

# Bluespotted Emperor (2023)

*Lethrinus punctulatus*



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## STOCK STATUS OVERVIEW

Jurisdiction	Stock	Stock status	Indicators
Western Australia	Pilbara	Sustainable	Spawning stock biomass, age structure, fishing mortality rate, catch, CPUE
Western Australia, Northern Territory	Northern Australia	Sustainable	Catch, indicator species status

## STOCK STRUCTURE

The distribution of Bluespotted Emperor is restricted primarily to Western Australian waters and extends from around Geraldton in the south to Darwin in the Northern Territory, with its greatest relative abundances in the western Pilbara region [Carpenter and Niem 2001; Newman et al. 2020]. Bluespotted Emperor are exploited primarily in the North Coast Bioregion of Western Australia [Newman et al. 2020]. Very small catches are landed in the Northern Territory. Bluespotted Emperor is one of the indicator species used to assess the status of the demersal resources in the Pilbara subregion of the North Coast Bioregion [Newman et al. 2018].

Johnson et al. [1993] examined allozymes (allelic variants of enzymes encoded by structural genes) from samples of Bluespotted Emperor from the Lacepede Islands, Bedout Island, Lendal Islands, Ningaloo, Shark Bay and the Abrolhos Islands in Western Australia (locations spread over a sampling distance of approximately 2,000 km). Bluespotted Emperor displayed little genetic variation over the geographic distance of sampling. While adult populations were not totally intermixed, the low level of genetic variation indicates extensive connectivity among populations of Bluespotted Emperor over large distances.

The lack of genetic differentiation among populations of Bluespotted Emperor across the northwest region of Western Australia indicates that there is gene flow among populations [Johnson et al. 1993; Moran et al. 1993] and in this region comprises one biological stock. Moran et al. [1993] examined the elemental composition in sagittal otolith carbonates of

Bluespotted Emperor from Maud Anchorage (Point Maud, Ningaloo), North-West Alison Point (Ningaloo) and Bedout Island (Pilbara). Significant differences were demonstrated between all three locations. The Maud Anchorage and North-West Alison Point locations are only separated by a distance of approximately 40 km. The results of the Moran et al. [1993] study indicate that there is limited mixing of adult Bluespotted Emperor assemblages. Given the absence of any discrete genetic structure, there is insufficient evidence to suggest revision of current management boundaries. Hence, the current boundaries that designate separate management units are deemed appropriate if adequate levels of adult biomass are maintained, as declines in one stock may have broader implications for the population network given the broader connectivity.

Here, assessment of stock status is presented at the management unit level—Pilbara (Western Australia) and Northern Australia (Kimberley, Western Australia and the Northern Territory).

## STOCK STATUS

### **Northern Australia**

Bluespotted Emperor in the Kimberley is landed commercially in the Northern Demersal Scalefish Managed Fishery (NDSMF). Bluespotted Emperor is assessed on the basis of the status of several indicator species (for example, Red Emperor and Goldband Snapper in the Kimberley region) within the North Coast Demersal Resource (NCDR) that represent the entire inshore demersal suite of species occurring at depths of 30–250 m [Newman et al. 2018]. The indicator species in the Kimberley have been classified as sustainable based on the performance measures identified in the harvest strategy [Wakefield et al. 2023]. The level of risk associated with the sustainability of Bluespotted Emperor in the NCDR is assessed as low. This assessment of Bluespotted Emperor is also supported by predictions for biomass and harvest rates from a data-limited Catch-MSY assessment model compared periodically to a model prediction for maximum sustainable yield (MSY). Bluespotted Emperor is occasionally landed in low numbers in the Northern Territory (there has been no recent catch reported for this species although there is probably a small annual catch (< 1 tonne (t)) that is misreported as "Emperor general" in recreational fishing surveys).

