

# National Snapper Workshop

## Rebuilding our iconic Snapper stocks

Ian Cartwright, Jonathan McPhail, Ian Knuckey,  
Tony Smith, Nick Rayns, Mike Steer  
February 2021

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and Regions



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## Abbreviations

ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences
ACE	annual catch entitlement
AFANT	Amateur Fishermen's Association of the Northern Territory
AFMF	Australian Fisheries Managers Forum
BRUV	baited remote underwater video
CPUE	catch per unit effort
DEPM	daily egg production methods
DPIPWE	Department of Primary Industry, Parks, Wildlife and the Environment (Tasmania)
EAC	East Australian Current
FAD	fish aggregation device
FIS	fisheries independent survey
FRDC	Fisheries Research and Development Corporation
FTO	fishing tour operator
GSVS	Gulf St. Vincent Stock
ITQ	individual transferrable quota
MAC	management advisory committee
MLL/MSL	Minimum legal length/minimum legal length
MoU	memorandum of understanding
MPA	marine protected area
MSE	management strategy evaluation
MSF	Marine Scalefish Fishery (South Australia)
NRM	natural resource management
OCS	Offshore Constitutional Settlement
PIRSA	Primary Industries and Regions, South Australia
PIT	passive internal tag
QMS	Quota Management System
SAFS	Status of Key Australian Fish Stocks Report
SARDI	South Australian Research and Development Institute
SESSF	Southern and Eastern Scale fish and Shark Fishery
SETFIA	South East Trawl Fishing Industry Association
SG/WCS	Spencer Gulf/West Coast Stock
SPR	spawning potential ratio
TAC	total allowable catch
TACC	total allowable commercial catch
VFA	Victorian Fisheries Authority
WCDSR	West Coast Demersal Scalefish Resource (Western Australia)

# 1.Executive Summary

The Department of Primary Industries and Regions (PIRSA) organised and ran a national Snapper Workshop in Adelaide from the 12 to 14 November 2019 with funding from FRDC and the strong support of the Australian Fisheries Managers Forum. The South Australian Research and Development Institute (SARDI) Aquatic Sciences facility at West Beach was the venue. The workshop was facilitated by Mr Ian Cartwright, who was supported by independent scientists Dr Tony Smith and Dr Ian Knuckey, and independent fisheries management consultant Dr Nick Rayns.

The workshop objectives were to:

1. identify key issues and challenges for Snapper, review Snapper research and critique jurisdictional management arrangements;
2. explore a national approach to collaborate and manage cross-jurisdictional Snapper stocks;
3. explore and develop a set of national R&D priorities for Snapper that address the challenges being faced; and,
4. develop a tool kit to support fishery managers to recover depleted Snapper stocks.

The workshop program ([Appendix 1](#)) was structured to address the objectives by:

- providing an overview of Snapper management arrangements and research;
- identifying common challenges, successes and knowledge gaps; and,
- determining an approach to managing Snapper resources.

Government representatives, independent scientists, fishery managers and Fisheries Research and Development Corporation representatives attended all three days of the workshop. Commercial, charter and recreational fishing representatives attended the last day of the workshop. The workshop was well attended with over 30 people on each of the first two days and over 40 people on the third day. A list of participants is provided at [Appendix 2](#).

The programme was organised into three days, each with a different theme. Following the presentations each day, breakout groups discussed management, research and end-user issues, which were summarised, presented to plenary and refined by all participants. A panel of experts contributed valuable input and perspectives, both in the breakout groups and during plenary discussions.

On the first day fisheries managers from all jurisdictions (and New Zealand) with Snapper fisheries provided presentations on the key management issues and challenges being faced, and the relative effectiveness of implemented management arrangements ([Section 3](#)). This was followed by a working group discussion and the development of common challenges, success and learnings, cross cutting issues and indigenous issues relating to the management of snapper ([Section 4](#)). The second day saw researchers from all jurisdictions (and New Zealand) with Snapper fisheries provide presentations on the status of Snapper stocks, stock structure, research activities and research priorities in each jurisdiction ([Section 5](#)). A summary of research issues and a list of Snapper research priorities were developed in the afternoon workshop and plenary sessions. Day three opened with a summary of the discussions from the management and research sessions during the first two days, and an opportunity for commercial, recreational and charter boat stakeholders to provide input ([Section 7](#)). The recreational and commercial sectors provided presentations and introduced useful end-user perspectives.



A 'best practice' recommended approach (toolkit) to managing Snapper ([Section 8](#)) was developed on Day 3. The approach is based on seven key initiatives (or tools) that were distilled from presentations and breakout sessions and workshopped with all attendees at the conclusion of Day3. The recommendations are written at a national level with an acknowledgement that some of the recommendations, or at least elements within them, may have already been implemented in some jurisdictions. The final section of the report lists a number of recommended cross-sectoral actions ([Section 9](#)).

**Keywords:** Snapper, cross-jurisdictional, cross-sectoral, fisheries management, recovery

## 2. Introduction

### 2.1 Workshop background

Snapper (*Chrysophrys auratus*) is an iconic Australian fish species distributed from Southern Queensland to Western Australia and supports important commercial, recreational (including charter boat) and indigenous fisheries. Their broad geographic distribution, together with their economic, social and cultural importance makes Snapper one of Australia's most significant fishery resources. Snapper is also a popular species amongst seafood consumers and, as such, commands a premium price in Australian markets and restaurants.

There are twelve currently identified Snapper stocks across Australia - six in Western Australia, one in Queensland, one in New South Wales, one in Victoria, two in South Australia and a shared stock between South Australia and Victoria. Recently, the FRDC released the *Status of Key Australian Fish Stocks (SAFS) Report 2018*

(<https://fish.gov.au/>) which concluded that “of these twelve stocks: seven are sustainable, one is recovering, three are depleted, and one is undefined”.

The SAFS assessment highlights a number of challenges that reflect the difficulties in managing Snapper. Snapper exhibit highly variable recruitment (e.g. Hamer and Jenkins 2007; Fowler and McLennon 2011), sensitivity to changing environmental conditions (e.g. Pecl et al. 2014) and by forming large schools (e.g. Mackie et al. 2009; WA Fisheries 2011), are effectively targeted by commercial and recreational fishers. Issues relating to shared access and allocation between sectors add to the complexity of Snapper management, particularly in jurisdictions with an established recreational sector (e.g. Wortmann et al. 2018; Knuckey et al. 2019).

Over the last 30 years, numerous management arrangements for Snapper have been implemented across Australia with varying levels of success. These arrangements have been largely informed by a diversity of research projects<sup>1</sup> that have aimed to improve our understanding of the biology and population structure of Snapper and refine stock assessment. However, as with all fish resources, Snapper stocks are constantly changing in response to fishing pressure, environmental change and recruitment, resulting in a need for continuous research, monitoring and management to ensure healthy fisheries and long-term sustainability.

Given the concerning status of some of Australia's key Snapper stocks and the similar challenges faced by all jurisdictions where Snapper is taken, there was a need to develop a national, consolidated approach to support the sustainability and responsible utilisation of Australia's Snapper resources. To achieve this, fisheries managers, scientists and key stakeholders from across Australia and New Zealand were brought together in a FRDC funded workshop to critique current Snapper management arrangements, review associated research, identify common challenges and knowledge gaps, and determine ways and means for improving management outcomes.

The three-day workshop hosted by PIRSA, was held in Adelaide from the 12 to 14 November 2019 at SARDI Aquatic Sciences, West Beach. The workshop was facilitated by Ian Cartwright and supported by independent scientists Tony Smith and Ian Knuckey, and independent fisheries management consultant Nick Rayns. The workshop also included the following participants:

- Government representatives from each jurisdiction and New Zealand;

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<sup>1</sup> <https://fish.gov.au/2014-Reports/Snapper>

- A Government representative from the Australian Fisheries Management Authority (AFMA);
- Industry (recreational and commercial) representatives from each jurisdiction and New Zealand; and,
- FRDC representatives.

Government representatives, independent scientists, fishery management experts, FRDC representatives attended all three days of the workshop. Industry representatives attended the last day of the workshop. The agenda for the workshop is provided at [Appendix 1](#).

The workshop was well attended with over 30 people on each of the first two days and over 40 people on the third day. A list of participants is provided in [Appendix 2](#).

A previous national Snapper Workshop was held in Adelaide in 2013. The report from that workshop was not published and is provided for information in [Appendix 3](#). The aim of the workshop was to identify cross-jurisdictional strategies and research priorities for Snapper and, partly based on the outputs of the workshop, a number of Snapper research projects eventuated (see <http://frdc.com.au/project?id=2888>). Notwithstanding completion of these projects, it is clear that a number of the research priorities identified at that workshop remain current.

## 2.2 Opening remarks

**Mr Ian Cartwright**, the workshop facilitator, welcomed participants noting that the workshop had brought together a range of key Snapper fishery stakeholders from across Australia and New Zealand, including research, government and industry (recreational, charter boat and commercial) representatives. The presence and support of FRDC representatives was recognised. Snapper fisheries are of great importance for all sectors and generate considerable social and economic benefits. The high level of experience within the room was acknowledged, as was the considerable management challenges presented by Snapper fisheries.

The Hon **Tim Whetstone MP**, Minister for Primary Industries and Regional Development, provided the opening address. The Minister noted that the National Snapper Workshop was being held at a challenging time for Snapper management in South Australia, due to the stock in Spencer Gulf/West Coast being classified as ‘depleted’ and the Gulf St Vincent stock being classified as ‘depleting’. The shared (with Victoria) South East stock is classified as sustainable. The South Australian Government has implemented strong management measures to support the recovery of the stocks in Spencer Gulf/West Coast and Gulf St Vincent, and to maintain a sustainable stock in the South East. Furthermore, a number of additional measures such as new Snapper research projects, a reduction in commercial fees and Snapper re-stocking were being implemented to support the recovery of Snapper stocks.

Minister Whetstone acknowledged the importance of the Snapper fishery for all sectors and the difficulty in balancing effective management amongst the shared sectors, particularly as stock levels are likely to fluctuate in response to climate and other environmental changes. These challenges highlight the need to develop a national, coordinated and effective approach to research and management, learning from the experiences of the past. The assembling of fisheries managers, scientists and key stakeholders from across Australia to critique Snapper management arrangements, review associated research, identify common challenges and knowledge gaps, and determine a ‘best-practice’ approach to managing this shared resource is the challenge that lays ahead for all participants at the workshop.

**Mr Sean Sloan**, Executive Director, Fisheries and Aquaculture at the Department of Primary Industries and Regions provided an overview of Snapper management in South Australia. The social,

economic and environmental challenges the government has faced in managing Snapper were highlighted. These challenges are in part due to the highly variable recruitment of Snapper, sensitivity to changing environmental conditions, and the spawning behaviour resulting in large schools that enable the effective targeting of commercial and recreational fishing effort. Significant funding has been provided for research in support of the numerous management measures that have been implemented for Snapper over the last 20 years. Despite these efforts, Snapper management has been met with limited success, as reflected by the SAFS report. Mr Sloan noted that the workshop had been initiated by PIRSA at the Australian Fisheries Management Forum (AFMF), given the concerns for Snapper stocks across the country and the need to develop a fisheries management toolbox for Snapper with supportive science and appropriate stock assessments.

## **2.3 Workshop Objectives**

The Workshop objectives were to:

1. identify key issues and challenges for Snapper, review Snapper research and critique jurisdictional management arrangements;
2. explore a national approach to collaborate and manage cross-jurisdictional Snapper stocks;
3. explore and develop a set of national R&D priorities for Snapper that address the challenges being faced; and
4. develop a tool kit to support fishery managers to recover depleted Snapper stocks.

## ***3. Management issues***

Fisheries managers from all jurisdictions (and New Zealand) with Snapper fisheries provided presentations on the key management issues and challenges being faced, and the relative effectiveness of current management arrangements.

### **3.1 South Australia – Jonathan McPhail**

The South Australian (SA) Snapper fishery is of significance to the recreational, charter boat, indigenous and commercial sectors. The fishery is based on three stocks: The Western Victorian Stock is a cross-jurisdictional stock that extends westward from Wilsons Promontory, Victoria, into the south eastern waters of South Australia. The remaining waters of South Australia are divisible into the Spencer Gulf / West Coast Stock and Gulf St. Vincent Stock. Using handlines and longlines, commercial catches peaked at over 1,000 t in 2010. After this time, there was a general decline in commercial and recreational catches. There were also declines in commercial CPUE and effort. Around 600 commercial licences have access to Snapper, through the marine scalefish fishery (MSF) and through licence conditions on other fishery licences (e.g. rock lobster and prawns).

There have been numerous reviews undertaken on Snapper management, given its importance, levels of catch and challenges associated with the species' life history (long-lived, slow growing, with variable recruitment). These reviews have resulted in a number of changes to management arrangements over time.

A major review of management arrangements for all sectors and science to support maintain sustainable stocks occurred between 2010 to 2012, which led to an extended state-wide seasonal closure (15 days) and the introduction of an 800 kg daily trip limit. In 2013, the *Management Plan for the South Australian Commercial Marine Scalefish Fishery* was subsequently implemented, including a harvest strategy and the first allocations of the resource between fishing sectors. Spawning

closures, hook limits and a reduced trip limit of 500 kg were also implemented. In the face of a continued decline, the commercial trip limit was reduced further during 2016, to 200 kg in Spencer Gulf and 350 kg in Gulf St Vincent and the South East, and there was a reduction in bag-limits and boat-limits for the recreational (including charter boat) sector. Despite these changes, stocks continued to decline and the Minister announced a closure of the West Coast and Gulfs to Snapper fishing until 2023, and in the South East a seasonal closure from 1 November to 31 January each year until 2023 and a total allowable catch (TAC) for the open season.

**Current rules/access – commercial.** The commercial fishery has been mainly managed as an input-controlled fishery (gear restrictions, area and seasonal closures) and quasi-output controls with size limits and daily catch limits. There is an intention to move the management of Snapper into a quota-managed fishery once the stock has rebuilt, under the current significant MSF reform process.

**Current rules/access – recreational and charter.** The recreational sector is managed via Input controls (gear restrictions, area and seasonal closure) and quasi-output controls (size limits, bag and boat limits). The recreational and charter boat sector will be managed through the provision of a limited number of tags in the south east.

