Rebuilding Plan for Snapper (*Chrysophrys auratus*) stocks in South Australia

2026

Government of South Australia
Department of Primary Industries and Regions

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Disclaimer

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Executive summary

Snapper (*Chrysophrys auratus*) is a long-lived, slow growing species that is an iconic fishery resource in southern Australia. It supports commercial, recreational, charter boat, and Aboriginal traditional fisheries, with cultural significance across its distribution. The biological characteristics of the species make it susceptible to various threats, including targeted and incidental fishing mortality and changes in the physical environment, such as water temperature.

Snapper populations in South Australia (SA) are characterised by episodic and variable recruitment (of juvenile Snapper) which drives population dynamics and fishery production.

Significant declines in Snapper productivity between 2007 and 2019 have impacted SA's Snapper fishery. Following the 2019 Snapper Stock Assessment and a review of the management arrangements, fishing for Snapper was prohibited in all State waters from 1 November 2019 except for the region that now constitutes the South East Fishing Zone (SEFZ). This fishery closure was originally implemented to remain in effect until 1 February 2023, however, was extended through to 30 June 2026 following ongoing depleted stock status assigned to the Spencer Gulf/West Coast stock and Gulf St Vincent stock in the Snapper Stock Assessment Report 2022. Due to impacts of a harmful algal bloom dominated by *Karenia* spp which was initially detected in March 2025 in SA, and uncertainty this has created in estimates of Snapper biomass, the Snapper closure was extended for a further 12 months to 30 June 2027.

A new Management Plan for the South Australian Commercial Marine Scalefish Fishery ("the MSF Management Plan") came into effect on 1 July 2025 and included significant updates following major reforms made to the commercial Marine Scalefish Fishery in 2021. A key change was a new harvest strategy framework inclusive of target, trigger and limit reference points and a 'hockey stick' decision rule to control fishing mortality in relation to the size of the biomass of the fish stocks.

The *Fisheries Management Act 2007* ("the Act") aims to ensure the sustainable harvest of SA's aquatic resources. Accordingly, a goal of the Management Plan is to maintain biomass of fish stocks at sustainable levels, and an objective of the harvest strategy under the Management Plan is to recover depleted stocks to above the limit reference point within specified timeframes.

Purpose

Consistent with the legislative framework and the MSF Management Plan, the overarching aim of this rebuilding plan is to rebuild the Spencer Gulf/West Coast and Gulf St Vincent Snapper stocks to biologically sustainable levels, and to support economic and social benefits to the community. This rebuilding plan sets out the state government's objectives for rebuilding depleted Snapper stocks in SA and the associated management, monitoring and evaluation arrangements. As Snapper in the SEFZ remains classified as sustainable, this plan does not apply in that zone.

To guide the development of this rebuilding plan, model projections of relative biomass for each stock were undertaken by the South Australian Research and Development Institute (SARDI). The projections demonstrated that increases in biomass were heavily dependent on episodic recruitment events and that exploitation, even at very low levels, prolonged the estimated time to reach the biomass limit.

The rebuilding objectives are:

- To rebuild depleted Snapper stocks to above the biomass limit reference point (B_{20}) by 2041.
- Having reached B_{20}, continue to rebuild Snapper stocks from above the biomass limit to the biomass target (B_{50}) – consistent with the harvest strategy in the MSF Management Plan.

It is important to note: where recruitment events occur earlier or later than projected in the modelled mean, the biomass may reach the biomass limit faster or slower than 2041, and recovery of stocks are likely be at different rates in the different fishing zones.

Decision rules

- Where the biomass of Snapper stocks remains below 15% of unfished levels (B_{15}), Snapper fishing on the stocks will remain closed.
- Where the biomass is below the biomass limit (B_{20}), but above 15% of unfished levels (B_{15}), fishing will remain closed unless sufficient recruitment has occurred to the extent that some limited harvest of Snapper may be considered, provided that the level of harvest allows for the rebuilding objectives outlined in this plan to be met.
- Where the biomass of Snapper stocks is above the biomass limit (B_{20}) and sufficient recruitment to the population has occurred, fishing may recommence in a fishing zone, with fishing mortality to be progressively increased consistent with the harvest strategy in the MSF Management Plan. Precautionary buffers to the Recommended Biological Catch will be required where sufficient recruitment is not present to ensure the biomass continues to rebuild to the biomass target.

Management measures

The following management measures are to apply to support rebuilding of Snapper stocks, as informed by scientific advice from SARDI (available on the PIRSA website) and recommendations from the Marine Scalefish Fishery Management Advisory Committee:

- Where fishing is open, a total allowable catch is to apply in the relevant fishing zone consisting of a total allowable commercial catch and total allowable recreational catch to ensure that total Snapper catch allows for ongoing rebuilding including consideration of incidental fishing mortality.
- Mandatory reporting of retained Snapper catches across commercial, charter boat and recreational fishing sectors to closely monitor harvest against catch limits.
- Mandatory reporting of non-retained (i.e., discarded) Snapper catch in commercial fisheries including the Charter Boat Fishery to better quantify total fishing mortality. Voluntary reporting of discarded Snapper catch will also be encouraged for recreational fishing.
- Where fishing is open, a seasonal spawning closure from 1 October to 31 March each year to provide protection for Snapper throughout the reproductive period (i.e., pre-spawning aggregation, active spawning, and dispersion after spawning has concluded) restricting the catch and possession of Snapper in the relevant fishing zone. This period is to optimise the opportunity for successful spawning and recruitment consistent with SARDI advice.
- Year-round spatial closures to provide additional protections at key locations where Snapper are known to aggregate.
- Ongoing regulated legal minimum length to protect juvenile and small Snapper from fishing.
- Recreational and charter boat Snapper bag and boat limits that are adjusted proportionate to the size of the Snapper catch limits.

Monitoring and assessment

Monitoring of the stocks using the following primary performance indicators will enable application and evaluation of the effectiveness of the management measures applied under this rebuilding plan:

- Fishable biomass – model output

- Fishing mortality – model output
- Recruitment – age structure.

A full integrated Snapper stock assessment is to be undertaken every three years or more frequently as required.

Scientific monitoring and sampling will include periodic fishery independent estimates of biomass, and surveys to monitor relative trends in juvenile abundance. Where fishing is open, fishery statistics for each sector will be analysed to assess fishing mortality against prescribed reference points.

PIRSA will co-develop a communications plan with the relevant peak bodies and leverage existing platforms and engagement tools to communicate decisions, outcomes, updates to stakeholders and the wider community, and where appropriate, seek feedback regarding the application of this rebuilding plan.

A review of this rebuilding plan shall be undertaken approximately every three years, following the completion of each full Snapper stock assessment. Reviews will be guided by the Marine Scalefish Fishery Management Advisory Committee and in consultation with the relevant peak representative stakeholder bodies.

