

Brownstripe Snapper (2023)

Lutjanus vitta



Fabian Trinnie: Department of Primary Industries and Regional Development, Western Australia, **Marlee Jesson-Kerr:** Department of Agriculture and Fisheries, Queensland, **Deepak George Pazhayamadom:** Department of Industry, Tourism and Trade, Northern Territory, **Stephen Newman:** Department of Primary Industries and Regional Development, Western Australia

STOCK STATUS OVERVIEW

Jurisdiction	Stock	Stock status	Indicators
Western Australia	Western Australia	Sustainable	Catch, indicator species status
Northern Territory	Northern Territory	Sustainable	Biomass, fishing mortality
Queensland	East Coast Queensland	Undefined	Catch
Queensland	Gulf of Carpentaria	Undefined	Catch

STOCK STRUCTURE

Brownstripe Snapper is widely distributed throughout the western Pacific and eastern Indian Ocean region, ranging from New Caledonia and the Gilbert Islands to southern India, extending northwards to southern Japan and is also found in the Seychelles (Anderson and Allen 2001). In Australian waters, Brownstripe Snapper occurs from the Houtman Abrolhos Islands in Western Australia, around the northern coast to Moreton Bay in southern Queensland.

There is little information on biological stock structure and population connectivity for this species in Australian waters. Brownstripe Snapper is broadly distributed across the continental shelf at depths ranging from 20 to 120 m, with a dispersal capacity via a pelagic egg and larval phase that may contribute to widespread gene flow. However, geographic separation of some populations and the likelihood of limited adult movement suggests separate management units are appropriate.

Here, assessment of stock status is presented at the jurisdictional level—Western Australia and

Northern Territory—and the management unit level—Gulf of Carpentaria (Queensland) and East Coast Queensland.

STOCK STATUS

East Coast Queensland Brownstripe Snapper is harvested as a part of the Reef Line Fishery (RLF) in Queensland where catch is constrained by a multi-species TACC. In early 2020, the management regime was developed further with the introduction of a Harvest Strategy for the fishery. For secondary target and by-product species like Brownstripe Snapper, this includes species-specific harvest control rules and catch reference points that trigger stock assessments and the implementation of species-specific TACCs [QDAF 2020]. In addition to the Harvest Strategy, Brownstripe Snapper are managed by minimum legal size limits that align with their reproductive biology (i.e., size at sexual maturity) [Ramachandran et al. 2014]. To date, no formal stock assessments have been undertaken to quantify biomass levels of Brownstripe Snapper on the east coast of Australia.

Brownstripe Snapper can be reported at the species level (Brown Hussar, *Lutjanus vitta*), however over 99% of commercial catch is recorded under the *Hussar Unspecified* complex. This catch category includes two species; Hussar (*Lutjanus adetii*) and Brownstripe Snapper (*Lutjanus vitta*) for which the relative species composition is unknown. Commercial catch recorded against this category was historically much higher than in recent years; between 1995–96 and 2002–03 average annual catch was 89 tonnes (t) (range 64–110 t). Catch declined sharply (79%) following the expansion of no-take marine reserves within the Great Barrier Reef Marine Park and the introduction of a quota management system for coral reef finfish species. Catch dropped to an average of 24 t from 2003–13 before stabilising at an average of 14 t over the last decade. Notably the catch was low in 2022 at 4 t, although this drop was associated with a decrease in fishing days from 1,447 days per year in 2020–21 to 675 fishing days per year in 2021–22 suggesting the decrease in catch is likely a result of fisher behaviour and not a result of a decrease in biomass. The recreational sector also contributes to Hussar Unspecified fishing mortality (44,000 fish; 2019–20 estimate) [Teixeira et al. 2021]. There is insufficient information available to confidently classify the status of this stock.

On the basis of the evidence provided above, East Coast Queensland management unit is classified as an **undefined stock**.