**Challenges, successes and learnings:** Collection of sufficient data to manage Snapper stocks effectively has proved challenging, including the collection of reliable recreational fishing data and pre-recruit information to inform future stock status and pre-emptive (rather than reactive) management measures. In addition to technical issues, the collection of such data is expensive. Snapper spawning aggregations, while attractive to fishers, impact assessments by causing hyperstability of catch rates and elevated fishing mortality. Climate change impacts, including on spawning migrations, remains highly uncertain.

Despite facing challenges, there have been a number of successful research projects to inform management (e.g. use of daily egg production methods (DEPM) for recruitment and genetic methods to determine stock structure). An MOU between the Victorian Fisheries Authority (VFA) and PIRSA and the resulting cooperation has informed management decisions, which will be further informed through holding the National Snapper Workshop.

The value of fisheries independent survey (FIS) information has been realised including the critical data on pre-recruitment. The harvest strategy needs to include explicit decision rules linked to stock status and the information that will be available from a FIS. Finally, the value of cooperation and good governance involving all sectors and government working together will be essential to the effective future management of Snapper in SA.

### 3.2 Western Australia – Shane Walters

Snapper are an iconic species for commercial and recreational fishers in Western Australia (WA). There are six Snapper stocks in WA (<http://fish.gov.au/report/230-Snapper-2018>), three of these stocks occur in the Shark Bay Inner Gulfs (i.e. Denham Sound, the Eastern Gulf and Freycinet Estuary), with the other stock occurring in oceanic waters from Onslow to the SA border. Management of demersal scalefish resources in WA is based on a bioregional model with Snapper being a key indicator species in the South Coast, West Coast and Gascoyne Coast Bioregions and Shark Bay Inner Gulf demersal scalefish resources. Over the past ten years, WA Snapper catches have ranged from 250-600 t, with commercial catches ranging from 150-500 t and recreational (including charter) catches ranging between 80-120 t in WA.

**Current management – Gascoyne oceanic Snapper.** Snapper in the oceanic waters of the Gascoyne Coast Bioregion are currently considered depleted and are a key indicator species for the Gascoyne

Demersal Scalefish Resource. A harvest strategy was introduced in 2017 for this resource, setting out the objectives, performance indicators, reference levels and harvest control rules. Snapper have a minimum size limit of 410 mm and are subject to a three-month spawning closure. The commercial fishery is limited entry, operating under an individual transferrable quota (ITQ) system for Snapper and mixed demersal scalefish. Recreational fishers require a Recreational Fishing Boat Licence if fishing from a powered vessel, have a bag limit of three Snapper and a possession limit. Charter fishers operate under a limited-entry system and are also subject to recreational rules.

A draft recovery plan for Gascoyne oceanic Snapper was recently released for public consultation with explicit performance levels, control rules and milestones to recover the stock within 20 years. Two key strategies form the recovery plan: 1) limit total mortality (retained catch + post-release mortality) by all sectors; and 2) protection for key Snapper spawning aggregations. In 2018, the commercial Snapper quota was reduced by over 81% and a three-month spawning closure was introduced to initiate recovery.

***Current management – Shark Bay Inner Gulfs Snapper:*** Snapper in Shark Bay Inner Gulfs includes three separate Snapper stocks in the Eastern Gulf, Denham Sound and Freycinet Estuary. The Shark Bay Inner Gulf Snapper fishery had catches of 40 tonnes in 1983 that rose sharply, peaking at over 100 tonnes in 1995. In the 1990s, the Eastern Gulf Snapper stock collapsed and the other stocks were deemed high risk. This resulted in significant management action being taken between the late 1990s-early 2000s including the removal of commercial line fishing, reduced bag limits, increased minimum size limit, introduction of a maximum size limit, spawning closures and a limited tag system in Freycinet Estuary. In 2015, all three stocks had recovered to target levels. This resulted in the removal of the maximum size limit and the establishment of the Freycinet Management Zone that replaced the limited tag system with a possession limit of one day's bag limit or 5 kg fillets.

***Current management – West Coast Snapper:*** In the late 1990s – early 2000s there were increasing fisher concerns for the West Coast Demersal Scalefish Resource (WCDSR), including Snapper. A 2007 stock assessment confirmed that the WCDSR was subject to overfishing and recommended total mortality be reduced by 50-100% to recover the WCDSR within 20 years. Between 2007 and 2010, a recovery plan was implemented with the aim of recovering the WCDSR by 2030. The key strategy to recover Snapper on the west coast was to maintain each sector's catches below 50% of 2005/06 levels resulting in significant reform on the commercial and recreational sectors to achieve these reduced catches. Ten years into the 20-year recovery plan, the latest science shows there are some early signs of recovery but stocks are not yet at sustainable levels.

There are formal sectoral allocations in the WCDSR, with 64% allocated to the commercial sector and 36% allocated to the recreational (including charter) sector. Minimum size limits apply and fishers are required to have a release weight on board their vessel (to aid in the prevention of barotrauma). The main commercial line fishery operates under a limited entry, individually transferrable effort (ITE) system (hours) and other management arrangements (i.e. metropolitan area closure and gear restrictions). Recreational fishers have a mixed species daily bag limit of two demersal scalefish (including Snapper), a two-month temporal (effort) closure and possession limits.

Cockburn and Warnbro Sounds support the largest known Snapper spawning aggregations in the West Coast Bioregion. Latest science on Snapper migration and reproductive condition shows Snapper migrating to Cockburn Sound to spawn were in reproductive condition prior to the commencement of the current spawning closure. In addition, recreational and charter fishers were increasingly targeting pre-spawning migrating Snapper and aggregating Snapper prior to the commencement of the closure. In 2019, a management review of the spawning closure resulted in the expansion of the closure area to protect pre-spawning migrating Snapper and the

commencement was moved forward one month to provide additional protection for spawning Snapper. The changes received over 96% community support.

**Current management – South Coast Snapper:** Snapper on the South Coast are currently considered sustainable. The commercial line fishery is currently transitioning from open-access to limited entry arrangements. The recreational sector has a mixed species daily bag limit of 3 demersal scalefish (including Snapper) and a possession limit.

**Challenges, successes and learnings:** Managing total mortality (retained catch + post-release mortality) versus managing retained catches to sustainable levels. Tight management arrangements to recover the WCDSR (i.e. mixed species bag limit of 2 demersal scalefish) has led to a significant increase in the proportion of catch being released (four in every five Snapper caught are now released) and emphasised the difficulties of managing individual species within a mixed species fishery. The post-release mortality implications of this increase in released catch is impacting on the rate of recovery of the WCDSR. How do we improve management arrangements to reduce total mortality of demersal scalefish? For example, we need to balance protection of breeding fish and post-release mortality – are minimum size limits appropriate for demersal scalefish with high or very high rates of post-release mortality (i.e. Baldchin Groper *Choerodon rubescens*) or in the case of Snapper, where the numbers of released fish are high?

Where formal harvest strategies have been developed with significant involvement of key stakeholders, management action in response to sustainability issues has been more effective due to increased transparency and confidence for decision makers, stakeholders and the community. Learnings from Snapper management in WA are that significant reductions (50-100% reduction) in fishing mortality coupled with protection of key spawning aggregations over a sustained period (up to 20 years) is often required to recover Snapper stocks.

### 3.3 Northern Territory – Bec Oliver

**The fishery:** The Northern Territory (NT) Snapper fishery is a multi-sector fishery that spans entire NT coastline from the high water mark out to 15 nm. Fishing is concentrated around rocky reefs within 150 km of Darwin and being close to shore, there are resource sharing considerations and challenges between the commercial, recreational and fishing tour operator (FTO) sectors.

*Chrysophrys auratus* are not found in the NT, however various other tropical Snapper species are found in the NT. In the NT vertical and drop lines are used to target more than 40 different species managed under two separate zones – Western and Eastern. The commercial sector primarily targets the relatively quick growing Black Jewfish (*Protonibea diacanthus*) taking more than 90% of the catch, while the recreational sector focuses on the slower growing Golden Snapper (*Lutjanus johnii*) and Black Jewfish. Numbers of commercial licences peaked at around 160 in the early 1990s and have been reduced through a licence reduction scheme to around 50 licences currently.

Sustainability concerns for Black Jewfish and Golden Snapper were formally identified in 2008 and confirmed by an environmental risk assessment completed in 2009. Management action was taken to reduce the recreational possession limits and capped commercial catches of Black Jewfish and Golden Snapper in the Western Zone. Stock assessments in 2011 and 2014 indicated that both Black Jewfish and Golden Snapper were overfished and measures were required to reduce the harvest by 20% and 50% respectively. This promoted a restructure of the fishery in 2015 that introduced spatial closures, further reduced the recreational possession limits and commercial catch limits.

Since this time, further pressure on Black Jewfish as a result of the high market price for swim bladders has incentivised unlicensed fishers to target Black Jewfish for illegal sale of their swim

bladders. This led to measures being introduced to reduce the potential for illegal trade, including amateur possession limits for all swim bladders, preventing the removal of bladders while fishing and prohibiting the stockpiling of swim bladders at premises.

**Current rules/access – commercial:** In the more remote Eastern Zone, where there is significantly less fishing effort, the commercial sector is primarily managed through input-based controls such as gear restrictions and limited entry. The Western Zone is managed by ITQs with a total allowable commercial catch (TACC) for Black Jewfish of 145 tonnes and 4.5 tonnes for Golden Snapper. All licences have access to the fishery, with nine licences receiving ITQs for the western zone. Both zones have gear restrictions.

**Current rules/access – recreational:** There are no size limits for Golden Snapper and Black Jewfish due to the high mortality rate from barotrauma. General possession limits (15 fish per person) and personal possession limits for target and secondary species (Black Jewfish – 2, Golden Snapper – 3) are used as key management tools. Vessel possession limits for recreational fishers and FTOs, and licence restrictions for FTOs to target reef fish are also in place.

Five temporary closures implemented to aid the protection and recovery of ‘at risk’ reef fish apply to recreational, FTOs and commercial sectors.

**Failures, successes and learnings:** In common with many other exploited stocks, population stock structure for key species has recently been found to consist of discrete stocks along the coastline, indicating the need for finer scale management. The development and implementation of robust harvest strategy to replace current ad hoc management measures is a priority to enable a quick response to changes in stock condition. An improved framework required is required for effective consultation with multiple sectors.

### 3.4 Queensland – Sian Breen and Chad Lunow

**The fishery:** In Queensland (QLD) Snapper is a primary species in the Rocky Reef Fishery, which includes a range of other species including Pearl Perch (*Glaucosoma scapulare*), Teraglin (*Atractoscion aequidens*), Cobia (*Rachycentron canadum*) and Grass Emperor (*Lethrinus laticaudis*). There are 243 active commercial licences currently in the fishery. Snapper are also extensively targeted by the large recreational and charter sectors. The QLD Snapper stock is part of the East Coast stock, shared with New South Wales (NSW). The QLD portion of the stock has increasingly come under pressure over time moving from ‘undefined’ in 2012 to ‘depleted’ in 2018. It has been identified as over-fished or depleted for more than 6 years. Queensland fishers take around 30% (recreational 14%, charter 5% and commercial 10%) of the 591t catch shared with NSW in 2013. In 2019, around 950,000 Queenslanders went recreational fishing, highlighting the significance of the sector.

The commercial sector has seen harvests fall from around 270 tonnes in 2005 to an estimated less than 20 t in 2019. In 2011, a major reform was proposed in response to the 2008 stock assessment. These proposals included: TACs for the commercial and charter sectors, and an annual six-week closure (mid-February to end of March) for recreational fishers, a recreational Snapper permit and recreational bag limit changes. Due to pressure from stakeholders, only one six-week closure was implemented (in 2011), a minor reduction in recreational bag limit from 5 to 4 fish and no TACs were introduced. The 2016 stock assessment showed that Snapper stock condition was potentially much worse, with all models suggesting a decreased biomass (10-23% of unfished biomass in Queensland).

There is currently a major reform underway, the *Sustainable Fisheries Strategy 2017-2027* (SFS), which has set a policy direction to achieve maximum economic yield (MEY - 60% of unfished



biomass), and the development of harvest strategies through the establishment of a Rocky Reef Working Group (in 2017). However, the objective of the reform in relation to Queensland Snapper is to rebuild the stock to 40% of virgin biomass in 10 years, with a TAC for Queensland of 120 t from a total yield of 400 t from the East Coast Stock. Initial reforms under the SFS were implemented on the 1<sup>st</sup> September 2019 included urgent measures for Snapper (such as a boat limit for recreational fishers, TACC and annual 4 week spawning closure).

**Current rules/access – commercial:** A competitive TACC of 42 t for the commercial sector has been established. Commercial netting was banned under the urgent measures and the commercial fishery is now line-only.

**Current rules/access – recreational:** A minimum legal length (MLL) of 35 cm, an individual possession limit of four fish with only one over 70 cm and a recreational boat limit of twice the individual possession limit.

**Current rules/access – charter:** The recreational boat limit does not apply to the charter fishing sector, however, the larger individual possession limits for extended charter trips (i.e. >72 hrs) have been removed.

**Failures success and learnings:** The main reason for the lost opportunity to implement reform in 2011, and halt stock decline, was lack of support from stakeholders, particularly recreational fishers, for the suggested management changes. A more strategic delivery and public messaging of stock assessment outcomes would have reduced the influence of a small number of “champion” sector leaders who were able to create uncertainty in stock assessment results. How stock assessment results are communicated is fundamental to gaining a mandate for change. There is also a need for better communication around the difference in stock status signals between QLD and NSW.

The over-arching SFS policy framework helped to drive recent reforms, coupled with, and driven by, improved communication of the need for change by all sectors. In 2016, the east coast Snapper stock was assessed as a whole (across QLD and NSW), which addressed concerns about separate jurisdictional assessments and improved acceptance of science from the recreational sector. Snapper tagging studies showed that, irrespective of management in NSW, taking action in Queensland can lead to improved outcomes on Queensland part of the stock.

