

# Black Jewfish (2020)

*Protonibea diacanthus*



**Thor Saunders:** Department of Primary Industry and Resources, Northern Territory, **Alice Pidd:** Department of Agriculture and Fisheries, Queensland, **Fabian Trinnie:** Department of Primary Industries and Regional Development, Western Australia, **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
Northern Territory	Darwin Region	Sustainable	Biomass, fishing mortality
Northern Territory	Regional Northern Territory	Sustainable	Biomass, fishing mortality
Northern Territory, Queensland	Gulf of Carpentaria	Undefined	Catch
Queensland	Queensland East Coast	Undefined	Catch

## STOCK STRUCTURE

Black Jewfish is a widespread Indo-Pacific species found from Exmouth Gulf in Western Australia, north and east across Northern Australia, to the east coast of Queensland. The stock structure for this species has been investigated in the north-western part of its range along the West Australian and Northern Territory coastlines [Saunders et al. 2016a]. The results indicated that separate stocks exist at the scale of tens of kilometres [Saunders et al. 2016a]. However, it is extremely difficult to collect relevant biological, and catch and effort information to assess each of these individual fine-scale biological stocks, although this fine-scale stock structure is an explicit consideration for fishery managers. Due to the logistic and operational constraints of the relevant monitoring, assessment and management agencies, assessment is only feasible at the jurisdictional level. This approach assumes that the assessment of stock status within a jurisdictional assessment unit is relevant to all biological stocks within that assessment unit.

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

## STOCK STATUS

### Darwin Region

This management unit is where the highest catches of Black Jewfish occur in the Northern Territory and is approximately within a radius of 300 km of Darwin. Black Jewfish is a targeted species of the Coastal Line Fishery, contributing 68 per cent of the total harvest; the recreational fishing sector, contributing 21 per cent; Fishing Tour Operators, contributing 5 per cent and the rest comprising other commercial fisheries and an unknown Indigenous harvest. Given the fine-scale stock structure of this species [Saunders et al. 2016a], it is likely that this management unit incorporates several populations. Consequently, the assessment has been 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 2014 stock assessment using a Stock Reduction Analysis indicated that Black Jewfish were overfished and that overfishing was occurring [Saunders et al. 2016b]. However, the most recent assessment using data up to 2019, indicates that current biomass has increased significantly to 93 per cent of unfished levels [Saunders 2020a] suggesting that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired. While this biomass estimate is probably overly optimistic, there is evidence that strongly supports a significant increase in the abundance of Black Jewfish and the recovery of the stocks within this management unit. This includes successive years of above-average recruitment (indicated by the reduction in average length of monitored catches and an increase in the number of fish caught), a previous stock assessment indicating that the biomass had recovered to 50 per cent of unfished levels [Penny et al. 2018] as well as the management measures (catch limits and area closures) introduced in 2015 that have reduced catches from the peaks that occurred in the mid-2000s [NTG 2017]. The model outputs also indicate the current fishing mortality is only 24 per cent of that required to attain Maximum Sustainable Yield 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, Black Jewfish in the Darwin Region management unit is classified as a **sustainable stock**.

### Gulf of Carpentaria

In the Gulf of Carpentaria, Black Jewfish are taken by commercial trawl, net and line fishers as well as recreational anglers. It is also likely that this species consists of multiple biological stocks in this region [Saunders et al. 2016a]. Black Jewfish were exposed to historical fishing from foreign fleets during the 1950s to the 1980s [O'Neill 2011], however, these historical catches were relatively low (< 10 tonnes (t)).

In the Queensland portion of this management unit concerns over rapid depletion of Black Jewfish stocks led to the introduction of a 6 t Total Allowable Commercial Catch (TACC) on 1 January 2020. The TACC is applied to the commercial sector but has implications for recreational fishers, with take of the species becoming prohibited across sectors upon exhaustion of catch limits for the remainder of the quota season. Prior to the TACC commercial harvest has reduced, averaging 8 t over the 2015–19 calendar year period and peaking at 13.5 t in 2016 in the Gulf of Carpentaria Inshore Fin Fish Fishery [QFISH 2020]. The number of licences in operation averaged 27 for the years 2012–15, but have increased to a peak of 49 in 2017 [QFISH 2020], likely due to the high value placed on Black Jewfish swim bladders. However, an increase in the targeting of Saddletail Snapper by the Northern Territory Demersal Fishery (DF) has led to a peak catch of 17 t of Black Jewfish occurring in this management unit in 2019.

