

37. Goldband Snapper *Pristipomoides multidentis*

Stephen Newman^a, Bonnie Holmes^b, Julie Martin^c, David McKey^c, Craig Skepper^a and Corey Wakefield^a



Table 1: Stock status determination for Goldband Snapper

Jurisdiction	Queensland	Northern Territory	Western Australia		
<i>Stock</i>	Queensland (CRFFF, DWFFF)	Northern Australian (DF, FTF, TRF)	GDMSF	NDSF	PDSF
<i>Stock status</i>					
	Undefined	Sustainable	Sustainable	Sustainable	Sustainable
<i>Indicators</i>	Catch, quota usage, performance indicators	Catch, trigger reference points	Age structure, catch	Biomass, age structure, catch, CPUE	Age structure, catch, CPUE

CPUE = catch per unit effort; CRFFF = Coral Reef Fin Fish Fishery (Queensland); DF = Demersal Fishery (Northern Territory); DWFFF = Deep Water Fin Fish Fishery (Queensland); FTF = Finfish Trawl Fishery (Northern Territory); GDMSF = Gascoyne Demersal Scalefish Managed Fishery (Western Australia); NDSF = Northern Demersal Scalefish Fishery (Western Australia); PDSF = Pilbara Demersal Scalefish Fisheries (Western Australia); TRF = Timor Reef Fishery (Northern Territory)

^a Department of Fisheries, Western Australia
^b Department of Agriculture, Fisheries and Forestry, Queensland
^c Department of Primary Industry and Fisheries, Northern Territory

Stock structure

Goldband Snapper is widely distributed throughout northern Australia and the tropical Indo–West Pacific. It comprises separate biological stocks in each of the management regions in Western Australia and across northern Australia. Separate biological stocks exist between Australia and Indonesia¹⁻². The existence of multiple biological stocks across northern Australia and Western Australia suggests that several biological stocks may also be present on the east coast, although this remains to be determined. Since biological stock delineation is known for this species in the Northern Territory and Western Australia, stock status is reported at the level of individual biological stocks. In Queensland, in the absence of information on biological stock boundaries, status is reported at the jurisdictional level.

Stock status

Queensland

The stock status of Goldband Snapper on the east coast of Australia is not well known. No formal stock assessments have been undertaken. Increased specificity in commercial logbooks since 2007 will help to determine status in the future, but more information is required on attributes such as age structure. Catch trends of Goldband Snapper are being monitored through the performance measurement system in Queensland³⁻⁵.

Insufficient information is available to confidently classify the status of the Goldband Snapper stock in Queensland; hence, Goldband Snapper in Queensland are classified as an **undefined stock**.

Northern Australian biological stock

The Northern Australian Goldband Snapper biological stock is harvested by the Timor Reef Fishery (Northern Territory), Demersal Fishery (Northern Territory) and Finfish Trawl Fishery (Northern Territory), but most of the catch (~90 per cent) is from the Timor Sea and western Arafura Sea. Initial assessments of the northern Australian biological stock of Goldband Snapper were conducted in 1993 and 1996.⁶⁻⁷ These stock assessments estimated that the biomass in the Timor Sea in 1990 was 9000 tonnes (t). This estimate was based on trawl surveys conducted in 1990 and 1992 and took into account the likely inefficiency of trawl gear in preferred Goldband Snapper habitat, due to seabed structure. No biomass estimates have been made since then.

The current estimate of annual sustainable yield (1300 t: 900 t for the Timor Sea and 400 t for the Arafura Sea⁶⁻⁷) was based on recommendations in the 1996 assessment, to harvest a conservative 10–15 per cent of the estimated biomass in 1990. The stock assessment models used to estimate the sustainable yield were reviewed in 2000 and 2003 (Northern Territory Government, unpublished data), and recommendations have remained unchanged. Over the past 10 years, total Goldband Snapper catch and catch per unit effort have gradually increased. In 2010, the total commercial catch of Goldband Snapper (including charter) was 600 t. Given the conservative limits on harvest and the low current catch, the biological stock is not considered to be recruitment overfished, and fishing mortality is unlikely to cause the biological stock to become recruitment overfished.

