

Golden Snapper Stock Assessment

Key Points

- The latest stock assessment classifies Golden Snapper (*Lutjanus johnii*) as '**depleting**' in the Greater Darwin region and '**sustainable**' in other regions of the Northern Territory (NT).
- The current level of fishing mortality on Golden Snapper will prevent stocks from recovering in the Greater Darwin region.
- Golden Snapper are an indicator species for similar inshore reef fish species that are slow growing and long-lived in the NT.
- A recovery plan is required to reduce fishing mortality and rebuild stocks to sustainable levels within an acceptable timeframe.

Previous stock assessments

Stock assessments in 2011 and 2014 concluded that Golden Snapper were overfished in the Northern Territory. Following extensive consultation with fishing sectors, management arrangements were introduced in 2015 to reduce catches of Golden Snapper by 50% in the Greater Darwin region. In 2018, an updated stock assessment for Golden Snapper, that considered data up to and including 2017, indicated that stocks in the Greater Darwin region remained overfished and that existing fishing pressure will likely maintain the level of overfishing¹.

Harvest Strategy

In 2023, the Coastal Line Fishery Harvest Strategy (the Harvest Strategy) was implemented to manage the catch of inshore reef fish in the Territory across all fishing sectors.

The Harvest Strategy was developed in consultation with the Coastal Line Advisory Group, which included members with expertise in recreational, charter, commercial, and Aboriginal traditional fishing. Harvest strategies are considered best practices in fisheries management nationally and internationally, as they provide a framework for responding to various fishery conditions before they occur. This proactive approach offers greater certainty to resource users and avoids ad-hoc decision-making².

The Harvest Strategy outlines the need to undertake regular stock assessments of Golden Snapper. It includes pre-determined management actions to control fishing mortality should stocks be lower than the target (desirable) level, i.e. at a trigger (undesirable) or limit (unacceptable) reference point.

¹ Saunders, T (2018) *Stock assessment of Golden Snapper (Lutjanus johnii) in the 'Darwin Region' of the Northern Territory*, Unpublished Fishery Report.

² Sloan, S. R., Smith, A.D.M., Gardner, C., Crosthwaite, K., Triantafillos, L., Jeffries, B. and Kimber, N (2014) *National Guidelines to Develop Fishery Harvest Strategies*. FRDC Report –Project 2010/061. Primary Industries and Regions, South Australia, Adelaide, March. CC BY 3.0.

Latest stock assessment outcomes

NT Fisheries has undertaken a stock assessment for Golden Snapper in accordance with the Harvest Strategy³. The stock assessment was assessed for three assessment units* across the NT and considered data up to and including 2021. The assessment outcomes are provided in the table below (Table 1).

Table 1. Stock status determination for Golden Snapper in the NT.

Management unit	Stock status
Greater Darwin	Depleting
Gulf of Carpentaria	Sustainable
Regional NT	Sustainable

Stock status classifications are based on the 'Status of Australian Fish Stocks' framework, which provides a consistent and transparent national approach to monitoring and reporting on the status of fish stocks in Australia. A 'depleting' stock status for Golden Snapper in the Greater Darwin region indicates that overfishing is occurring and moving the stock in the direction of becoming overfished and depleted.

Stock assessments in the Territory

The Greater Darwin region is assessed using a Stock Synthesis model, which is internationally recognised for its ability to integrate multiple lines of evidence to provide comprehensive estimates of stock condition.

The Gulf of Carpentaria and Regional NT are assessed using Catch-Maximum Sustainable Yield models and independent fishing survey data. Catch-Maximum Sustainable Yield models and independent fishing survey data are more suitable methods for regions with limited data.

Several data sources were used to inform these stock assessment models, including:

- Recreational fisher boat ramp and phone surveys.
- Charter fishing and commercial logbook records.
- Biological data from charter fishing operations including fish length, age, sex, and reproductive maturity.
- Scientific research on Golden Snapper.

³ Pazhayamadam, DG., Randall, J., Curin-Osorio, S., Usher, M. (2024) *Stock assessment of Golden Snapper (Lutjanus johnii) in the Northern Territory 2021*, Department of Agriculture and Fisheries, Northern Territory Government.

*Refer to the full stock assessment report for assessment unit boundaries

Greater Darwin region stock trajectory

The stock assessment for the Greater Darwin region shows that the biomass of Golden Snapper is critically low, at 21% of its original, unfished level (Figure 1). This means that only about a fifth of their original population remains. The percentage could be as low as 13% or as high as 29%, (95% confidence intervals). This estimate of biomass is below the limit reference point of 30% in the Harvest Strategy. Forecasting the biomass trajectory, as shown by the blue shading, suggests that stocks are unlikely to recover from the critically low level.