Black Jewfish are particularly vulnerable to fishing pressure due to their tendency to aggregate [Phelan 2008] and are slow to recover once depleted [Taillebois et al. 2017]. There is evidence that targeted fishing of Black Jewfish aggregations in this management unit through the mid-late 1990s, while producing relatively low catches in absolute terms, was sufficient to significantly reduce abundance of large mature fish in the northern Cape York region [Phelan 2002]. The perceived overfishing of this aggregation area resulted in a two-year ban on fishing for Black Jewfish which was further extended as a permanent closure [Roelofs 2003]. No studies have been undertaken to measure recovery of this aggregation area. The Northern Territory DF trawl fishery began increasing effort in 2012, resulting in higher levels of harvest of Black Jewfish in the western Gulf of Carpentaria. These catches are likely to be from a different stock than the Cape York aggregation so the impacts of this fishing activity are unknown. Additionally, while Black Jewfish are a popular recreational species in the Gulf of Carpentaria, there are no reliable estimates of recreational harvest [Roelofs 2003].

On the basis of the evidence provided above, the management unit Black Jewfish in the Gulf of Carpentaria is classified as a **undefined stock**.

**Queensland East Coast** Black Jewfish are harvested by commercial fishers (net and line) and recreational anglers on the Queensland east coast. Commercial catches have fluctuated over the last 20 years (average 26.8 t, 2000–2019), increasing markedly in recent years due to the high value placed on Black Jewfish swim bladders on the export market. Concerns over rapid depletion of Black Jewfish stocks on the Queensland east coast led to the introduction of a 20 t Total Allowable Commercial Catch (TACC) on 1 January 2020. The TACC is applied to the commercial sector but has implications for recreational fishers, with take of the species becoming prohibited across sectors upon exhaustion of catch limits for the remainder of the quota season. In addition to the TACC, spatial closures were introduced as of 1 September 2019 to prohibit the take and possession of Black Jewfish in Dalrymple Bay and Hay Point, reducing fishing pressures on these key aggregation points. In the years prior to the TACC commercial harvest increased markedly, peaking at 136 t in the 2018 calendar year [QFISH 2020]. Nominal catch rates have been steadily increasing over the last 20 years, with the most notable increases seen in 2018–19. Increased fishing pressure will continue while there is high demand for swim bladders in overseas markets and while high prices are attainable. No formal stock assessments have been undertaken to quantify biomass levels of Black Jewfish on the Queensland east coast. There are no reliable estimates of fishing pressure from recreational and Indigenous activities [Webley et al. 2015, Teixeira et al. 2021].

The legal size limit on the Queensland east coast (750 mm TL) is below the reported age of first maturity for females (850–900 mm TL) and may not be effective in protecting spawning females from fishing. A conservative possession limit (two fish) reduces recreational fishing pressure on the stock. Recent management changes will drive a decrease in harvest and effort, however their impact on stock sustainability cannot be considered in this assessment which is based on 2019 data. There is currently insufficient information available to confidently classify the status of the stock.

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

**Regional Northern Territory** This management unit represents all Northern Territory waters outside the Darwin Region and Gulf of Carpentaria management units. Catch of Black Jewfish in this region is dominated by the finfish trawl vessels in the Demersal Fishery (DF). Additionally, foreign trawlers harvested substantial amounts (peak of 70 t) of Black Jewfish when they operated in this area in the 1970s and 1980s [Saunders 2020b]. Catches by the domestic trawlers have been significantly

lower and in 2019 was 9 t. Given the fine-scale stock structure of this species [Saunders et al. 2016a], 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 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 Black Jewfish was 85 per cent of unfished levels [Saunders 2020a] 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 0.04 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.