Other learnings included:

- looking at what worked, or not, in other jurisdictions (WA, SA);
- management measures that are applied to all sectors equally (e.g. season closures to protect breeding fish);
- offering alternative fishing opportunities to take pressure off demersal species such as Fish Aggregation Devices (FADs);
- use of social media to promote focus on other species during the closure; having the closure when the fish are actually breeding;
- using weight of evidence approach, not just stock assessments; and
- identification of innovative recreational fishing sector ‘leaders’ to help drive acceptable of management changes.

FRDC funded research is now looking into Management Strategy Evaluation (MSE) modelling management scenarios and effective ways to change fisher behaviour using social media that increases support from stakeholders.

### 3.5 New South Wales – Phil Bolton

**The fishery:** Snapper fisheries in New South Wales are recreationally important, providing a sought-after table fish, and are one of the top five finfish, both by numbers and total harvest. Trapping is the primary commercial method, taking 84% of the catch, with small line and trawl fisheries at 13% and 3% respectively. Commercial effort and catch are at historically low levels – around 160 t in 2018/19. The most recent recreational survey (2013/14) indicated a recreational catch of 148 t. Snapper stocks have been in long term decline from a peak of >900 t, with growth overfishing occurring for many years.

**Current rules/access – commercial:** Snapper are taken in the commercial ocean trap and line fishery, which has undergone a recent substantial reform. Under the reform there is a minimum shareholding required for access with a linkage between shares and trap numbers. Gear restrictions include trap dimensions, numbers of traps and escape panels. Line and hook numbers are also restricted. Spatial restrictions apply to marine parks and marine protected areas (MPAs).

**Current rules – recreational:** A bag limit of 10 fish applies.

**Current rules – all sectors:** A 30 cm MLL applies.

**Management actions:** In the late 1990s, a 4 cm increase in the MLL from 28-32 cms was proposed. In response, 2001 the MLL was increased from 28 cm to 30 cm, which resulted in improvements to catches. The further proposed increase to 32 cm did not occur. In 2008, escape gaps were introduced in commercial fish traps to address discards.

### 3.6 Victoria – Kate Simpson

**The fishery:** The Victorian Snapper fishery is a highly valued recreational fishery and also supports an ongoing hook and line quota-managed commercial fishery from April 2022 in Port Phillip Bay. This follows a \$27 million adjustment program to buy back commercial net licences starting in 2016. The fishery is focused on two stocks – the Western Victorian stock and the Eastern Victorian stock. The primary focus is on the Western stock and the Bay is a major nursery ground for the western stock.

The commercial catch in 2018/19 was 49 t with most of the landings coming from the Western stock (Port Phillip Bay). The commercial catch from the Eastern stock has rarely exceeded 5 t per year, averaging around 3.5 t per year since 2009/10. There has been a long history of commercial fisheries management with hook restrictions introduced as early as the 1930s, followed by seasonal closures and a series of effort reductions.

Snapper is a key component of the highly valued Victorian recreational fishery, which has had bag and MLL limits in place since 1992. The recreational catch of Snapper has increased to around 600 t per year and substantial government and VRFish programmes have been put in place to promote and manage recreational fishing, including those fishers targeting Snapper. The last of these initiatives being the 'Target One Million' phase two investment of an additional \$35 million towards recreational fishing. As a result of strong recreational stakeholder leadership and advocacy, most of the Snapper management changes have been driven by recreational fishers, in accordance with scientific advice. There has been continued investment into recreational monitoring and assessment through the recreational fishing licence fund. Future work is planned towards stronger recreational co-management arrangements and a community return (harvest) strategy.

**Current rules/access – commercial:** A catch cap is in place on the commercial Snapper harvest in Port Phillip Bay (88 t) and will be hook and line only from April 2022.

**Current rules-access- recreational:** Open all year round with seasonal peaks for recreational fishers in Port Philip Bay in late Spring and early Summer. There are bag limits of 10 per person with an MLL of 28 cm, with a maximum of 3 fish over 40 cm. Fishing of all types are not permitted in marine parks or sanctuaries.

**Failures, successes and learnings:** There is a strong predictive capacity for the fishery based on a long time-series of FISs. Victoria experienced the highest ever pre-recruit event for Snapper in Port Phillip Bay in 2018.

### 3.7 Tasmania – Grant Pullen

**The fishery:** There is no commercial fishery *per se* for Snapper in Tasmanian waters, which is taken as an adjunct (bycatch) during fishing operations targeting other species. There are currently low catches of Snapper by all sectors.

A combined trip limit (with Striped Trumpeter *Latris lineata* and Yellowtail Kingfish *Seriola lalandi*), applies to all fishers holding a Tasmanian commercial scale fish fishery licence (personal). Given Tasmania is a climate change ‘hotspot’ with marine waters warming at three times the global average, there is an anticipation that the East Australian Current (EAC) will push the larvae of several species, including Snapper, further south. If larval survival is sufficient, Snapper abundance may increase. This will create significant management challenges and the Department of Primary Industry, Parks, Wildlife and the Environment (DPIPWE) are working with State and Commonwealth agencies to understand the implications of climate change on fisheries and the necessary changes to fisheries management.

The average per annum commercial Snapper catch has been around 250 kg in total for the last three years, while the latest recreational catch estimates (2017/18) are that 1,500 Snapper were retained and 2,400 released, a substantial increase over earlier surveys.

**Current rules/access – commercial:** A trip limit of 250 kgs for a combined catch of Snapper, Striped Trumpeter and Yellowtail Kingfish applies. There is also a MLL of 30 cm.

**Current rules/access – recreational:** A daily bag limit (five fish) and possession limit (10 fish) apply, as with the commercial sector, MLL is 30 cm

**Challenges, successes and learnings:** There is a substantial and growing interest from the recreational sector in opportunities posed by climate-driven range-extending species such as Snapper. Conversely, commercial interest is relatively low and individual catches are capped. There is a need to introduce early management to both sectors if the potential benefits from increased Snapper abundance are to be realised.

### 3.8 Commonwealth – Brodie Macdonald

**The fishery:** Snapper are generally taken in the Commonwealth as a bycatch species. Management measures under the Offshore Constitutional Settlement (OCS) and associated MOUs aim at minimising targeting and discarding. Snapper are most frequently encountered in the Southern and Eastern Scale fish and Shark Fishery (SESSF), where AFMA has implemented a range of trip limits on fisher’s landing catches in Tasmania, Victoria and SA. Snapper in the waters of NSW and WA are under state jurisdiction.

The Snapper bycatch issue is particularly complex in waters adjacent to Victoria, where there are interactions with the recreational sector and licenced Victorian commercial Snapper fishers. There have been ongoing attempts to prevent the targeting of Snapper, while at the same time reducing discards resulting from unavoidable bycatch. An industry initiative from 2010 to 2012 to trial landing

of all Snapper, while actively avoiding targeting the species, resulted in an increase in trip limit from 50 to 200 kg for trawl vessels. The relevant industry body, the South East Trawl Fishing Industry Association (SETFIA) can approve landings >200 kg in the Eastern and Western Zones (excluding the area off Port Phillip Heads), provided certain prior landing conditions are met.

**Current rules/access – commercial:** A trip limit for Snapper of 200 kg remains for trawl operators in waters relevant to Victoria, with retention of >200 kg possible under certain conditions. The 200 kg trip limit will continue to apply to waters around Port Phillip Bay heads with the facility to exceed the limit in the Eastern and Western Zones if exceptional circumstances occur. If the combined Eastern and Western Zones catch exceeds 35 t in a year a response of reverting back to a 200 kg trip limit and a review will be triggered. A limit of 50 kg applies to gillnet and longline operators in Victoria. A trip limit of 250 t for a combination of finfish species applies for all methods in Tasmania, and a trip limit of 50 kg applies to all methods in SA.

**Failures, successes and learnings:** The challenge of restricting the targeting of Snapper while minimising discards remains, particularly where restrictive measures are in place for state fishers (e.g. SA). There are opportunities though for complementary management arrangements between state and Commonwealth fisheries, particularly where there is spatial overlap in fisheries.

### 3.9 New Zealand – John Taunton-Clark and Richard Ford

**The fishery:** The Snapper fishery is one of the largest and most valuable coastal fisheries in New Zealand. It is a relatively complex fishery with three major managed stocks (SNA1, SNA7 and SNA8), with total allowable catch in the range of hundreds to thousands of tons per stock, exploited by both the commercial and recreational sectors <https://www.mpi.govt.nz/dmsdocument/40787-fisheries-assessment-plenary-may-2020-stock-assessments-and-stock-status-volume-3-red-cod-to-yellow-eyed-mullet>.

The recreational Snapper fishery is the largest recreational fishery in New Zealand and is the major target species on the northeast and northwest coasts of the North Island. Snapper is also targeted seasonally around the rest of the North Island and the top of the South Island. There have been significant reductions in bag limits and increases in minimum legal size (MLS) in SNA1, SNA7 and SNA8. The most substantial changes have occurred in SNA 1, the bag limit has reduced from 30 in 1985 to 7 in 2014 when the MLS increased from 27 to 30 cm. The number of hooks permitted on a recreational longline was reduced from 50 to 25 in 1995.

The commercial fishery rapidly expanded in the 1970s using trawl, pair trawl and Danish seine methods, and longlines. By the mid-1980s there were signs of overfishing. Following the introduction of the Quota Management System (QMS) in 1986, TACCs were set at levels intended to allow for some stock rebuilding. While there were TACC increases through the early 1990s via quota appeals, subsequent assessment and management reviews reduced TACCs to further promote stock rebuilding. Supporting controls on both the commercial and recreational sectors were also introduced.

Change to both commercial and recreational fisheries management and strong recruitment has subsequently resulted in a substantial improvement in stock status. Commercial catch per unit effort (CPUE) also increased. Fishery monitoring is ongoing, including a number of innovative approaches for estimating recreational catch.

**Current rules/access – commercial:** The commercial Snapper fishery is managed under QMS using a system of TACCs, ITQs and annual catch entitlements (ACEs).

**Current rules/access – recreational:** The two main methods used to manage recreational harvests of Snapper are the MLS and daily bag limits.

**Failures, successes and learnings:**

- Complex fisheries - Multi-method, mixed species, multi-sector, multi-stock, and not usually a spawning aggregation fishery;
- Highly valued and high value - Competing demands/expectations, but also good justification for information gathering;
- Quota System - Information hungry, ongoing monitoring required;
- Costs of monitoring and some research are restrictive;
- Management has been successful and stocks have grown towards targets;
- Warmer than average temperatures (leading to a number of good recruitment years) and a consistent management approach have aided Snapper recovery in NZ; and,
- Assessment update in 2021 will determine if targets reached.

## 4. Management issues summary

During the afternoon session, participants broke into working groups to consider the key issues raised in the management presentations. These were presented and discussed in a plenary session. A summary of these issues is provided below:

### 4.1 Overall status of stocks/management

Most Snapper stocks have shown significant declines over a long period, although the Victorian stocks are in good shape due to good recent recruitment. In fisheries where declines have occurred, various management actions have been taken, which in many cases, have been inadequate to address increased fishing mortality/ drops in recruitment and have not resulted in significant rebuilding. Without pre-recruit information, the schooling nature of Snapper can lead to hyperstability in catch rates (stable catch rates despite falling abundance), masking the true status of the resource. The status of Snapper stocks, life histories and management frameworks differ greatly between stocks and between jurisdictions. Managing the changes in stock size that results from highly variable recruitment has proved difficult in most jurisdictions because harvesters often see no or little change in catch or catch rate. In Victoria, the current catch and catch rates are driven by a high recruitment event, rather than as a direct result of management action. This highlights the tenuous link between management actions and stock status. That said, pre-recruitment information, such as that collected in Victoria, would assist in driving management change to deal with the reality of episodic recruitment, the drivers for which remain poorly understood.

### 4.2 Common challenges

**Fisheries and environmental data.** Even though it is a key recreational species in all jurisdictions where it occurs, there has been a lack of timely and accurate recreational data on which to base management decisions. In some states, accurate recreational fishing data has not been collected for many years, resulting in limited effective management of the recreational catch. With some exceptions (Victoria) there is also a lack of pre-recruit information. Understanding impacts of environmental drivers, including climate change, on recruitment, stock movement and stock size etc., is required. There is a need to better understand all forms of mortality (i.e. by-catch, post release mortality).

**Achieving management change.** Even where good data are available, ‘activist’ opposition and perception of inequity between sectors has delayed management action. Winning hearts and minds

to support management changes and thereby gain the necessary political will to accept scientific advice and adopt management action continues to be a challenge. It is necessary to match management strategies to Snapper stock structure/life histories given spawning behaviour and episodic recruitment. Finally, there is need to ensure that effective management measures are understandable and enforceable, with strategies for their implementation tailored to account for the differences between commercial and recreational sectors.

**Multi-species issues.** Managing an individual species within a mixed species fishery is challenging because management actions to address problems with one species can have unintended consequences on others, e.g. displacement of fishing effort arising from area closures.

**Incremental, politically acceptable change.** Driven by political considerations, particularly regarding the large recreational sector, frequently only small, inadequate management changes have been implemented, with insufficient consideration given to the negative impact this has on the long-term sustainability of the fishery. Short-term decisions based on acceptable levels of political ‘noise’ and issues such as election cycles may not be adequate to address a declining biomass. Delaying necessary action may reduce short-term pressures, but all too frequently lead to further declines and the need for additional, usually more draconian, management measures (such as a fishery closure).

Multiple management changes, usually with differences between sectors, leads to complexity as different stakeholders are affected differently by the management change, in turn resulting in perceived inequities.

**Episodic recruitment.** Management changes/tools have been inadequate to address increased fishing mortality on stocks that are characterised by episodic recruitment. This is exacerbated in jurisdictions that do not have pre-recruit information to support management, thereby resulting in reactive rather than proactive management interventions. There is limited understanding of the drivers of Snapper recruitment.

**Unclear Management objectives.** Some fisheries have mixed or unclear management objectives and lack effective harvest strategies, leading to increased inter-sectoral conflict. These objectives tend to be broad (cross-sectoral), whereas they need to be specific to a particular sector (recreational, charter boat, commercial and indigenous), to better reflect different values. There are few jurisdictions where management objectives provide guidance on allocation between sectors (resource sharing) and for those that have compliance with the allocations has been variable. Further, the basis for some allocations has been disputed leading to increasing conflict.