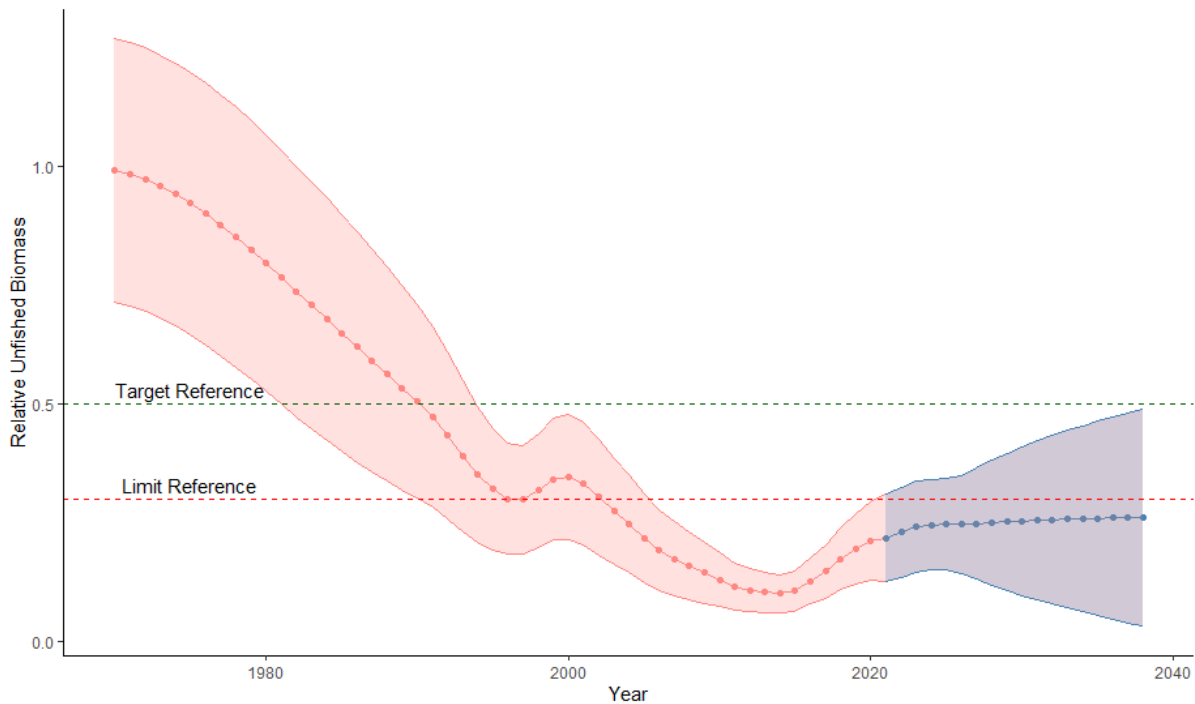


Figure 1. Relative biomass trajectory of Golden Snapper in the Greater Darwin region, with 95% confidence intervals. Straight dashed lines are the target (green) and limit (red) reference points as defined under the CLF Harvest strategy. The red line and shaded area depict the relative biomass trajectory of the latest stock assessment with 95% confidence bounds. The blue line and shaded area depict the projected biomass with 95% confidence bounds where fishing mortality is maintained at current levels (i.e. no reduction in fishing mortality). Current fishing mortality is taken to be the annual average fishing mortality from 2019 to 2021.

Indicator species

Golden Snapper serve as an indicator species for other inshore reef fish in the Greater Darwin region that are slow-growing, long-lived, and lack sufficient data for individual stock assessments. These species include, but are not limited to:

- Grass Emperor
- Mangrove Jack
- Red Emperor
- Cods (e.g. Goldspotted Rockcod)
- Red Snappers (e.g. Indonesian)
- Blackspot Tuskfish

The depleting stock status of Golden Snapper indicates that high levels of fishing in the Greater Darwin region may also be depleting stocks of other reef fish species.

Fishing mortality is too high

The estimated fishing mortality rate is 2.1 times the rate considered to be sustainable. The primary source of fishing mortality in the Greater Darwin region is from recreational and charter fishing. To help Golden Snapper stocks recover in the long-term, fishing mortality needs to be consistently reduced below the maximum sustainable limit (the green dotted line shown in Figure 2).

