

Bluespotted Emperor (2020)

Lethrinus punctulatus



Stephen Newman: Department of Primary Industries and Regional Development, Western Australia, **Fabian Trinnie:** Department of Primary Industries and Regional Development, Western Australia, **Thor Saunders:** Department of Industry, Tourism and Trade, Northern Territory, **Corey Wakefield:** Department of Primary Industries and Regional Development, Western Australia

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, Lowendal 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. This indicates that in

Western Australia, Bluespotted Emperor may comprise separate management units, if management arrangements are mediated in a way that harmonises with the spatial patterns of exploitation.

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 is landed in the Northern Demersal Scalefish Managed Fishery (NDSMF) in the Kimberley management region of Western Australia [Newman et al. 2020] and 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).

Bluespotted Emperor is assessed on the basis of the status of two indicator species (Red Emperor and Goldband Snapper) that represent the entire inshore demersal suite of species occurring at depths of 30–250 m in the Kimberley management region of WA [Newman et al. 2018]. The major performance measures for these indicator species are estimates of relative spawning stock levels using an integrated age-structured model. The target level of spawning biomass is 40 per cent of the unfished level, with a threshold reference level of 30 per cent and a limit reference level of 20 per cent of the estimate of initial spawning biomass [DPIRD 2017]. The spawning biomass levels of these two indicator species were at the threshold level in the NDSMF in 2017 [Newman et al. 2020]. The above evidence indicates that the biomass of the Bluespotted Emperor stock is unlikely to be depleted and that recruitment is unlikely to be impaired.

The catch of Bluespotted Emperor in the NDSMF has been low and stable for the past 10 years (2010–19), ranging from 27–63 t, with a mean annual catch of 48 t. 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 Northern Australia stock is classified as **sustainable**.

Pilbara

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 [Newman et al. 2020]. The major performance measures for the Pilbara management unit are based on estimates of current relative spawning stock levels of Bluespotted Emperor in the Pilbara Demersal Scalefish Fisheries derived using an integrated age-structured model. The target level of spawning biomass is 40 per cent of unfished (1972) biomass, with a threshold reference level of 30 per cent and a limit reference level of 20 per cent of the unfished spawning biomass [DPIRD 2017]. The spawning biomass level of Bluespotted Emperor overall (across all management areas) was greater than 40 per cent in the Pilbara Demersal Scalefish Fisheries in 2015 (the year the last integrated assessment was undertaken). The above evidence indicates that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired.

An assessment of fishing mortality derived from representative samples of the age structure of Bluespotted Emperor has also been undertaken for separate management areas in the Pilbara subregion in 2015. These fishing mortality (F) based assessments utilise the following reference levels based on ratios of natural mortality (M) that are applicable to each species, i.e. $F_{\text{target}} = 2/3M$, $F_{\text{threshold}} = M$ and $F_{\text{limit}} = 3/2M$ [DPIRD 2017]. 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.

Catch levels of Bluespotted Emperor in the Pilbara over the last 10 years (2010–19) have ranged from 138–422 t, with a mean annual catch of 269 t. The above evidence indicates that the current level of fishing mortality is unlikely to cause the stock to become recruitment impaired.

