Redthroat Emperor (2020)

Lethrinus miniatus

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STOCK STATUS OVERVIEW

Jurisdiction	Stock	Stock status	Indicators
Western Australia	Western Australia	Recovering	Catch, effort, fishing mortality
Queensland	East Coast Queensland	Sustainable	Catch, standardised catch rate, stock assessment

STOCK STRUCTURE

Genetic analysis indicates that there are two separate biological stocks of Redthroat Emperor in western and eastern Australian waters [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 (based on 2019 data) estimated the spawning biomass to be 72 per cent of unfished levels of 1946 [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 2015 to 2019, the Queensland total harvest averaged 281 t per year, including 142 t by the commercial sector, 76 t by the charter sector and 80 t by the recreational sector in recent year [QFISH 2020, Teixeira et al. 2021]. The combined harvest is 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 per cent 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. 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

The Western Australian Department of Primary Industries and Regional Development uses fishing mortality (F) based assessments for data-limited species that compare to reference levels (target, threshold and limit) based on ratios of natural mortality (M) (Ftarget = 2/3M, Fthreshold = M and Flimit = 3/2M; [Wise et al. 2007]).

In 2007, an assessment of three indicator species for the whole West Coast Demersal Scalefish Resource, to which Redthroat Emperor belongs, identified that overfishing had been occurring, i.e. $F >$ the limit for each species [Wise et al. 2007, Newman et al. 2018]. The indicator species (West Australian stocks of West Australian Dhufish, Snapper and Baldchin Groper) were selected for the resource based on a range of factors, including inherent vulnerability, social/economic importance and management requirements [Newman et al. 2018]. Regular assessments focus on West Australian Dhufish and Snapper, with aperiodic assessments of other species, such as Baldchin Groper.

Management arrangements for both the commercial and recreational sectors were introduced between 2007 and 2010 to recover stocks of all demersal species (including the Western Australian biological stock of Redthroat Emperor). These arrangements were designed to reduce effort to ensure annual retained catches of the demersal resource do not exceed 50 per cent of 2005–06 levels This recovery strategy is designed to reduce F to less than the threshold and increase spawning potential ratio (SPR) above the threshold (30 per cent of the pre-fishing level).

Under the current management arrangements, annual commercial catches of Redthroat Emperor have remained below 50 per cent of 2005–06 levels (95 t) since 2009, i.e. 48–65 t, with 43 t landed in 2019. Annual catches of private boat-based recreational fishers and charter fishers are small, with 13 t landed in 2017-18 [Ryan et al. 2019, Gaughan and Santoro, 2020].

Fishing mortality rates for Redthroat Emperor have been recently estimated on historically collected age structure data using methods that take into account recruitment variation [Fisher, 2013]. Results indicated that F had decreased from 0.37 (±0.06) in the period 2005-2007, which was above the limit of 0.26, to 0.18 (±0.05) in 2011-2012, which is just above the threshold of 0.17. These F estimates constitute the most recent assessment for Redthroat Emperor. However, an age-based assessment of the primary indicator species (the Western Australia biological stock of West Australian Dhufish and the West Coast stock of Snapper) was conducted in 2017, based on 2012-13 to 2014-15 data. Estimated F values for West Australian Dhufish (F = 0.21) and Snapper (F = 0.23) were still above their limit reference points (F = 1.5M = 0.165, 0.18, respectively) and spawning potential ratios were between the limit and threshold for West Australian Dhufish (SPR = 0.2–0.3) and below the limit of SPR = 0.2 for Snapper [Fairclough et al. 2020]. That assessment was based on age composition data collected just after management changes were completed and recovery was expected to take ~20 years, given the longevity of these species [Hesp et al. 2002, Norriss and Crisafulli 2010].

Estimates of *F* were also derived using a method that allows for a change in fishing mortality, i.e. for cohorts of fish that have recruited to the fishery pre- and post-management changes [Fisher 2013]. For the small number of age classes in the 2012–13 to 2014–15 data for West Australian Dhufish and Snapper that recruited to the fishery after management changes commenced in 2008, *F* estimates were lower than for age classes recruited to the fishery prior to management changes, i.e. *F* = 0.13 vs 0.21 for West Australian dhufish and *F* = 0.14 vs 0.27 for Snapper. This observation suggests that recovery of these species had commenced and, as they are considered indicators of the status of all species in the resource, it is assumed that is also the case for Redthroat Emperor. The above evidence indicates that the biomass of this stock was likely to be depleted and recruitment likely to be impaired. However, the current level of fishing mortality should allow the Western Australia biological stock of Redthroat Emperor to recover from its recruitment impaired state.