Gulf of Carpentaria Brownstripe Snapper is harvested as a minor by-product species by trawl (Gulf of Carpentaria Developmental Fin Fish Trawl Fishery) (GOCDFTF) and line (Gulf of Carpentaria Line Fishery) in the Gulf of Carpentaria (Queensland). Apart from a minimum legal size and recreational possession limit, there are no other constraints to fishing pressure for this species. In both commercial fisheries, Brownstripe Snapper has been harvested in negligible amounts (< 1 t per year) and the trawl fishery as a whole has been largely inactive since 2016. There are no reliable estimates of recreational harvest for this stock of Brownstripe Snapper however it is likely to be minor. There is insufficient information available to confidently classify the status of this stock.

On the basis of the evidence provided above, Gulf of Carpentaria management unit is classified as an **undefined stock**.

Northern Territory

Brownstripe Snapper is mainly caught and discarded as bycatch by the Northern Territory's Demersal Fishery's finfish trawl gear due to their small size. There are uncertainties around their biomass removals with potential misidentification as other snapper species. Similar to other trawl caught Lutjanid species, Brownstripe Snapper had their highest catches during the late 1980s when foreign fishing fleets were fishing in NT waters and recent development in the Demersal Fishery has seen catches increase to these historical levels (approximately 30 t) with an average annual catch of 20 t in the last 10 years. Relative biomass estimates from recent fishery independent surveys indicate approximately 1,490 t in the Northern Territory [Knuckey and Koopman 2022]. The harvest fraction in 2022 is less than 1% of the estimated biomass which indicates a relatively low fishing pressure. A preliminary assessment using catch data applied to a modified catch-MSY model (developed by Martell and Froese [2013] and modified by Haddon et al. [2018]), estimated that the 2022 biomass of Brownstripe Snapper was around the MSY reference levels [Pazhayamadam 2022] suggesting that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired. Similarly, the fishing mortality in 2022 was estimated to be around the target level of 0.22 indicating 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, Brownstripe Snapper in the Northern Territory is classified as a **sustainable stock**.

Western Australia

The majority of the commercial catch of Brownstripe Snapper in WA is landed in the Pilbara Fish Trawl Managed Fishery. They are also landed in small quantities by the Gascoyne Demersal Scalefish Managed Fishery, the Northern Demersal Scalefish Managed Fishery, the Pilbara Line Fishery, and the Pilbara Trap Managed Fishery. Brownstripe Snapper are primarily assessed on the basis of the status of several indicator species (including, for example, Red Emperor, Rankin Cod, and Bluespotted Emperor in the Pilbara region, and Red emperor and Goldband Snapper in the Kimberley region) across 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]. These indicator species in the Pilbara and 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 Brownstripe Snapper in the NCDR is assessed as low. This assessment of Brownstripe Snapper is also supported by the results of a data-limited Catch-MSY assessment, where recent catches are compared to model predictions for maximum sustainable yield (MSY).

Total catch for Brownstripe Snapper across WA over the last 10 years (2013–22) have ranged from 80–218 t, with a mean annual catch of 156 t. This is similar to the average catch across the previous 10 years at 144 t. Over the past 10 years when reliable catch estimates are available for the recreational and charter sectors, these catch levels have been relatively low compared to commercial catches, typically being less than 1% of the total catch. Results of analyses using a Catch-MSY model applied to data on annual catches for this species (1993–2022) show that the annual catches since 2017 have fluctuated around the median model prediction for maximum sustainable yield (MSY), after having been below the 95% CI of MSY in the period from 2006–16. This is consistent with the predicted values for biomass in recent years being above BMSY, and fishing mortality remaining below FMSY. However, it is important to recognise

STATUS OF AUSTRALIAN FISH STOCKS REPORT
Brownstripe Snapper (2023)

that Catch-MSY is a data-limited technique with strong assumptions, dependent on user inputs. For this assessment, these included specified ranges for initial depletion (0.4–0.8), based on likely catch levels from foreign fleets prior to the start of the time series, final depletion (0.15–0.7), based on recent catches relative to the maximum recorded annual catch and the non-targeted nature of commercial fishing for this species, and medium resilience ($r=0.3-0.8$, consistent with species longevity, of approximately 12 years). Given consistent catch levels across multiple fisheries, recent catches of this species being less than the predicted MSY, and status of the indicator species for the NCDR, it is considered unlikely that the biomass of Brownstripe Snapper in Western Australia is depleted and recruitment is unlikely to be impaired. Furthermore, the level of fishing mortality is unlikely to result in the stock becoming recruitment impaired.