Total catch of Bluespotted Emperor in the Kimberley over the last 10 years (2013–22) have ranged from 42–74 t, with a mean annual catch of 54 t. This is an increase on the averages catches across the previous 10 years of 24 t. Recreational and charter catch are relatively low compared to the commercial catch, in the past 10 years where reliable catches estimates are available, the proportion of the total catch has averaged < 2%. The Catch-MSY model applied to data on annual catches for this species (1993–2022), indicate that the annual catches from 1993–96 and 2012–21 were above the median model estimate for maximum sustainable yield (MSY), having gone above the 95% CI in 2022, but from 1997–2011 were below MSY. This is also consistent with the predicted values for biomass remaining above BMSY for the entire time series, and fishing mortality remaining below FMSY. However, it is important to recognise that Catch-MSY is a data-limited technique with relatively strong assumptions, dependent on user inputs. For this assessment, these included specified ranges for initial depletion (0.4–0.8), based on likely but unknown catches from foreign fleets prior to the start of the time series, final depletion (0.15–0.7), based on recent catches relative to maximum recorded annual catch and the non-targeted nature, and low resilience ( $r=0.1–0.6$ , consistent with species longevity, of approximately 16 years in WA). Given recent catches of this species being within the confidence of the predicted MSY, and status of the indicator species for the NCDR, it is considered unlikely that the biomass of Bluespotted Emperor in Northern Australia is depleted. Further, the above 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, Bluespotted Emperor in Northern Australia is classified as **sustainable**.

## **Pilbara**

Bluespotted Emperor is one of the indicator species in the Pilbara management unit of the North Coast Bioregion of Western Australia [Newman et al. 2018] and as such the stock status of Bluespotted Emperor contributes to determining the risk-level for the biological sustainability of the demersal scalefish resources in the Pilbara management unit. Bluespotted Emperor are landed primarily in the Pilbara Trap Managed Fishery and Pilbara Fish Trawl (Interim) Managed Fishery in the Pilbara management region of the North Coast Bioregion of Western Australia. The major performance measures for the Pilbara management unit of Bluespotted Emperor are periodic assessments of spawning stock levels and fishing mortality estimated using an integrated age-structured model relative to standard reference levels and fishing mortality from catch curve analysis derived from representative samples of the age structure. The integrated age structured assessment model was last delivered in 2015 but is currently being updated and will be delivered at the end of 2023. Catch, effort and/or catch rates for the indicator species/fishing sector are also reviewed annually, to determine whether they are consistent with current harvest control rules (HCRs) for the resource [DPIRD 2017].

The spawning biomass level of Bluespotted Emperor overall (across all management areas) was greater than 40% in the Pilbara Demersal Scalefish Fisheries in 2015 [Wakefield et al. 2023]. This indicates that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired. The fishing mortality-based assessments and associated uncertainty ranges indicated that the fishing levels on Bluespotted Emperor in 2015 were mainly between the target and threshold levels in all management areas. The estimates of  $F$  indicate that the overall management unit is unlikely to have been heavily exploited during the time series for which data are available. The low estimates of  $F$  in the west, in its main area of abundance, further indicate that the exploitation on the overall management unit is currently low. The 2015 assessment resulted in a low risk to the stock over the next 5 years.

Total catch of Bluespotted Emperor in the Pilbara over the last 10 years (2013–22) have ranged from 138–428 t, with a mean annual catch of 300 t. This is a decrease on the average catches across the previous 10 years of 380 t. Recreational and charter catch are relatively low compared to the commercial catch, in the past 10 years where reliable catch estimates are available, the proportion of the total catch has averaged < 1%. Catch rates of Bluespotted Emperor are determined from the commercial trawl fishery. These catch rates have remained relatively stable from 2015 to 2020 but have declined in the last two years. The above 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 Pilbara management unit is classified as a **sustainable stock**.

