Crimson Snapper (2016)

Lutjanus erythropterus

Julie Martin: Department of Primary Industry and Resources, Northern Territory, **Corey Wakefield**: Department of Fisheries, Western Australia, **Malcolm Keag**: Department of Agriculture and Fisheries, Queensland, **Stephen Newman**: Department of Fisheries, Western Australia

STOCK STATUS OVERVIEW

Jurisdiction	Stock	Fisheries	Stock status	Indicators
Western Australia	North Coast Bioregion	GDSMF, NDSMF, PLF, PTMF, PFTIMF	Sustainable	Catch, CPUE, indicator species status
Northern Territory, Queensland	Northern Australia	DF,CLF,TRF, GOCDFFTF, GOCLF	Sustainable	Catch, CPUE, indicator species status
Queensland	East Coast Queensland	CRFFF	Undefined	Catch

DF,CLF,TRF Demersal Fishery, Coastal Line Fishery, Timor Reef Fishery (NT), CRFFF Coral Reef Fin Fish Fishery (QLD), GOCDFFTF Gulf of Carpentaria Developmental Fin Fish Trawl Fishery (QLD), GOCLF Gulf of Carpentaria Line Fishery (QLD), GDSMF Gascoyne Demersal Scalefish Managed Fishery (WA), NDSMF Northern Demersal Scalefish Managed Fishery (WA), PLF Pilbara Line Fishery (WA), PTMF, PFTIMF Pilbara Trap Managed Fishery, Pilbara Fish Trawl (Interim) Managed Fishery (WA)

STOCK STRUCTURE

Crimson Snapper (*Lutjanus erythropterus*) is a widespread Indo-Pacific species found throughout tropical Australian waters. Research on the biological stock structure of this species in Australian waters has only occurred in northern Australia; including the Timor Sea, the Arafura Sea and the Gulf of Carpentaria[1]. A single genetic stock was found across this region. In addition to this Northern Australian biological stock, it is considered that the species has a similar biological stock structure to Saddletail Snapper (*Lutjanus malabaricus*), with a Western Australian (North Coast Bioregion) biological stock and a biological stock off the east coast of Queensland[1].

Here, assessment of stock status is presented at the biological stock level—North Coast Bioregion (Western Australia), Northern Australia and East coast (Queensland).

STOCK STATUS

East Coast Queensland

Crimson Snapper is taken in both the commercial and recreational sectors off eastern Queensland, probably in similar numbers for each sector.

Recreational harvest estimates group Saddletail and Crimson Snapper together because these two species are often not separately identified. The recreational harvest of these species was estimated to be around 73 000 fish in 2013–14[5], similar to the estimates in 2000 and 2012[6]. The relative proportions of the two species in this catch are not known.

Since 2004, commercial harvest has dropped to around 20 t per year. At around the same time, there was an expansion of no-take marine reserves within the Great Barrier Reef Marine Park, and a quota management system for coral reef finfish species was introduced. Both management interventions are likely to have influenced commercial harvest. Commercial harvest is not effectively constrained as this species is managed as part of the 'other species' quota category, which comprises many other coral reef finfish species. There is a cap on the total catch for the group, but no individual cap on any one species within the group. Although recreational fishing effort is not capped, the present level of combined fishing pressure is unlikely to cause the stock to become recruitment overfished.

Current biological information is unavailable, and no assessment has been completed for this stock. With no index of abundance, insufficient information is available to confidently classify the status of this stock.

On the basis of the evidence provided above, the East coast (Queensland) biological stock is classified as an **undefined stock**.

North Coast Bioregion

Crimson Snapper is caught primarily on the north-west coast of Western Australia as a component of the multispecies Pilbara Line, Trap and Fish Trawl fisheries (Western Australia) and the Northern Demersal Scalefish Managed Fishery (NDSMF) in the Kimberley region of Western Australia[2]. Crimson Snapper is assessed on the basis of the status of several indicator species (including, for example, Red Emperor—*Lutjanus sebae* and Goldband Snapper—*Pristipomoides multidens* in the Kimberley region) that represent the entire inshore demersal suite of species occurring at depths of 30–250 m. The major performance measures for these indicator species are estimates of spawning stock levels. The target level of spawning biomass is 40 per cent of the unfished level. The limit level is 30 per cent of the estimate of initial spawning biomass. Indicator species assessments using an integrated age structured model 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 Trap Managed Fishery, Pilbara Fish Trawl Interim Managed Fishery and Pilbara Line Fishery in 2007[2]. The spawning biomass levels of the indicator species were either greater than the target level or between the target level and the threshold level in the NDSMF in 2014[2]. The above evidence indicates that the biomass of this stock is unlikely to be recruitment overfished.