Contents

1. Acronyms and abbreviations

$B_{(15, 20, 30,40, 50)}$	15%, 20%, 30%, 40%, 50% of unfished biomass
B_{LIM}	Biomass limit reference point
B_{TARG}	Biomass target reference point
B_{TRIG}	Biomass trigger reference point
CBF	Charter Boat Fishery
CPUE	Catch Per Unit Effort
DEPM	Daily Egg Production Method
F	Fishing Mortality
FRDC	Fisheries Research and Development Corporation
F_{TARG}	Fishing mortality associated with B_{TARG}
GSV	Gulf St Vincent
GSVFZ	Gulf St Vincent/Kangaroo Island Fishing Zone
HSF	Harvest Strategy Framework
ITQ	Individual Transferable Quota
LCF	Lakes and Coorong Fishery
MSF	Marine Scalefish Fishery
MSFMAC	MSF Management Advisory Committee
PIRSA	Department of Primary Industries and Regions
RBC	Recommended Biological Catch
RLF	Rock Lobster Fisheries
SE	South East
SEFZ	South East Fishing Zone
SG/WC	Spencer Gulf/West Coast
SGFZ	Spencer Gulf Fishing Zone
WCFZ	West Coast Fishing Zone
TAC	Total Allowable Catch
TACC	Total Allowable Commercial Catch
TARC	Total Allowable Recreational Catch
The Act	The *Fisheries Management Act 2007*
TRP	Target Reference Point

2. Introduction

Snapper (*Chrysophrys auratus*) is a long-lived, slow growing species that is an iconic fishery resource in southern Australia. It supports commercial, recreational, charter boat, and Aboriginal traditional fisheries, with cultural significance across its distribution.

Significant declines in Snapper productivity between 2007 and 2019 have impacted South Australia's Snapper fishery. Following the 2019 Snapper Stock Assessment (Fowler et al., 2019) and a review of the management arrangements, fishing for Snapper was prohibited in all State waters from 1 November 2019, except for the region that now constitutes the South East Fishing Zone (SEFZ). This fishery closure was originally implemented to remain in effect until 1 February 2023.

In October 2022, the Snapper Stock Assessment Report 2022 was completed by Drew et al. (2022) for the Department of Primary Industries and Regions (PIRSA) which outlined ongoing concern for the Snapper stocks, and assigned the stock status classification as follows:

- Spencer Gulf/West Coast stock (SG/WC) – 'Depleted'
- Gulf St Vincent (GSV) stock – 'Depleted'
- South East Region (SE) (Western Victoria stock) (WV) – 'Sustainable'.

After consideration of this assessment and recommendations from the Marine Scalefish Fishery Management Advisory Committee (MSFMAC), the fishery closures for the SG/WC and GSV stocks were extended to 30 June 2026 to prohibit fishing for Snapper where stocks were depleted. The extension of the closures was supported by an $8.8 million State Government support package, including $2.5 million from the Fisheries Research and Development Corporation (FRDC) to undertake the Snapper Science Program.

Due to impacts of a harmful algal bloom dominated by *Karenia* spp which was initially detected in March 2025 in South Australia (SA), and uncertainty this has created in estimates of Snapper biomass, the Snapper closure was extended for a further 12 months to 30 June 2027.

When a fish stock is classified as 'Depleted' it means the biomass (or proxy) has been reduced through catch and/or non-fishing effects, such that recruitment is impaired, and current management is not adequate to recover the stock, or adequate management measures have been put in place but have not yet resulted in measurable improvements (Piddocke et al., 2021).

The *Fisheries Management Act 2007* ("the Act") aims to ensure the sustainable harvest of South Australia's aquatic resources. Accordingly, a goal of the Management Plan for the South Australian Commercial Marine Scalefish Fishery (PIRSA 2025a) ("the MSF Management Plan") is to maintain biomass of fish stocks at sustainable levels, and an objective of the harvest strategy under the Management Plan is to recover depleted stocks to above the limit reference point within specified timeframes.

Consistent with the Act and MSF Management Plan, this rebuilding plan has been developed with the overarching aim of rebuilding depleted Snapper stocks in SA to biologically sustainable levels, and to support economic and social benefits to the community. In doing so, the rebuilding plan sets out:

- Management objectives for rebuilding the depleted Snapper stocks in SA
- Estimated timeframes for recovery against milestones
- Transparent, predefined criteria for certain management measures (decision rules) to meet objectives
- When fishing may be considered to be reopened for areas currently closed to Snapper fishing
- Performance indicators and reference points to monitor stock rebuilding

- Key management arrangements in place to achieve the management objectives
- Arrangements for the monitoring and assessment of stocks.

3. Scope

This rebuilding plan is applicable to the two depleted stocks in SA – the SG/WC stock, and the GSV stock. This plan does not apply to Snapper within the SEFZ, noting it is part of the WV stock which is classified as sustainable.

4. Background

4.1. Biology

Snapper is a large-bodied, demersal, marine fish species in the family Sparidae, broadly distributed throughout temperate and sub-tropical waters of the Indo-Pacific region. This includes a continuous distribution around the southern coastline of mainland Australia and northern Tasmania (Kailola et al., 1993; Last et al., 2011). Throughout its distribution, Snapper occurs across a diversity of habitats extending from shallow, coastal bays and estuaries to the edge of the continental shelf, and across a depth range of 1–200 m. It is a long-lived species, estimated to live up to 36 years in SA and up to 40 years in other parts of Australia (McGlennon et al., 2000; Norriss & Crisafulli, 2010).

Snapper is a multiple batch spawning species with indeterminate fecundity and asynchronous oocyte development (McGlennon, 2003; Saunders, 2009). In SA, Snapper has a protracted active spawning period that extends from November to February, peaking in December and January (McGlennon, 2003; Saunders et al., 2012). Mature fish form dense aggregations prior to and during the spawning period and can spawn repeatedly over consecutive days (Scott et al., 1993). Juveniles initially remain in the vicinity of their nursery areas for several months after settlement and then transition to more complex habitats as they develop, reaching sexual maturity at 3–4 years of age and 250–350 mm fork length (Pecl et al., 2014).

Snapper populations in SA are characterised by distinct strong and weak age classes that are consistent amongst years, relating to inter-annual variation in recruitment of age 0+ juveniles and the resulting variation in year-class strength (McGlennon et al., 2000; Fowler & Jennings, 2003). The occasional strong year class sustains the fishery through periods of time that are characterised by poor to average recruitment (McGlennon et al., 2000; Fowler et al., 2017).

4.2. Stock structure

The stock structure for Snapper in Australian waters is complex, as there are considerable differences in the spatial scales over which populations are divisible into separate stocks (Fowler, 2016; Fowler et al., 2017a). A recent study indicated that there are three stocks that occur in South Australian coastal waters (Fowler, 2016; Fowler et al., 2017). The WV stock is a cross-jurisdictional stock that extends westward from Wilsons Promontory, Victoria into the south eastern waters of South Australia as far west as Cape Jervis. There are also two sole SA stocks, i.e., the SG/WC stock and GSV stock (Fowler, 2016; Fowler et al., 2017) (Figure 1).

The recent study on the stock structure of Snapper was also informative about the demographic processes responsible for the replenishment of the three stocks. It indicated that each stock depends on recruitment into a primary nursery area: Port Phillip Bay (PPB), Victoria for the WV stock; Northern Spencer Gulf (NSG) for the SG/WC stock; and Northern Gulf St. Vincent (NGSV) for the GSV stock (Fowler 2016) (Figure 1).

The three biological stocks of Snapper (SG/WC; GSV; WV) are spread across the four MSF fishing zones (management units) in SA (Figure 3).