**Developing enforceable instruments.** Ensuring compliance with regulations using both regulatory and voluntary approaches in small-scale coastal fisheries is challenging. Snapper fisheries present a particular challenge, given the high proportion of catch taken by the less effectively controlled recreational sector. There is a lack of clarity over what sanctions can, or should, be applied in the event of a breach of agreed catch shares.

**Communication.** There is frequently ineffective communication about the science and a need to deliver clearer, easily understood information to lay stakeholders, who ultimately comprise the majority of those catching snapper.

### 4.3 Successes and learnings

While workshop participants saw some value in a national approach (SAFS Report, triple bottom line management etc.) it was noted that one size (of management measures) will not fit all jurisdictions. However, given the current parlous state of many Snapper stocks, it seems an ideal time to ‘capitalise

on a crisis' and seek additional funding and other support to rebuild and better manage Snapper across the nation.

There are examples of strong/overarching reforms to address management failures, generally characterised by excessive fishing effort in coastal fisheries in QLD, SA and NSW. These reforms provide an opportunity to improve the management of Snapper. Ad hoc and inconsistent changes to management have mitigated against learning and need to be overcome through strategic agreements that include all key stakeholders, particularly at the political level.

Decision making that is led from the top and engages all stakeholders has a better chance of effectively being implemented and translated into management outputs than ad hoc management decisions that are developed in a reactive environment. However, even the successful implementation of management measures cannot guarantee stock sustainability outcomes, particularly in the absence of good recruitment.

In the short term, there is need to apply a more precautionary approach to exploitation of Snapper stocks, while developing and implementing harvest strategy-driven management; ad hoc and inconsistent management changes mitigate against learning. Harvest strategies with clear trigger reference points and control rules have been essential in supporting management decisions and recovery. For shared Snapper stocks, the same harvest strategies should be applied to ensure consistent management responses across jurisdictions.

Seasonal and spatial closures have generally been considered successful, noting that there are several confounding factors in determining the success of closures. Effectiveness of closures and changes in spawning behaviour/location over time need to be understood and allowed for the choice, location and duration of spawning closures. Closures applied to only one sector often lead to perceptions of inequity and often result in conflict.

Effective communication/public engagement is essential to achieve management change; need for specialist approaches, including social media and clear, science-driven messaging on actions is necessary to achieve agreed goals and a shared vision.

Getting sectoral (recreational, commercial and charter) management approaches right, including resource sharing, data collection and management tools and levers is essential, given the disparity between them. In developing management frameworks, there is a need to understand and account for the differences in recreational and commercial fisher behaviour/motivation.

Strong and enduring sector organisations and consultative mechanisms with good governance processes, including Management Advisory Committees (MACs), have been helpful in achieving change.

*Note: The agenda did not allow for due consideration of compliance, particularly for the recreational sector, which will be essential in translating policy, science and regulation into improved management outcomes for Snapper. The Panel recommends that any follow-up workshop should include a discussion on compliance and the integrity of (i.e. keeping within) Snapper catch allocations.*

#### **4.4 Cross-jurisdictional issues**

A number of cross-jurisdictional challenges and benefits from increased communication and cooperation between jurisdictions were identified.

Challenges include:

- limited communication/cooperation between jurisdictions (i.e. sharing of information or different management arrangements for the same stock);

- the mobility of recreational (and commercial) fleets; and
- divergent (and sometimes inconsistent) management policies and objectives across jurisdictions.

Benefits, some of which are not fully realised, include:

- joint stock assessments for stocks that straddle across state/commonwealth boundaries;
- cooperative management arrangements, both informal (MOUs e.g. Vic/SA) and formal (OCS); and,
- standardisation of messages/data/regulations for adjacent stocks and jurisdictions.

These and other benefits should be strongly encouraged and reported on regularly.

#### **4.5 Indigenous recognition**

While not an issue *per se*, there is a need for greater awareness, recognition and incorporation of Indigenous resource use into management approaches in all jurisdictions. Few jurisdictions had formal mechanisms for allocation of Snapper (or others) resources to the Indigenous sector. Working collaboratively with Indigenous groups is more likely to produce strong, positive and enduring outcomes. There is limited information on catch by the Indigenous sector.

#### **4.6 Survey summary**

Participants were asked to complete a short online survey at the end of day one to determine their priority issues. Key issues relevant to improving Snapper management derived from the survey are listed below:

- Lack of or uncertain management frameworks and overarching principles and a need to recognize the importance of good science and clear communication between stakeholders
- Challenge of correctly estimating recreational fishing mortality and being able to effectively control it
- Knowledge of the impact of environment / climate change on recruitment
- Role of the Ecosystem Approach to managing Snapper
- Lack of bold leadership and a 'difficult' bureaucracy hampering the best way forward for managing Snapper
- National cross-jurisdictional collaboration towards an agreed framework with common goals and clear direction and objectives
- Would be useful to compile jurisdictional information to show what has worked and what has not
- Understanding of recruitment and exploitation (fishing mortality)

## **5. Research**

Researchers from all jurisdictions (and New Zealand) with Snapper fisheries provided presentations on the status of Snapper stocks, stock structure, research activities and research priorities in each jurisdiction.



## 5.1 South Australia – Tony Fowler

Research activities on Snapper in South Australia (SA) fall into two categories:

- Core-funded research and monitoring – to determine stock status, based on fishery performance indicators that are specified in the commercial Marine Scalefish Fishery (MSF) Management Plan; and,
- FRDC-funded research (and development and extension) projects, which have involved projects on the life history and population biology of Snapper.

Three key FRDC-funded projects relevant to Snapper in SA have been funded since 2002 and have focussed on: adult migration and its impact on regional stock structure and productivity; climate change impacts; and the development of the DEPM to provide estimates of spawning biomass of Snapper.

Management changes, stock structure and the status of each of the two major Snapper stocks in SA over time were presented. Between 2012 and 2017, the Spencer Gulf/West Coast Stock (SG/WCS) was classified as ‘transitional depleting’ but in 2018 this was downgraded to ‘depleted’. This poor status was also retained in 2019. From 2012-2017, the Gulf St. Vincent Stock (GSVS) was classified as ‘sustainable’, but in 2019 this was modified to ‘depleting’.

The poor recent status of the SG/WCS has been evident from several independent fishery performance indicators. Commercial fishery statistics have declined since 2007, but particularly since 2012. Estimates of spawning biomass from DEPM surveys in 2013 and 2018 were both relatively low. Estimates of population age structures from commercial market sampling indicated that the regional population in northern Spencer Gulf is truncated, and consists of only a few young age classes. Furthermore, the age structures indicate that recruitment has been poor throughout the 2000s.

For the GSVS, record catches through the mid-2000s, have since declined considerably. These suggest that biomass also increased considerably, but has subsequently declined. These trends were substantiated by estimates of spawning biomass from DEPM surveys that were undertaken in 2014 and 2018. The trends in biomass reflect strong recruitment throughout the early 2000s, but a subsequent decline related to a series of poor year classes since 2009.

Knowledge gaps and research priorities for Snapper in SA include:

- developing a protocol for regular DEPM surveys;
- improving estimates of catches from the recreational sector;
- developing a robust and defensible stock assessment model; and
- estimates of population age structures because of low recent sample sizes.

Two research priorities, i.e. recruitment variability and post-release survival are being addressed through two new FRDC-funded projects.

## 5.2 Western Australia – Gary Jackson

Research on Snapper dates to the 1950s, when the focus was entirely on commercial fishing but more recently, from the 1990s, there has been increasing recognition and associated research/management of recreational Snapper fisheries. Research undertaken by Department of Primary Industries and Regional Development (DPIRD) is a mixture of core-funded monitoring and assessment to provide advice to government, and externally funded projects to address more specific

biological or fishery-related information gaps. Since 2000, there have been four major FRDC-funded projects, and one NRM-funded project, focused on Snapper.

Stock structure of Snapper over the 5000+ km of its distribution in WA is complex. Stocks are currently monitored/assessed/managed on the basis of three separate biological stocks in inner Shark Bay (i.e. Eastern Gulf, Freycinet, Denham Sound) and, in open marine waters off the west and south coasts, there are another three management units (i.e. Shark Bay/Gascoyne oceanic, West Coast, South Coast). These stocks are monitored and periodically assessed, mostly using fishery dependent information. The Shark Bay/Gascoyne oceanic stock — with 80% of the catch (until recently) taken by commercial vessels — has been assessed using an integrated model incorporating time-series of total catch data and commercial CPUE combined with age-composition data from commercial catch sampling at fish processors. The stock was assessed as depleted in 2017, with substantial management action taken in 2018 (i.e. TACC reduced by 80% and a seasonal closure to protect key spawning aggregations). Inner Shark Bay stocks — have been essentially recreational fisheries since the mid-1990s, DEPM was used between 1997-2013 (now discontinued) to estimate spawning biomass, combined with information on age composition of recreational catches in integrated models to estimate stock status. All three stocks were assessed as sustainable in 2015. West Coast stock — with catch shared between sectors — is assessed using catch data and age-composition data from commercial (fish processors) and recreational catches<sup>2</sup> to estimate fishing mortality and spawning potential ratio (SPR) and assess against reference points. The stock was assessed as recovering in 2017. For the South Coast stock — with most of the catch taken by commercial sector — age-composition data from commercial catch (fish processors) is used to estimate fishing mortality and SPR and assessed against reference points. The stock was assessed as sustainable in 2015.

Key issues and challenges include:

- stock structure and connectivity in open marine waters;
- disruption in times-series of commercial catch/catch rate data (reducing fleet sizes, management actions);
- reduced access to commercial catches for biological data (changes in supply chain),
- limited information on commercial discard rates;
- development of fishery independent surveys and improved stock assessment models, effects of stock abundance/environment on recruitment variability; and
- long term effects of fishing on spawning aggregations, post-release mortality rates (effects of shark depredation, barotrauma).

Several of these issues — stock relationships, recruitment variability, development of fishery independent survey methods - are being addressed under a current FRDC Project (co-investigators CSIRO, University of Western Australia, University of Adelaide, Flinders University) and an ARC Project (Flinders University and partners in all Australia states and New Zealand).

### **5.3 Northern Territory – Lianos Triantafillos**

Dozens of species of tropical Snappers are caught in the inshore and offshore waters of the NT. Research was initially focussed on offshore Snappers that are targeted by Demersal and Timor Reef

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<sup>2</sup> Send Us Your Skeletons program: <http://www.fish.wa.gov.au/Fishing-and-Aquaculture/Recreational-Fishing/Send-Us-Your-Skeletons>

fisheries, with a large trawl survey undertaken in 1990 to determine the biomass of tropical Snapper found offshore. This was followed by research trying to better understand the population dynamics of these species.

The focus of research shifted towards inshore tropical Snappers in the late 2000s, when sustainability issues for Golden Snapper and reef fish species was first identified in the Greater Darwin region (within 150 km), due to fishing pressure from the Coastal Line Fishery, recreational and the fishing tourism sectors. A stock assessment was undertaken in mid-2011, using a Stock Reduction Analysis model, confirmed that Golden Snapper were overfished and required a 50% reduction in harvest (in all sectors).

Since then, a range of projects has been undertaken to better understand inshore Snapper. These include:

- A tagging study between 2010 and 2018 to better understand movement and migration patterns of Golden Snapper.
- Annual recreational surveys for Greater Darwin area (an area that represents 80% of the total annual NT recreational fishing effort) since 2014.

Assessment of stock structure of Golden Snapper and Tricky Snapper (*Lethrinus laticaudis*)

- Using microsatellites, microchemistry of otoliths and parasites (separate stocks exist at a scale of 10s of km within NT).
- Monitoring of diversity and abundance of demersal fish species at sites inside and outside five reef protection zones using baited remote underwater video (BRUVs) and acoustic surveys.

A number of information gaps exist, including a lack of knowledge of stock-structure and a poor understanding of population dynamics in less commercially important species of tropical Snappers, since stock assessments are limited to a few key target species. Where modelling is done, outputs are compromised by reliance on CPUE as the only index of abundance. There is a limited understanding of the impact of seismic surveys and climate change on stocks.

To address fisheries information needs, there are a number of technological innovations being developed or already in use. BRUVs continue to be used inside and outside the five protection zones and the use of the Vessel Monitoring System (VMS) is mandatory in the Demersal, Timor Reef and Coastal Line fisheries. Electronic logs are also being used to monitor catch in the Demersal, Timor Reef and Coastal Line fisheries, as well as charter boat sector. Going forward, electronic monitoring on all trawl shots in the Demersal and Timor Reef fisheries is being introduced and until such, observers are regularly deployed (minimum 20% of shots). A demersal trawl survey will be undertaken in 2020 to provide biomass estimates for key Snapper species. This survey will be stratified to take into account stock structure of target species, depth, habitat type and time and duration of shot.

## **5.4 Queensland – Michael O'Neill**

The latest research identified important learnings for Australian east coast snapper (Wortmann et al., 2018; Wortmann et al., 2019). The work across New South Wales and Queensland waters established:

- A more southern stock-boundary, based on genetics data, which shifted from near Sydney towards the Victorian boarder. As well as nominal fish tagging data suggesting more localised rather than distant movements of snapper.

- New historical catch and fisher knowledge data supported estimation of historical harvest tonnages taken by commercial, charter and recreational fishing 1880–2018. This was critical and indicated high fishing mortality rates.
- The monitoring data for annual fish age compositions showed spatial changes in the patterns of fishing to harvest larger and older fish from deeper and more distant waters in Queensland. Like for catch rates, standardisation methods are being explored to reduce bias caused by spatial shifts in fishing from year to year.
- Statistical standardisation of snapper catch-rates, including new data on fishing power, illustrated declines for line fishing methods (all waters). However, catch rates increased for trap fishing (only permitted in NSW waters). The unique trap effect of domed vulnerability (big snapper are less likely to enter fish cage-traps compared to small snapper) may inform differently on the abundance of larger sized snapper and their spawning.
- Queensland fishery independent beam trawl surveys signalled some declines in young-of-year (small pre-recruit) snapper.
- Management strategy evaluations are identifying the key management levers to improve spawning biomass (egg production); FRDC project 2019-020 in progress.

