

# Golden Snapper (2023)

*Lutjanus johnii*



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## STOCK STATUS OVERVIEW

Jurisdiction	Stock	Stock status	Indicators
Western Australia	Western Australia	Sustainable	Catch
Northern Territory	Darwin Region	Depleted	Catch, biomass, fishing mortality
Northern Territory	Regional Northern Territory	Sustainable	Catch, biomass, fishing mortality
Northern Territory, Queensland	Gulf of Carpentaria	Sustainable	Catch, biomass, fishing mortality, biology, catch-MSY modelling, fishery independent survey
Queensland	Eastern Australia	Sustainable	Catch, biomass, fishing mortality, biology, catch-MSY modelling

## STOCK STRUCTURE

Golden Snapper is a moderately long-lived (i.e. 30 years), late-maturing species that can reach a length of one metre [Cappo et al. 2013]. They are broadly distributed throughout the tropical and sub-tropical Indo-West Pacific with juveniles spending several years in estuarine and inshore reef habitats before migrating to nearshore reef environments (to a depth of at least 80 m) as they near sexual maturity [Allen 1985; Kiso and Mahyam, 2003; Tanaka et al. 2011].

The distribution of this species within Australian waters extends from the Kimberley region in Western Australia, around the north of the continent to the southern Great Barrier Reef (around Rockhampton) [Travers et al. 2009]. A study of the stock structure of Golden Snapper across

this range suggests that many functionally separate adult populations are present at a scale of tens of kilometres, although boundaries are unknown [Taillebois et al. 2021].

Golden Snapper experience moderate to high harvest rates in some Australian fisheries (particularly those targeting adults of this late-maturing species), which can cause localised depletion. However, it is extremely difficult to collect relevant biological and catch-and-effort information to assess each adult population unit.

Here, assessment of stock status is presented at the jurisdictional level—Western Australia; and the management unit level—Darwin Region, and Regional Northern Territory (Northern Territory); Gulf of Carpentaria (Northern Territory and Queensland), East Coast (Queensland).

## STOCK STATUS

### Darwin Region

The Darwin Region represents the area within a radius of approximately 300 km of this population centre. Within this region, Golden Snapper is primarily caught by recreational fishers. Of the total Golden Snapper catch within the Darwin Region management unit, 76% is taken by recreational anglers, 19% by fishing tour operators, and 5% by commercial fishers (predominantly in the Coastal Line Fishery). No estimates of the Indigenous harvest of Golden Snapper are available for this stock.

The most recent assessment [Saunders 2018] was an update of the 2014 Stock Reduction Analysis model [Grubert et al. 2013] that considered data up to and including 2017. The results indicate that the Greater Darwin Region remained overfished in 2017 (99% probability) and existing fishing pressure will likely maintain the level of overfishing. The assessment estimated that biomass and egg production were 23% of the unfished biomass (1970), indicating this stock is recruitment overfished. Given the recent information on the stock structure of this species [Taillebois et al. 2021], it is likely that the assessment incorporates several populations. As the model is driven by the populations that receive the highest harvest rates in the Northern Territory the assigned status can be assumed to be representative of these heavily fished areas, with other less accessible areas being more lightly fished. The average proportion of catch by fishing sectors (commercial, fishing tour operators and recreational) have not changed significantly since the last assessment in 2018. The above evidence indicates that the stock is likely to be depleted and that recruitment is likely to be impaired.

In the Darwin Region, abundance, catch and catch rate have substantially declined over the past 10 years [NTG 2017]. The fisheries accessing these exploited stocks operate inshore and include the Coastal Line Fishery, the Barramundi Fishery, Fishing Tour Operators and recreational fishers. Catch limits and fishery area closures were implemented in 2015 to reduce harvest by an estimated 50% to allow for the biomass of Golden Snapper stocks to recover [Grubert et al. 2013]. Given the species' relatively slow growth rate, the management measures introduced in 2015 are unlikely to have yet supported measurable stock recovery.

On the basis of the evidence provided above, Golden Snapper in the Darwin Region (Northern Territory) management unit is classified as a **depleted stock**.

### Eastern Australia

Golden Snapper is mainly harvested by the recreational sector on the Queensland east coast, and no stock assessment has been undertaken to

estimate current biomass in relation to unfished biomass in this management unit. Estimated recreational landed catch at the whole of Queensland level increased from 25 t in 2013–14 [Webley et al. 2015] to 97 t in the most recent Recreational Fishing Survey [Teixeira et al. 2021]. Estimates are unable to be given at the stock level due to low sample size. According to this survey, close to two-thirds of recreationally caught fish were released [Teixeira et al. 2021]. However, given that this species suffers substantial post-release mortality from barotrauma [Welch et al. 2014], it is likely that total fishing mortality by this sector is higher than indicated by landed catch. The Indigenous harvest from this management unit is unknown. The species is taken as by-product in the East Coast Inshore Fishery (Queensland), predominantly by set mesh net. Annual commercial catches increased from less than 1 t per year in the early 2000s to averaging 7 t over the last decade to 2021–22.

