

# Saddletail Snapper (2023)

*Lutjanus malabaricus*



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## STOCK STATUS OVERVIEW

Jurisdiction	Stock	Stock status	Indicators
Western Australia	North Coast Bioregion	Sustainable	Catch, indicator species status
Northern Territory	Joseph Bonaparte Gulf	Sustainable	Biomass, fishing mortality
Northern Territory	Timor, Arafura seas	Sustainable	Biomass, fishing mortality
Northern Territory, Queensland	Gulf of Carpentaria	Sustainable	Catch, biomass
Queensland	East Coast Queensland	Sustainable	Biomass, Stock assessment

## STOCK STRUCTURE

Saddletail Snapper is a widespread Indo-Pacific species found from Shark Bay in Western Australia, across northern Australia to the east coast of Queensland [Newman 2002]. Genetic studies indicate that three biological stocks occur across the species' Australian range: the North Coast Bioregion biological stock, the Northern Australian biological stock (including the Timor Sea, Arafura Sea and the Gulf of Carpentaria) and the East coast of Queensland biological stock [Elliot 1996; Salini et al. 2006]. Saunders et al. [2018] used otolith microchemistry and parasitology to identify separate biological Saddletail Snapper stocks in the Joseph Bonaparte Gulf, Timor and Arafura seas and Gulf of Carpentaria.

Here, assessments of stock status are presented at the 5 identified biological stock level—North Coast Bioregion (Western Australia), Joseph Bonaparte Gulf (Northern Territory), Timor-Arafura seas (Northern Territory), Gulf of Carpentaria (Northern Territory and

Queensland) and East coast (Queensland).

## STOCK STATUS

**East Coast Queensland** Saddletail Snapper is mainly caught by hook and line with the majority harvested from within the Great Barrier Reef Marine Park (GBRMP). The most recent assessment, a two sex population model fit to age and length data using standardised CPUE from commercial logbooks as an index of abundance, estimated that biomass in 2020 was 23% of unfished levels (estimate range across scenarios = 13 to 73%) [Campbell et al 2021]. In response to the biomass estimate, the stock assessment highlighted the need to rebuild the east coast Saddletail Snapper stock but changes in management have not been made. However, it also cautioned against using the assessment as the sole basis for management decisions due to the wide range in biomass estimates.

Saddletail Snapper is a regionally important recreational species, and this sector accounts for around 70% of the estimated (annual) harvest. Recreational estimates based on the 2019–20 survey data, indicate that around 162 t of Saddletail Snapper are harvested by this sector each year [Teixeira et al. 2021]. Saddletail Snapper is the fifth most harvested species by recreational fishers in the GBRMP [QDAF 2023]. The popularity of this species is also reflected in the charter fishery data. Logbook data collected from the charter sector indicate a peak in catches in 2016–17 of 29 t and a five-year harvest average of 17 t.

Saddletail Snapper is a secondary target species in the commercial Reef Line Fishery. Over the last 10 years, the RLF reported annual harvest range of 47 t to 99 t at an average of 70 t (2012–13 to 2021–22). Catches peaked in 2017–18. Average catches in the four fishing seasons following this have shown a general improvement with the 2018–19 to 2021–22 averaging 69 t per year (range = 62 t to 74 t). The stock assessment suggested that this (recent) trend in catch was due to strong recruitment to the fishery after a long period of (biomass) decline [Campbell 2021]. This has been reflected by increasing catches over the last three years. In 2021–22 the RLF reported harvest of 74 t of Saddletail Snapper on the Queensland east coast.

Commercial harvest is constrained by a multi-species total allowable commercial catch (TACC). The long-term management of the species is also guided by the Reef Line Fishery Harvest Strategy: 2020–2025 [QDAF 2020]. Over the longer-term, harvest rates for Saddletail Snapper have been impacted by a range of management reforms including the introduction and expansion of marine park zones, the introduction of limited licencing and the establishment of quota in the RLF. For example, commercial harvest rates are almost half the historical peak of 114 t to 256 t (1997–98 to 2002–03).

Recreational harvest is controlled through a minimum legal-size limit and a combined possession limit ( $n = 9$ ) that includes Saddletail Snapper and Crimson Snapper. Saddletail Snapper make up the larger part of the recreational catch as it is targeted more frequently. Recreational estimates indicate that Saddletail Snapper make up around 80% of the Crimson Snapper and Saddletail Snapper catch reported during the 2019–20 recreational fishing survey [Teixeira et al. 2021]. The Indigenous catch of Saddletail Snapper is unknown but is considered minor. A portion of the biomass is afforded protection from fishing by zoning in the GBRMP, although this has not been quantified.