The catch of Crimson Snapper in the NDSMF has been low and variable for the past 5 years (2011–15), with a mean annual catch of 52 tonnes (t), ranging from 38–89 t (comprising on average, less than five per cent of the total catch). Similarly, the catch of Crimson Snapper in the Pilbara demersal fisheries has been stable for the past 3 years (2013–15), with a mean annual catch of 197 t, ranging from 159–175 t. The above evidence indicates that the current level of fishing pressure is unlikely to cause the stock to become recruitment overfished.

On the basis of the evidence provided above, the North Coast Bioregion (Western Australia) biological stock is classified as a **sustainable stock**.

Northern Australia

This cross-jurisdictional biological stock has components in the Northern Territory and Queensland. Each jurisdiction assesses the part of the biological stock that occurs in its waters. The status presented here for the entire biological stock has been established using evidence from both jurisdictions.

The Northern Territory manages the commercial harvest of Crimson Snapper and Saddletail Snapper together as 'red snapper'. Crimson Snapper has made up around 22 per cent of the red snapper catch for the past 15 years and is assessed on the basis of the status of the main species, Saddletail Snapper, as an indicator for the combined group. Analysis of Saddletail Snapper in 2013, using a stochastic stock reduction analysis model, estimated egg production to be around 80 per cent of that prior to the start of the fishery; well above conventional fishery targets[3]. The above evidence indicates that the biomass of this part of the Crimson Snapper stock is unlikely to be recruitment overfished.

The combined Northern Territory total allowable commercial catch for red snappers is 3800 t and the commercial catch of Crimson Snapper in 2015 was 698 t. Trawl effort and catch per unit effort have both increased since 2012. The 2013 assessment confirmed that the current harvest rate of red snappers is below that required to achieve maximum sustainable yield (MSY). The above evidence indicates that the current level of fishing pressure is unlikely to cause this part of the Crimson Snapper stock to become recruitment overfished.

For the Queensland part of the biological stock, the commercial harvest in 2015 was 100 t. This contrasts with harvests of 150–350 t per year during the period 2004–11, and harvests of 0–28 t during the period 2012–14. The MSY for this part of the stock is approximately 170 t[4] and the average harvest from 2004–15 was around this level.

The harvest (100 t) in the Queensland part of the biological stock in 2015 was well below the MSY however, the current total allowable catch does not constrain catch below the MSY if it were fully utilised. The above evidence indicates that the current level of fishing pressure is unlikely to cause this part of the Crimson Snapper stock to become recruitment overfished.

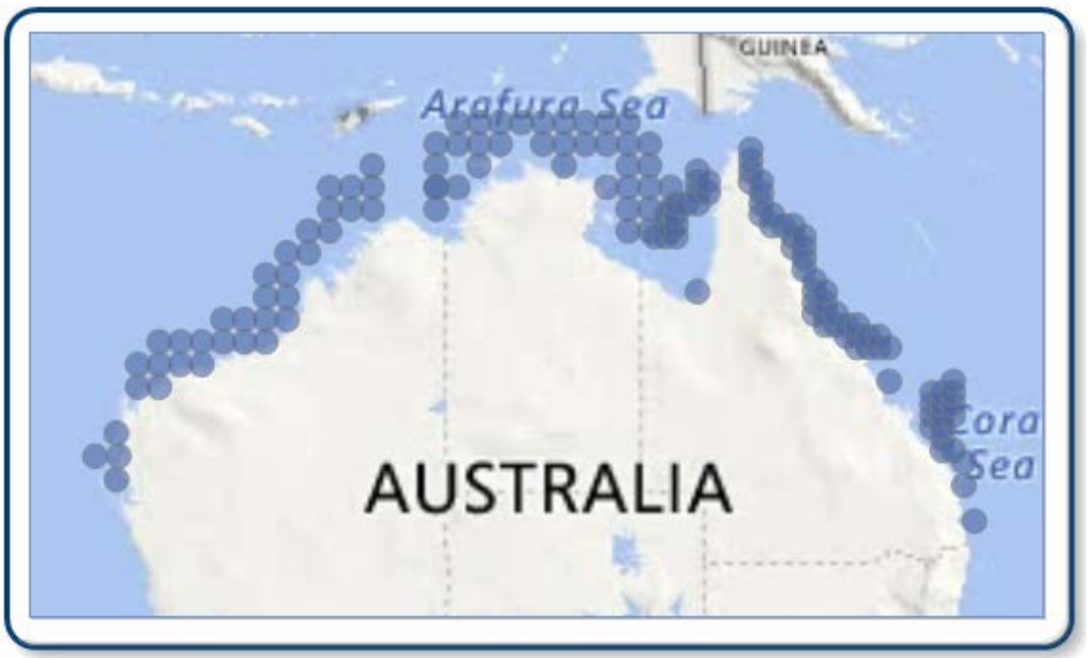
On the basis of the evidence provided above, the Northern Australian biological stock is classified as a **sustainable stock**.