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

BIOLOGY

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

Species	Longevity / Maximum Size	Maturity (50 per cent)
Redthroat Emperor	20 years, 650 mm TL	Females: 1.2 years, 280 mm FL, 310 mm TL

DISTRIBUTION

Distribution of reported commercial catch of Redthroat Emperor

TABLES

Fishing methods		
	Queensland	Western Australia

Charter		
Hook and Line	✓	✓
Spearfishing	✓	
Commercial		
Dropline		✓
Fish Trap		✓
Gillnet		✓
Hand Line, Hand Reel or Powered Reels		✓
Line	✓	✓
Recreational		
Hook and Line	✓	✓
Spearfishing	✓	✓

Management Methods		
	Queensland	**Western Australia**
Charter		
Bag limits		✓
Gear restrictions	✓	✓
Licence		✓
Limited entry	✓	✓
Marine park closures	✓	✓
Passenger restrictions		✓
Possession limit	✓	✓
Size limit	✓	✓
Spatial closures	✓	
Spatial zoning		✓
Temporal closures	✓	✓
Commercial		
Effort limits		✓
Gear restrictions	✓	✓
Limited entry	✓	✓
Marine park closures	✓	✓
Size limit	✓	✓
Spatial	✓	✓

closures		
Spatial zoning		✓
Temporal closures	✓	
Total allowable catch	✓	
Total allowable effort		✓
Vessel restrictions	✓	✓
Recreational		
Bag and possession limits		✓
Bag limits		✓
Gear restrictions	✓	✓
Licence (boat-based sector)		✓
Marine park closures	✓	✓
Possession limit	✓	✓
Size limit	✓	✓
Spatial closures	✓	
Spatial zoning		✓
Temporal closures	✓	✓

Catch		
	Queensland	Western Australia
Charter		4 t
Commercial	151.149 t	42.684 t
Indigenous	Unknown	Unknown
Recreational	119 t (2019-20)	9 t (2017-18)

Western Australia Data for Western Australia align with the 2019 calendar year.

Western Australia – Recreational (Catch) Boat-based recreational catch is from 1 September 2017–31 August 2018. These data are derived from those reported in Ryan et al. [2019].

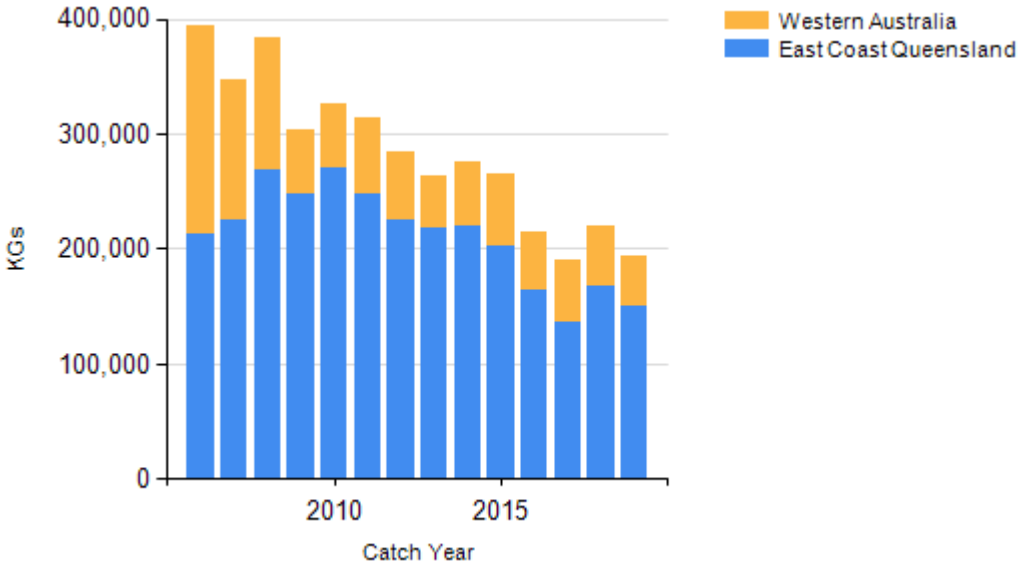
Western Australia – Recreational (management methods) A Recreational Fishing from Boat Licence is required for the use of a powered boat to fish or to transport catch or fishing gear to

or from a land-based fishing location.

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 - note confidential catch not shown

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