

Assessment Authors and Year

Stewart J. 2023. NSW Stock Status Summary 2021/22 – Snapper (*Chrysophrys auratus*). NSW Department of Primary Industries. Fisheries NSW. 8 pp

Stock Status

Current stock status	On the basis of the evidence contained within this assessment, Snapper is currently assessed as Sustainable for the NSW component of the stock.
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Stock structure & distribution

Snapper in eastern Australia is a single genetic stock extending from central Queensland south to Eden in New South Wales (NSW) (Sumpton et al. 2008; Morgan et al. 2019). Tagging studies have shown that Snapper within the East Coast biological stock are largely resident; however a few individuals have been recaptured more than 1000 km from where they were tagged, and fish that do move generally do so in a northward direction (Sumpton et al. 2003; Stewart et al. 2019). These movements, coupled with the assumed general southward movement of snapper larvae due to the East Australian Current, is thought to facilitate enough genetic mixing among snapper populations on the east coast to maintain a single genetic stock (Stewart et al. 2019). Despite genetic homogeneity, the life-history characteristics of Snapper in New South Wales waters suggest they should be managed as a single jurisdictional stock. Limited mixing throughout the population, with substantial latitudinal variability in key biological traits including growth, size and age at sexual maturity and spawning periods, support a spatially refined management unit. In addition most commercial landings in New South Wales are thought to consist of fish that recruit from local estuaries [Gillanders 2002].

The data presented in this summary relate to the NSW part of the biological stock.

Biology

Snapper in NSW grow relatively quickly, attaining maturity at around 2 years of age and 26 cm total length (TL) in northern NSW and 3 years of age and 32 cm TL in southern NSW (Stewart et al., 2010). Growth rates are however highly variable. Spawning peaks during August in northern NSW and around October in southern NSW. Growth is significantly faster in the northern areas, but not different between males and females (Stewart et al., 2019). Longevity is more than 40 years old, and most Snapper in NSW attain the current minimum legal length of 30 cm TL after 3 years.

FISHERY STATISTICS

Catch information

Commercial

Commercial landings of Snapper in NSW peaked at 950 t in the early 1980s, followed by a steady 20 year decline to the early 2000s to less than 200 t p.a. (Fig. 1). Landings then increased until around 2010, declined for 3 years, and have been reasonably stable averaging 180 t p.a. between 2014/15 and 2021/22. Almost the entire (~97%) NSW commercial Snapper catch is taken in the Ocean Trap and Line Fishery, with approximately 83% being taken by the method of demersal fish trapping.

Stock Status Summary – 2021/22



NSW Stock Status Summary – Snapper (*Chrysophrys auratus*)

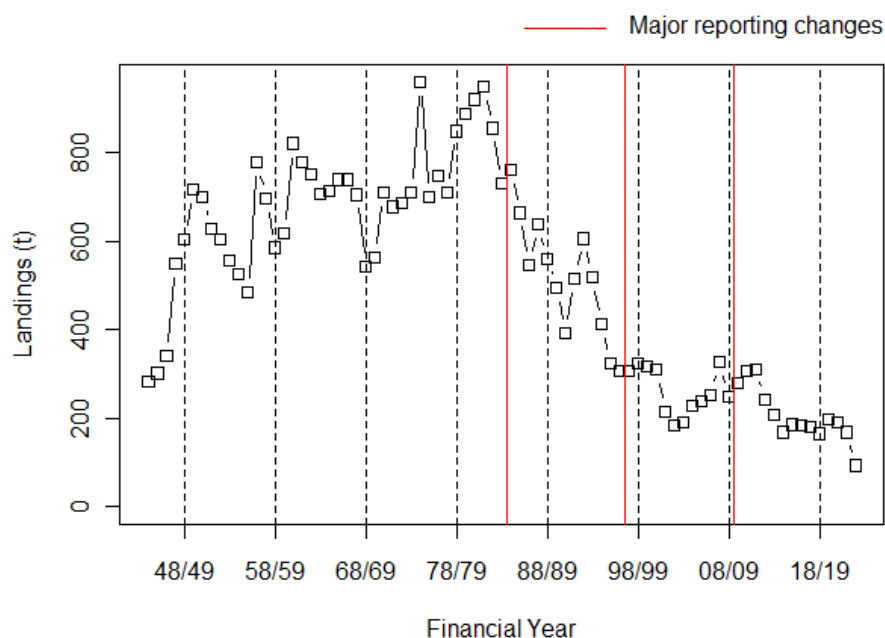


Figure 1 Commercial landings of Snapper for NSW from 1947/48 to 2022/23. Note that data for 2022/23 may be incomplete.