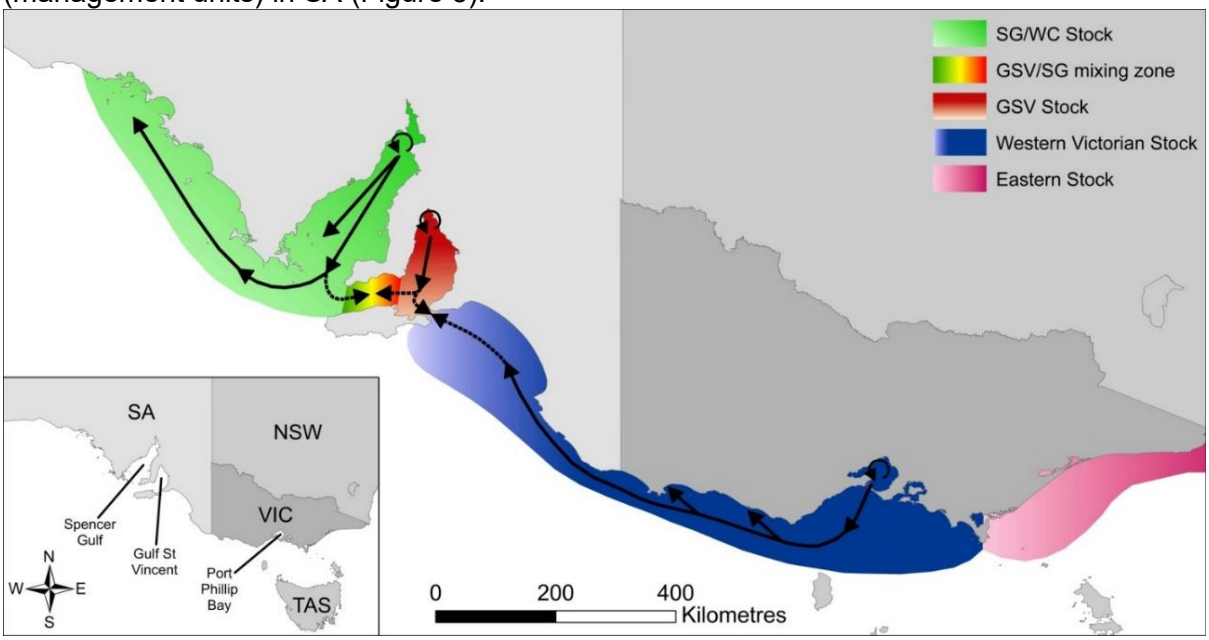

Figure 1 - Map of the coast of south-eastern Australia showing the stock structure for Snapper based on implied fish movement (Fowler, 2016, Fowler et al., 2017). The arrows indicate directions and extent of emigration of fish from primary nursery areas in northern Spencer Gulf, northern Gulf St Vincent, and Port Phillip Bay, Victoria. Inset shows the broader geographic region. SG – Spencer Gulf, GSV – Gulf St Vincent, WC – west coast of Eyre Peninsula.

4.3. Stock assessment and status

The last full stock assessment available during the development of this rebuilding plan was the Snapper Stock Assessment Report 2022 (Drew et al., 2022). This assessment included the following outcomes for Snapper in SA:

- Snapper populations are characterised by episodic and variable recruitment (of juvenile Snapper) which drives population dynamics and fishery production;
- The Snapper closure[1] appeared to have arrested declines in fishable biomass for the SG/WC and GSV stocks, but there was not yet evidence of stock recovery;
- The SG/WC and GSV stocks were classified as 'depleted' with low biomass (while the WV stock (in the SEFZ) remained classified as 'sustainable');
- The SG/WC and GSV stocks have had extended periods of poor juvenile recruitment (a decade for the GSV stock and two decades for the SG/WC stock);
- The recovery of the SG/WC stock and the GSV stock is dependent on the recruitment of juveniles to each population and the subsequent accumulation of biomass.

The next full Snapper stock assessment is expected to be published in 2026 as part of the three year Snapper Science Program (FRDC 2024-087). Provisional key results from this assessment were released in November 2025, and suggested that whilst the stocks were recovering, both Snapper stocks remained depleted (i.e., below the biomass limit).

Impact of algal bloom

In mid-March 2025, a harmful algal bloom, dominated by *Karenia* spp., was identified in the waters around the Fleurieu Peninsula in SA. The bloom subsequently spread, primarily into GSV, but also into the

[1] The 2022 stock assessment considered data up to 31 January 2022, encompassing two years of the initial Snapper closure

Spencer Gulf, southern Yorke Peninsula, Kangaroo Island, and the Coorong. It is estimated the algal bloom has affected over 500 species of fish, invertebrates, and associated marine and coastal diversity (source: iNaturalist). This has included mortality of commercial fishery species including Snapper. As part of the extensive SARDI Algal Bloom Response, fisheries and fish stocks are being assessed to understand the impact of the algal bloom. This included an additional Snapper hydroacoustic survey in GSV in January 2026 which showed a 47% reduced Snapper abundance compared with pre-algal bloom levels. It is not possible to determine if the lower estimate of biomass from the hydroacoustic survey in 2026 reflected mortality from the algal bloom, the displacement of Snapper to other areas to avoid the bloom, or a combination of these hypotheses.

As part of the algal bloom response, additional biomass surveys are planned in 2026/27 and another stock assessment report is due in 2027.

4.4. The Snapper fishery

Snapper is an iconic fishery species and important fishery resource in each mainland State of Australia. Throughout the mid 2000s, SA was the dominant State-based contributor to the national total catches for both the commercial and recreational sectors (Fowler et al., 2016). SA's Snapper fishery is geographically extensive and encompasses most of the State's coastal marine waters from the far west coast of Eyre Peninsula to the South East Region, although the highest fishery catches have generally been taken from either Spencer Gulf or Gulf St Vincent (Fowler et al., 2016, 2019, 2020; Steer et al., 2018a, 2018b).