This research advanced knowledge for future stock assessment and snapper management. Core work continues in Queensland on improved catch logbooks and validation, pre-recruit surveys, fish age-length monitoring, recreational fishing surveys and catch rate standardisation. A user-friendly web-interface for management strategy evaluation is being developed for Queensland's rocky reef fishery managers and their working group. This is for pearl perch and snapper. Updated stock assessments are due mid-2021.

Future approaches to snapper management need to modernise and transform towards target levels of fishing mortality. This is occurring under Queensland's Sustainable Fishing Strategy. This includes informing stakeholders, through working groups, to understand the effective management levers for safeguarding spawning biomass, and for improving average catch rates and the sizes of fish harvested.

In general, traditional management methods have not worked optimally. Future research needs to consider innovative ideas and solutions to support new management procedures. They need to resolve uncertainties in indices snapper abundance, spawning, recruitment or fishing mortality.

Research's role might be best served to modernise the way we monitor fish stocks. The solutions are not in hand for snapper today, but might relate to using cost-effective technologies from other fields of science. This might encompass the use of camera, video, satellite, sonar, and digital observing technology. As well as advancing survey, genetic, otolith and VMS fishery sciences. Enhanced data is required to overcome the fishery dependencies (biases/blurriness) in data sets and build stakeholder trust and knowledge.

Wortmann, J., M. F. O'Neill, W. Sumpton, M. J. Campbell, and J. Stewart. 2018. Stock assessment of Australian east coast snapper, *Chrysophrys auratus*: Predictions of stock status and reference points. Department of Agriculture, Fisheries and Forestry, Queensland Government.

Wortmann, J., M. F. O'Neill, W. D. Sumpton, G. M. Leigh, and M. Campbell. 2019. Informing inter-jurisdictional snapper management in eastern Australia. Fisheries Research and Development Corporation, FRDC project number 2015-216.

## 5.5 New South Wales – John Stewart

Research activities and funding fall into two distinct categories:

- Core Government and Industry funded research and monitoring for stock assessment, and;
- Externally funded research to address specific knowledge gaps (usually funded by the FRDC, Australian Research Council or the NSW Saltwater Recreational Fishing Trust).

Recent research projects have focussed on: general biology (growth rate, size at maturity, spawning season and patterns of movement); recreational fishing harvests; barotrauma; stock structure; and, the composition of landings.

A description of the commercial and recreational Snapper fisheries in NSW was provided, including current management arrangements and fishing methods. Time-series of harvest, fishing effort and size- and age-compositions in commercial landings were provided. Incorporation of these data into the most recent stock assessment (supported via FRDC project No. 2015/216) was described as well as the rationale for selecting the model scenarios most likely to represent the NSW component of the stock. The stock assessment indicated that the stock was somewhere between ~20 and 45%  $B_0$ . The majority of the eastern Australian biological stock of Snapper reside in NSW waters.

Knowledge gaps/research priorities include: the effects of changes in the Eastern Australian Current on distribution, reproduction, productivity and the fishery; recruitment – drivers and dynamics, strength signals, major spawning areas; longer-term movements (six years only in tagging data); better understanding of growth variation with latitude and temperature; and, appropriate scales of assessment and management.

## 5.6 Victoria – Paul Hamer

Port Phillip Bay has been the centre of Snapper fishing in Victoria since the early 20th century. The first major research into Victoria's Snapper resource over the past 30 years was triggered by the concerns from both the commercial and recreational sectors about the decline in the Port Phillip Bay fishery through the early to mid-1990s. While earlier work had discovered aspects of population structure from tag/recapture studies, and spring-summer spawning aggregations were well known in Port Phillip Bay, basic fisheries biology, early life-history and recruitment processes were poorly understood.

At this time, a significant FRDC-funded project was initiated to learn more about migratory dynamics from tag/recapture data, reproductive biology, age and growth, trophic ecology, and environmental drivers of recruitment. A smaller pilot project, also funded by FRDC, developed cost-effective methods for sampling small 0-age juveniles. Other state-funded projects involved estimates of recreational harvest and composition, and development of creel survey approaches. This work provided important information on the fisheries biology and broad stock structure of Snapper in south eastern Australia but did not provide the required detail on early life history and recruitment processes. As it became more evident that prolonged recruitment failure had likely driven the decline in the Port Phillip Bay fishery, further recruitment studies were recommended.

In 2000, a second major FRDC project was funded to focus on recruitment processes, migratory dynamics and spatial connectivity. This work further developed the sampling program for 0-age Snapper and applied the developing method of otolith chemistry to resolve connectivity between nursery areas and stock replenishment, further confirming the stock structure, but importantly demonstrating the dependence of the entire 'western stock' on spawning and juvenile recruitment in Port Phillip Bay. This work also demonstrated the long-term value of the 0-age surveys in Port Phillip Bay as a stock-wide indicator of replenishment. The surveys continue to occur every year as a core

component of the Victorian Snapper assessment program, and have proven to provide reliable predictions of future trends in adult catch rates.

The National Recreational and Indigenous Fishing Survey also occurred during the early 2000s, and recreational creel surveys became a key part of the fishery monitoring program in Victoria – with a particular focus on the Snapper fisheries in Port Phillip Bay and Western Port Bay. An FRDC project in the mid-2000s further refined the approach to recreational catch estimates. Meanwhile the creel surveys, commercial sampling, and the 0-age surveys became entrenched in the ongoing Snapper monitoring program.

In the late 2000s to early 2010s, opportunities also arose for studies into larval biology and ecology, to further understand the biophysical drivers of recruitment variation. Funding from the Channel Deepening monitoring program in Port Phillip Bay and an ARC Linkage project supported this work, which provided in-depth understanding of the role of river flow and nutrient dynamics in influencing Snapper recruitment in Port Phillip Bay.

Meanwhile large year-classes originating from the late 1990s and early/mid 2000s had resulted in dramatic recovery of the western stock fishery, and the recreational fishery was again booming. However, opportunistic catches in coastal waters by Commonwealth Danish seine and trawl fisheries and a newly emerged longline fishery off south-east South Australia, coupled with several years of poor 0-age recruitment in Port Phillip Bay triggered concerns about the sustainability of the rapidly increasing fishing pressure. The linkage between the increased catches in south-east South Australia and juvenile recruitment in Port Phillip Bay was further confirmed by another otolith chemistry study out of South Australia funded by FRDC. The lack of structured management processes, resource sharing and multi-jurisdictional management approaches was seen as a key risk to maintaining the recovered stock status.

A third major FRDC/Victorian Recreational Fishing Licence Trust funded project was initiated in 2013. This project, focussed on the western stock, sought to develop improved stock assessment tools, including an integrated assessment model, monitoring systems for the recreational fishery (i.e. effort monitoring using boat ramp cameras). In addition, an MSE model framework to support development of a harvest strategy, modelling tools advise on application of size and bag limits for regulating recreational harvest, and improved multi-jurisdictional collaboration on management and assessment.

While the monitoring program in Victoria has been ongoing for many years, funded mostly by cost-recovered funds from commercial fisheries and recreational licence funds, the recent FRDC project has provided the necessary tools to apply the information from the monitoring program to a structured management strategy should the VFA choose to pursue such an approach.

## **5.7 Tasmania – Sean Tracey**

Snapper are not currently assessed in the Tasmanian scalefish assessment report, rather, they are considered an emerging species. The species is predominantly targeted by recreational fishers in Tasmania with no specific commercial fishery for the species.

Research on Snapper in Tasmania has been limited to post-graduate research projects, and more recently an FRDC funded project 2018-070 *“Opportunities and impacts of range extending scalefish species: understanding population dynamics, ecosystem impacts and management needs”*. This project includes the collection of basic biological information for three species – Snapper, Yellowtail Kingfish and King George Whiting (*Sillaginodes punctatus*). The aim is to determine if there are physiological differences between fish caught in Tasmania (range edge) and more endemic habitats

on the mainland. This information may be used to guide management decisions. Species distribution models and ecosystem models will also be developed to predict the potential growth of the populations of these species in Tasmania. The FRDC project has fishery independent components but sample collection is primarily based on a 'citizen science' program collecting fish frames from recreational fishers. Observations of Snapper are also regularly reported to the citizen science program 'REDMAP', which has been useful to map the extent of distribution of Snapper in Tasmania.

A current PhD student is conducting controlled experiments in a laboratory environment to assess Snapper physiology in the cooler waters of Tasmania, relative to endemic water temperatures on the mainland. A recent publication based on this work shows that while performances decline at range-edge minimum temperatures, cold-acclimated Snapper are optimized for energy savings and range-edge limitation may arise from sub-optimal temperature exposure throughout the year, rather than acute minimum temperature exposure.

Preliminary results of the PhD research using acoustic telemetry to assess seasonal movement/residency of Snapper were also presented, indicating that Snapper are strongly associated with reef areas, which may have implications for localised depletion. There was evidence of seasonal migration from semi-sheltered bays to deep water (March-April) across all fish sizes tagged. Results since the workshop have shown that many of the fish subsequently returned to the same semi-sheltered waters after winter. The Snapper tagged in this study also appear to have lower site attachment than previous Snapper tracking studies in Victoria, especially for the small size classes (pinkies).

Future research may include:

- Further understanding the effects of ocean warming on Snapper populations in Tasmania, including breeding, habitat availability and overwintering.
- Resolving genetics of Tasmanian Snapper (uncertainty for the Tasmanian stock - Morgan et al. 2019)
- Historic or ongoing connectivity with mainland populations?
- Do multiple sub-populations exist in Tasmania?
- Are recreational catches indicating increased abundance in future?
- Enhancing opportunities – Artificial reefs?
- Or fundamental is the ability of the current populations to sustain a fishery whether it be recreational, commercial or a combination if there was to be rapid growth in targeting fish.

## **5.8 New Zealand –Rich Ford and John Taunton-Clark**

New Zealand Snapper fisheries in SNA1, SNA7 and SNA8 are scientifically assessed using fully quantitative assessments to determine stock status when possible. Inputs to the assessments include: catch (both recreational estimates and reported commercial catches), commercial catch-at-age/recruitment, fishery-dependent and independent abundance estimates and a range of biological parameters. Recreational catch estimates are available from 2011/12 and 2017/18 using national panel surveys, aerial access surveys, as well as ongoing web camera monitoring of access points/creel surveys. Commercial catch data goes back as far as 1920 and catch-at-age data shows when strong year classes have entered the fishery. Assessments include estimates of other sources of mortality, and illegal catch.

Both commercial CPUE and independent relative abundance estimates are used (as available by stock) as well as absolute population estimates from periodic tagging studies (in SNA1 and SNA8)

prior to 2002, although using the preferred PIT physical tags is now problematic for food safety reasons.

New Zealand Snapper are slower growing and caught at relatively small MLS compared to those in Australia. However, New Zealand Snapper stocks support substantial yields (hundreds to thousands of tonnes per stock). The latest quantitative assessments of New Zealand Snapper stocks at the time of the workshop suggested these are between 10 and 38% of virgin biomass with encouraging trends seen in monitoring since those assessments. Stock Assessments for SNA7 and SNA8 since the workshop both suggest biomass has reached or exceeded the target of 40%B<sub>0</sub>; an update for SNA1 is expected next year.

New Zealand has a science working group system to provide for the review of science by *stakeholders* to ensure the science is fit-for-purpose and scientifically robust. Research gaps have been identified for each stock and include issues around stock structure, abundance indices, temporal trends in growth rates, information about recent recruitment, protected species interactions, catch history and assumptions of recruitment steepness at low biomass.

Environmental interactions of note for the Snapper fishery include:

- with protected species (Black Petrel *Procellaria parkinsoni* in longline fisheries in North-Eastern NZ, and Maui Dolphin *Cephalorhynchus hectori maui* on the west coast of the North Island);
- impacts of trawling on the benthos;
- with habitats of significance (the Kaipara Harbour is considered a recruitment hotspot to the West Coast North Island fishery);
- Snapper in New Zealand generally recruit better with warmer water temperatures.

**Failures, successes and learnings:** Science can support good management by:

- Informing predictions to test management scenarios;
- Pre-recruit surveys that enable fore-warning of recruitment to the fishery;
- Good alignment with management and agreement of all parties over science through working group review;
- Informing trade-offs between objectives and providing advice on how uncertainty should be considered;
- Standardising data between fisheries to enable meaningful comparisons;
- Providing good recreational harvest data, this is expensive but has made a management difference in New Zealand.

## 6. Research issues summary

During the afternoon session, participants broke into working groups to consider Snapper research priorities, using the morning's science presentations as a basis. The outcomes of the working groups were presented and discussed in a plenary session. A summary of the research issues arising from the working groups, the plenary discussion and the participant survey is provided below:



## 6.1 Current and past Snapper research

There has been significant investment in understanding general Snapper biology (i.e. growth, reproduction, diet etc.). Most jurisdictions have undertaken some level of stock assessment modelling, supported by catch, commercial CPUE and length- and age-frequency data, to support implementation of management arrangements. There has been limited application of management strategy evaluation to harvest strategies. In some jurisdictions, there has been research on population structure and the movement of Snapper.

Trends in recruitment have been substantiated by DEPM surveys (SA) and juvenile fishery-independent sampling (Victoria). Victoria has also researched Snapper larval biology and ecology, and the biophysical drivers of recruitment variation (river flow and nutrient dynamics) and their influence on recruitment in Port Phillip Bay. For most other jurisdictions, recruitment trends and the drivers of recruitment remain poorly understood. Work that supports a better understanding of recruitment is not necessarily expensive, but considered essential to estimating stock replenishment, given the episodic nature of Snapper recruitment.

Robust quantification of recreational catch continues to prove challenging but is becoming increasingly important as the proportion of the stock taken by recreational fishers increases. Some improvement in the collection of recreational catch and effort data and efforts to align recreational surveys has been seen in some jurisdictions (e.g. Victoria and New Zealand). That said, there is more that could be done in terms of collaboration and/or coordination between the jurisdictions that would enable this data to be more effectively used to improve management.

Current research projects, funded primarily by FRDC, include recruitment variability and post-release survival (SA), stock relationships, and development of fishery independent survey methods (WA). There needs to be better collaboration and coordination of this research between jurisdictions.