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

**Western  
Australia**

Black Jewfish are not a target species in the Kimberley Gillnet and Barramundi Managed Fishery of Western Australia, but are landed in small quantities as by-product [Newman et al. 2020]. They have also been landed in very small quantities as by-product in the Pilbara Fish Trawl Interim Managed Fishery, the Nickol Bay Prawn Managed Fishery and the Pilbara Line Fishery. The total commercial catch in Western Australia in 2019 was approximately 4.0 tonnes (t). Black Jewfish catches have only been reported from a small area of their range in Western Australia. They are also landed in small quantities by charter fishers, primarily in the Kimberley region of Western Australia. In addition, Barramundi has been classified as a sustainable stock in the Kimberley Gillnet and Barramundi Managed Fishery (Western Australia) management unit. Barramundi is an indicator species [see Newman et al. 2018] for the North Coast Nearshore and Estuarine Resource. Given the status of Barramundi as an indicator species, there is a concomitant low level of risk associated with the biological sustainability of all species harvested in the North Coast Nearshore and Estuarine Resource. The above evidence indicates that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired.

Given the low level of take across their distributional range in Western Australia, the above evidence indicates that the current level of fishing mortality is unlikely to cause the stock to become recruitment impaired.

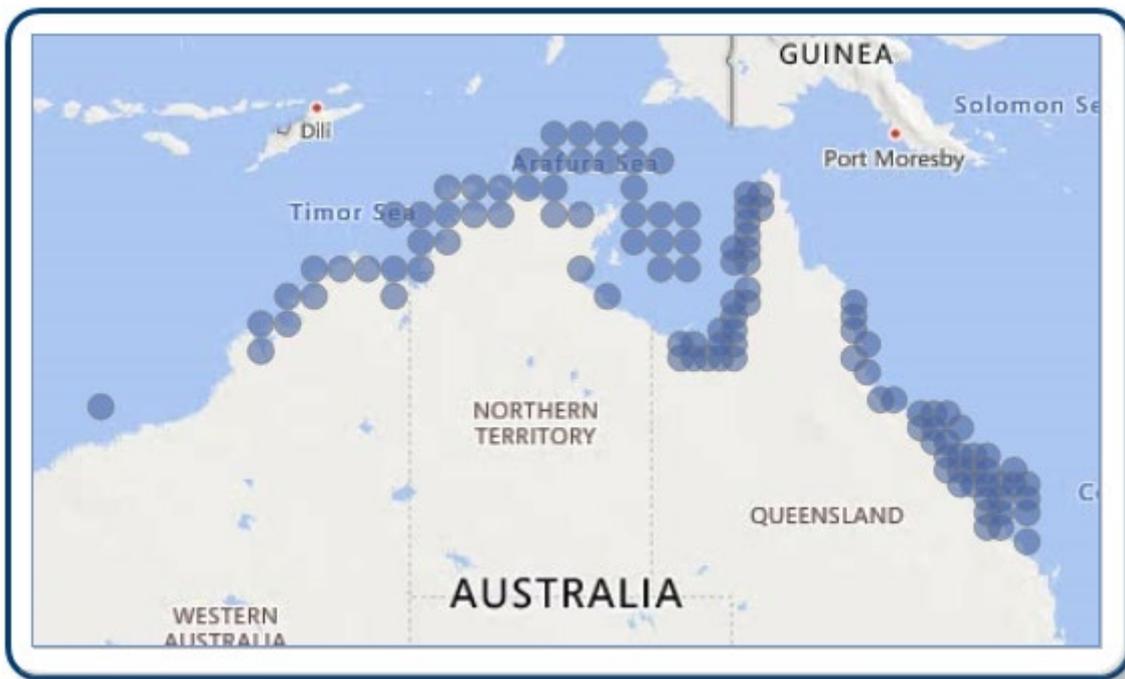
On the basis of the evidence provided above, Black Jewfish in Western Australia is classified as a **sustainable stock**.