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

Northern Demersal Scalefish Fishery (Western Australia) biological stock

Goldband Snapper is exploited in the North Coast and Gascoyne bioregions of Western Australia⁸. It is one of the indicator species used to assess the status of the demersal resources in the North Coast Bioregion.

The major performance measures for Goldband Snapper in the Northern Demersal Scalefish Fishery biological stock relate to spawning stock levels. The target level of spawning biomass is 40 per cent of the unfished (1980) level. The limit level is 30 per cent of the initial spawning biomass. The spawning biomass of Goldband Snapper was greater than 40 per cent of the unfished level in the Northern Demersal Scalefish Fishery biological stock in 2007 (the year the last integrated assessment was undertaken), as derived by synthesising the available data in an integrated age-structured model⁹. The biological stock is not considered to be recruitment overfished.

The fishing mortality (F)-based assessments indicated that the median fishing pressure on Goldband Snapper in this biological stock was below the target level in 2006, and between the target and the threshold in 2008¹¹. These fishing mortality-based assessments use reference levels that are based on ratios of natural mortality (M) for each species, such that $F_{target} = \frac{2}{3}M$, $F_{threshold} = M$ and $F_{limit} = \frac{3}{2}M$. Goldband Snapper catches from the Northern Demersal Scalefish Fishery biological stock from 2006 to 2010 have ranged between 336 and 523 t⁹. Since 2008, catches of Goldband Snapper have been relatively stable, ranging between 457 and 523 t¹¹. This level of fishing mortality is unlikely to cause the biological stock to become recruitment overfished.

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

Pilbara Demersal Scalefish Fisheries (Western Australia) biological stock

The stock assessment for Goldband Snapper in the Pilbara Demersal Scalefish Fisheries biological stock is based on an assessment of fishing mortality derived from representative samples of the age structure. These fishing mortality-based assessments use reference levels that are based on ratios of natural mortality for each species, such that $F_{target} = \frac{2}{3}M$, $F_{threshold} = M$ and $F_{limit} = \frac{3}{2}M$. The fishing mortality-based assessments indicated that the median fishing level on Goldband Snapper in this biological stock was either below the target level or between the target and the threshold level in 2008, depending on the area of the fisheries¹¹. This indicates that fishing is not having an unacceptable impact on the age structure of the population. The biological stock is not considered to be recruitment overfished.

Goldband Snapper catches from the Pilbara Demersal Scalefish Fisheries biological stock from 2006 to 2010 have been stable, ranging between 103 and 141 t¹¹. This evidence indicates that the current level of fishing mortality is unlikely to cause the biological stock to become recruitment overfished.

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

Gascoyne Demersal Scalefish Managed Fishery (Western Australia) biological stock

The stock assessment for Goldband Snapper in the Gascoyne Demersal Scalefish Managed Fishery biological stock is based on an assessment of fishing mortality derived from representative samples of the age structure. These fishing mortality-based assessments use reference levels that are based on ratios of natural mortality for each species, such that $F_{target} = \frac{2}{3}M$, $F_{threshold} = M$ and $F_{limit} = \frac{3}{2}M$. The fishing mortality-based assessments indicated that the median fishing level on Goldband Snapper in this biological stock was below the target level in 2006 and 2008⁸. This indicates that fishing is not having an unacceptable impact on the age structure of the population. The biological stock is not considered to be recruitment overfished.

Goldband Snapper catches from the Gascoyne Demersal Scalefish Managed Fishery biological stock from 2006 to 2010 have been stable, ranging between 105 and 144 t⁸. This evidence indicates that the current level of fishing mortality is unlikely to cause the biological stock to become recruitment overfished.