The base case estimates from the assessment model indicate the stock is at 23% of unfished levels. However, a portion of the biomass is afforded protection from fishing by zoning in the GBRMP, although the extent of this has not been quantified. Biomass estimates for this species are relatively low and estimates under alternate scenarios show a high degree of variability. This variability combined with the cross-sector appeal of the species restricts assessments of current stock status including the ability to determine long-term sustainability trends. The available evidence suggests a recent period of strong recruitment and (potential) rebuilding of the east coast Saddletail Snapper stock and increases in commercial catches suggest the stock is not recruitment impaired.

On the basis of the evidence provided above, the East Coast Queensland biological stock is classified as a **sustainable stock**.

### **Gulf of Carpentaria**

The Gulf of Carpentaria Saddletail Snapper stock is mainly harvested by commercial finfish trawl operators within the Gulf of Carpentaria Developmental Fin Fish Trawl Fishery (GOCDFFTF - Queensland) and Demersal Fishery (DF-Northern Territory). Recreational and Indigenous harvest of Saddletail Snapper is low given the offshore distribution of this species [QDAF 2023], and charter catches have been <1 t. Saddletail Snapper were also exposed to fishing from foreign fleets during the 1950s to the 1980s [O'Neill et al. 2011], but these catches (annual peak of 261 t) were substantially lower than contemporary levels.

In the Queensland portion of this stock, commercial catches were very low (average < 4 t) until they increased substantially during 2002–13 (average 135 t). Fish trawl effort and catch from the GOCDFFTF declined markedly after 2011–12 as a result of trawl effort being transferred to other stocks. A revised total quota tonnage for all species of 450 t for the fishery introduced in 2015 represented a considerable reduction from the 1,250 t set in previous years [O'Neil et al. 2011; Leigh and O'Neill 2016]. There was no catch of Saddletail Snapper by this fishery from 2016–17 to 2019–20. With renewed interest in the fishery, commercial fishing resumed from 2020–21 with a catch of 49 t and 42 t the next year. These catch totals are well below the 150 t Saddletail Snapper TACC set for the fishery. Fishery independent surveys in 2021 provided updated estimates of relative biomass for the fishery [Knuckey et al. 2022] but no changes to management of the fishery have occurred. However, in the Northern Territory portion of this stock, an increase in the targeting of this species by the DF in 2019-20 led to a very large increase in catch (728 t). After this peak, catches reduced to quantities similar to the ten-year average in this stock (257 t), with 247 t caught in 2020–21 and 232 t caught in 2021–22.

This stock has been assessed using data up to 2022 using a catch-MSY model, incorporating catch data from both Queensland and the Northern Territory. It is important to recognise that catch-MSY is a data-limited technique with strong assumptions, dependent on user inputs. The results of this modelling were that biomass was estimated to be between 29% and 57% of unfished levels, which is above the limit reference point. This indicates that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired. However, the biomass trajectory shows that the stock continues to decline since 2007, although not at levels sufficient to classify the stock as depleted [Pazhayamadom 2023]. The high levels of exploitation predicted by the model is probably an artefact of relatively low historical catches, which do not represent the large biomass present and consequently bias F upwards and depletion downwards [Saunders and Roelofs 2020]. Nevertheless, subsequent years will require close monitoring to ensure that the model bias is in fact true and unsustainable fishing

pressure is not being exerted.

A trawl survey conducted in 1990 predicted that the biomass of Saddletail Snapper in this stock was approximately 14,000 t [Sainsbury et al. 1991], with more recent biomass surveys also indicating there is a large stock size in the Gulf of Carpentaria, estimating the biomass of the NT portion of the stock was around 70,000 t [Knuckey and Koopman 2022; Knuckey et al. 2022]. Taking the most conservative estimation of biomass, the peak catch in 2019-20 only represents approximately a 6% harvest fraction. However, it should be noted that the most recent survey was designed to obtain a time-series of consistent and robust relative abundance indices and due to uncertainties around assumptions of catchability, herding and escapement, this one-off estimate of absolute abundance should be used with caution. Additionally, due to differences in survey design, biomass estimates between the 1990 and 2021 surveys should not be compared [Knuckey and Koopman 2022]. Regardless, these estimates of biomass can assist in understanding the impact fishing has on this stock, with the low level of catch relative to biomass size, along with the results of the catch-MSY modelling, indicating the level of fishing mortality is unlikely to cause the stock to become recruitment impaired.