BIOLOGY

Crimson Snapper biology[7–10]

Species	Longevity / Maximum Size	Maturity (50 per cent)
Crimson Snapper	Northern Australia: 42 years; 470 mm SL East coast north Queensland: 640 mm FL	Northern Australia: Males 270–280 mm SL, Females 350–370 mm SL East coast north Queensland: Females 485 mm (+/- 1.7) FL

DISTRIBUTION



Distribution of reported commercial catch of Crimson Snapper

TABLES

Commercial Catch Methods	Northern Territory	Queensland	Western Australia
Line		✓	
Otter Trawl		✓	
Various	✓		✓

Fishing methods			
	Northern Territory	Queensland	Western Australia
Commercial			
Line		✓	
Otter Trawl		✓	
Various	✓		✓
Indigenous			
Hand Line, Hand Reel or Powered Reels		✓	
Recreational			
Hand Line, Hand Reel or Powered Reels	✓	✓	✓

Management Methods			

	Northern Territory	Queensland	Western Australia
Commercial			
Effort limits			✓
Gear restrictions	✓	✓	✓
Limited entry		✓	✓
Size limit		✓	
Spatial closures	✓	✓	✓
Spatial zoning	✓		✓
Temporal closures		✓	
Total allowable catch	✓	✓	✓
Total allowable effort			✓
Vessel restrictions		✓	✓
Indigenous			
Laws of general application apply			✓
Recreational			
Bag limits			✓
Licence			✓
Limited entry			✓
Passenger restrictions		✓	✓
Possession limit	✓	✓	✓
Size limit		✓	
Spatial closures	✓	✓	✓
Spatial zoning			✓
Temporal closures		✓	

Active Vessels			
	Northern Territory	**Queensland**	**Western Australia**
	2 Vessel in CLF, 8 Vessel in DF, 9 Vessel in TRF,	86 License in CRFFF, 2 License in GOCDFFTF, 1 License in GOCLF, 0 Vessel in	8 Vessel in NDSMF, 6 Vessel in PLF,

		DWFFF, 1 Vessel in GOCLF,	

CLF Coastal Line Fishery(NT)

DF Demersal Fishery(NT)

TRF Timor Reef Fishery(NT)

CRFFF Coral Reef Fin Fish Fishery(QLD)

DWFFF Deep Water Fin Fish fishery(QLD)

GOCDFFTF Gulf of Carpentaria Developmental Fin Fish Trawl Fishery(QLD)

GOCLF Gulf of Carpentaria Line Fishery (QLD)

NDSMF Northern Demersal Scalefish Managed Fishery(WA)

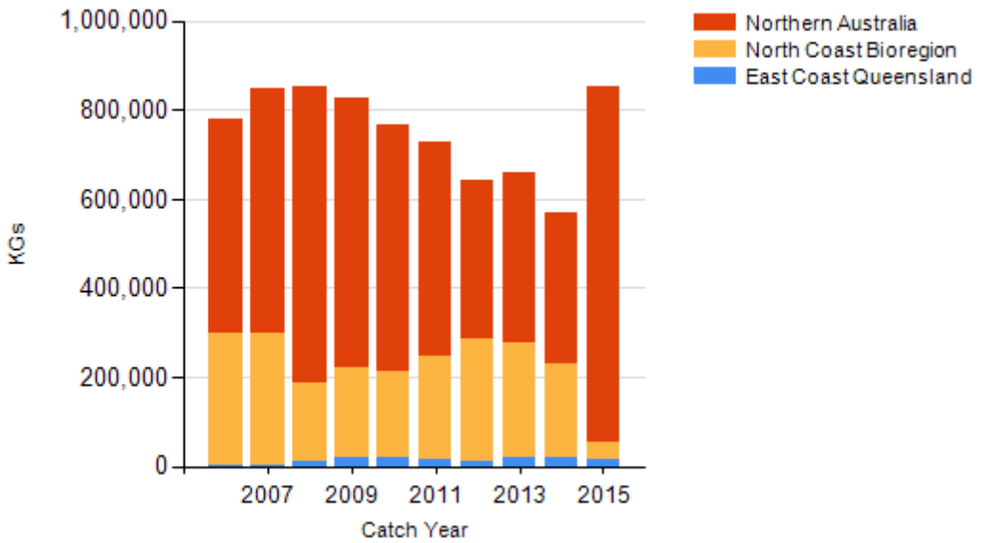
PLF Pilbara Line Fishery(WA)