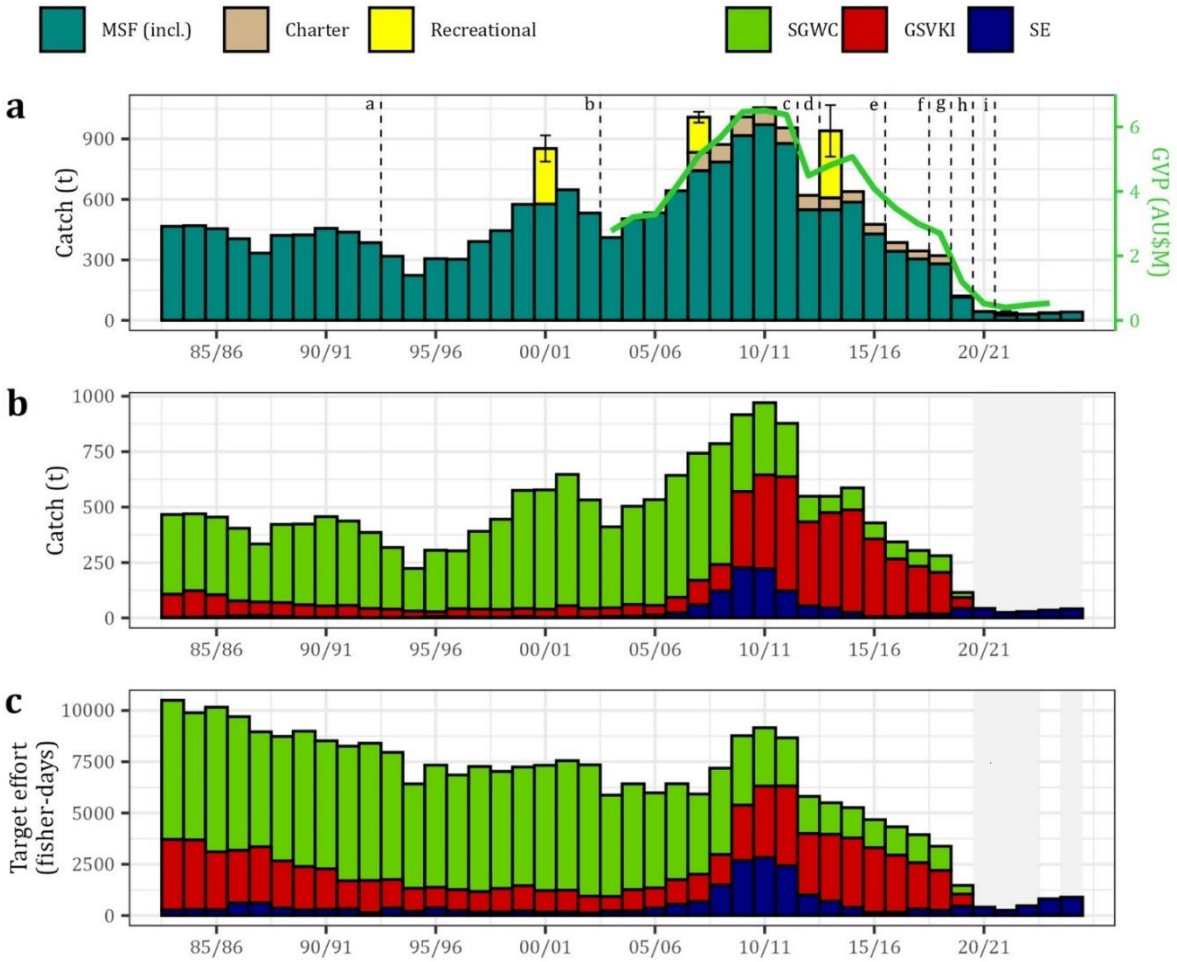

Figure 2 Fishery statistics for South Australia's Snapper Fishery as outlined in Dennis et al. (2024). Long-term trends in annual estimates of: (a) total catch for the commercial sector (MSF, SZRLF, NZRLF combined) and the recreational sector from surveys in 2000/01, 2007/08, 2013/14 and 2021/22 (error bars = standard error), and gross value of production (GVP); (b) total commercial catch, by biological stock – Spencer Gulf/West Coast (SG/WC), Gulf St Vincent/Kangaroo Island (GSV/KI) and South East Fishing Zone (SEFZ); and (c) commercial effort targeting Snapper by Fishing Zone. Grey shading indicates years when data for one or more Fishing Zones are confidential. Years when key Snapper management changes were implemented are included in plot (a). See table 1 for description of management changes (a-i),

Table 1 Snapper management changes and corresponding years and plot references (a-i) for figure 2

Year	Management Measure	Region	Details	Plot Ref.
1993	Gear restriction	State-wide	Prohibition of catching Snapper with fish traps or any net	a
2003	Seasonal closure	State-wide	Month long closure implemented in November of each year	b
2012	Trip limit (kg)	SG & GSV	800 kg daily trip limit applied	c
2012	Seasonal closure	State-wide	Seasonal closures extended to mid-December	c
2013	Spatial closures	SG & GSV	Spatial closures implemented for key spawning areas from November to January inclusive	d
2013	Trip limit (kg)	SG & GSV	500 kg daily trip limit applied	d
2013	LL Hook limit	SG & GSV	Hook limits reduced to 200 from 400	d
2016	Trip limit (kg)	SG	200 kg daily trip limit applied	e
2016	Trip limit (kg)	GSV/SE	350 kg daily trip limit applied	e
2018	Spatial closure	SG and GSV	Locations of spawning closures revised	f
2019	Fishery closures	SG, GSV/KI & WC	Snapper fishery closed to all sectors	g
2020	TAC introduced	SE	TAC introduced from 2019 onwards	h
2021	ITQ introduced	State-wide	ITQ and fishing zones introduced and removal of seasonal closure in the SE region	i

In SA, Snapper is a primary target species of the commercial, charter boat and recreational fishing sectors (PIRSA 2025a). Licence holders from four different commercial fisheries have access to the resource, i.e., the Marine Scalefish Fishery (MSF), the Northern Zone Rock Lobster Fishery (NZRL), Southern Zone Rock Lobster Fishery (SZRL) and Lakes and Coorong Fishery (LCF) (PIRSA 2025a). The main gear types used by commercial fishers in SA to target Snapper are handlines and longlines. Some Commonwealth fisheries also have a level of bycatch access to Snapper noting that arrangements are in place between the State and Commonwealth where there are restrictions on the take of Snapper within State waters.

For recreational fishers, Snapper is targeted using rods and lines primarily from boats, although jetty and land-based catches do occur (Fowler et al., 2016).

Estimates of total State-wide commercial catch have fluctuated over varying time scales. Since 2003/04, State-wide catch increased to a record level of 970.9 t in 2010/11, before declining to 280.7 t in 2018/19 (pre-gulfs closures; Figure 2).

In 2021/22 and 2022/23, total commercial catch declined to record low levels (25 t and 29 t, respectively) with all landings coming from the SEFZ, due to the fishery closures for SG/WC and GSV stocks (Figure 2).

The recreational catch in the 2021/22 survey was 3 t from the SEFZ (Figure 2).

The spatial structure of SA's Snapper fishery underwent considerable change between 2008 and 2012 (Fowler et al., 2016, 2019). Historically, SG supported the highest catches and catch rates, but these declined considerably through the late 2000s. Concurrently, the catches and catch rates in northern GSV and the SE increased to unprecedented levels (Fowler et al., 2019, 2020). For the three stocks, these changes in fishery statistics reflected changes associated with different, independent, demographic

processes relating to recruitment and adult migration (Fowler, 2016; Fowler et al., 2017, 2019, 2020). From 2011, the changes in the spatial structure of the fishery and stock status caused considerable concern for fishery management. As detailed in Fowler et al. (2020) this resulted in a succession of management changes that were implemented to limit commercial catches and to maximise the opportunities for spawning and recruitment.

By late 2019, it was apparent that additional management arrangements were required to arrest the decline in the statuses of the SG/WC and GSV stocks, which led to the implementation of the initial Snapper closures in all state waters other than the SEFZ from 1 November 2019 to 1 February 2023.

After consideration of the results from the 2022 Snapper Stock Assessment Report (Drew et al., 2022) and recommendations from the MSFMAC, the fishery closures for the SG/WC and GSV stocks were extended to 30 June 2026. Due to impacts of a harmful algal bloom dominated by *Karenia* spp which was initially detected in March 2025 in SA, and uncertainty this has created in estimates of Snapper biomass, the Snapper closure was extended for a further 12 months to 30 June 2027.

In the SEFZ, where the WV stock has remained classified as sustainable, fishing has remained open under a total allowable catch (TAC) comprised of a total allowable commercial catch (TACC) and total allowable recreational catch (TARC). To support monitoring of catches against these catch limits, mandatory reporting of Snapper catches has been in place for commercial, charter boat and recreational fishers.

Reform of the MSF

In July 2021, the commercial MSF underwent a major fishery reform to improve the economic performance of the commercial MSF and increase stock sustainability. Reforms to the MSF included:

- a government funded voluntary licence surrender program resulting in the removal of 100 licences from the fishery (305 to 205 – at the time of development of this plan there were 197 MSF licences);
- establishment of four fishing zones – West Coast Fishing Zone (WCFZ), Spencer Gulf Fishing Zone (SGFZ), Gulf St Vincent and Kangaroo Island Fishing Zone (GSVFZ), and SEFZ (Figure 3);
- establishment of individual transferable quota (ITQ) and TACC management for the ‘Management Tier 1’ stocks for the MSF and the Rock Lobster fisheries (RLF) as follows –
    - King George Whiting in GSVFZ, SGFZ, WCFZ (a catch cap without ITQ was applied in the WCFZ);
    - Snapper in the SEFZ, GSVFZ, SGFZ, WCFZ;
    - Southern Garfish in the GSVFZ, SGFZ;
    - Southern Calamari in the GSVFZ, SGFZ.

