

Brownstripe Snapper (2020)

Lutjanus vitta



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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	Sustainable	Catch

STOCK STRUCTURE

Brownstripe Snapper are 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 are also found in the Seychelles (Anderson and Allen 2001). In Australian waters, Brownstripe Snapper occur 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 are 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 (Northern Territory and 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 a 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*), however over 99 per cent 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 per cent) 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 has remained steady at around 20 t to 27 t since 2004–05. Catch rates followed a very similar pattern, declining (70 per cent) from around 23 kg per dory day to 7 kg as the fishery moved away from the fillet market to the more lucrative live coral trout trade. The charter sector harvested 11.8 t of Hussar Unspecified in 2019. The recreational sector also contributes to Hussar Unspecified fishing mortality (33 000 fish; 2013–14 estimate) [Webley et al. 2015].

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 inactive since 2016. There are no reliable estimates of recreational harvest 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 a **sustainable stock**.

Northern Territory Brownstripe Snapper are mainly caught and discarded as bycatch by the Northern Territory's Demersal Fishery's finfish trawl gear due to their small size. 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). An 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 2019 biomass of Brownstripe Snapper was 42 per cent of unfished levels [Saunders 2020] 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 2019 was estimated to be around the target level of 0.2 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

Brownstripe Snapper is caught primarily on the north west coast of Western Australia as a component of the multispecies Pilbara Demersal Scalefish Fisheries (which include the Pilbara Fish Trawl (Interim) Managed Fishery, the Pilbara Trap Managed Fishery and the Pilbara Line Fishery) in the Pilbara management region of the North Coast Bioregion; and also as a component of the Northern Demersal Scalefish Managed Fishery (NDSMF) in the Kimberley management region of the North Coast Bioregion of Western Australia [Newman et al. 2020].

Brownstripe Snapper is assessed on the basis of the status of several indicator species (including, for example, Red Emperor and Goldband Snapper in the Kimberley region) that represent the entire inshore demersal suite of species occurring at depths of 30–250 m [Newman et al. 2018]. The major performance measures for these indicator species are estimates of spawning stock levels estimated using an integrated age-structured assessment. 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]. Indicator species assessments determined that the spawning biomass levels of each of the indicator species were greater than 40 per cent of the unfished level in the Pilbara Demersal Scalefish Fisheries in 2015 (the year the last integrated assessment was undertaken). The spawning biomass levels of the indicator species were at the threshold level in the NDSMF in 2017 [Newman et al. 2020]. The above evidence indicates that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired.

The catch of Brownstripe Snapper in the Pilbara Demersal Scalefish Fisheries over the past 10 years (2010–19) have ranged from 80–208 tonnes (t), with a mean annual catch of 128 t. The catch of Brownstripe Snapper in the NDSMF has been low and stable for the past 10 years (2010–19), ranging from 3–18 t, with a mean annual catch of 11 t. A small amount of Brownstripe Snapper is caught in the Gascoyne region of WA with catches <1 tonne per year. 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, Brownstripe Snapper in Western Australia is classified as a **sustainable stock**.

BIOLOGY

Brownstripe Snapper biology [Newman et al. 2000; 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

TABLES

Fishing methods	Northern Territory	Queensland	Western Australia
Charter			
Hook and Line	✓	✓	
Rod and reel			✓
Commercial			
Bottom Trawls	✓	✓	
Dropline			✓
Fish Trap			✓
Hand Line, Hand Reel or Powered Reels			✓
Line		✓	
Otter Trawl			✓
Recreational			
Hook and Line	✓	✓	
Management Methods			
	Northern Territory	Queensland	Western Australia
Charter			
Bag limits			✓

Gear restrictions	✓	✓	
Limited entry	✓		✓
Passenger restrictions			✓
Possession limit		✓	
Seasonal closures		✓	
Spatial closures	✓	✓	✓
Spatial zoning		✓	✓
Commercial			
Effort limits			✓
Gear restrictions		✓	✓
Individual transferable quota		✓	
Limited entry		✓	✓
Limited entry (licensing)		✓	
Seasonal closures		✓	
Spatial closures		✓	✓
Spatial zoning		✓	✓
Total allowable catch		✓	
Total allowable effort			✓
Vessel restrictions		✓	✓
Recreational			
Gear restrictions	✓	✓	
Licence (Recreational Fishing from Boat License)			✓
Marine park closures	✓		
Possession limit	✓	✓	✓
Seasonal closures		✓	
Spatial closures	✓	✓	✓