On the basis of the evidence provided above, the Gulf of Carpentaria (Northern Territory and Queensland) biological stock is classified as a

**sustainable stock.**

**Joseph  
Bonaparte  
Gulf**

Harvest of this Saddletail Snapper stock was first reported in 1988 and the average catch from trap and line vessels in the Demersal Fishery (DF) to 2011 was very small (average < 2 t) compared to the adjacent Timor-Arafura seas stock. From 2011–12 a finfish trawler entered the fishery and catches increased to 180 t in the first year and have averaged 268 t over the last 10 years, with a maximum catch in 2018–19 (367 t) and a minimum catch in 2021–22 (95 t). A trawl survey conducted on this stock [Ramm 1994] suggested that the Saddletail Snapper biomass was relatively large (6,677 t). A more recent fishery independent survey supported this finding, estimating a stock size of 8,891 t [Knuckey and Koopman 2022]. Consequently, the peak harvest represents approximately a 5% harvest fraction of the most conservative estimate of biomass. It is important to note that this most recent survey was designed to obtain a time-series of consistent and robust relative abundance indices and due to uncertainties around assumptions of catchability, herding and escapement, this one-off estimate of absolute abundance should be used with caution. Additionally, due to differences in survey design, the biomass estimates from the two separate surveys should not be compared [Knuckey and Koopman 2022]. Regardless, these estimates of biomass can assist in understanding the impact fishing has on this stock, with the low level of catch relative to biomass size indicating the level of fishing mortality is unlikely to cause the stock to become recruitment impaired.

This stock was also assessed using data up to 2022 using a stochastic Stock Reduction Analysis (SRA) model. Biomass was estimated to be between 57% and 86% of unfished levels, which is above the limit reference point. The stock is not considered to be recruitment impaired. Exploitation values were also found to be below the reference point relative to MSY levels indicating the fishing pressure is at sustainable levels [Pazhayamadom 2023]. Overall, the SRA outputs indicate that the current fishing mortality is unlikely to cause the stock to become recruitment impaired.

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Based on the evidence above, the Joseph Bonaparte (Northern Territory) biological stock is classified as a **sustainable stock**.

**North Coast Bioregion** Saddletail Snapper is caught primarily on the north-west coast of Western Australia as a component of the multispecies Pilbara Demersal Scalefish Fisheries (which includes 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 (NCB); and as a component of the multispecies Northern Demersal Scalefish Managed Fishery (NDSMF) in the Kimberley management region of the North Coast Bioregion of Western Australia. Saddletail Snapper are 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]. The indicator species in the Pilbara and Kimberley have been classified as sustainable [Wakefield et al. 2023]. The level of risk associated with the sustainability of Saddletail Snapper in the NCDR is assessed as low. This assessment of Saddletail 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).

The total catch of Saddletail Snapper in the NCB over the last 10 years (2013–22) have ranged from 168–372 t, with a mean annual catch of 268 t. This is an increase on the average catches across the previous 10 years of 185 t. Recreational and charter catch are relatively low compared to the commercial catch, in the past 10 years where reliable catches estimates are available, their contribution of the total catch has averaged 2%. Analyses using a Catch-MSY model applied to data on annual catches for this species (1973–2022), demonstrated that the annual catches from 1985–2016 were below the median model estimate for maximum sustainable yield (MSY), but have been above MSY from 2017 to 2022, after having been around the 95% CI of MSY in 2019. The predicted values for biomass in recent years exhibit a declining trend but have remained above BMSY, and fishing mortality has remained below FMSY. However, it is important to recognise 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 (0.8–0.975), based on low foreign fleets catch at 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 of commercial fishing for this species, and low resilience ( $r=0.1–0.6$ , consistent with species longevity, of approximately 31 years in WA). Given the recent catches across multiple fisheries being within the predicted MSY range, and status of the indicator species for the NCDR, it is considered unlikely that the biomass of Saddletail Snapper in the NCB is depleted. The evidence also 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 North Coast Bioregion (Western Australia) biological stock is classified as a **sustainable stock**.

**Timor, Arafura seas** Saddletail Snapper was one of several tropical snapper species that were heavily exploited in this stock by foreign fishing operations from the early 1970s to 1990 [O'Neill et al. 2011]. Annual catches by this fleet peaked in the late 1980s at 2,189 t. Domestic harvest was negligible until 1995 when trawl operations

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began. Since 2012–13 catches from this stock have fluctuated between a maximum of 1,812 t in 2017-18 to a minimum of 979 t in 2019-20.

