	✓
Spatial zoning		✓
Temporal closures		✓

Catch		
	Queensland	Western Australia
<b>Charter</b>	63 t (2019–20)	5 t (2021–22)
<b>Commercial</b>	113.936 t	29.7856 t
<b>Indigenous</b>	Unknown	Unknown
<b>Recreational</b>	50 t (2019–20)	10 t (2020–21)

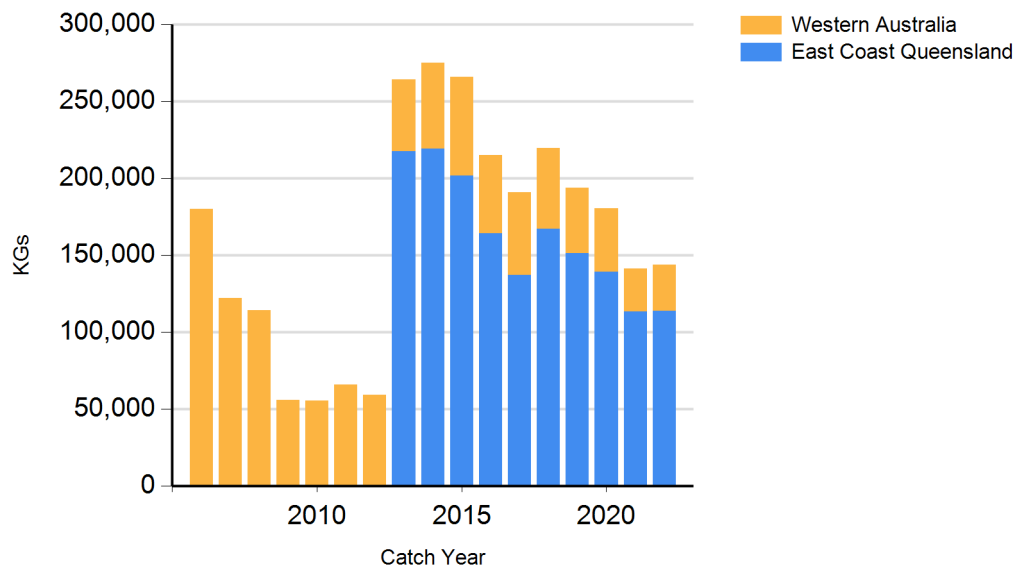
**Western Australia – Commercial/Charter.** Catches reported by calendar year.

**Western Australia – Recreational.** Boat-based catch from 1 September 2020 to 31 August 2021.

**Western Australia – Indigenous (Management Methods).** Subject to application of 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.

**Queensland – Indigenous (Management Methods).** For more information see: <https://www.daf.qld.gov.au/business-priorities/fisheries/traditional-fishing>

## CATCH CHART



Commercial catch of Redthroat Emperor

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