Recreational & Charter boat

The most recent estimate of the recreational harvest of Snapper in NSW was made for 2019/20 and was approximately 127,000 fish weighing around 94 t (Murphy et al. 2022). Recent recreational surveys in NSW have estimated the catch for only long-term (1-3 year) recreational fishing licence holders and their households. The conversion factor to scale up to an estimate of total recreational catch is uncertain; however has been estimated to be 1.7 by the recreational monitoring team within NSW DPI. That equates to an estimated 215,00 fish weighing around 160 t during 2019/20. Using this conversion estimate, recreational harvest of Snapper in NSW has been reasonably steady since 2013/14, being roughly 178 t in 2013/14 and 180 t in 2017/18 (West et al., 2015, Murphy et al., 2020).

Harvest by the NSW charterboat fishery is included as part of the recreational fishing surveys; nevertheless, harvest reported in charterboat logbooks has averaged around 25,000 Snapper estimated to weigh around 18 t each year (2016/7 to 2021/22).

Aboriginal cultural fishery

There are no data on aboriginal harvest.

Illegal, Unregulated and Unreported

There are no data on Illegal, Unregulated and Unreported harvest; however it is considered minor in NSW waters.

Fishing effort information

Commercial fishing effort on Snapper in NSW has declined substantially in recent years. The number of days fish trapping when Snapper were reported through compulsory daily fisher logbooks has declined steadily from around 5,000 during 2009/10 to fewer than 3,000 during 2021/22 (Fig. 2).

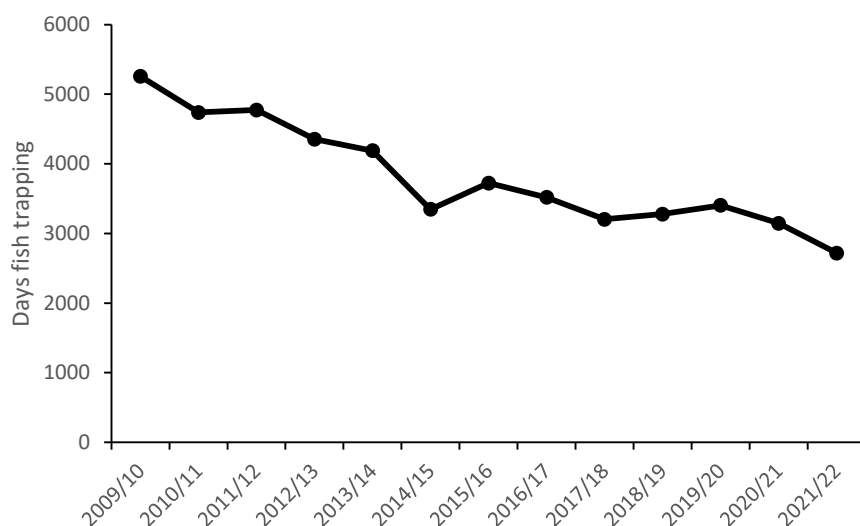


Figure 2 Annual reported days fished when Snapper were landed by fish trapping 2009/10 to 2021/22.

Catch Rate information

Catch rate of Snapper using demersal fish trapping were standardised in terms of kg/day from daily logbooks data 2009/10 to 2021/22. Catch rates were standardised for month, authorised fisher, latitude and depth. Standardisation was done using the r-package 'cede' (Haddon et al. 2018).

Standardised catch rates have been reasonably stable for the previous 7 years, noting a slight decrease in 2021/22. There has been a slightly increasing trend since 2014/15 (Fig. 3).