A fishery independent survey was undertaken in 2021 to estimate relative biomass of key offshore species in Northern Territory waters, including Saddletail Snapper. As a result of this work, biomass of Saddletail Snapper in the NT was estimated to be 165,707 t, with a coefficient of variation of 0.08. Within this, the biomass of Saddletail Snapper in the Timor, Arafura seas stock was estimated to be approximately 86,707 t [Knuckey and Koopman 2022]. The commercial harvest in this stock has averaged 1,418 t in the last 10 years, which is around 2% of the estimated relative biomass. It is important to note that this survey was designed to obtain a time-series of consistent and robust relative abundance indices and due to uncertainties around assumptions of catchability, herding and escapement, this one-off estimate of absolute abundance should be used with caution [Knuckey and Koopman 2022]. Regardless, this estimate of biomass can assist in understanding the impact fishing has on this stock, with the low level of catch relative to biomass size.

This stock was also assessed using a stochastic Stock Reduction Analysis (SRA) model with data up to 2022. Biomass was estimated to be between 77% and 85% of unfished levels, which is above the limit reference point. The stock is not considered to be recruitment impaired. Exploitation values were also found to be below the reference point relative to MSY indicating the fishing pressure is at sustainable levels [Pazhayamadom 2023]. The results of this SRA assessment, along with the high biomass levels indicated by the fishery independent survey indicate that the current fishing mortality is unlikely to cause the stock to become recruitment impaired.

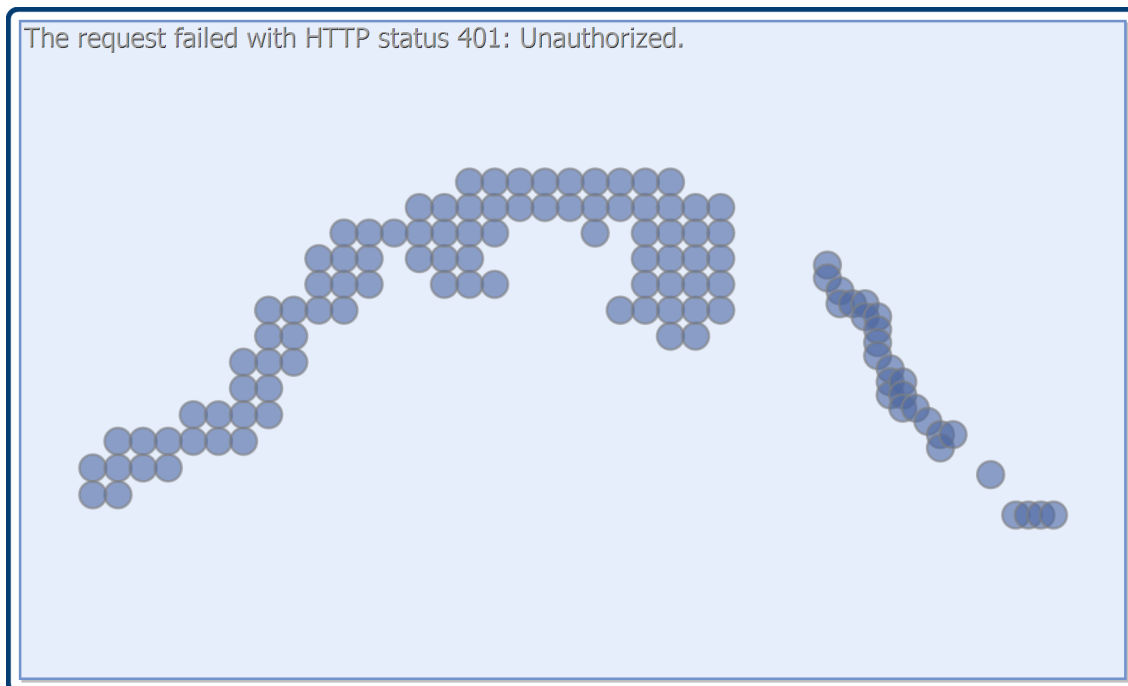
On the basis of the evidence provided above, the Timor-Arafura seas (Northern Territory) biological stock is classified as a **sustainable stock**.