## 6.2 Snapper research priorities from the workshop

The research topics below came from breakout group discussions, which were added to in a plenary session. Time did not permit prioritisation, although one group did attempt it. Reflecting on the presentations, subsequent to the workshop panel members summarised and suggested priority research **as highlighted**. Some jurisdictions will have done research on some or part of these priorities. Additionally, some research topics will be of more, or less, applicability or interest to particular jurisdictions.

- **Fishery-independent indices, derived from:**
  - ***Pre-recruit surveys; e.g. similar to the cost-effective beam trawl surveys undertaken in Port Phillip Bay, Victoria to provide a relative index of recruitment strength and to inform management with a prediction of likely changes to future stock biomass. It is recognised that this is likely more achievable in an embayment than in open waters.***
  - ***Close Kin methods; to estimate the absolute spawning stock size of Snapper, based on genetic identification of parent-offspring matches in adults sampled from the spawning grounds; noting Snapper is a likely suitable species for this approach.***
  - ***Spawning biomass index; e.g. DEPM, not as new research, but to examine if further application of the method is possible for Snapper spawning aggregations.***
  - ***BRUVs; are a relatively cost effective and robust sampling tool for scientists assessing the community composition, distribution, relative abundance and size of Snapper.***
  - ***Tagging; to measure fishing mortality and movement.***

- Acoustic surveys; are another potential means of providing a relative biomass index (or even absolute with multi-frequency acoustics) if spawning aggregations are predictable in space and time.
- **Recruitment dynamics:**
  - **Processes driving recruitment; including stock size and environmental factors – noting the challenges presented by this priority. A reasonable time-series of recruitment indices is likely required before this work can begin.**
  - Identifying when and where Snapper spawn; is required to inform work on obtaining pre-recruit or spawning biomass indices?
  - Stock enhancement; where stocks are depleted or in decline, is there possibilities of enhancing recruitment to the stock? This is possibly blue-sky, but may warrant an initial desk-top analysis.
- **Resource sharing:**
  - **Access and allocation; in all of Australia's fisheries, there are few that have higher cross-sectoral access and allocation issues than Snapper. The political and social aspects of managing and sharing this coastal resource is fraught, and often leads to sub-optimal management arrangements in most, if not all, jurisdictions. Understanding likely sectoral reactions to management measures, including compliance is needed to improve the effectiveness of regulation. A review of Snapper compliance focussing on legal frameworks, stakeholder knowledge of the rules, enforceability and resourcing would be useful.**
  - The "value" of the Snapper resource; understanding how this differs among the Indigenous, recreational and commercial sectors. How do we evaluate (the social and economic values) and allocate the resource based on these different values?
  - Social science; e.g. as above, understanding and measuring different sectoral values, expectations and motivations.
- **General biology:**
  - **Post-release survival; noting that there is already a project in train, this is a critical issue in fisheries with increasing levels of recreational catch and release, particularly as bag limits are reduced and size limits increased. With information available on post-release survival, managers can consider the merits (or otherwise) of catch and release strategies.**
  - Population dynamics; specific to each stock is important to understand suitable management scenarios.
  - **Stock assessment modelling; compare and contrast Snapper stock assessment models and methods.**
  - Spatial stock structure and movement; this is reasonably well understood now as a result of substantial investment in research to date.
  - CPUE standardisation by assessment approach; particularly an issue with the transition of fisheries from dominance of commercial catches to recreational.
- **Broader ecosystem issues:**
  - Ecosystem modelling

- Multi-species fisheries: as one of the more prized and targeted species by all sectors, the ability to control snapper fishing mortality in multi-species fisheries is an issue, probably more in commercial than recreational fisheries.
  - Depredation: recreational and charter fishers are reporting increased depredation of line-caught Snapper, particularly in warmer waters. If determined to be significant, there are some techniques/gears used in commercial fisheries to reduce depredation, which could be tested.
- **Harvest strategies:**
    - **Management strategy evaluation**; *a range of different management approaches has been implemented in the different jurisdictions. This provides the opportunity to test and compare the different approaches, particularly focused on shared expertise/resources.*
  - **Communication/extension/media:**
    - Education on post release survival; with catch and release as a management tool in recreational fishing in all jurisdictions, it is important that methods to reduce post-release mortality are well understood and communicated to the recreational and charter sectors.
    - Disruptions to spawning aggregations; some (non-Snapper) fisheries are based entirely on targeting spawning aggregations, in contrast, some jurisdiction use temporal closures to protect snapper spawning aggregations. Is targeting of spawning aggregations an issue for Snapper fisheries?

## 7. Commercial and recreational viewpoints

Day three opened with a summary of the discussions from the management and research sessions during the first two days, providing an opportunity for commercial and recreational stakeholders to provide input. The recreational and commercial sectors provided presentations, which are summarised below. Finally, a 'best practice' approach to managing Snapper and a list of cross-cutting recommended actions was developed.

### 7.1 Victoria (recreational) – Michael Burgess

Recreational fishing in Victoria is a worth \$7.1 billion to the Victorian economy, with over 800,000 Victorians go fishing around six million times a year, spending around \$300 per trip. Current Victorian government policy on recreational fisheries is based on the 'Target One Million' initiative, which is applying more than \$80 million in government funding to increase recreational fishing participation to 1 million by 2022. A 'Better Boating Policy' initiative of \$47 million includes the provision of improved (and free) boat ramps.

VRFish is an independent, not for profit company acting as the Victorian Recreational Fishing Peak body with the mission to make fishing better, for everyone. Funding is provided through recreational fishing licence fees. VRFish provides advice to Government and other stakeholders on matters that affect recreational fishing, while advocate at the national level through membership on the Australian Recreational Fishing Foundation.

Engagement with recreational fishers and other stakeholders is a key role for VRFish. A range of communication strategies are used, including direct engagement, traditional communications, a website, social media and electronic marketing. Working with VFA, research data is being

communicated and range of YouTube videos have been produced that promote good management practices.

The peak recreational Snapper fishing season is from September to December, mainly targeting large fish, and is one of the most highly anticipated events on the Victorian recreational fishing calendar. During this time, it is not uncommon to have boat ramp queues of 2-3 hours reflecting the enormous social and economic value of the fishery.

VRFish and its members are aware of the biological drivers for the fishery, and in particular the reliance on strong recruitment pulses, which is driving the current high biomass and associated catch rates. Ongoing fisheries monitoring, both by researchers (pre-recruit trawl surveys) and from recreational and commercial fishers (catch and effort data) is essential to future proofing the fishery. Other monitoring activities include access point creel surveys research and diary anglers, catch length composition and the collection of otoliths for age structure. Recreational fishers are directly involved with, and supportive of this work.

Planning ahead for the likely periods of low recruitment will be essential to ensure the future of the Snapper fishery. 'Early warning' alarms of low recruitment years that will show up in the pre-recruit sampling as well as changes in catch rates and length-frequencies will trigger management responses through the harvest strategy. This will reduce the emotion and conflict usually associated with regulatory change.

VRFish actively engages recreational fishers through the promotion of sustainable fishing for Snapper. Initiatives include a campaign to increase post-release survival and the 'Snapper Stewards' program. Through these programs, informed recreational fishers spread the word, act as eyes on the water to support compliance and participate in citizen science and habitat restoration. This all adds up to generating more responsible attitudes and behaviours that make Snapper fishing even better.

## **7.2 South Australia (recreational) – Graham Keegan**

A perspective on the status of the recreational fishery in SA was provided. It was indicated that without a TAC, the commercial Snapper harvest dramatically increased in Spencer Gulf/West Coast in the mid-1990s, around 2006/7 in Gulf St Vincent and 2010 in the South-East of SA. These stocks were subject to dramatic declines in biomass ultimately leading the extensive Snapper fishery closures introduced at the end of 2019. The benefits of the timely introduction of a TAC were illustrated. PIRSA Snapper management interventions for both commercial and recreational fishers over time were described.

For the future, the recreational sector believes that management needs to move away from reactive management to one more based on better assessment, with improved data and effective management controls for all sectors. The long-awaited action on the commercial fishery review that commenced in 2014, still remains to be implemented. For the recreational sector, there is a need to obtain more accurate catch and effort data and an estimate of the past and possible future contribution of the recreational sector to the economy. Other actions that should be taken include an ongoing investment in science, making good the commitment to review the marine sanctuaries and action on environmental issues including seagrass destruction, pollution, storm water and pesticides in run-off.

The Minister's Recreational Fishing Advisory Council is working on recreational fishing strategy that will include: a comprehensive recreational fishing survey to produce more reliable catch data, an ABARES economic survey and a recreational contribution to shared access fishery research, possibly through the introduction of a recreational fishing licence.

### 7.3 New Zealand (recreational) – John Holdsworth

The New Zealand recreational fishery lands around about 40% of the national Snapper catch, with Snapper as the most significant recreational species. The Quota Management Area (QMA) in the north east is the most productive area, with recreational fishers landing 3,120 t of a total of 7,690 t in 2017/18. An annual recreational allowance is set, managed by bag limits and size limits. Density of fishing effort is not proportional between fishing method (recreational, Danish seine, longline and trawl) as determined from logbook data (commercial) and aerial overflight counts (recreational).

The Hauraki Gulf, east of Auckland, is extensively fished by both sectors, with the number of active recreational fishers in the Hauraki Gulf Marine Park representing 37% (218,300) of the national number of saltwater fishers with 30% of the national total (178,100) focused on the Inner Hauraki Gulf. While Snapper is the key recreational species in the Hauraki Gulf (80% of the total catch) at least 25 other finfish species are harvested as well as substantial numbers of shellfish. Average harvest weight of Snapper per fisher from summer creel surveys in the Hauraki Gulf has increased from 1.3 kg in 1991 to 3.4 kg in 2011.

A combination of methods is used to assess recreational catch and construct a plausible catch history, which is used in the stock assessment (telephone diary/interview, aerial and access surveys, national panel survey). Concurrent National Panel Survey in 2011–12 gave confidence in amateur harvest estimates.

Amateur fishers measure the quality of fishing based on catch rate and the proportion of prime sized fish available with the best way to provide this experience being to restore abundance. The Snapper (SNA1) stock assessment in 2013 showed that abundance has been low for 30 years (less than 20% Spawning Stock Biomass for much of that time in the Hauraki Gulf and Bay of Plenty). This led to a management review in 2013. The review proposed a number of management options to restore spawning biomass using a combination of changes to the TAC, different allocations between sectors, reduced bag limits and an increased size limit. The key findings of the review were that while the level of recruitment would lead to rebuilding, it would be a slow rate and a TAC reduction to speed stock rebuilding to 40% of unfished biomass was justified.

There was strong public reaction to the review. Media and political attention were extensive, 47,400 public submissions were received and concerns were raised over wastage and dumping by the commercial sector, caused by taking Snapper when targeting other species. It became clear that there was a need for well-defined management strategy for the SNA1 fishery. The final management decision was that the TAC was increased by 500 t with a 450 t increase in the recreational allowance and 50 t allowance for Maori customary non-commercial fishing. In addition, recreational harvest would be reduced by dropping the bag limit from nine limit to seven and increasing the size limit to 30 cm fork length (FL). The commercial TACC and size limit (25 cm FL) remained unchanged.

Following the 2013 decision a long-term strategy for SNA1 in the form of a Snapper Management Plan was developed over two years using a multi-sector action group. Actions have focused in reducing juvenile mortality and waste, with no further reduction in TAC to date and while stocks are rebuilding, they remain below target.

There remain some unanswered questions concerning how recreational fishers will respond to increased abundance of Snapper. Will increased success lead to higher catches, which in turn will slow/prevent stock recovery to the target of 40% of unfished biomass? Or will a majority of recreational fishers take only what they need, not the maximum allowed, to avoid exceeding their collective allowance and facing further restrictions on individual catch? Finally, there is a need to

ensure fair and reasonable allocation principles, bearing in mind the economic and social importance of the recreational fishery.

#### **7.4 Northern Territory (recreational) – David Ciaravolo**

The Amateur Fishermen's Association of the Northern Territory (AFANT) as founded in 1980 as a non-government, legally constituted, not-for-profit organisation, AFANT currently has approximately 3,000 members (9% of recreational fishers) comprising Individual and Affiliate Members. Major operational funding is provided by the NT DPIR Industry Development Support Program under a five-year funding agreement.

There are approximately 30,000 resident recreational fishers in the NT, with visitors contributing around 50% of the total effort. It has been recorded that 45% of fishing effort is off the Greater Darwin area, with Barramundi (*Lates calcarifer*) and Golden Snapper being the most common species taken. The main reef species are Golden Snapper and Black jewfish.

Major fishing controls in the coastal line fishery are possession limits (Golden Snapper (3) and Black Jewfish (2)) and five reef fish protected areas. To improve governance a Resource Sharing Framework is in place and a multi-Sector Harvest Strategy is under development. Management advice provided through the Coastal Line Fishery Management Advisory Committee, which has multi sector representation.

Major activities and achievements of AFANT include:

- Strong membership base & brand awareness
- Fishing Access and Infrastructure (Gov, Land Councils, Traditional Owners)
- Representation on MACs, Recreational Fisheries Advisor) committee, other advisory bodies.
- Research support & partnerships
- Projects, partnerships & events
- New Artificial Reefs & FADs (Up to \$10M)
- Collaborative Golden Snapper and jewfish tagging
- Recreational fishing value recognised and prioritised accordingly
- Research tagging partnership with NT DPIR
- Sustainable fishing practices
- Gone Fishing Day & youth Fishing
- Consultation & communication
- Golden Snapper Stocking (5,000 fish stocked in 2017)
- Research and other partnerships based on corporate citizenship

AFANT first started advocating for regulatory changes to protect the (tropical) Snapper and Black Jewfish stocks in 2007 based on research from fisheries and anecdotal evidence from recreational fishers on serious declines in the fishery. AFANT's leadership and support was a major driver for the significant changes introduced in 2015, which included the introduction of Reef Protection Areas, possession limits, vessel limits, a cap on fishing tour operators, a reduced TACC and ITQs for Western Zone (Greater Darwin Region).

New challenges and next steps include: the implementation of a new harvest strategy with refined social objectives, targets and decision rules, a review of Reef Fish Protection Area closures, and monitoring and refining management. As the fishery evolves there will be a need to refocus education enhance resource stewardship to address such issues as the black market in Black Jewfish swim bladders.