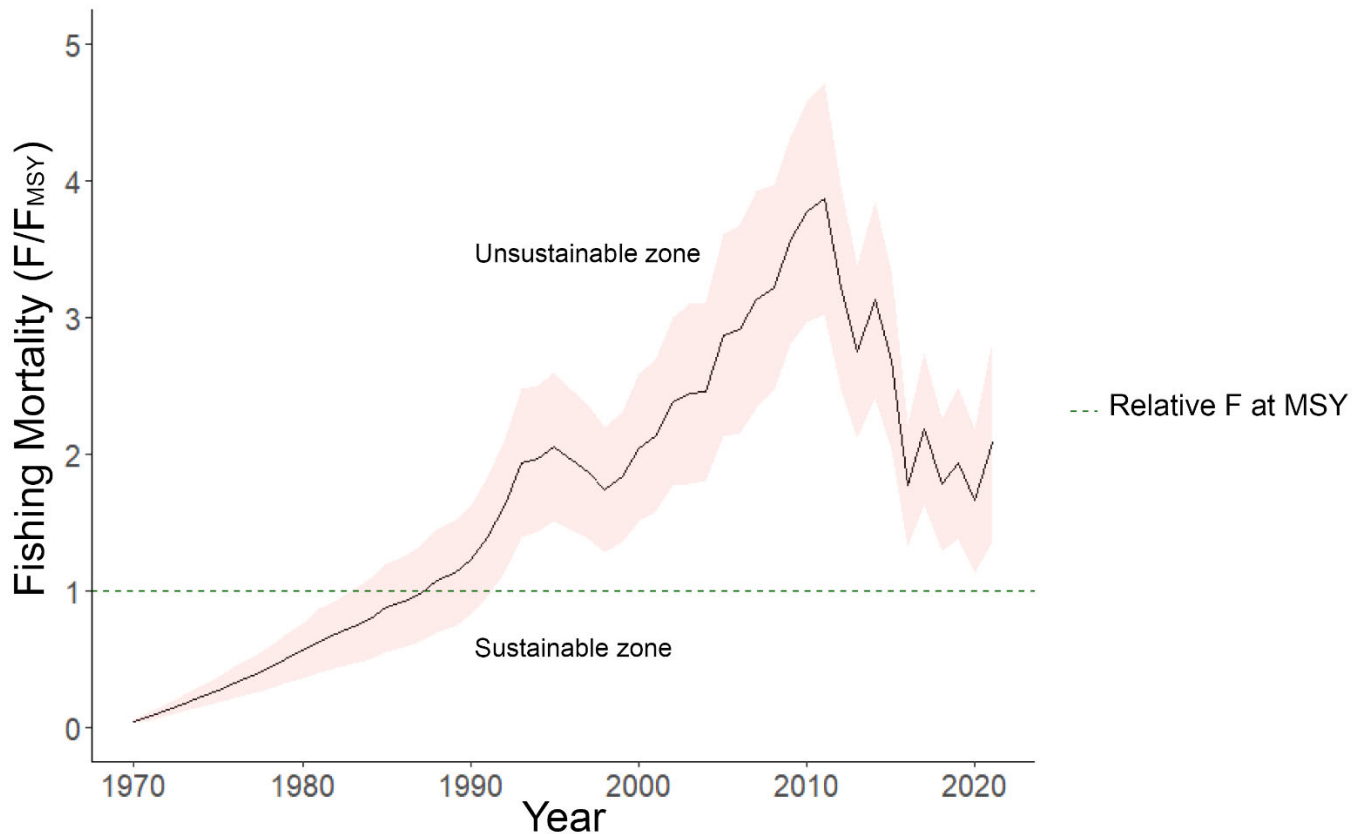


Figure 2. Relative fishing mortality rate of Golden Snapper in the Greater Darwin region. Fishing is considered unsustainable if the fishing mortality rate is greater than fishing mortality at MSY (i.e. $F/F_{MSY} > 1$).

Next steps

The current biomass estimate for Golden Snapper falls below the limit reference point set in the Harvest Strategy. This requires the development of a formal Recovery Plan for the Greater Darwin region.

A Recovery Plan will be designed to provide a structured framework for implementing management actions to reduce fishing mortality and promote stock recovery, allowing stocks to rebuild within an acceptable timeframe. It also sets recovery targets to monitor and measure recovery progress over time.

The Recovery Plan will be developed in consultation with key fishing stakeholders and experts and is expected to take 12 months to complete. The process will include a public consultation phase, providing an opportunity for you to contribute to its development.