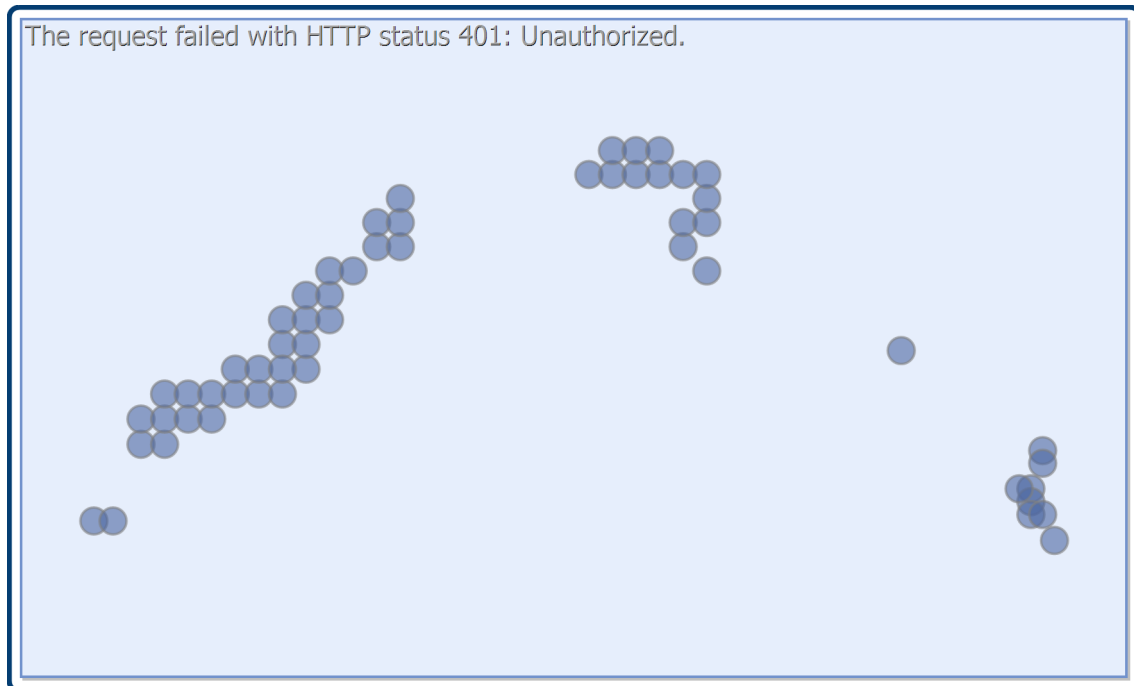
On the basis of the evidence provided above, Brownstripe Snapper in Western Australia is classified as a **sustainable stock**.

BIOLOGY

Brownstripe Snapper biology [Newman et al. 2000; Palla and Sotto 2021; Ramachandran et al. 2014]

Species	Longevity / Maximum Size	Maturity (50 per cent)
Brownstripe Snapper	12 years, 257 mm FL [Newman et al. 2000]	7.8 years, 158 mm TL [Ramachandran et al. 2014]

DISTRIBUTION



Distribution of reported commercial catch of Brownstripe Snapper

STATUS OF AUSTRALIAN FISH STOCKS REPORT
Brownstripe Snapper (2023)

TABLES

Fishing methods			
	Northern Territory	Queensland	Western Australia
Charter			
Hook and Line	✓	✓	
Rod and reel			✓
Commercial			
Dropline			✓
Fish Trap			✓
Hand Line, Hand Reel or Powered Reels			✓
Line		✓	
Midwater Trawl		✓	
Otter Trawl			✓
Unspecified	✓		
Recreational			
Hook and Line	✓	✓	