A preliminary assessment using catch data from all commercial fisheries 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 Golden Snapper on the East Coast was 51% of unfished levels [Saunders and Roelofs 2020a] suggesting that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired. The model estimated the fishing mortality in 2019 was equal to the limit reference point of 0.2. Harvest in recent years has been above the estimated MSY. The current level of fishing mortality is unlikely to cause the stock to become recruitment impaired, however, should high fishing pressure continue, there is an increased risk of overfishing occurring. Catch-MSY modelling has a higher degree of uncertainty and should not be solely relied on to make inferences about long-term biomass trends. However, Golden Snapper occupy a range of habitats, and spend their juvenile years in mangrove estuaries, this likely affords some protection from fishing pressure [Kiso and Mahyam 2003]. A weight of evidence approach suggests recruitment is unlikely to be impaired.

On the basis of the evidence provided above, the East Coast (Queensland) management unit is classified as a **sustainable stock**.

### **Gulf of Carpentaria**

In the Gulf of Carpentaria management unit, Golden Snapper is mainly harvested by trawl vessels in the commercial Gulf of Carpentaria Developmental Fin Fish Trawl Fishery) (GOCDFFTF—Queensland) and Demersal Fishery (DF—Northern Territory). Golden Snapper was also fished by foreign fleets between the 1950s and 1980s [O'Neill et al. 2011], and these catches (annual peak of 60 t) were higher than contemporary levels.

In the Queensland portion of this management unit commercial catches remained stable at 20–35 t annually from 2001–2011. However, fish trawl effort from the GOCDFFTF declined markedly from 2012–2020 with catch averaging less than 1 t. In 2020 Golden Snapper were transitioned to a 61 t species-specific TACC and non-transferable ITQ. The fishery recommenced in 2020–21, seeing an increase in commercial catch to 17 t, dropping again to 7 t in 2021–22. In the Northern Territory portion of this management unit, the predominant catch has been from the recreational sector with an estimated average of 3.9 t in 2019 [West et al. 2022] which seem to be stable in comparison with estimates from 2010 [West et al. 2012]. Trawl catch of Golden Snapper in Northern Territory have been < 3.5 t between 2013 and 2022 except for 2019 when a peak landing of 19.5 t was reported.

A preliminary assessment using catch data from all commercial fisheries applied to a modified catch-MSY model (developed by Martell and Froese [2013] and

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modified by Haddon [2018]), estimated that the 2019 biomass of Golden Snapper was 47% of unfished levels [Saunders and Roelofs 2020b] 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 0.12 which approximated the target level and was well below the limit reference point indicating that the current level of fishing mortality is unlikely to cause the stock to become recruitment impaired. Recent fishery independent surveys estimated biomass of Golden Snapper in 2021 was 1,000 t in the western Gulf of Carpentaria [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 similar survey in the eastern Gulf of Carpentaria also estimated biomass of Golden Snapper in 2021, however the coefficient of variation (CV) was high. The survey indicated that the harvest fraction likely represents a very small percentage of the available biomass [Knuckey et al. 2022]. Catch-MSY modelling has a higher degree of uncertainty and should not be solely relied on to make inferences about long-term biomass trends. However, Golden Snapper occupy a range of habitats, and spend their juvenile years in mangrove estuaries, this likely affords some protection from fishing pressure [Kiso and Mahyam 2003]. A weight of evidence approach suggests recruitment is unlikely to be impaired.

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

**Regional  
Northern  
Territory**

Regional Northern Territory Region encompasses all waters outside of approximately 300 km from Darwin. Catch in this region is dominated by the midwater or bottom trawl vessels in the Demersal Fishery (DF). Additionally, foreign trawlers harvested substantial amounts (peak of 140 t) of Golden Snapper when they operated in this area in the 1970s and 1980s [Pazhayamadam 2022]. Catches by the domestic trawlers have been significantly lower and in 2022 was 34 t. Given the fine-scale stock structure of this species [Taillebois et al. 2021], it is likely that this management unit incorporates several populations. Consequently, the assessments will be driven by the populations that receive the highest harvest rates in this management unit and the assigned status can be assumed to be representative of these heavily-fished areas, with other less accessible areas being more lightly-fished.

A preliminary assessment using catch data from all fishing sectors applied to a modified catch-MSY model (developed by Martell and Froese [2013] and modified by Haddon [2018]), estimated that the 2022 biomass of Golden Snapper was well above 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 0.06 which was well below the limit reference point indicating that the current level of fishing mortality is unlikely to cause the stock to become recruitment impaired. A recent trawl survey in 2021 indicates that the harvest fraction of Golden Snapper is less than 1.5% of the estimated biomass representing relatively low fishing pressure on the stock [Knuckey and Koopman 2022].