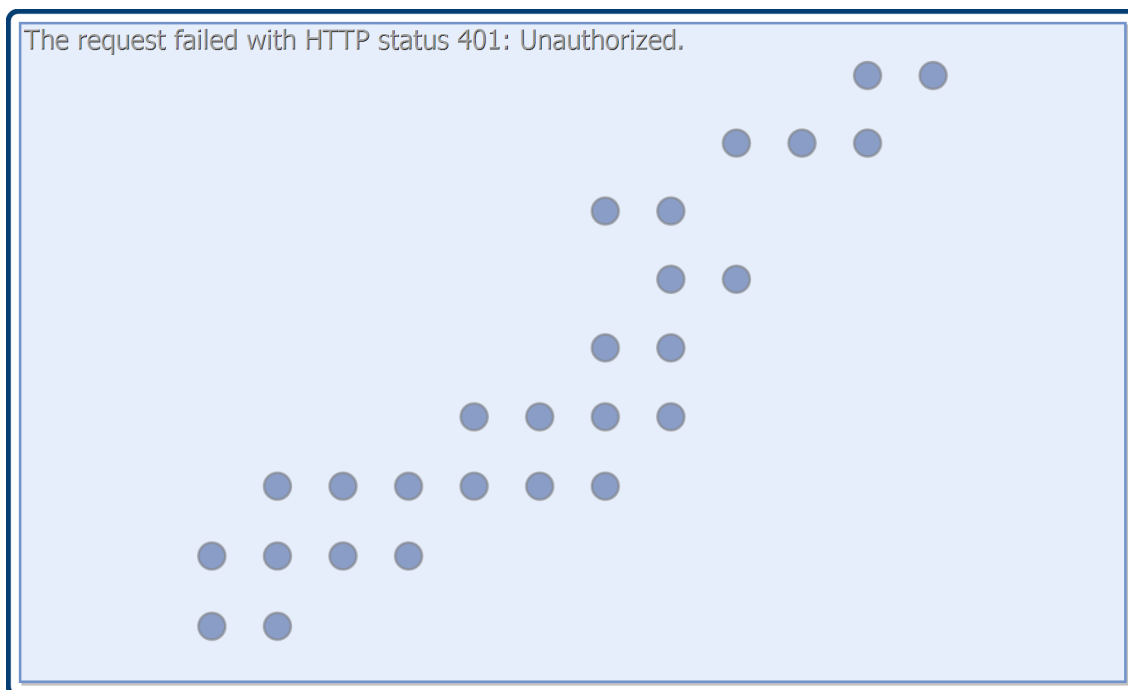
## **BIOLOGY**

**Bluespotted Emperor biology** [Wakefield et al. unpublished data]

STATUS OF AUSTRALIAN FISH STOCKS REPORT  
Bluespotted Emperor (2023)

Species	Longevity / Maximum Size	Maturity (50 per cent)
Bluespotted Emperor	16 years, 384 mm FL	1.6 years, 206 mm FL

**DISTRIBUTION**



Distribution of reported commercial catch of Bluespotted Emperor

**TABLES**

Fishing methods	Northern Territory	Western Australia
<b>Charter</b>		
Handline		✓
Hook and Line	✓	
Rod and reel		✓
Unspecified		✓
<b>Commercial</b>		
Fish Trap		✓
Hand Line, Hand Reel or Powered Reels		✓
Otter Trawl		✓

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<b>Recreational</b>		
Handline		✓
Hook and Line	✓	
Spearfishing		✓
Unspecified		✓

<b>Management Methods</b>		
	<b>Northern Territory</b>	<b>Western Australia</b>
<b>Charter</b>		
Bag limits		✓
Gear restrictions	✓	
Limited entry	✓	✓
Passenger restrictions		✓
Possession limit	✓	
Size limit		✓
Spatial closures	✓	✓
Spatial zoning		✓
Vessel limits	✓	
<b>Commercial</b>		
Effort limits		✓
Gear restrictions	✓	✓
Limited entry	✓	✓
Size limit		✓
Spatial closures	✓	✓
Spatial zoning		✓
Total allowable catch		✓
Total allowable effort		✓
Vessel restrictions		✓

STATUS OF AUSTRALIAN FISH STOCKS REPORT  
Bluespotted Emperor (2023)