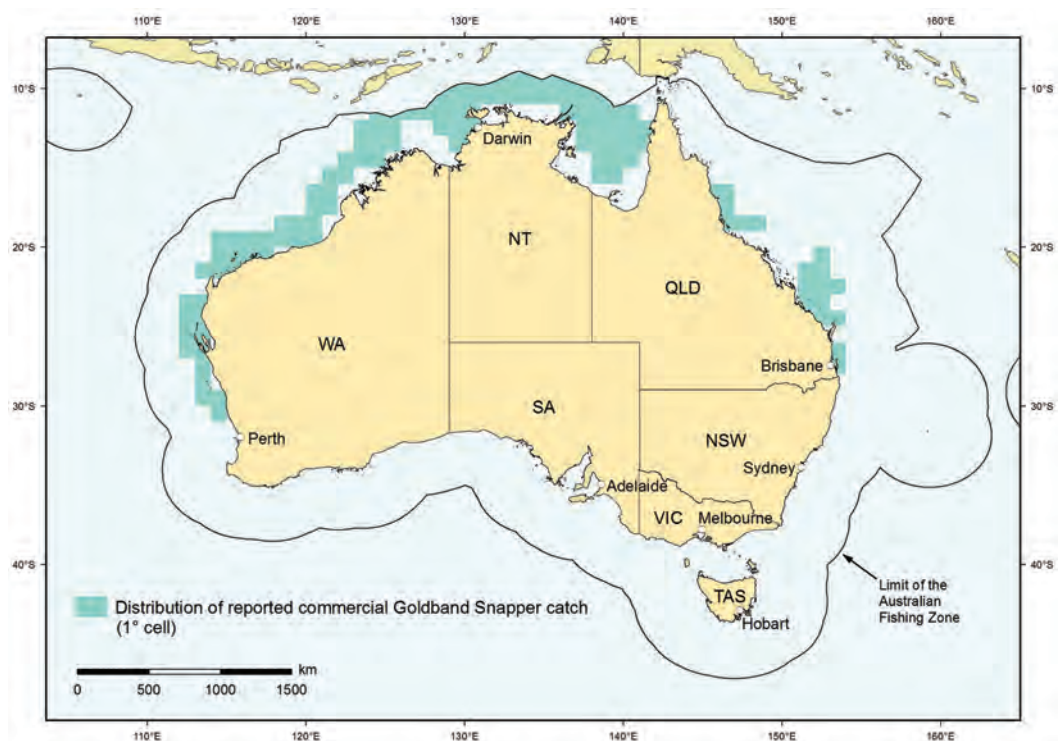
On the basis of the evidence provided above, this biological stock is classified as a **sustainable stock**.

Table 2: Goldband Snapper biology^{1-2,10-11}

<i>Longevity and maximum size</i>	30 years; 70 cm FL, 81 cm TL
<i>Maturity (50%)</i>	8 years; 47 cm FL, 55 cm TL

FL = fork length; TL = total length

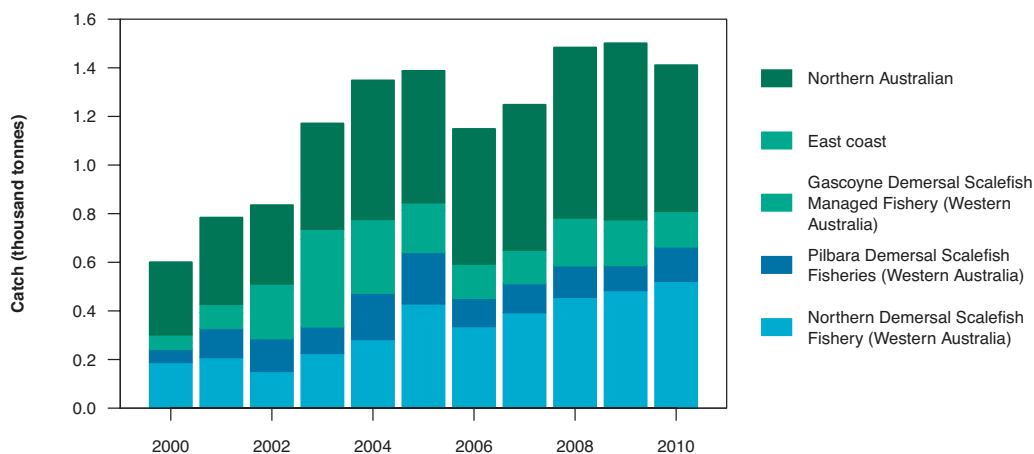
Figure 1: Distribution of reported commercial catch of Goldband Snapper in Australian waters, 2010