Catch			
	Northern Territory	**Queensland**	**Western Australia**
Commercial	697.844t in DF,CLF,TRF,	14.524t in CRFFF, 99.665t in GOCDFFTF, 0.038t in GOCLF,	0.2184t in GDSMF, 38.7104t in NDSMF, 2.12t in PLF,
Indigenous	Unknown	Unknown	Unknown
Recreational	0.4 t	7 t	1.76 t

DF,CLF,TRF Demersal Fishery, Coastal Line Fishery, Timor Reef Fishery (NT), CRFFF Coral Reef Fin Fish Fishery (QLD), GOCDFFTF Gulf of Carpentaria Developmental Fin Fish Trawl Fishery (QLD), GOCLF Gulf of Carpentaria Line Fishery (QLD), GDSMF Gascoyne Demersal Scalefish Managed Fishery (WA), NDSMF Northern Demersal Scalefish Managed Fishery (WA), PLF Pilbara Line Fishery (WA), PTMF, PFTIMF Pilbara Trap Managed Fishery, Pilbara Fish Trawl (Interim) Managed Fishery (WA),

a Queensland For Queensland, the reporting period for the Coral Reef Fin Fish Fishery (Queensland) and Deep Water Fin Fish Fishery (Queensland) is financial year (2014–15).
b Queensland – Commercial (fishing methods) In Queensland, Crimson Snapper is trawled in only one of the Queensland fisheries in which it is caught commercially - the Gulf of Carpentaria Developmental Fin Fish Trawl Fishery
c Queensland – Indigenous Under the Fisheries Act 1994 (Qld), Indigenous fishers in Queensland are entitled to use prescribed traditional and non-commercial fishing apparatus in waters open to fishing. Size and possession limits, and seasonal closures do not apply to Indigenous fishers. Further exemptions to fishery regulations may be applied for through permits.
d Indigenous Subject to the defence that applies under 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.
e Western Australia – Commercial (catch) For Pilbara Fish Trawl Interim Managed Fishery (Western Australia) and Pilbara Trap Managed Fishery (Western Australia), catch is unavailable as there were fewer than three vessels in the fishery.
f Western Australia – Recreational (catch) Boat-based recreational catch from 1 May 2013–30 April 2014.
g Northern Territory and Queensland – Recreational (catch) Saddletail Snapper and Crimson Snapper catch were combined during the Northern Territory 2010 recreational fishing survey11 and the Queensland 2013–14 recreational fishing survey5.

CATCH CHART



Commercial catch of Crimson Snapper - note confidential catch not shown

EFFECTS OF FISHING ON THE MARINE ENVIRONMENT

- The impacts on the benthic habitat of fishing activity for Crimson Snapper are limited to those of the trawl fisheries, which is restricted to around seven per cent of the North Coast Bioregion of Western Australia[2] and parts of the Northern Territory and Queensland.
- There are few bycatch issues associated with trap and line-based fishing. Bycatch of dolphins and turtles can occur in the fish trawls, but this has decreased significantly since the introduction of exclusion devices introduced in Western Australia in 2005 and the Northern Territory in 2006. Given the area of distribution and estimated population size of these protected species, the impact of the fish trawl fishery on the stocks of these protected species is likely to be minimal[12,13]. Gear and fishing modification continue to reduce this level of interaction[2,12,14].
- The Northern Territory fisheries that target Crimson Snapper have received full Export Exemption accreditation under the Australian *Environment Protection and Biodiversity Conservation Act 1999*. The Western Australian and east coast fisheries (Queensland) that target Crimson Snapper have received Approved Wildlife Trade Operation Exemptions accreditation under the *Environment Protection and Biodiversity Conservation Act 1999* (except for the Pilbara Trap Managed Fishery [Western Australia] which does not export fish). These assessments, subject to adherence to any accompanying conditions and recommendations, demonstrate that these fisheries are managed in a manner that does not lead to overfishing, and that fishing operations have a minimal impact on the structure, productivity, function and biological diversity of the ecosystem.

ENVIRONMENTAL EFFECTS on Crimson Snapper

- Climate change and variability have the potential to impact fish stocks in a range of ways, including influencing their geographic distribution (for example, latitudinal shifts in distribution). However, it is unclear how climate change may affect risks to the sustainability of this species. Slow growing and long-lived species such as Crimson Snapper are less likely to be affected by short duration environmental changes (of one or a few years), with adult stocks comprising fish recruited over many years.
- Changes in ocean chemistry such as ocean acidification have the potential to impact on the replenishment rates of fish populations by affecting larval survival[15], and also individual growth rates and spawning output[16].