Management Tier 1 stocks represent the top tier of management with TACCs which can be unitised with ITQs, and require quantitative analyses. Snapper is a Management Tier 1 stock across all fishing zones.

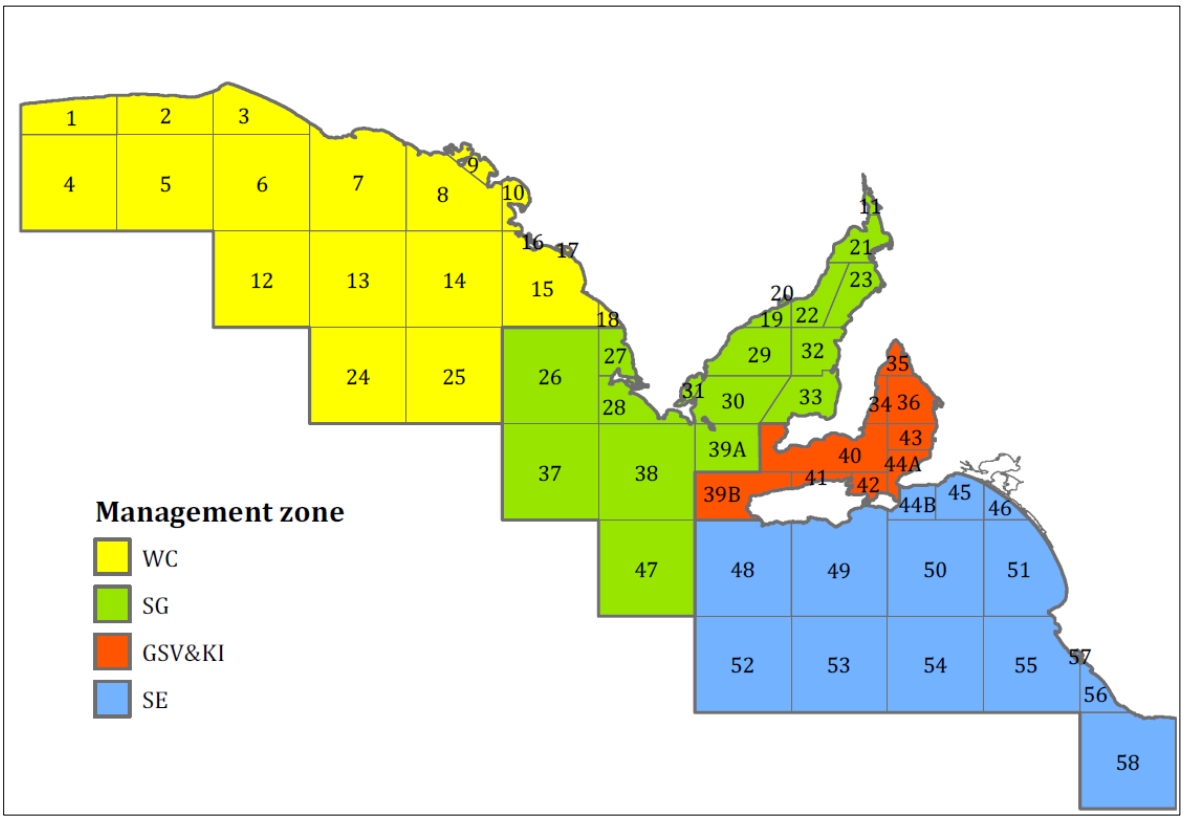

Figure 3 - The four Fishing Zones implemented through the commercial MSF reform in July 2021. These are the Spencer Gulf fishing zone (SGFZ), Gulf St Vincent/Kangaroo Island fishing zone (GSV/KIFZ), West Coast Fishing Zone (WCFZ) and South East Fishing Zone (SEFZ). The boundaries of each zone are delineated by existing MFA blocks or sub-blocks.

5. Provisions of the MSF Management Plan

Goal 1(a) of the MSF Management Plan (2025) is to *maintain biomass of fish stocks at sustainable levels.* The two key management strategies to achieve this goal are:

- 1(a)(i) Management arrangements (input and output controls) applied for Management Tier 1-3 stocks consistent with the harvest strategy and supports sustainable use of the resource.
- 1(a)(ii) Rebuilding strategies are implemented for stocks that are considered depleted.

The MSF Management Plan (2025) includes a new Harvest Strategy Framework ("the harvest strategy") for the MSF. The harvest strategy describes the indicators to measure the performance of stocks, and the use of these indicators and their associated reference points and decision rules for managing MSF stocks, including Snapper, at sustainable levels. The reference points are set to achieve preferred stock status (called the target reference point) and to avoid undesirable outcomes (the limit reference point). The default[2] harvest strategy reference points are:

- Biomass target reference point (BTARG) is 50% of the unfished biomass, or proxy, denoted as B_{50}. The corresponding fishing mortality reference point is F_{50}.
- Trigger Reference point (BTRIG) is 40% of the unfished biomass, or its proxy (B_{40}).
- Biomass limit reference point (BLIM) is 20% of the unfished biomass, or proxy, denoted as B_{20}.

[2] The reference points are the default values used unless alternative reference points are identified that are scientifically defensible to be more appropriate and are specified in the Implementation Plan for the Marine Scalefish Fishery Harvest Strategy Framework.

For Management Tier 1 stocks (including Snapper in all fishing zones), the harvest strategy will be applied to determine a Recommended Biological Catch (RBC) for a fishing zone. The RBC is the recommended total catch (less any buffer), for a fishing zone including take of all extractive sectors.

A “hockey stick decision rule” (Figure 4) applies whereby the fishing mortality is increased/reduced proportionate to the size of the biomass below the biomass trigger (BTRIG). Unless a rebuilding plan is in place, the RBC is reduced to zero when the biomass is below the biomass limit (B_{20}).

A TACC (or catch cap) is the RBC less the regional distribution (“regional share”) of state-wide allocations to the recreational, charter boat and Aboriginal traditional fisheries.

If the RBC changes in response to application of the harvest strategy, the TACC is to be adjusted accordingly.

The harvest strategy is accompanied by an Implementation Plan which sets out information regarding the Assessment Category, assessment type and associated decision rule that applies to each stock (PIRSA 2025b).

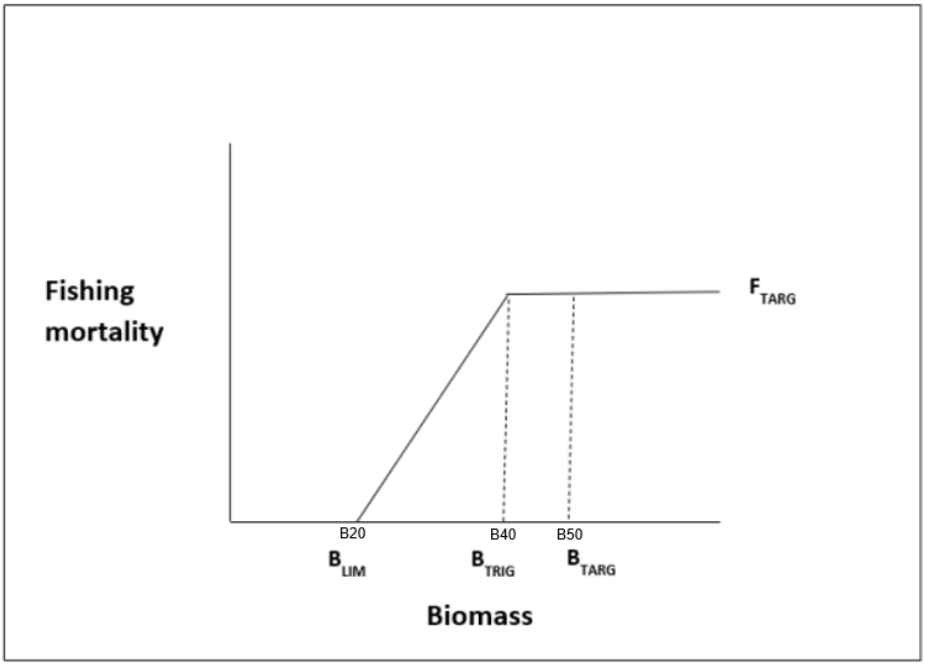

Figure 4 - Chart illustrating the 'hockey stick decision rule' as provided in the Management Plan (PIRSA 2025a).