Main features and statistics for Goldband Snapper fisheries in Australia in 2010

- Goldband Snapper is taken commercially using baited traps, vertical lines (drop lines, longlines and hand lines) and semidemersal fish trawls. Charter and recreational catch is typically taken by rod and reel using bait, lures or jigs.
- A range of input and output controls have been applied to Goldband Snapper across the three jurisdictions:
 - > Input controls include limited entry, gear restrictions, spatial zonation and effort limits.
 - > Output controls include total allowable catches, and recreational size and bag limits.
- In 2010, Goldband Snapper catch was reported from 28 vessels from the Coral Reef Fin Fish Fishery (Queensland), 17 vessels from the Northern Territory, 7 vessels from the Northern Demersal Scalefish Fishery (Western Australia) and 10 vessels from the Gascoyne Demersal Scalefish Managed Fishery (Western Australia). Twenty three vessels reported catch of Goldband Snapper in the Pilbara Demersal Scalefish Fisheries (Western Australia) (comprising 6 vessels from the Pilbara Fish Trawl and Pilbara Fish Trap fisheries and 7 vessels from the Pilbara Line Fishery). A small quantity of Goldband Snapper was reported as incidental catch by 2 vessels from the Gulf of Carpentaria.
- Total commercial catch of Goldband Snapper across Australia in 2010 was 1410 t, comprising 52 t in Queensland (2009–10 financial year), 600 t in the Northern Territory and 758 t in Western Australia (523 t in the Northern Demersal Scalefish Fishery, 141 t in the Pilbara Demersal Scalefish Fisheries and 94 t in the Gascoyne Demersal Scalefish Managed Fishery).
- The total amount of Goldband Snapper caught in the charter sector in 2010 was around 10 t, comprising 350 kg on the Queensland east coast, 0.5 t in the Northern Territory and 8.8 t in Western Australia. No data are available for the recreational catch in 2010 on the east coast of Australia, the Gulf of Carpentaria, the Northern Territory or Western Australia. Indigenous catches for the northern Australian biological stocks are considered to be negligible¹².
- The impact of illegal, unreported and unregulated (IUU) fishing in northern Australian waters, primarily by foreign fishers, remains uncertain. However, since 2007, increased surveillance across the north of Australia has resulted in a substantial reduction in the number of foreign fishing vessels accessing Australian waters. The scale and magnitude of IUU fishing, and thus its contribution to exploitation status or recovery of fish populations and ecosystems, are not known; this is an area of uncertainty in stock assessments.

Figure 2: Commercial catch of Goldband Snapper in Australian waters, 2000–10 (calendar year)



Note: Queensland catch is presented by financial year (e.g. 2009–10 is reported as 2010).

Catch explanation

The total commercial catch of Goldband Snapper in Australia has gradually increased from around 600 t in 2000 to around 1400 t in 2010. This increase has been associated with the development of these fisheries.

The total commercial catch of Goldband Snapper in the Northern Territory has been relatively stable over the past five years. The decrease in total catch in 2006 was associated with reduced commercial catches from the Gascoyne Demersal Scalefish Managed Fishery (Western Australia) and Pilbara Demersal Scalefish Fisheries (Western Australia), as a result of management changes. The majority of the commercial catch in Western Australia is derived from the Northern Demersal Scalefish Fishery. The total catch of Goldband Snapper from Western Australian biological stocks has remained stable over the past three years, despite variation in effort levels across the different biological stocks.

Effects of fishing on the marine environment

- The maintenance of high levels of biomass of Goldband Snapper in Western Australia to meet biological stock recruitment requirements results in a negligible risk to the overall ecosystem from these fisheries. Furthermore, research demonstrated that there has been no reduction in either mean trophic level or mean maximum length in the finfish catches recorded within the Pilbara or Kimberley, Western Australia (i.e. no fishing down of the food web)¹³.
- The impacts on the benthic habitat of fishing activity for Goldband Snapper are limited to those of the trawl fisheries, which is restricted to around 7 per cent of the North West Shelf of Western Australia and parts of the Northern Territory.
- 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 significantly decreased since the introduction of turtle excluder devices in the Pilbara Demersal Scalefish Fisheries in 2005. Given the area of distribution and expected 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. Gear and fishing modification continue to reduce this level of interaction⁸.