<b>Recreational</b>		
<b>Bag limits</b>		✓
<b>Gear restrictions</b>	✓	
<b>Licence (Recreational Fishing from Boat License)</b>		✓
<b>Possession limit</b>	✓	✓
<b>Size limit</b>		✓
<b>Spatial closures</b>	✓	✓

<b>Catch</b>		
	<b>Northern Territory</b>	<b>Western Australia</b>
<b>Charter</b>	Unknown	0.25 t
<b>Commercial</b>	0 t	334.398 t
<b>Indigenous</b>	Unknown	Unknown
<b>Recreational</b>	Unknown	0.52 t ± 0.173 t se

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**Western Australia.** Active Vessels data are confidential as there were fewer than three vessels in the Pilbara Fish Trawl Interim Managed Fishery, the Pilbara Trap Managed Fishery and the West Coast Demersal Gillnet and Demersal Longline (Interim) Managed Fishery.

**Western Australia – Recreational (Catch).** Boat-based recreational catch is from 1 September 2020–31 August 2021. These data are derived from those reported in Ryan et al. [2022].

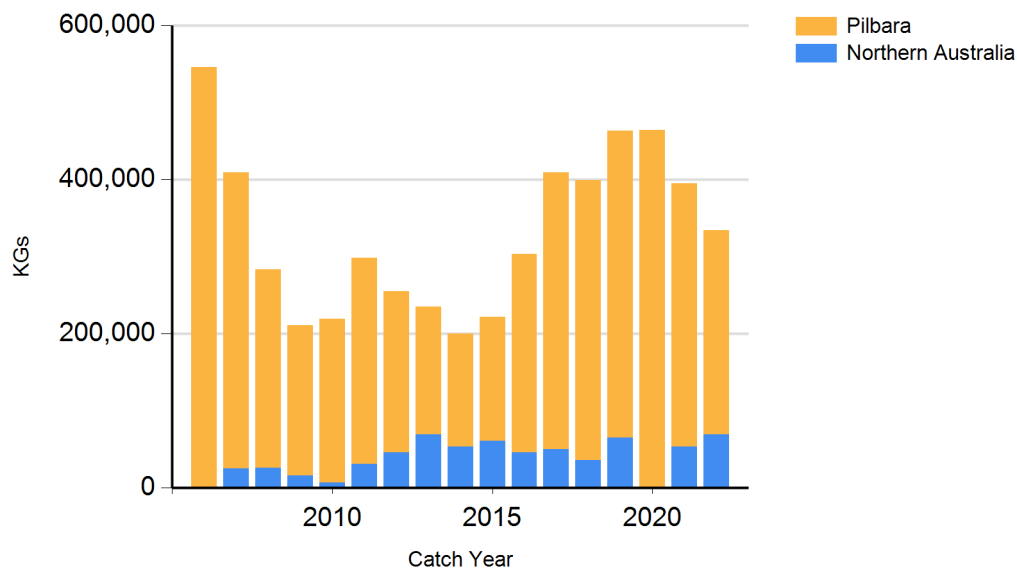
**Western Australia – Recreational (Management Methods).** A Recreational Fishing from Boat Licence is required for the use of a powered boat to fish or to transport catch or fishing gear to or from a land-based fishing location.

**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.

**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 license and passenger numbers.

**Northern Territory – Indigenous (Management Methods).** The Fisheries Act 1988 (NT), specifies that: “Unless expressly provided otherwise, nothing in this Act derogates or limits the right of Aboriginal people who have traditionally used the resources of an area of land or water in a traditional manner to continue to use those resources in that area in that manner.”

## CATCH CHART



Commercial catch of Bluespotted Emperor - note confidential catch not shown

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Newman et al. 2018	Newman, SJ, Brown, JI, Fairclough, DV, Wise, BS, Bellchambers, LM, Molony, BW, Lenanton, RCJ, Jackson, G, Smith, KA, Gaughan, DJ, Fletcher, WJ, McAuley, RB and Wakefield, CB 2018, A risk assessment and prioritisation approach to the selection of indicator species for the assessment of multi-species, multi-gear, multi-sector fishery resources. <i>Marine Policy</i> 88: 1122.
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