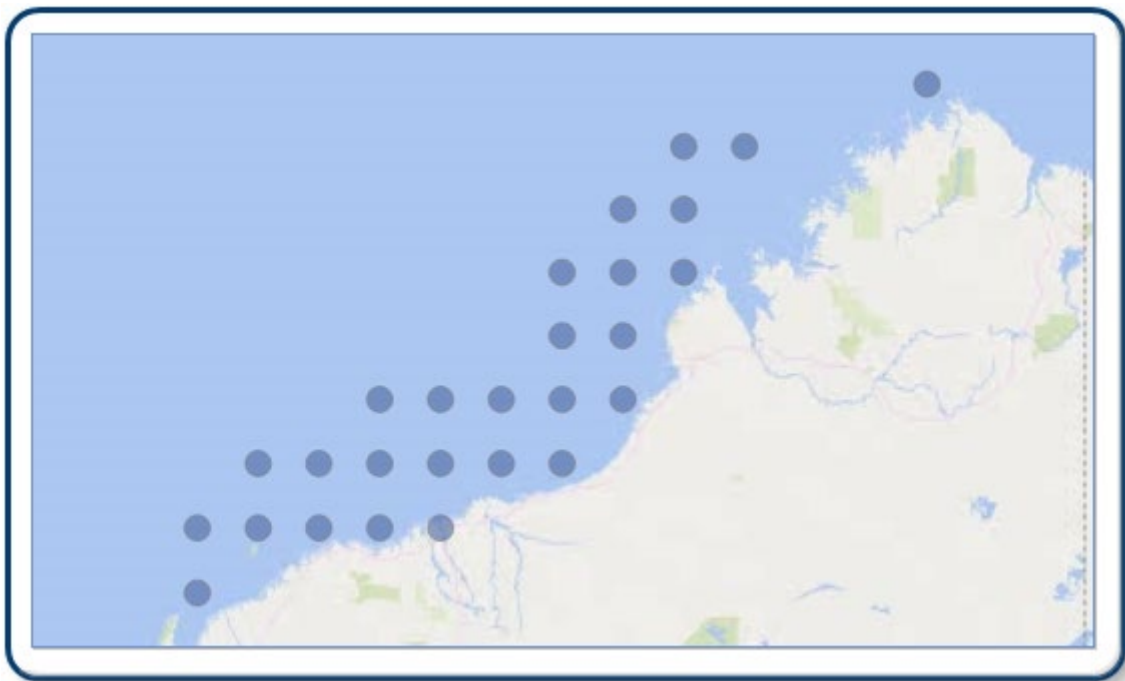
On the basis of the evidence provided above, the Pilbara management unit is classified as a **sustainable stock**.

BIOLOGY

Bluespotted Emperor biology [Wakefield et al. unpublished data]

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
Charter		
Hook and Line	✓	

Rod and reel		✓
Commercial		
Fish Trap		✓
Hand Line, Hand Reel or Powered Reels		✓
Otter Trawl		✓
Unspecified	✓	
Recreational		
Handline		✓
Hook and Line	✓	
Spearfishing		✓

Management Methods	
	Western Australia
Charter	
Bag limits	✓
Limited entry	✓
Passenger restrictions	✓
Size limit	✓
Spatial closures	✓
Spatial zoning	✓
Commercial	
Effort limits	✓
Gear restrictions	✓
Limited entry	✓
Size limit	✓
Spatial closures	✓
Spatial zoning	✓
Total allowable catch	✓
Total allowable effort	✓
Vessel restrictions	✓
Recreational	
Bag limits	✓
Licence (Recreational Fishing)	✓

from Boat License)	
Possession limit	✓
Size limit	✓
Spatial closures	✓

Catch		
	Northern Territory	Western Australia
Charter	Unknown	< 0.5 t
Commercial	0 t	463.219 t
Indigenous	Unknown	Unknown
Recreational	Unknown	Insufficient data

Western Australia Active Vessels data is 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 2017–31 August 2018. These data are derived from those reported in Ryan et al. [2019].