Management Methods			
	Northern Territory	Queensland	Western Australia
Charter			
Bag limits			✓
Bag/possession limits		✓	
Gear restrictions	✓	✓	
Limited entry	✓		✓
Passenger restrictions			✓
Seasonal or spatial closures		✓	
Size limits		✓	
Spatial closures	✓		✓

STATUS OF AUSTRALIAN FISH STOCKS REPORT
Brownstripe Snapper (2023)

Spatial zoning			✓
Commercial			
Bycatch limits	✓		
Effort limits			✓
Gear restrictions	✓	✓	✓
Harvest Strategy		✓	
Limited entry	✓	✓	✓
Seasonal or spatial closures		✓	
Size limits		✓	
Spatial closures			✓
Spatial zoning	✓		✓
Total allowable catch	✓	✓	
Total allowable effort			✓
Vessel restrictions	✓	✓	✓
Recreational			
Bag/possession limits		✓	
Gear restrictions	✓	✓	
Licence (Recreational Fishing from Boat License)			✓
Marine park closures	✓		
Possession limit	✓		✓
Seasonal or spatial closures		✓	
Spatial closures	✓		✓

STATUS OF AUSTRALIAN FISH STOCKS REPORT
Brownstripe Snapper (2023)

Catch			
	Northern Territory	Queensland	Western Australia
Charter	0	Unknown	< 0.5 t
Commercial	11.807 t	10.7 t	189.303 t
Indigenous	Unknown	Unknown	
Recreational	0	44,000 fish (2019–20 survey)	Unknown

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

Queensland – Commercial (Catch). Queensland commercial and charter data have been sourced from the commercial fisheries logbook program. Further information available through the Queensland Fisheries Summary Report <https://www.daf.qld.gov.au/business-priorities/fisheries/monitoring-research/data/queensland-fisheries-summary-report>

Queensland – Recreational Fishing (Catch). Data based at the whole of Queensland level and derived from statewide recreational fishing surveys. Where possible, estimates have been converted to weight (tonnes) using best known conversion multipliers. Conversion factors may display regional or temporal variability. In the absence of an adequate conversion factor, data presented as number of fish.

Western Australia. Active Vessels data is unreportable as there were fewer than three vessels operating in Pilbara Fish Trawl Interim Managed Fishery and Pilbara Trap Managed Fishery.

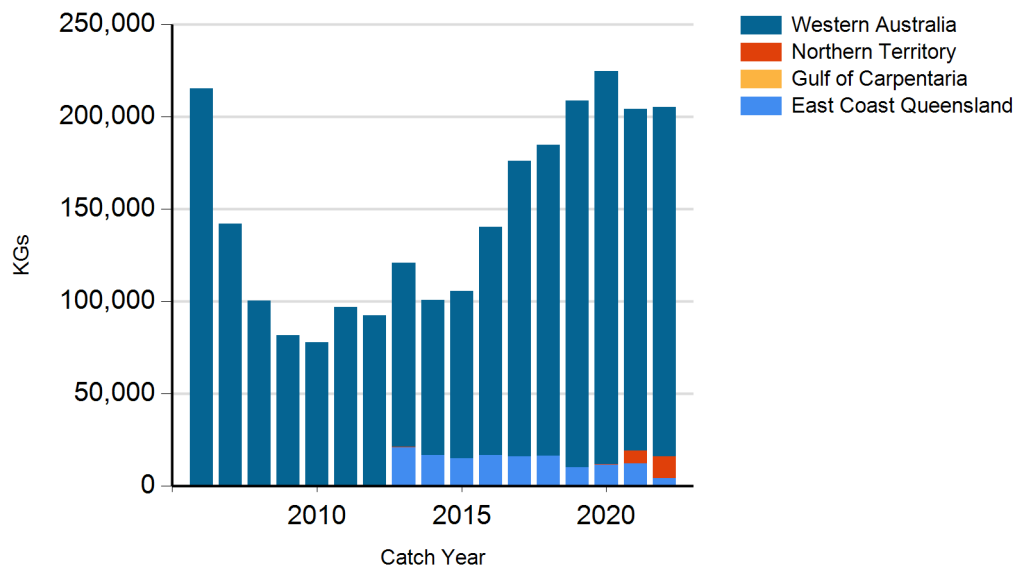
Western Australia – Recreational (Catch). Boat-based recreational catch is from 1 September 2020–31 August 2021. These data are derived from those reported in Ryan et al. [2022]. Shore based catches of Mangrove Jack are not known.