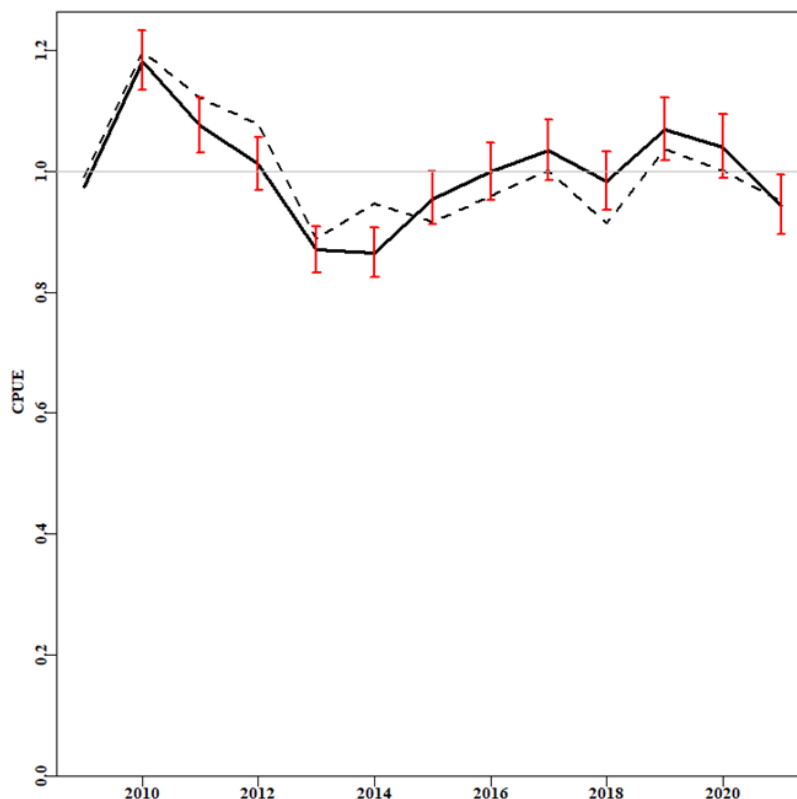


Figure 3 Standardised catch rates (kg/day fish trapping) for the period 2009/10 to 2021/22. The year denotes the first year of the financial year.

STOCK ASSESSMENT

Stock Assessment Methodology

Year of most recent assessment:

2018 on data to 2016 (Wortmann et al., 2018).

2023 using NSW data to 2021/22

Assessment method:

2018. Full population model using data from NSW and Queensland.

2023. Weight of evidence using trends since 2016, being the final year in the full stock assessment model.

Main data inputs:

2018. All sectors – catch, effort, catch rates, size and age compositions in landings

2023. NSW catch (commercial and recreational), standardised commercial CPUE, size and age composition in landed commercial catch.

Key model structure & assumptions:

2018. Age-structured population model with yearly time-step.

2023. NSW catch rates, sizes and ages are indicative of the exploitable biomass.

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Sources of uncertainty evaluated:

2018. Various scenarios with different input parameters and catch rate series.

Status Indicators - Limit & Target Reference Levels

Biomass indicator or proxy	Depletion estimate inferred from 2016 model outputs and recent trends in NSW catch rates and age compositions.
Biomass Limit Reference Point	0.2 depletion.
Biomass Target Reference Point	No formal target reference point.
Fishing mortality indicator or proxy	Commercial fishing effort. Harvest (all sectors). Size and age compositions in commercial landings.
Fishing mortality Limit Reference Point	No formal target reference points for these indicators; however trends are assessed.
Fishing Mortality Target Reference Point	No formal target reference point

Stock Assessment Results

The full stock assessment using catch rate data for NSW fish trapping estimated that in 2016 the Snapper stock was between 0.2 and 0.45 of unfished levels (Wortmann et al., 2018). Since that time harvest (commercial and recreational) has remained relatively stable, averaging 345 t p.a. Standardized catch rates in NSW generally increased since 2016, noting a reduction in the most recent year 2021/22.

The sizes of Snapper in commercial landings have remained remarkably stable (Fig. 4, Wortmann et al., 2018), due largely to the selectivity of the main fishing method demersal fish traps that select against larger individuals. The age compositions in commercial landings have changed somewhat since the late 1990s, with a substantially greater proportion of the catch being older fish in excess of 5 years old (Fig. 5, Stewart, 2020).

Stock Status Summary – 2021/22

NSW Stock Status Summary – Snapper (*Chrysophrys auratus*)