Rebuilding depleted stocks

Section 9.11 of the MSF Management Plan (2025) provides that:

- Where a fish stock is classified as depleted (or overfished), there should be a high probability of stock recovery to levels above the limit reference point, within specified timeframes related to the generation time of the species.
- Depending on the species and level of depletion, a rebuilding plan or strategy will be required. An additional buffer can also be applied to the RBC to increase confidence that rebuilding occurs.
- By-catch provisions may be considered in a rebuilding plan for a particular stock on a case-by-case basis. These plans should consider if by-catch can be avoided, and levels of post-release mortality. These plans should consider management across all sectors that take a depleted stock.

The harvest strategy also outlines various flexibilities and scenarios where departures from the decision rule may be considered, including:

- By-catch provisions when the RBC is zero (i.e., stock is in a depleted state) – this would account for incidental catches of a stock due to the multi-species nature of the MSF. This could be considered when the level of targeting can be reduced and the ability of fishers to avoid the stock is clear. Any incidental catch must not stop the stock rebuilding.
- Multi-year RBCs may be applied for depleted stocks where the fishery is closed or an approved rebuilding plan is in place and the RBC is sufficiently conservative to allow rebuilding.
- A minimum/maximum change rule may be applied to avoid very small or very large changes to the catch limits from year to year, as long as there are no trends in the RBCs that could lead to an increased risk to the stock.
- Step up/step down total catch – this may be applied such that a total catch is increased or reduced over several years rather than in one year as determined by the RBC. The aim would be to minimise, for example, impacts on the fishery due to large episodic recruitment and provide the best means of managing this recruitment.

Other sectors

The MSF harvest strategy outlines that management arrangements for each fishing sector, on a case-by-case basis, would aim to maintain all sectors to their regional share of the RBC. This is consistent with the provisions in the Management Plan for Recreational Fishing in South Australia (2020) ("the Management Plan for Recreational Fishing") and associated harvest strategy therein, which outlines that the biological objectives, performance indicators and limit reference points for assessing stock status for the key recreational species that are also commercially important species are outlined in the various commercial management plans.

The Management Plan for the South Australian Charter Boat Fishery (2022) defers to the Management Plan for Recreational Fishing with respect to harvest strategies.

The management plans for the SA Southern Zone and Northern Zone Rock Lobster Fisheries (RLF) do not explicitly defer to the MSF Management Plan with respect to the harvest strategies for marine scalefish species, however, in the case of Snapper, this is implied, noting that the RLF has been allocated ITQ units for Snapper and is encompassed within the Snapper TACCs. Access arrangements to the MSF is further described in the MSF Management Plan (PIRSA 2025a).

Commercial fishers operating under a Commonwealth concession in the waters adjacent to SA also have access to Snapper as incidental by-catch of up to 50 kg per trip. Under the Offshore Constitutional Settlement agreement between the South Australian and Commonwealth Governments, the Snapper resource is to be managed consistent with the State arrangements. Pursuant to these arrangements, the Snapper fishery closures in SA have been mirrored by the Commonwealth Government.

6. Snapper threats

Snapper has various biological characteristics which make it more susceptible to fishing pressure and other threats. Key issues that have been identified as potential threats to Snapper stocks, other than targeted fishing include:

- **Changes to the physical environment** – Assessing the potential effects of climate change on Snapper is part of the Snapper Science Program being led by SARDI (FRDC 2023-085). Temperature is known to be important for Snapper (Pecl et al., 2014). The optimal temperature range for Snapper spawning and egg and larval survival is between 18 and 22 °C. For northern Spencer Gulf, preliminary analysis indicated there had been an increase in the mean sea surface temperature (SST) during the summer months over the past 40 years. This resulted in fewer days within the optimal temperature range during the 2000s and 2010s. There has also been a

progressive increase in the frequency and intensity of marine heatwaves since the mid-2000s, which have potential to significantly affect the survival of developing Snapper eggs and larvae.

- **Incidental mortality** – Snapper are known to be incidentally encountered by commercial and recreational fishers when targeting other species in SA. It is challenging to quantify the fishing mortality associated with the incidental catch and release of Snapper in SA. Snapper can suffer barotrauma when caught from depths greater than 10 metres due to the rapid change in pressure when they are brought to the surface, resulting in the expansion of gasses within the fish's body. Barotrauma is strongly associated with mortality, which can occur up to 24 hours after release. The severity of barotrauma increases with increasing depth, which results in higher mortality rates in deeper water (FRDC 2019-044).
- **Other / Catastrophic events** – Algal blooms such as the bloom of microalgae dominated by *Karenia spp.* which was initially detected in March 2025 in SA has had a devastating impact on hundreds of marine species, and may also have impacts on Snapper. See section 4.3 for further information regarding impacts from this bloom.

7. Rebuilding timeframes

The timeframe for rebuilding depleted Snapper stocks will be heavily influenced by various factors, notably the levels of recruitment and fishing mortality. Snapper populations in SA are characterised by episodic and variable recruitment (of juvenile Snapper) which drives population dynamics and fishery production. The SG/WC and GSV stocks have had extended periods of poor juvenile recruitment (a decade for the GSV stock and two decades for the SG/WC stock). The recovery of the SG/WC stock and the GSV stock is dependent on the recruitment of juveniles to each population and the subsequent accumulation of biomass.

In applying principles of ecologically sustainable development, there is a need to balance community, economic, social, and physical well-being while sustaining the potential of aquatic resources of the State to meet the reasonably foreseeable needs of future generations.

The MSF Management Plan outlines that specified timeframes for rebuilding are typically between TMIN and 2xTMIN, where TMIN is defined as the time for recovery to the limit reference point in the absence of fishing. Where it is not possible to estimate this, the mean generation time plus 10 years or 3x the mean generation time can be used.

As part of the Snapper Science Program and to guide development of this rebuilding plan, Snapper biomass projections have been modelled for various fishing scenarios by SARDI (available on the PIRSA website). The projections of relative biomass for each stock demonstrated that increases in biomass were heavily dependent on episodic recruitment events and that exploitation, even at very low levels, prolonged the estimated time to reach the biomass limit. In the case of the SG/WC stock, the estimated mean time to reach the biomass limit was 21 years (2020-2041) in the absence of fishing. For the GSV stock, projections were more optimistic, with a mean estimated time to reach the biomass limit of 13 years (2020-2033) in the absence of fishing.

Whilst the model projections available represent the best available science at the time this plan was adopted, the projected outcomes are highly dependent on episodic and variable recruitment events of juvenile Snapper into the populations.

It is important note that where recruitment events occur earlier or later than the modelled mean, the biomass may reach the biomass limit faster or slower than what has been projected.