References

1	Salini, J, Ovenden, J, Street, R, Pendrey, R, Haryantis and Ngurah 2006, Genetic population structure of red snappers (*Lutjanus malabaricus* Bloch and Schneider, 1801 and *Lutjanus erythropterus* Bloch, 1790) in central and eastern Indonesia and northern Australia, *Journal of Fish Biology*, 68(suppl. B): 217–234.
2	Newman, SJ, Wakefield, C, Skepper, C, Boddington, D, Blay, N, Jones, R and Dobson, P. 2015, North Coast Demersal Fisheries Status Report. pp. 189-206. In: Fletcher, W.J. and Santoro, K. (eds.) 2015. *Status Reports of the Fisheries and Aquatic Resources of Western Australia 2014/15: The State of the Fisheries.* Department of Fisheries, Western Australia, Perth, Australia. 353p.
3	Martin, JM 2013, Stock assessment of Saddletail Snapper (*Lutjanus malabaricus*) in the Northern Territory Demersal and Timor Reef Fisheries, unpublished report, Department of Primary Industry and Fisheries, Darwin.
4	Leigh, GM and O'Neill, MF 2016, *Gulf of Carpentaria Finfish Trawl Fishery: Maximum Sustainable Yield*, Agi-Science Queensland, Department of Agriculture and Fisheries, Queensland.
5	Webley, J, McInnes, K, Teixeira, D, Lawson, A and Quinn, R 2015, Statewide Recreational Fishing Survey 2013–14, Queensland Department of Agriculture and Fisheries, Brisbane.
6	Taylor, S, Webley, J and McInnes, K 2012, 2010 Statewide Recreational Fishing Survey, Department of Agriculture, Fisheries and Forestry, Brisbane.
7	Fry, G and Milton, DA 2009, Age, growth and mortality estimates for populations of red snappers *Lutjanus erythropterus* and *L. malabaricus* from northern Australia and eastern Indonesia, *Fisheries Science*, 75: 1219–1229.
8	Fry, G, Milton, DA, Van Der Velde, T, Stobutzki, I, Andamari, R, Badrudin and Sumiono, B 2009, Reproductive dynamics and nursery habitat preferences of two commercially important Indo-Pacific red snappers *Lutjanus erythropterus* and *L. malabaricus, Fisheries Science*, 75: 145–158.
9	McPherson, GR and Squire, L 1992, Age and growth of three dominant *Lutjanus* species of the Great Barrier Reef Inter-Reef Fishery, *Asian Fisheries Science*, 5, 25–36.
10	McPherson, GR, Squire, L and O'Brien, J 1992, Reproduction of three dominant *Lutjanus* species of the Great Barrier Reef Inter-Reef Fishery, *Asian Fisheries Science*, 5, 15–24.
11	West, LD, Lyle, JM, Matthews, SR, Stark, KE and Steffe, AS 2012, Survey of Recreational Fishing in the Northern Territory, 2009-10. Northern Territory Government, Australia. Fishery Report No. 109.
12	Wakefield, CS, Santana-Garcon, J, Dorman, SR, Blight, S, Denham, A, Wakeford, J, Molony, BW and Newman, SJ 2016, Performance of bycatch reduction devices varies for chondrichthyan, reptile, and cetacean mitigation in demersal fish trawls: assimilating subsurface interactions and unaccounted mortality, *ICES Journal of Marine Science in press*
13	Molony, BW, Wakefield, CB, Newman, SJ, O'Donoghue, S, Joll, L and Syers, C 2015, The need for a broad perspective concerning fisheries interactions and bycatch of marine mammals, pp.65-78, In: Kruse, GH, An, HC, DiCosimo, J, Eischens, CA, Gislason, GS, McBride, DN, Rose, CS and Siddon, CE (eds.). Fisheries Bycatch: Global Issues and Creative Solutions. Alaska Sea Grant, University of Alaska Fairbanks.
14	Northern Territory Government 2016, Status of Key Northern Territory Fish Stocks Report 2014. Northern Territory Government. Department of Primary Industry and Fisheries. Fishery Report No. 115.
15	Hughes, T 2010, *Marine and Tropical Sciences Research Facility milestone report for program 2.5i.3*, report to the Australian Government Department of the Environment, Water, Heritage and the Arts,
16	Johnson, JE and Welch, DJ 2010, Marine fisheries management in a changing climate: a review of vulnerability and future options, *Reviews in Fisheries Science*, 18(1): 106–124.