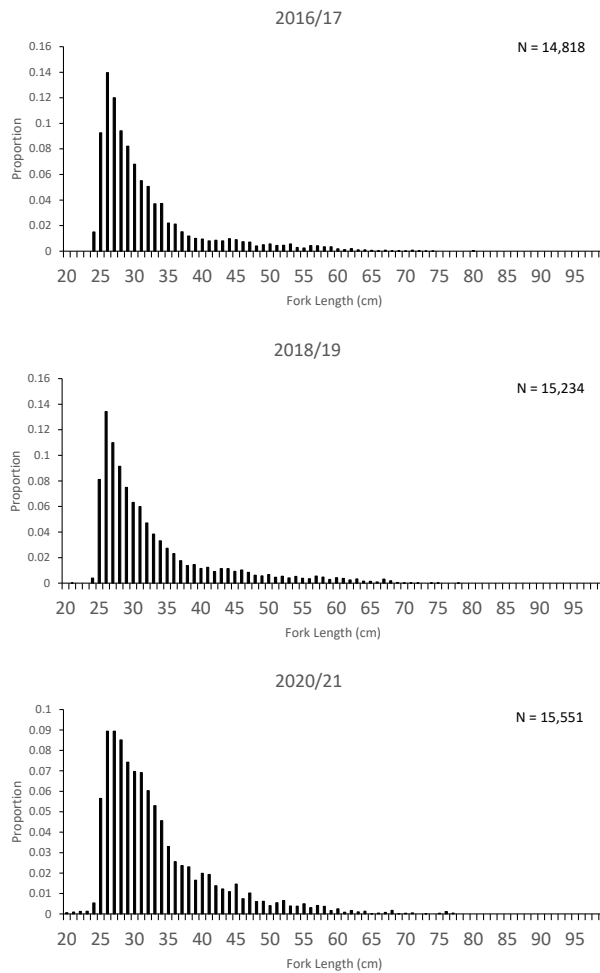


Figure 4 Length composition of Snapper in the NSW landed commercial catch 2016/17 to 2020/21.

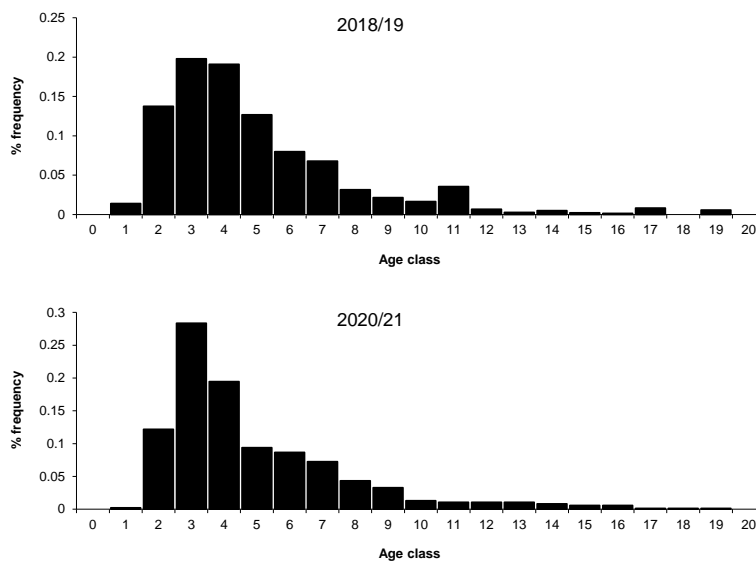


Figure 5 Age composition of Snapper in the NSW landed commercial catch 2018/19 and 2020/21.

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NSW Stock Status Summary – Snapper (*Chrysophrys auratus*)

Stock Assessment Result Summary

Biomass status in relation to Limit	<p>The stock assessment model indicated that in 2016 the spawning biomass of Snapper in NSW was between 0.2 and 0.45 of unfished levels. Standardised catch rates have increased slightly since that time, despite a slight decrease during 2021/22. Therefore there are no indications that the available stock has declined since 2016. This is above the limit of 0.2.</p>
Biomass status in relation to Target	<p>No formal target reference point.</p>
Fishing mortality in relation to Limit	<p>The harvest of Snapper in NSW (commercial and recreational) has declined substantially since the 1970s and 1980s during which time the stock was declining. Recent harvest levels are related to increasing relative abundance indicating that fishing mortality is not excessive.</p> <p>Fishing effort towards Snapper has declined substantially and continues to do so.</p> <p>The size composition in the landed commercial catch has remained stable since the 1990s, noting that the selectivity of the main fishing gear, demersal fish traps, precludes capture of many large (> 50 cm FL) Snapper.</p> <p>The age composition in commercial landings has seen an increase in the proportion of 'older' (> 5 years) fish in landings despite little change in the size composition. This supports the population model estimates of an increasing biomass in recent times with subsequent increases in age range for any given size, especially at those sizes vulnerable to fish trapping.</p>
Fishing mortality in relation to Target	<p>No formal target reference point.</p>
Current SAFS stock status	<p>The stock in NSW is not considered to be recruitment impaired.</p> <p>The current level of fishing mortality is unlikely to cause the biological stock to become recruitment impaired.</p> <p>On the basis of the evidence provided above, Snapper in New South Wales is classified as a sustainable stock.</p>

Qualifying Comments

The last published stock assessment was for data up to 2016 and using proxies for biomass and fishing mortality since that time in a weight of evidence approach is more uncertain. Nevertheless, there are no signs that the relative abundance of exploitable Snapper in NSW has decreased since that time.

References

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