The next Snapper stock assessment is expected to be completed in 2026 and may also impact model projected timeframes for recovery.

The mean generation time plus 10 years is a commonly used alternative rebuilding timeframe to the biomass limit and has been used in other jurisdictions (e.g., AFMA). For Snapper in SA, the mean generation time is approximately 11 years where the mean generation time is defined as the average age of a reproductive individual in an unexploited stock (Goodyear, 1995). This approach suggests a reasonable rebuilding period for Snapper in SA may be 21 years and is within range of the modelled projections.

After considering the modelled projections, the inherent uncertainty around episodic recruitment events, and the biologically-based timeframes, the rebuilding timeframe to reach the biomass limit (B_{20}) selected for this rebuilding plan is 21 years (2020-2041). It is noted that recovery of stocks is likely to be at different rates in different fishing zones and a stock in either fishing zone may reach B_{20} before 2041.

This timeframe is comparable to rates of rebuilding seen in other Snapper fisheries, in particular the New Zealand SNA7 stock which experienced a similar level of depletion (Langley, 2024).

8. Objectives for rebuilding

Consistent with the Act, goals of the MSF Management Plan, and objectives of the MSF harvest strategy, the overarching aim of this rebuilding plan is to rebuild the Spencer Gulf/West Coast and Gulf St Vincent Snapper stocks to biologically sustainable levels, and to support economic and social benefits to the community.

The rebuilding objectives are:

- To rebuild depleted Snapper stocks to above the biomass limit reference point (B_{20}) by 2041 (21 years from 2020).
- Having reached B_{20}, continue to rebuild Snapper stocks from above the biomass limit to the biomass target (B_{50}) – consistent with the harvest strategy in the MSF Management Plan.

9. Management arrangements to achieve objectives

To achieve the objectives of this rebuilding plan, the following decision rules and management measures are to be applied. These measures have been informed by scientific advice from SARDI (available on the PIRSA website) and recommendations from the MSFMAC.

Decision rules

1. Where the biomass of SG/WC or GSV Snapper stocks remains below 15% of unfished levels (B_{15}), Snapper fishing on the stocks will remain closed (Table 2).
2. Where the biomass of SG/WC or GSV Snapper stocks is below the biomass limit (B_{20}), but above 15% of unfished levels (B_{15}), fishing will remain closed unless a sufficient* recruitment event has occurred to the extent that some limited harvest of Snapper may be permitted, provided that the level of harvest allows for the rebuilding objectives outlined in this plan to be met. In such a scenario, the appropriate level of take will be guided by scientific advice from SARDI and recommendations from the MSFMAC, in consultation with stakeholders (Table 2).
3. Where the biomass of Snapper stocks is above the biomass limit (B_{20}) and sufficient recruitment* to the population has occurred, fishing may be reopened, with fishing mortality to be progressively increased consistent with the harvest strategy in the MSF Management Plan. Where the biomass is between B_{20} and B_{30} and sufficient recruitment* is not present, a precautionary buffer must be applied to the RBC (e.g., 20%) to ensure the biomass maintains a positive trajectory towards the

biomass target (B_{50}) (Table 2). The buffer will be guided by recommendations from the MSFMAC and specified within the Implementation Plan for the MSF HSF.

***Sufficient recruitment** is defined as one strong year class in the first eight years (from spawning) of the regional age structure, where a strong year class is defined as being ≥20% of the overall age structure for two consecutive years. See example in Figure 5.

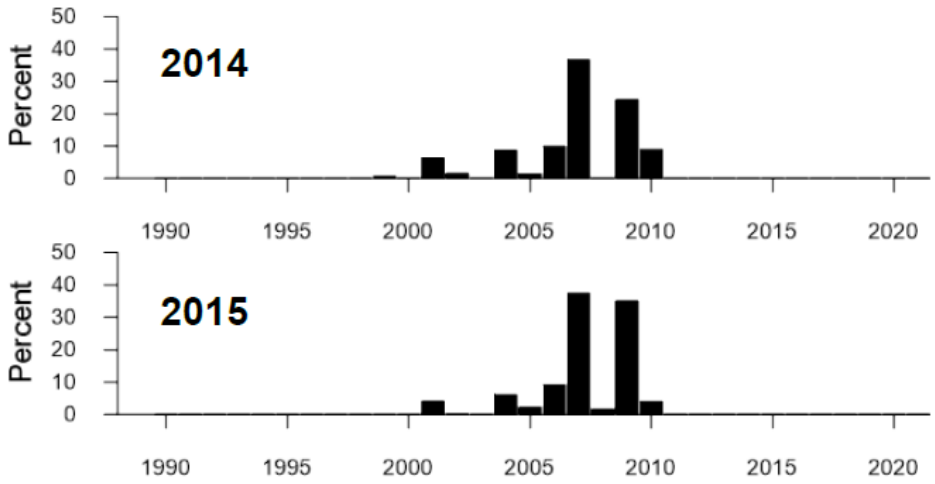

Figure 5 - Example of sufficient recruitment is illustrated in the figure above showing estimated Snapper age classes from southern GSV (from Fowler, 2023).

Table 2 - Decision rules for Snapper rebuilding. The combination of fishable biomass and **sufficient recruitment*** indicates when Snapper fishing in either the SGFZ/WCFZ or GSVFZ may be opened and how catch limits will be set.

	Fishable biomass (B) of Snapper in relation to unfished levels			
Presence of sufficient recruitment*	**Biomass < B_{15}**	**B_{15} ≤ biomass ≤ B_{20}**	**B_{20} < biomass ≤ B_{30}**	**Biomass > B_{30}**
Yes	Closed	Potential TAC	Open – hockey stick	Open – hockey stick
No	Closed	Closed	Open – hockey stick (precautionary buffers required)	Open – hockey stick

Management measures

The following management arrangements are to be implemented to support rebuilding of Snapper stocks.

1. A total allowable catch (TAC) is to apply in the relevant fishing zone (e.g., WCFZ, SGFZ or GSVFZ) consisting of a TACC (distributed with ITQ) and TARC (recreational and charter) to be set consistent with the regional catch shares.

2. Mandatory catch reporting of retained Snapper across commercial, charter boat and recreational fishing sectors is to apply where Snapper fishing is reopened.

3. Mandatory reporting of non-retained catches (i.e., discards) of Snapper is to be implemented as soon as practicable across the commercial and charter fishing sectors. For the recreational (non-charter) sector, voluntary catch reporting of discarded Snapper will be promoted and encouraged.

4. Seasonal spawning closure to prohibit all take and possession of Snapper from 1 October to 31 March each year in a fishing zone to provide protection for Snapper throughout the reproductive period (i.e., pre-spawning aggregation, active spawning, and dispersion after spawning has concluded). This period is to optimise the opportunity for successful spawning and recruitment consistent with SARDI advice.

5. Year-round spatial closures at important aggregation sites are to be implemented as soon as practicable to provide additional protection for Snapper, as follows (coordinates for all closures are included in Appendix A):

    - Spencer Gulf - all fishing activities will be prohibited within a 1 km radius of the following recognised aggregation sites for Snapper (Figure 6):

        - the shipwreck of the Illusion, a 13 m wooden trawler that sunk in 1981.
        - the shipwreck of the Santa Anna, a 14 m wooden trawler that sunk in 1976.
        - the shipwreck of the Estelle Star, a 24 m wooden trawler that sunk in 1978.

    - Spencer Gulf - an area of mixed natural and artificial structure referred to as ‘Jurassic Park’. In recognition of the elongated features of the seabed at this site, all fishing activities will be prohibited within a 1 km x 3 km rectangle at this site.