On the basis of the evidence provided above, Golden Snapper in the Regional Northern Territory management unit is classified as a **sustainable stock**.

**Western  
Australia**

Golden Snapper is not a target species in the demersal commercial fisheries of Western Australia, but is landed in small quantities as by-product in the North Demersal Scalefish Managed Fishery. Total catch of Golden Snapper in WA over

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the last 10 years (2013–22) have ranged from 4.0–9.9 t, with a mean annual catch of 7.3 t. This is consistent with the average catches across the previous 10 years of 6 t. The total commercial catch of Golden Snapper in Western Australia has been low and stable over the last 10 years (2013–22), ranging from < 0.1–1.7 t per year, with a mean annual catch of 700 kg. The catch of Golden Snapper by recreational (approximately 2 t annually) and charter fishers (approximately 4.5 t annually) is greater than the commercial catch of this species and primarily caught in the Kimberley region of Western Australia. Given the low catches of Golden Snapper in Western Australia are derived from a limited area compared to the wider distribution of the species, it is considered unlikely that the biomass of Golden Snapper in Western Australia is depleted.

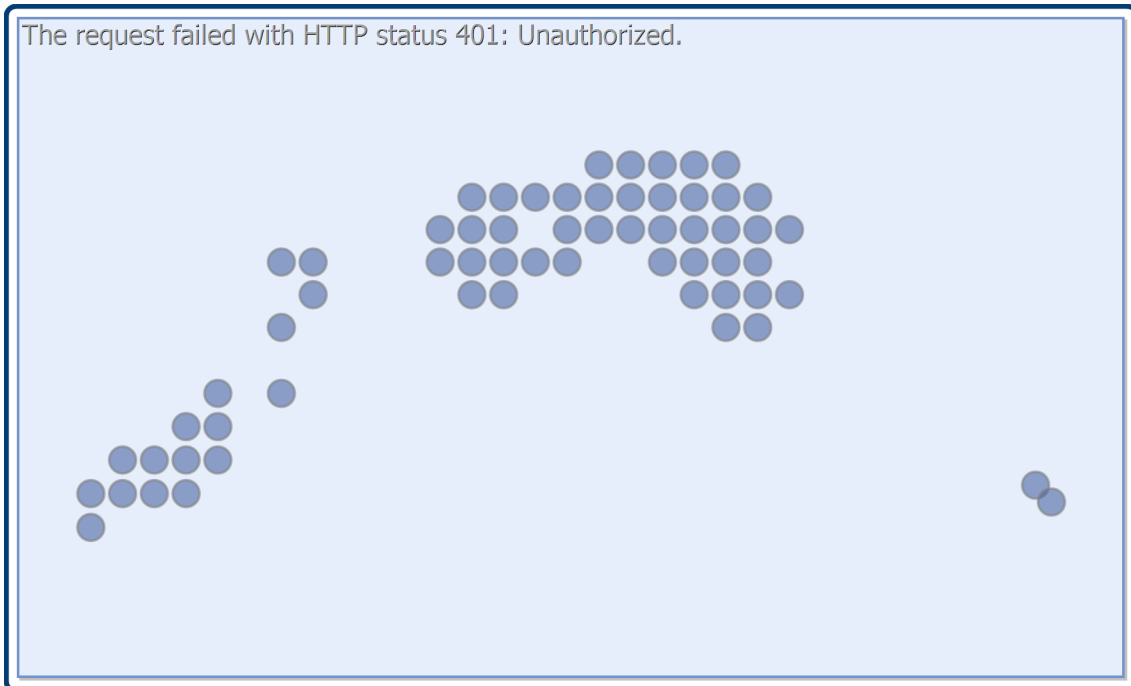
On the basis of the evidence provided above, Golden Snapper in Western Australia is classified as a **sustainable stock**.

**BIOLOGY**

**Golden Snapper biology** [Hay et al. 2005; Cappo et al. 2013; Welch et al. 2014]

Species	Longevity / Maximum Size	Maturity (50 per cent)
Golden Snapper	30 years, 990 mm FL, 15 kg	Varies by location and sex: Males 4–9 years and 400–600 mm FL, Females 6–10 years and 400–650 mm FL

**DISTRIBUTION**



Distribution of reported commercial catch of Golden Snapper

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TABLES

<b>Fishing methods</b>			
	<b>Northern Territory</b>	<b>Queensland</b>	<b>Western Australia</b>
<b>Charter</b>			
Hook and Line	✓	✓	✓
<b>Commercial</b>			
Bottom Trawls	✓		
Fish Trap			✓
Gillnet			✓
Handline	✓		
Line		✓	
Midwater Trawl		✓	
Net		✓	
Otter Trawl			✓
Unspecified	✓		
<b>Recreational</b>			
Hook and Line	✓	✓	
Spearfishing	✓	✓	✓
Unspecified	✓		