Environmental effects on Goldband Snapper

- Climate change and variability have the potential to impact fish stocks in a range of ways, including influencing their geographic distribution (e.g. latitudinal shifts in distribution). However, it is unclear how climate change may affect risks to sustainability.
- Changes in ocean chemistry have the potential to impact on the replenishment rates of fish populations¹⁴, and on individual growth rates and spawning output¹⁵.

References

1. Newman, SJ, Steckis, RA, Edmonds, JS & Lloyd, J 2000, Stock structure of the goldband snapper, *Pristipomoides multidens* (Pisces: Lutjanidae) from the waters of northern and western Australia by stable isotope ratio analysis of sagittal otolith carbonate, *Marine Ecology Progress Series*, 198: 239–247.
2. Ovenden, JR, Lloyd, J, Newman, SJ, Keenan, CP & Slater, LS 2002, Spatial genetic subdivision between northern Australian and southeast Asian populations of *Pristipomoides multidens*: a tropical marine reef fish species, *Fisheries Research*, 59(1–2): 57–69.
3. Queensland Department of Employment, Economic Development and Innovation 2010, *Annual status report for the Coral Reef Fin Fish Fishery*, DEEDI, Brisbane.
4. Queensland Department of Employment, Economic Development and Innovation 2011, *Stock status of Queensland's fisheries resources 2011*, DEEDI, Brisbane.
5. Queensland Department of Employment, Economic Development and Innovation 2012, *Annual status report for the Deep Water Fin Fish Fishery*, DEEDI, Brisbane.
6. Ramm, D 1994, *Australia's Northern Trawl Fishery*, final report to the Fisheries Research and Development Corporation project 86/049, Fishery Report 32, Northern Territory Department of Primary Industry and Fisheries, Darwin.
7. Ramm, DC 1997, *Towards the sustainable use of Northern Territory fishery resources: review workshops led by Carl J Walters*, final report to the Fisheries Research and Development Corporation, project 96/158, Fishery Report 39, Northern Territory Department of Primary Industry and Fisheries, Darwin.
8. Fletcher, WJ & Santoro, K (eds) 2011, *State of the fisheries and aquatic resources report 2009/10*, Western Australian Department of Fisheries, Perth.
9. Newman, SJ, Wakefield, C, Skepper, C, Marriott, R, Cliff, M, Boddington, D, Mitsopoulos, G, Rome, B, Green, R & Blazeski, S 2011, North coast demersal fisheries status report, in WJ Fletcher & K Santoro (eds), *State of the fisheries and aquatic resources report 2010/11*, Western Australian Department of Fisheries, Perth, 190–208.
10. Newman, SJ & Dunk, IJ 2003, Age validation, growth, mortality and additional population parameters of the goldband snapper (*Pristipomoides multidens*) off the Kimberley coast of northwestern Australia, *Fishery Bulletin*, 101(1): 116–128.
11. Newman, SJ, Moran, MJ & Lenanton, RCJ 2001, *Stock assessment of the outer-shelf species in the Kimberley region of tropical Western Australia*, final report to the Fisheries Research and Development Corporation, project 97/136, Fisheries Western Australia, Perth.
12. Henry, GW & Lyle, JM 2003, *The national recreational and indigenous fishing survey*, Fisheries Research and Development Corporation project 99/158, Australian Government Department of Agriculture, Fisheries and Forestry, Canberra, http://eprints.utas.edu.au/2526/1/Henry_Lyle_Nationalsurvey.pdf.
13. Hall, NG & Wise, BS 2011, *Development of an ecosystem approach to the monitoring and management of Western Australian fisheries*, report to the Fisheries Research and Development Corporation, project 2005-063, Fisheries Research Report 215, Western Australian Department of Fisheries, Perth.
14. 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, Canberra, www.rrrc.org.au/publications/downloads/25i3-JCU-Hughes-T-2010-March-Milestone-Report.pdf.
15. Johnson, JE & 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.