Western Australia – Recreational (management methods). A Recreational Fishing from Boat License 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.

CATCH CHART

STATUS OF AUSTRALIAN FISH STOCKS REPORT
Brownstripe Snapper (2023)



Commercial catch Brownstripe Snapper - note confidential catch not shown

References	
Wakefield et al. 2023	Wakefield, C, Trinnie, F, Skepper, C, Boddington, Newman, SJ, and Steele, A 2023, North Coast Demersal Resource Status Report 2022, pp. 167–176. In: Gaughan, D.J. and Santoro, K. (eds.), 2023, Status Reports of the Fisheries and Aquatic Resources of Western Australia 2021/22: The State of the Fisheries, Department of Primary Industries and Regional Development, Western Australia, Perth, Australia.
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: 11–22.
Ryan et al. 2022	Ryan, KL, Lai, EKM and Smallwood, CB 2022. Boat-based recreational fishing in Western Australia 2020/21, Fisheries Research Report No. 327 Department of Primary Industries and Regional Development, Western Australia. 221pp.
Ramachandran et al. 2014	Ramachandran, S, Ali, DM, and Varghese, BC 2014, Age, growth and maturity of brown stripe snapper <i>Lutjanus vitta</i> (Quoy & Gaimard, 1824) from southwest coast of India, <i>Journal of Marine Biology Association India</i> , 55(2): 61–68.
Newman et al. 2000	Newman, SJ, Cappo, M, and Williams, DM 2000, Age, growth and mortality of the stripey, <i>Lutjanus carponotatus</i> (Richardson) and the brown-stripe snapper, <i>L. vitta</i> (Quoy and Gaimard) from the central Great Barrier Reef, Australia, <i>Fisheries Research</i> , 48: 263-275
Anderson and Allen 2001	Anderson, WD and Allen, GR 2001, Lutjanidae. FAO species identification guide for fisheries purposes. The living marine resources of the Western Central Pacific, Vol. 5, Part 3 (ed. by Carpenter, KE and Niem, VH), pp. 2840–2918, Food and Agriculture Organization of the United Nations, Rome.
QDAF 2020	Queensland Department of Agriculture and Fisheries 2020, Reef line fishery harvest strategy: 2020–2025. Brisbane, Queensland.
Martell and Froese 2013	Martell, S and Froese, R 2013, A simple method for estimating MSY from catch and resilience. <i>Fish and Fisheries</i> 14:504–514.
Haddon et al. 2018	Haddon M, Punt, A and Burch, P 2018, simpleSA: A package containing functions to facilitate relatively simple stock assessments. R package version 0.1.18.
Pazhayamadom 2022	Pazhayamadom, DG 2022, Northern Territory Brownstripe Snapper (<i>Lutjanus vitta</i>) stock status summary—2022 (unpublished fishery report)
Palla and Sotto 2021	Palla HP and Sotto, FB 2021, Reproductive biology of brownstripe snapper <i>Lutjanus vitta</i> (Quoy and Gaimard, 1824) from West Sulu Sea, Philippines, <i>Egyptian Journal of Aquatic Research</i> 47, 67–73.

STATUS OF AUSTRALIAN FISH STOCKS REPORT
Brownstripe Snapper (2023)

Teixeira et al. 2021	Teixeira, D, Janes, R, and Webley, J 2021, 2019–20 Statewide Recreational Fishing Survey Key Results, Project Report. State of Queensland, Brisbane.
Knuckey and Koopman 2022	Knuckey, IA and Koopman, M 2022, Survey of tropical snapper in Northern Territory fisheries - 2021, Fishwell Consulting.