#### **7.5 South Australia (commercial) – Nathan Bicknell**

Snapper are caught as part of the commercial MSF. The MSF is a complex, multispecies, multi-gear fishery with 307 licence holders harvesting numerous species across coastal waters within SA. The

fishery is important to Indigenous, recreational and commercial fishers, with differing objectives between the sectors. The MSF fleet is owner-operated with small vessels (<12m) fishing in coastal waters (<3 n miles), having one or two crew.

In common with many other small-scale fisheries in Australia, the MSF has suffered from an historical over allocation of licences resulting in a high level of latent effort, which has decreased the overall profitability of the fleet. Effort controls have been used to control catch and effort, although the large, highly mobile, adaptive and innovative fleet has reduced the effectiveness of these controls.

Snapper is one the primary target species for the MSF, which has a 35-year catch history for the species. Traditionally, Snapper were taken during a seasonal handline fishery by generalist fishers, which in recent times has moved to a year-round long-line fishery, with fewer specialised fishers. Both handline and longline methods are highly effective and in 2007/8, the commercial catch share of Snapper was 80%, falling to around 62% in 2013/14.

The Marine Fishers Association (MFA) was incorporated in 2007 from the ashes of the Fisheries Management Committee (FMC) and now represents the licence holders under co-management. The MFA has an elected Board, an Executive Officer, and an Independent Chair. It is also a member of the state's peak industry body Wildcatch Fisheries SA (WFSA), and the national Seafood Industry Association (SIA).

The history of SA Snapper management has been characterised by complex and confounding management measures over time. Measures have generally been taken on a retrospective (three-year stock assessment period), piece-meal basis to deal with a crisis rather than through the use of a comprehensive and coordinated approach. All too frequently the least objectionable management option has been taken (e.g. spawning closures) and currently just about all the tools in the management tool shed have been used. Compounding the problem has been the use of a compromised CPUE data and time series, and the inability to predict fisher's behaviour or the consequences of management changes. It should be noted that despite industry meeting every target or reduction required, Snapper stocks have continued to decline.

**Future challenges.** At the time of the workshop, the MSF is facing a high degree of uncertainty due to the impact of the Snapper closures, which will have a direct impact on the fishery and fishers significantly. Concurrently, there is also a significant MFS reform process about to commence after a long period of consultation. MSF fishers have lost faith in the science, management and politics surrounding the management of Snapper. There are countervailing stock assessments with the CPUE series being relatively optimistic and the fisheries independent DEPM being more conservative. Industry is of the view that an improved integration and recognition of industry knowledge would go some way to restoring faith in the stock assessment process. Competition between fishers, gear-types, regions and stakeholders continues and there is a need to ensure any management changes are equitably spread between the commercial and recreational sectors. This should include monitoring and compliance activities, noting that there is limited capacity in this area and a deal of cross subsidy between sectors.

There are opportunities for improving the management of the MSF. These include:

- generating the political will to take hard decisions to control fishing morality across the sectors;
- a shared MAC process with both commercial and recreational representation;
- a harvest strategy that would reduce uncertainty as to the measures that will be implemented as stock indicators change

- an increased monitoring budget (DEPM, pre-recruitment and recreational surveys);
- reform/restructure of the MSF; and
- Resource sharing with TACC and TARC allocations.

Beyond these opportunities 'blue sky' activities would see further improvements. Such activities would include changes to monitoring and assessment (direct involvement of fishers, equitable science funding based on sectoral allocations and the development of a predictive pre-recruitment index and refined fisheries independent methods including acoustics). More effective management levers/measures including unitisation of the fishery and harvest tags should be considered.

## **7.6 New Zealand (commercial) – Kim Drummond**

Snapper management of the four main stocks in Aotearoa/New Zealand is effective, fishing mortality (all sources) is at sustainable levels and stocks are rebuilding where required. However, while sustainability is being achieved the second limb of the purpose of the Fisheries Act ('...provide for utilisation') is not being adequately addressed, and current management arrangements are not cognisant of the impediments to value creation.

Throughout the key Snapper management areas (SNA1, SNA2, SNA7 and SNA8) industry has actioned a wide range of measures to improve Snapper management. In the key area of SNA1, measures include cameras on vessels to monitor catch of protected species, measuring of sub-legal discards and move-on rules where sub-legal thresholds met. Measures in other areas include seasonal closures, associated fishery impacts, selectivity trials, active avoidance and cooperation with catch sampling, aging and stock assessment.

A case study of industry involvement in Snapper management in SNA7 was presented. Prior to the introduction of the QMS in 1986 Snapper catch in the Tasman and Golden Bays (500 t) and Marlborough Sounds (100 t) had been relatively stable before Government incentives to increase catches led to overharvesting and exceeding processing capability. Post QMS industry successfully called for a review of the TACC even though it had been inflated by the decisions of a Quota Appeal Authority. In support of the TACC review, industry was actively involved in juvenile surveys and tagging programmes to assist with stock assessment and yield estimation. Contrary to the industry view, the TACC was found to be set too high and had to be reduced. Nevertheless, in the aftermath of the contested TACC reduction industry supported a range of adjustments in management settings in support of optimum utilisation. These included measures to protect juvenile habitat, a move to cost recovery for key management functions and a shift from a fixed ITQ within the TACC to a proportional share of the TACC. Conversely, shares of the TAC between sectors are not proportional to catch.

In the late 1990s, a modest increase in the TACC and the setting of a TAC was achieved in response to the initial stock rebuilding that had occurred. Simultaneously, there was a downsizing of the inshore fleet in order to improve catch rates and profitability in line with the incentives under the QMS. It was also necessary to reposition Snapper as a bycatch fishery to protect the integrity of the TACC. Fine-scale management to supplement available information was implemented and the environmental footprint reduced through improvements to gear and its selectivity.

Industry were active participants in the process to review the TAC/TACC for a second time in 2016, which resulted in a modest increase in the TACC and an excessive allocation to the recreational sector. This outcome was contrary to legal precedent for sectoral allowances to be based on actual sectoral catch, since the recreational allocation in SNA7 greatly exceed the recreational catch. Rather than resort to legal action, the industry responded by investing in catch sampling and ageing to assist



with a further (third) review of the TAC/TACC for the 2020/21 fishing year and committed to a collaborative working group to consider management options.

Looking ahead in SNA7, the commercial sector continues to look for:

- recognition of the incentives for stewardship that come with proportional rights to a share of the TACC in perpetuity;
- a revised allocation of the TAC and increased certainty on how benefits of the rebuild will be shared;
- costs recovered by the Crown to reflect the actual costs incurred for managing each sector;
- increased focus going into the impact of non-fishing effects on the marine environment; and
- maintaining or increasing abundance at or to levels agreed to by users of the resource.

## **7.7 WA (recreational) – Matt Gillet**

Recfishwest, as the peak body representing the interests of WA recreational fishers, takes a keen interest in the management of Snapper in WA as an icon species. Snapper is the most caught demersal recreational species in WA with around 117,000 individuals caught annually between Carnarvon and Albany. Under fishing rules, size limits (41-50 cm) and bag limits (2-3 per person) apply to all areas. Spawning closures apply to Gasgoyne Oceanic waters, Shark Bay and Cockburn Sound. These regulations are heavily supported by the recreational fishing sector.

Following a mass fish kill, including a significant number of large Snapper in the Cockburn sound during the peak spawning season in 2015, there was community outrage. This led to the formation of the 'Snapper Guardians' program, which includes a Recfishwest-led Snapper stocking community event. This event is government supported and aims at connecting the community with the environment. The event provides the community with the sense of being part of the solution empowering individuals to step up and play their part in securing the future of the Snapper fishery. In addition to government and community members, other local partners including Cockburn Power Boats Association, Halco Tackle and local tackle stores also support the event.

Initially, a trial project grew out fertilised Snapper eggs, which were subsequently released into the ocean using a Recfishwest crowd funding campaign to raise the money for a juvenile release program. Now Snapper eggs are collected and taken to South Metropolitan TAFE for grow out. The community became engaged by not just providing money, but buying their own fish for release during the community event. The first release was held in 2016 when 500 children and families joined Recfishwest staff and volunteers at a major Snapper Guardians event. Subsequent community Snapper release events have been held in 2017 and 2018, doubling in size each year to the point were close to 1,000 people now attend every year.

The key outcomes of the Snapper Guardian program are:

- a community that is personally invested in protecting a valuable community resource;
- "Community ownership" of the largest known Snapper spawning aggregation in the SW; and
- Active community advocacy to further protect spawning Snapper.

Given the success of the program Recfishwest intend to maintain and scale up the Snapper Guardians Program and use stocking as a means to smooth out the peaks and troughs of recruitment.

## 8. Recommended approach to Snapper management in Australia

Following commercial and recreational sector presentations, participants workshopped and refined a 'best-practice' approach ('toolkit') to managing Snapper across Australia, based on seven key initiatives (or tools) distilled from presentations and break-out sessions. These recommendations below have been written at a national level with an acknowledgement that some of the recommendations, or at least elements within them, may have already been implemented in some jurisdictions.

### 8.1 Building Trust

- By building a partnership with each sector through regular effective consultation and communication even through the hard times (continuous two-way communication)
- By allowing for the capacity to build relationships
- By understanding each other's values; how and why they differ between sectors
- In the information (and the science), including through stakeholder inclusion in science programs (i.e. fish tagging, fish frames), Snapper Guardians, speaking at workshops
- In the management process (proper governance, consultation, transparency, clear messaging)
- By understanding the reasons for, and benefits of, management and other changes
- By sharing benefits, responsibilities and solutions
- By adopting a 'no surprises' approach and avoid undue changing of goal posts
- Ensuring common goals and agreed objectives to provide clarity among stakeholders, manage expectations and improve the outcomes from Snapper stock management

### 8.2 Getting the right information

A research program that supports better management of Snapper stocks, including the following (see also [Section 6](#) above):

- **Basic biology**
  - While basic biological information of Snapper is known (distribution, stock structure, growth, longevity, age structures, reproductive biology, early life history) some changes may occur as a result of climate-change driven effects
- **Comprehensive data on removals** from each sector of the fishery (estimates of fishing mortality). These are considered a bare minimum requirement to manage any fishery.
  - *Commercial* – mandatory logbooks of catch and effort, noting Information from industry needs to be respected and a level of trust
  - *Charter boats* – mandatory logbooks of catch and effort
  - *Recreational* – robust estimates of total recreational catch
  - *Indigenous* – robust estimates of total Indigenous catch

- ***Recreational surveys***
  - Need to be undertaken regularly (in time and space), using a systematic approach and cover, where appropriate, the entire recreational fishing population
  - They need to be extrapolated to estimate entire recreational catch and be granular enough to be useful at the stock level
- ***Unseen “cryptic” fishing mortality***
  - Induced by lower minimum size limits, catch limits, trip limits and quotas
  - Post-release survival estimates (i.e. barotrauma, shark predation)
- ***Stock dynamics***
  - Fishery independent indices – Pre-recruitment surveys, DEPM essential to inform pro-active rather than reactionary management
  - Development of an improved/more robust stock assessment model, noting that a number of Snapper assessments have already been developed
  - Understanding environmental drivers that are conducive for recruitment
  - Standard, globally accepted reference points and performance measures for each fishery, noting that stocks are sustainable and support most productive fisheries at about 40% depletion (on average). This is accepted as a good target for a fishery. Stocks are in danger of collapse if they are depleted below 20%. This is an accepted lower limit for a fishery

### 8.3 Spreading the message

- ***Simple message***
  - Need to provide simple messages about Snapper, its biology and dynamics, importance to those that depend on it and the species’ role in the ecosystem
  - Where possible, seek common agreement across all sectors on the message to be delivered
  - Consideration needs to be given to who ‘owns’ the message and assumes responsibility to ensure it is correct
  - The message needs to be simple initially and then layered with additional details for those who wish to know more
  - Use marketing experts that can help design and deliver simple clear messages
- ***Clear Communication***
  - Information needs to be clear and understandable
  - While there is a role for other media, face to face communication is seen as most credible
- ***Share evidence***
  - The information needs to be shared with all stakeholders and be credible and have logic; this also avoids disputes where there is incomplete/unnecessarily conflicting information

- ***Foster stakeholder champions***
  - Can be very effective in getting the message across, but need to be careful during difficult times, when support may lead to vilification
  - Champions often have numerous influential connections that can help support the key message/change
- ***Use diverse communication channels***
  - Social media, industry champions, radio and television; tailor communication channels to the audience and message

## **8.4 Clear objectives and pathways**

- There is a need to develop and implement a well-defined harvest strategy with sectoral objectives, incorporating a decision-making process with appropriate limits and targets and control rules
- Most Snapper stocks are below targets and need rebuilding so there is a need to specify rebuilding objectives and strategies to achieve them
- Need to be clear on timeframes and some estimation of when the targets should be reached. To achieve this, fishing mortality must be reduced
- Reductions and rebuild timeframes (pathways to stock rebuilding) should be set in consultation with stakeholders and defined in harvest strategies
- Target levels and rebuilding pathway(s) should consider Snapper biology as well as the social and economic values of the different sectors
- There is a need to understand the values, goals and objectives of the different sectors

## **8.5 Sharing the fishery**

- There is a mixture of resource sharing arrangements in place or under development. There is no need to reinvent the wheel
- There is a need for clear objectives/policy for sharing the resource
- Deciding on resource sharing (including allocation) within and between States and Commonwealth is a political/policy matter, under Offshore Constitutional Settlement (OCS) arrangements
- Ensuring the integrity of sectoral shares is a management responsibility
- Providing data/analysis to inform management decisions is a shared (fishers and scientists) responsibility and is critical to maintaining partnerships
- Achieving compliance with regulations is a shared (government and fishers) responsibility

## **8.6 Responsible decision making**

- Transparent and evidence/science-based information should be used in all decision-making processes (noting, ultimately the decision is made by the Minister)
- Effective consultation and communication are essential in all fisheries management processes

- Ensure the outcome of any decision is understood and that all information used to support the decision is available to all stakeholders
- Harvest strategies offer consistent decision-making towards achieving targets and reduce conflict, but need to consider economic and social objectives when determining those targets

## **8.7 Politics and fisheries management**

- The role of MACs, industry bodies etc. is advisory in the context of decision making; it should be made clear that the final call on management decisions is made by the Minister
- Ministers may have many considerations in coming to a decision, e.g. balancing ecological, social and economic objectives
- Good evidence/science-based advice and harvest strategies assist Ministers to make good decisions
- Good advice from well-represented and respected stakeholder organisations support decision-making and vice versa
- Stakeholders need to be involved in all elements of key decision processes from the start (consultation) to the decision (conveying the decision and associated information to stakeholders)
- If all sectors are unified in a position, it is more likely to be supported
- Where possible, the minister should always be provided with solutions and not problems

## **9. Recommended collective actions**

### **9.1 Workshop recommendations**

The following recommendations were developed in plenary session with workshop participants:

1. Recreational, charter boat, commercial and indigenous executive officers from across the jurisdictions to hold a workshop to discuss establishing a national coordinated Snapper Guardians Program.
2. Develop a web portal that provides a centralised location for all information on Snapper and a networking opportunity for all stakeholders.
3. Jurisdictions to meet to discuss and collaborate on improving sharing of information and management of shared Snapper stocks, using the MOU developed by SA/VIC as a case study.
4. A national Snapper Workshop is held every three years to report on outcomes, sharing of information, ensuring a consistent approach to sustainable stocks.
5. Fisheries managers, scientists and industry to look for other opportunities to provide updated information on Snapper management, research and engagement such as ASFB annual conferences, World Fisheries Congress, National Recreational Fishing Conference, Seafood Directions.
6. Scientific modellers to hold a workshop to develop key elements of a national Snapper stock assessment model.