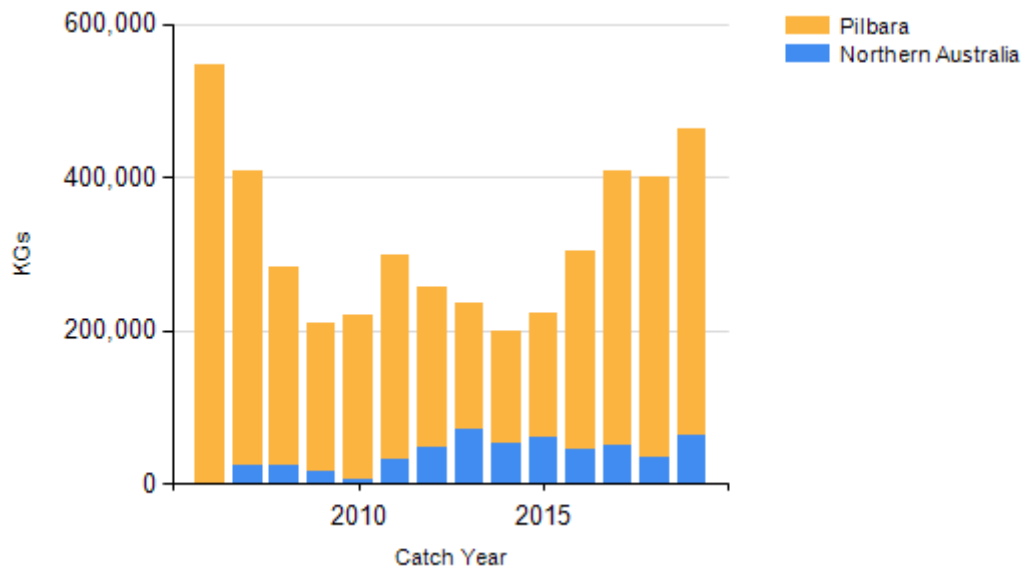
Western Australia – Recreational (management methods) A Recreational Fishing from Boat Licence is required for the use of a powered boat to fish or to transport catch or fishing gear to or from a land-based fishing location.

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.

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 "...without derogating from any other law in force in the Territory, nothing in a provision of this Act or an instrument of a judicial or administrative character made under it limits the right of Aboriginals who have traditionally used the resources of an area of land or water in a traditional manner from continuing to use those resources in that area in that manner".

CATCH CHART



Commercial catch of Bluespotted Emperor - note confidential catch not shown

References	
Newman et al. 2020	Newman, SJ, Wakefield, C, Skepper, C, Boddington, and Blay, N 2020, North Coast Demersal Resource Status Report 2019. pp. 159–168. In: Gaughan, DJ and Santoro, K (eds.) 2020. Status Reports of the Fisheries and Aquatic Resources of Western Australia 2018/19: The State of the Fisheries. Department of Primary Industries and Regional Development, Western Australia, Perth, Australia. 291p.
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. Marine Policy 88: 1122.
DPIRD 2017	DPIRD. 2017, North Coast demersal scalefish resource harvest strategy 2017–2021. Version 1.0. Fisheries Management Paper No. 285. Department of Primary Industries and Regional Development, Government of Western Australia, Perth, Australia. 35p.
Johnson et al. 1993	Johnson, MS, Hebbert, DR and Moran, MJ 1993, Genetic analysis of populations of north-western Australian fish species. Australian Journal of Marine and Freshwater Research. 44: 673–685.
Moran et al. 1993	Moran M, Edmonds J, Jenke J, Cassells G and Burton C 1993, Fisheries biology of emperors (Lethrinidae) in north-west Australian coastal waters. Final Report to the Fisheries Research and Development Corporation (FRDC) on Project No. 89/20. Fisheries Department, Perth, Western Australia. 58p.
Carpenter and Niem 2001	Carpenter, KE and Niem, VH (eds.) 2001, FAO species identification guide for fishery purposes. The living marine resources of the Western Central Pacific. Volume 5. Bony fishes part 3 (Menidae to Pomacentridae). Rome, FAO, pp. 2791–3380.
Ryan et al. 2019	Ryan, KL, Hall, NG, Lai, EK, Smallwood, CB, Tate, A, Taylor, SM, Wise, BS 2019, Statewide survey of boat-based recreational fishing in Western Australia 2017/18. Fisheries Research Report No. 297. Department of Primary Industries and Regional Development, Government of Western Australia, Perth.