    - Gulf St Vincent - all fishing activities will be prohibited within a 1 km radius of the following recognised aggregation sites for Snapper (Figure 6):

        - the shipwreck of the Zanoni, a 42 m composite sailing vessel that sunk in 1867 offshore from Ardrossan. The wreck of the Zanoni is already protected under the *Historic Shipwreck Act 1981* and is within a sanctuary zone of the Upper Gulf St Vincent Marine Park (DEW, 2022), but has been included here for completeness.
        - the shipwreck of the Ulonga, a 34 m wooden sailing vessel that sunk in 1976 offshore from Rapid Head.
        - Tapley Shoal, an area of large limestone ledges and banks approximately 15 km offshore from Edithburgh.

6. Ongoing regulated legal minimum length.

7. Recreational and Charter Boat Fishery Snapper bag and boat limits set consistent with the size of the available biomass and TARC.

PIRSA will continue to encourage application of best practices for fishing and catch handling to minimise barotrauma and minimise post release mortality of Snapper as outlined on the PIRSA website.

Amendments to the above arrangements may be considered where recommended by the MSFMAC and where they further the achievement of the objectives outlined in this rebuilding plan.

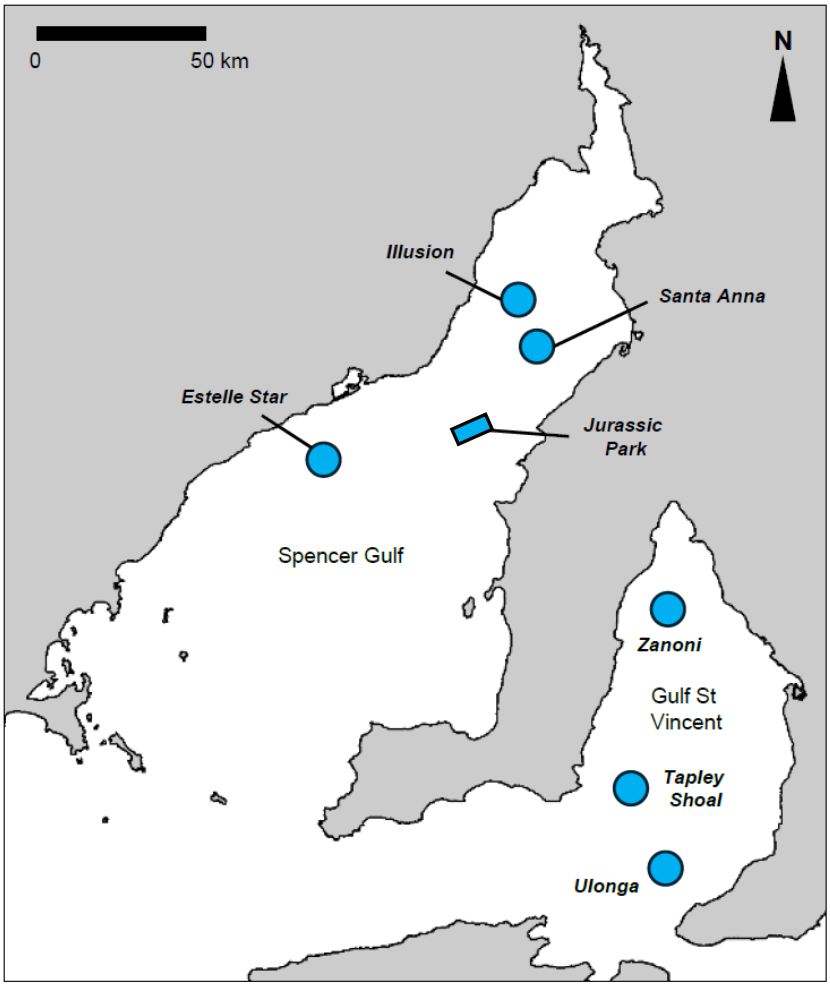

Figure 6 - locations of spatial closures to protect aggregations of Snapper in Spencer Gulf and Gulf St Vincent.

10. Monitoring and evaluation

Monitoring of the stocks using the following primary performance indicators will enable application and evaluation of the effectiveness of the management measures applied under this rebuilding plan:

- Fishable biomass – model output
- Fishing mortality – model output
- Recruitment – age structure.

An integrated stock assessment is required to assess each stock against the performance indicators of fishable biomass, fishing mortality, and recruitment. Adequate biological sampling and estimates of biomass are the minimum data inputs required to apply the fishery model. An integrated assessment would also include analysis of fishery statistics if fishing in a fishing zone is allowed. A fully integrated Snapper stock assessment will be undertaken every three years or more frequently as required.

Periodic fishery-independent estimates of biomass will be undertaken at least every five years to inform the integrated stock assessments for the SG/WC and GSV stocks. Biomass estimates may include the Daily Egg Production Method (DEPM), hydro acoustics, close-kin mark-recapture (CKMR) or other methods as considered appropriate.

Ongoing biological sampling will be undertaken to collect regional length and age structures that are used to interpret recruitment variability and are a key input into the fishery stock assessment model. Additionally,

surveys to monitor relative trends in juvenile abundance may be undertaken to develop a future index of relative recruitment to enable forecasts of future Snapper population trends.

In addition, if a stock is open to fishing, fishery statistics for each sector will be analysed to assess fishing mortality against prescribed reference points, including estimates of discard mortality. Standardised handline catch per unit effort (CPUE) (and potentially also standardised longline CPUE) for the commercial sector may also provide a relative index of abundance that could be incorporated into a fishery model.

A summary of the primary data sources and outputs proposed for scientific monitoring of this rebuilding plan are provided in

Table 3.

Table 3 - Summary of the primary data sources and outputs proposed for scientific monitoring in the Snapper Rebuilding Plan, and the respective performance indicator assessed. Each data source is analysed independently and then integrated into a fishery model. CPUE – catch per unit effort.

Data source	**Output**	**Performance indicator**	**Proposed frequency**
Fishery statistics	Catch, effort, and CPUE Relative index of abundance	Fishing mortality	Annual
Biological sampling	Regional length and age structures Retrospective interpretation of recruitment	Recruitment	Annual
Estimate of biomass	Estimate of biomass (spawning or absolute) Relative index of abundance	Fishable biomass	At least every 5 years
Recruitment surveys	Relative abundance of juvenile Snapper Relative index of recent recruitment	Recruitment	Annual
Integrated fishery model	Annual time series of biological performance indicators, i.e., fishable biomass, recruitment, harvest fraction, and egg production.	Fishable biomass Fishing mortality Recruitment	Every 3 years or more frequently as required

11. Stakeholder engagement and communications

This rebuilding plan has been developed with guidance from the MSFMAC and in consultation with peak representative bodies. PIRSA recognises that communicating outcomes, actions and updates to the public and stakeholders is critical to the success of rebuilding Snapper stocks in SA. PIRSA will co-develop a communications plan with the relevant peak bodies and leverage existing platforms and engagement tools to communicate decisions, outcomes and updates to stakeholders and the wider community, and where appropriate, seek feedback regarding the application of this rebuilding plan.

12. Review

A review of this rebuilding plan shall be undertaken approximately every three years following the completion of each full Snapper stock assessment to consider the latest available science and management information. Reviews will be guided by the MSFMAC[3] and in consultation with the relevant peak representative stakeholder bodies.

[3] Or other such lead advisory body for the shared-access MSF at the time.

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14. Appendix A – Map with Coordinates for Spatial closures