Catch	Northern Territory	Queensland	Western Australia
Charter	0	11.8 t	< 0.5 t
Commercial	0.3057 t	10.7 t	162.897 t
Indigenous	Unknown	Unknown	
Recreational	0	33 000 fish (2013–14 survey)	Unknown

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

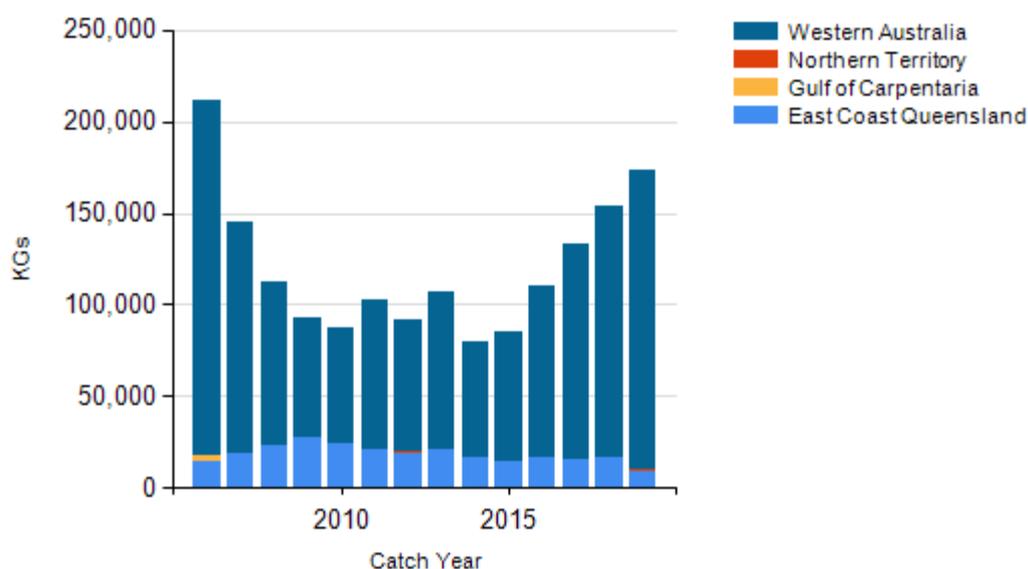
Western Australia Active Vessels data is unreportable as there were fewer than three vessels operating in Pilbara Fish Trawl Interim Managed Fishery and Pilbara Trap Managed Fishery.

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



Commercial catch Brownstripe Snapper - note confidential catch not shown

References	
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.
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, D.J. 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. <i>Marine Policy</i> , 88: 11–22.
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.
Ramachandran et al. 2014	Ramachandran, S, Ali, DM, 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
Palla et al. 2016	Palla, HP, Gonzales, BJ, Sotto, FB, Ilano, S, and Tachihara, K 2016. Age, Growth and Mortality of Brown Stripe Snapper <i>Lutjanus vitta</i> (Quoy and Gaimard 1824) from West Sulu Sea, Philippines, <i>Asian Fisheries Science</i> , 29: 28-42
Anderson and Allen 2001	Anderson, W.D. and Allen, G.R. 2001. Lutjanidae. FAO species identification guide for fisheries purposes. The living marine resources of the Western Central Pacific, Vol. 5, Part 3 (ed. by K.E. Carpenter and V.H. Niem), pp. 2840–2918. Food and Agriculture Organization of the United Nations, Rome.
Davis and West 1993	Davis, T.L.O. and West, G.J. 1993. Maturation, reproductive seasonality, fecundity and spawning frequency in <i>Lutjanus vittus</i> (Quoy and Gaimard) from the North West Shelf of Australia. <i>Fishery Bulletin</i> 91: 224-236.
QDAF 2020	Queensland Department of Agriculture and Fisheries (2020) Reef line fishery harvest strategy: 2020–2025. Brisbane, Queensland.
Webley et al. 2015	Webley, J, McInnes, K, Teixeira, D, Lawson, A and Quinn, R 2015, Statewide Recreational Fishing Survey 2013–14, Queensland Government Department of Agriculture and Fisheries, Brisbane.
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.
Saunders 2020	Saunders T. 2020 Northern Territory Brownstripe Snapper (<i>Lutjanus vitta</i>) stock status summary—2020 (unpublished fishery report)