<b>Management Methods</b>			
	<b>Northern Territory</b>	<b>Queensland</b>	<b>Western Australia</b>
<b>Charter</b>			
Bag/possession limits		✓	✓
Gear restrictions	✓	✓	✓
Licence			✓
Limited entry	✓		✓
Passenger restrictions			✓
Possession limit	✓		✓

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Seasonal or spatial closures		✓	
Size limits		✓	✓
Spatial closures	✓		✓
Spatial zoning			✓
Vessel limits	✓		
<b>Commercial</b>			
Effort limits			✓
Gear restrictions	✓	✓	✓
Harvest Strategy		✓	
Individual transferable quota		✓	
Limited entry	✓	✓	✓
Seasonal or spatial closures		✓	
Size limits		✓	
Spatial closures	✓		✓
Spatial zoning			✓
Total allowable catch	✓	✓	✓
Total allowable effort			✓
Vessel restrictions	✓	✓	✓
<b>Recreational</b>			
Bag limits			✓
Bag/possession limits		✓	
Gear restrictions	✓	✓	✓
Licence (Recreational Fishing from Boat License)			✓

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<b>Possession limit</b>	✓		✓
<b>Seasonal or spatial closures</b>		✓	
<b>Size limit</b>			✓
<b>Size limits</b>		✓	
<b>Spatial closures</b>	✓		✓

<b>Catch</b>			
	<b>Northern Territory</b>	<b>Queensland</b>	<b>Western Australia</b>
<b>Charter</b>	19 t	≤ 1 t	4.52 t
<b>Commercial</b>	36.0494 t	8.3134 t	0.89991 t
<b>Indigenous</b>	Unknown	Unknown	Unknown
<b>Recreational</b>	45.8 t (2017, Darwin Region)	97 t (2019–20 survey)	2.39 t (2020–21)



**Western Australia – Active Vessels.** Data are unreportable as there were fewer than three vessels operating in the PFTIMF, PTMF and WL.

**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 – 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 – 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.”

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

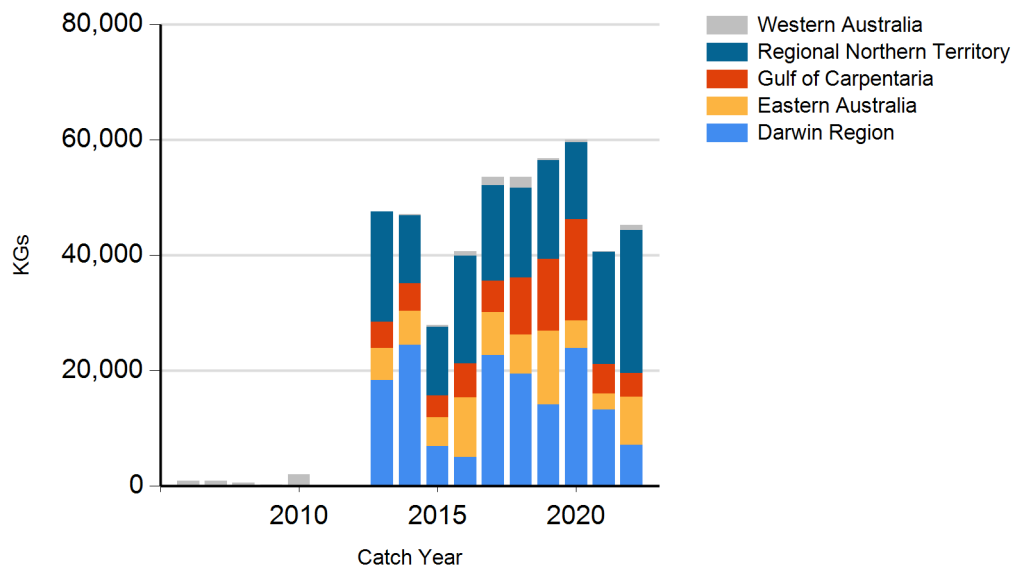
**Queensland – Commercial (Catch).** Queensland commercial and charter data has been sourced from the commercial fisheries logbook program. Further information available through the Queensland Fisheries Summary Report <https://www.daf.qld.gov.au/business-priorities/fisheries/monitoring-research/data/queensland-fisheries-summary-report>

**Queensland – Commercial (Management Methods).** Harvest strategies are available at: <https://www.daf.qld.gov.au/business-priorities/fisheries/sustainable/harvest-strategy>

**Queensland – Recreational Fishing (Catch).** Data are 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.

## CATCH CHART

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Commercial catch of Golden Snapper - note confidential catch not shown

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