**BIOLOGY**

**Black Jewfish biology** [Phelan 2002, Welch et al. 2014]

Species	Longevity / Maximum Size	Maturity (50 per cent)
Black Jewfish	15 years, 1 500 mm TL, 30 kg	Northern Territory: 2 years, TL 890 mm

**DISTRIBUTION**



Distribution of reported commercial catch of Black Jewfish

**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			✓
<b>Commercial</b>			
Bottom Trawls	✓		
Dropline	✓		
Gillnet	✓		✓
Hand Line, Hand Reel or Powered Reels		✓	
Handline	✓		
Midwater Trawl		✓	
Net		✓	
Otter Trawl			✓
<b>Recreational</b>			
Handline			✓
Hook and Line	✓	✓	
Spearfishing	✓	✓	
<b>Management Methods</b>			

	Northern Territory	Queensland	Western Australia
<b>Charter</b>			
Bag limits			✓
Gear restrictions		✓	
Limited entry	✓		✓
Passenger restrictions	✓		✓
Possession limit	✓	✓	✓
Size limit		✓	✓
Spatial closures	✓	✓	
Spatial zoning			✓
<b>Commercial</b>			
Catch limits	✓	✓	
Gear restrictions	✓	✓	✓
Limited entry	✓	✓	✓
Size limit		✓	✓
Spatial closures	✓	✓	✓
Spatial zoning			✓
Temporal closures		✓	✓
Total allowable catch		✓	
Vessel restrictions	✓	✓	✓
<b>Recreational</b>			
Bag limits		✓	✓
Gear restrictions	✓	✓	✓
Licence (Recreational Fishing from Boat License)			✓
Possession limit	✓	✓	✓
Size limit		✓	✓
Spatial closures	✓	✓	✓

Catch	Northern Territory	Queensland	Western Australia
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<b>Charter</b>	22 t		< 1 t
<b>Commercial</b>	167.156 t	164.63 t	3.4703 t
<b>Indigenous</b>	Unknown	Unknown	Unknown
<b>Recreational</b>	35 t (2016)	Unknown	Unknown

**Western Australia – Recreational (Catch)** Boat-based recreational catch if 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.

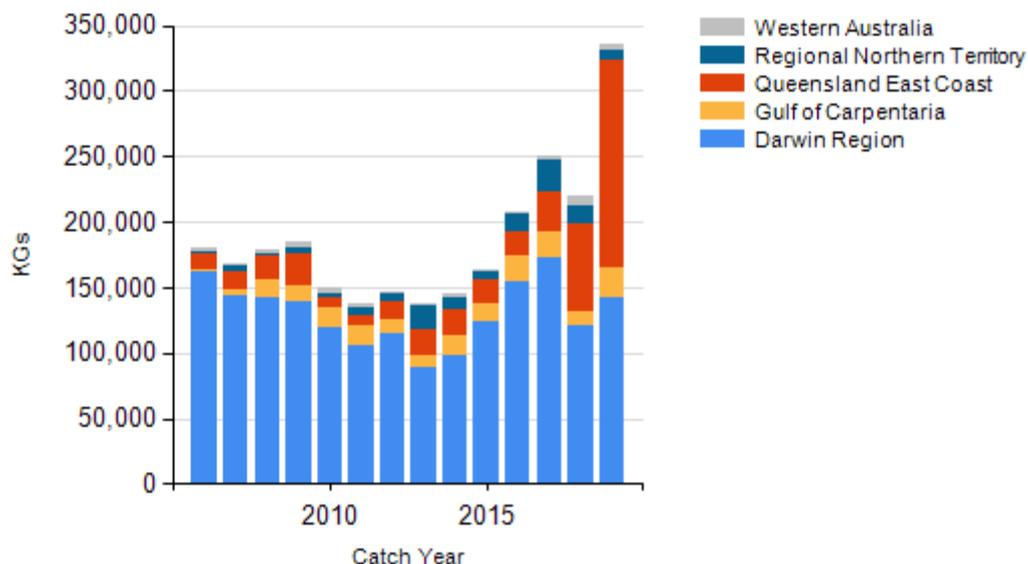
**Western Australia – Active Vessels** Data is confidential as there were fewer than three vessels operating in the Pilbara Fish Trawl Interim Managed Fishery.

**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** 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".

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

## CATCH CHART



Commercial catch of Black Jewfish - note confidential catch not shown

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