## BIOLOGY

**Saddletail Snapper biology** [Fry and Milton 2009; Fry et al. 2009; McPherson et al. 1992; McPherson and Squire 1992; Carpenter and Niem 2001; Newman 2002; Newman et al. 2000]

Species	Longevity / Maximum Size	Maturity (50 per cent)
Saddletail Snapper	Northern and Western Australia: 33 years, 680 mm SL East coast Queensland, 20 years; 1000 mm TL	Northern and Western Australia: 9 years, Males 280 mm SL, Females 370 mm SL East coast Queensland: Females 576 mm FL

## DISTRIBUTION



Distribution of reported commercial catch of Saddletail Snapper – confidential catch is not shown

**TABLES**

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

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Recreational			
Hook and Line	✓	✓	✓
Spearfishing		✓	

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			✓
Spatial zoning			✓

Commercial			
Effort limits			✓
Gear restrictions	✓	✓	✓
Harvest Strategy		✓	
Individual transferable quota		✓	
Limited entry		✓	✓
Seasonal or spatial closures		✓	
Size limits		✓	
Spatial closures	✓		✓
Spatial zoning	✓		✓



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Total allowable catch	✓	✓	
Total allowable effort			✓
Vessel restrictions		✓	✓
<b>Recreational</b>			
Bag/possession limits		✓	
Gear restrictions		✓	
Licence (Recreational Fishing from Boat License)			✓
Possession limit	✓		✓
Seasonal or spatial closures		✓	
Size limits		✓	
Spatial closures	✓		✓

Catch			
	Northern Territory	Queensland	Western Australia
<b>Charter</b>	3.8 t	18 t	2.70 t
<b>Commercial</b>	1931.08 t	74.6469 t	326.631 t
<b>Indigenous</b>	Unknown	Unknown	Unknown
<b>Recreational</b>	< 4 t (2019)	162 t [2019–20]	3.4 t (2020–21)

**Western Australia – Active Vessels.** Data is confidential as there were fewer than three vessels 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].

**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 – Recreational (Catch).** Saddletail Snapper, Crimson Snapper and Indonesian Snapper catch were combined during the Northern Territory 2018 to 2019 recreational fishing survey. Saddletail Snapper was assumed to be a proportion of the total reported catch of these species [West et al. 2022].

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

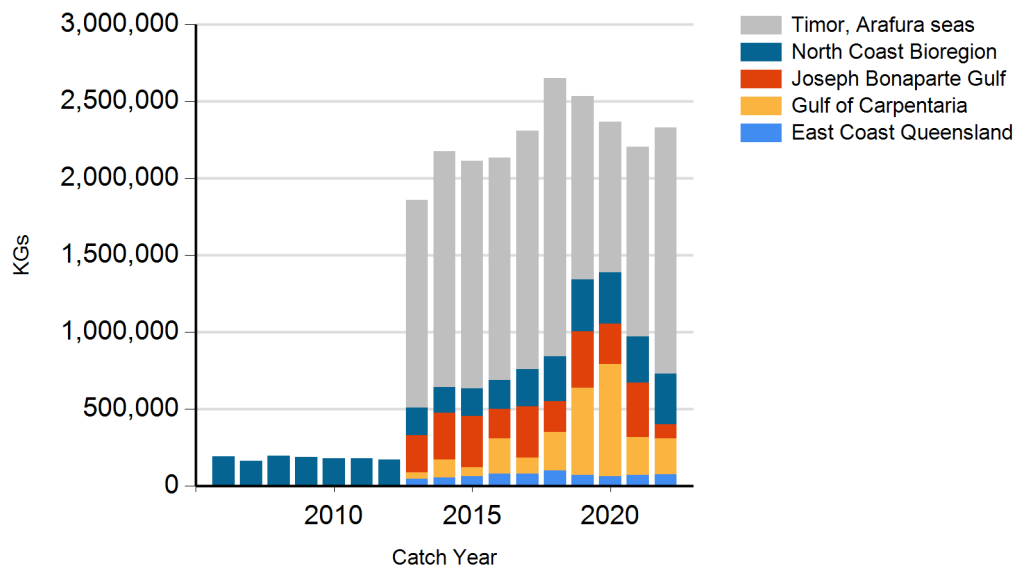
**Queensland – Recreational Fishing (Catch).** Data based at the whole of Queensland level and are derived from statewide recreational fishing surveys. Estimates have been converted to weight (tonnes) using best known conversion multipliers. Conversion factors may display regional or temporal variability.

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

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

## CATCH CHART

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Commercial catch of Saddletail Snapper - note confidential catch not shown

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