### **9.2 Additional panel recommendations**

The Panel suggests that consideration also be given to the following:

1. Development of joint stock assessments for stocks that straddle State/Commonwealth boundaries, where appropriate.
2. Data sharing, joint stock assessments and related matters should be recognised through cooperative management arrangements, both informal (MOUs, e.g. Vic/SA) and formal (OCS).
3. Priority be given to the development and implementation of a Snapper reporting app for recreational and charter fishing in all jurisdictions with a supporting education/extension program, alongside a commitment from all jurisdictions to share data.

## 10. Conclusions

The National Snapper Workshop was a significant achievement in bringing together government and industry to identify common challenges, successes and knowledge gaps and determining an approach to managing an importance resource for the recreational, commercial and indigenous sectors. It was evident at the workshop that the relative importance of Snapper to both the recreational and commercial sectors varies across each jurisdiction and appears dependent on alternative target species available and whether a commercial fishery has historically formed around Snapper. Both South Australian and Victoria fisheries reflect these dependencies.

Most jurisdictions have or are taking steps to share the resource between the recreational and commercial sectors with often a notional share to the indigenous sector. Monitoring and restricting the recreational sector's catches within its share continues to be a major issue, with little evidence of firm management responses when catches exceed allocated shares. Victoria has significantly reduced this problem by buying out the commercial fishery in regions where there is a high degree of overlap with the recreational sector.

Predicting and managing to Snapper recruitment is a key issue, as historically recruitment is erratic or occasional, and Snapper fisheries are frequently based on targeting a few good year classes. Victoria has had some success with its pre-recruit surveys and the workshop agreed that it would be worth looking at other ways of predicting recruitment.

South Australia is the only jurisdiction routinely using DEPM to estimate stock size. It is an expensive technique with some potential for it to be applied elsewhere in future. Other jurisdictions are either using fishery dependent data and/or other relative abundance methods. It is unclear whether knowing stock size for this species leads to better management outcomes.

Measuring total fishing mortality on each stock is proving difficult and expensive. Intermittent recreational surveys have wide error bounds and most commercial fishing catch is not verified. There are also problems with discard estimation and subsequent mortality of fish. Only WA accounts for this in any way. With small stocks/catches this can become a significant issue when trying to manage or assess a stock.

Determination of stock structure seems to be incomplete and probably arises from the different approaches taken by each jurisdiction. Western Australia has taken a finer scale approach while the east coast is much broader scale, noting the latter still refer to more structuring when convenient. Managing Snapper well across Australia will depend to some extent on agreement between the jurisdictions on stock structure the compatibility of management measures.

Climate effects may be having a significant impact on some Snapper stocks particularly at the northern and southern stock boundaries, with a general movement south. Understanding the implications of shifts in distribution, for example, will require the establishment of adequate management arrangements.

Management changes to rebuild Snapper stocks seem to work best when there is a combination of good science and good stakeholder engagement, and the collaboration between the two is on-going. This approach builds understanding and confidence in the science and views of stakeholders can be accounted for. Currently, the performance of jurisdictions in this area is mixed, with a few doing both well, while others less so, particularly where changes in government policy interrupt the ability of agencies to manage effectively, taking full account of scientific advice.

Overall, the workshop was successful in meeting its objectives. The key issues and challenges for Snapper management and research were identified and jurisdictional progress in these areas was critiqued through presentations, break out groups and panel sessions. A range of cross-jurisdictional (collective) activities where collaboration would be useful were explored and identified. Researchers presented jurisdictional R&D priorities for Snapper, which were subsequently discussed in breakout sessions and during panel sessions in plenary. The authors of this report prioritised these across jurisdictions based on workshop discussions. It should be noted that progress with addressing these priorities is well advanced in some jurisdictions. Finally, the workshop developed a 'best-practice' approach ('toolkit') to managing Snapper across Australia, based on seven key initiatives (or tools) distilled from presentations and break-out sessions. Time did not allow for a deeper analysis of management tools and their effectiveness; it hoped that a subsequent workshop would cover this issue.



## 11. References

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## **12. Appendices**

## APPENDIX 1

# National Snapper Management and Science Workshop Agenda

12 to 14 November 2019

**VENUE:** SARDI AQUATIC SCIENCES  
2 HAMRA AVENUE, WEST BEACH, SA

**Chair:** Ian Cartwright

**Independent Experts:** Tony Smith, Ian Knuckey and Nick Rayns

## Day 1

Time	Item	Speaker
10:00 am	Introduce the Minister	Chair
10:00 am	Official opening	Minister for Primary Industries and Regional Development
10:15 am	Welcome to Country	Isaac Hannam
10:20 am	Objectives of workshop/day 1	Chair
<b><u>Jurisdictional Snapper Management Arrangements Presentations</u></b>		
<b>Objectives:</b> <ol style="list-style-type: none"><li>1. To provide an overview of the past and current management arrangements.</li><li>2. To provide an overview on the successes, failures or learnings of management arrangements implemented.</li></ol>		
10:30 am	South Australia	Jonathan McPhail
10:55 am	Western Australia	Shane Walters
11:20 am	Northern Territory	Bec Oliver
11:45 am	Queensland	Sian Breen
12:10 pm	New South Wales	Phil Bolton
12:35 pm	<b>Lunch (30 mins)</b>	
1:05 pm	Victoria	Kate Simpson
1:30 pm	Tasmania	Grant Pullen
1:55 pm	Commonwealth	Brodie MacDonald
2:20 pm	New Zealand	John Taunton Clarke

2:45 pm	Afternoon tea (15 mins)	
<b><u>Workshop to discuss and develop a ‘best practice’ management approach</u></b>		
<b>Objectives:</b>		
<ol style="list-style-type: none"><li>1. To identify and discuss the failures, successes and learnings from the Snapper management arrangements implemented.</li><li>2. To identify the most appropriate ‘best practice’ management approach (tool kit) to recover depleted stocks and maintain sustainable stocks.</li></ol>		
3:00 pm	Workshop (groups) – Identify the most appropriate ‘best practice’ management approach (tool kit)	Chair, Independent experts
4:20 pm	Forum discussion on outcomes of workshop groups	Chair, Independent experts
5:00 pm	Closure day 1 (Chair, Independent experts to meet to discuss day 1 outcomes)	

## Day 2

Time	Item	Speaker
9:00 am	Introductions, summary of day 1 and objectives of day 2	Chair
<p><b><u>Jurisdictional Snapper Science Presentations</u></b></p> <p><b>Objectives:</b></p> <ol style="list-style-type: none"> <li>1. To provide an overview of the Snapper research, including those that were developed at the previous Snapper workshop in Adelaide.</li> <li>2. To provide an understanding of the current Snapper research knowledge gaps.</li> <li>3. To discuss and deliberate on how current and/or new research can support to inform the ‘best practice’ management approach.</li> </ol>		
9:20 am	South Australia	Tony Fowler
9:45 am	Western Australia	Gary Jackson
10:10 am	Northern Territory	Lianos Triantifillos
10:35 am	Queensland	Michael O’Neil
11:00 am	<b>Morning tea (15 mins)</b>	
11:15 am	New South Wales	John Stewart
11:40 am	Victoria	Paul Hamer
12:05 pm	Tasmania	Sean Tracey

12:30 pm	New Zealand	Richard Ford
12:55 pm	<b>Lunch (30 mins)</b>	
<b><u>Workshop to discuss and explore how science can support management approach</u></b>		
<b>Objective:</b> 1. To discuss and deliberate on how current and/or new research can support to inform the 'best practice' management approach.		
1:25 pm	Workshop (Groups) – Snapper science to support management approach	Chair, Independent Experts
2:50 pm	<b>Afternoon tea (15 mins)</b>	
3:05 pm	Forum discussion on outcomes of workshop group	Chair
4:00 pm	Closure Day 2 (Chair and independent experts to meet to discuss recap for presentation next day)	
<b><u>Other Activities</u></b>		
4:00 pm	Tour of SARDI Aquatic Sciences	Steven Clarke
6:30 pm	Dinner	Watermark, Glenelg

## Day 3

Time	Item	Speaker
9:00 am	Introductions, objectives of day 3, summary of previous two days & Q&A of summary	Chair, Independent Experts
<p><b><u>Jurisdictional Snapper Recreational and Commercial Presentations</u></b></p> <p><b>Objective:</b> 1. To provide an overview of the key issues and challenges being faced and the relative effectiveness of implemented management arrangements.</p>		
9:40 am	Victoria – Recreational Fishery	Michael Burgess
10:05 am	South Australia– Recreational Fishery	Graham Keegan
10:30 am	New Zealand – Recreational Fishery	John Holdsworth
10:55 am	<b>Morning tea (15 mins)</b>	
11:10 am	Darwin – Recreational Fishery	David Ciaravolo
11:35 am	Queensland – Charter Boat Fishery	John Gooding
12:00 pm	South Australia – Commercial fishery	Nathan Bicknell
12:25 pm	<b>Lunch (30 mins)</b>	
1:05 pm	New Zealand - Commercial Fishery	Kim Drummond
1:30 pm	Western Australia - Recreational Fishery	Matthew Gillet

**Workshop to discuss and explore how to incorporate industries key issues into management and science approach**

**Objective:** 1. To discuss how to incorporate industries key issues and challenges into the management approach and identified research.

1:55 pm	Workshop discussion – Recreational and commercial issues / challenges and successes and how to incorporate this into the management approach and identified research.	Chair, Independent Experts
3:05 pm	<b>Afternoon tea (15 mins)</b>	
3:20 pm	Forum discussion on outcomes from workshop	Chair
4:00 pm	Closure day 3	Chair

## APPENDIX 2

### Workshop participant List

Name	Organisation
Ian Cartwright	Thalassa Consulting (Independent Chair)
Ian Knuckey	Fishwell Consulting (Scientific expert)
Tony Smith	Tony Smith Consulting (Scientific expert)
Nick Rayns	Future Catch (Fisheries Management expert)
Chris Izzo	Fisheries Research and Development Corporation
Crispian Ashby	Fisheries Research and Development Corporation
Patrick Hone	Fisheries Research and Development Corporation
Chad Lunow	Department of Agriculture and Fisheries - Queensland
Michael O'Neill	Department of Agriculture and Fisheries - Queensland
Sian Breen	Department of Agriculture and Fisheries - Queensland
Dr John Stewart	Department of Primary Industries - New South Wales
Phil Bolton	Department of Primary Industries - New South Wales
Mark Cranstone	Department of Primary Industries - New South Wales
Gary Jackson	Department of Primary Industries and Regional Development - Western Australia
Shane Walters	Department of Primary Industries and Regional Development - Western Australia
Jonathan McPhail	Department of Primary Industries and Regions - South Australia
Delahay Miller	Department of Primary Industries and Regions - South Australia
Skye Barrett	Department of Primary Industries and Regions - South Australia
Dr Anthony Fowler	Department of Primary Industries and Regions - South Australia
Dr Mike Steer	Department of Primary Industries and Regions - South Australia
Prof Gavin Begg	Department of Primary Industries and Regions - South Australia
Jonathan Smart	Department of Primary Industries and Regions - South Australia
Grant Pullen	Department of Primary Industries, Parks, Water and Environment - Tasmania
Sean Tracey	Institute of Marine and Antarctic Studies
Rebecca Oliver	Department of Primary Industry and Resources - Northern Territory
Lianos Triantafillos	Department of Primary Industry and Resources - Northern Territory
Kate Simpson	Victorian Fisheries Authority
Paul Hamer	Victorian Fisheries Authority
Brodie MacDonald	Australian Fisheries Management Authority
John Tauton-Clark	Fisheries New Zealand
Richard Ford	Fisheries New Zealand
John Holdsworth	New Zealand Sport Fishing Council
Kim Drummond	Te Ohu Kaimoana – New Zealand
John Gooding	Charter Boat Fishery - Queensland
Lachlan Reed	Recreational Fishery - Queensland
Michael Thompson	Commercial Fishery - Queensland
Michael Burgess	VR Fish - Victorian Recreational Fishing Body
Randall Owens	Great Barrier Reef Marine Park Authority
Nathan Bicknell	Marine Fishers Association – South Australia
Graham Keegan	Minister's Recreational Fishing Advisory Council - South Australia

Neil MacDonald	Surveyed Charter Boat Owners & Operators Association of South Australia
Tom DiVittorio	Surveyed Charter Boat Owners & Operators Association of South Australia
David Ciaravolo	Amateur Fishermen's Association of the Northern Territory
Matt Gillet	RecFish West - Peak Fishing Recreation Body Western Australia
Vic Levett	Recreational Fishing New South Wales Advisory Council
Matt Sherriff	Recreational fishery - Tasmania



# APPENDIX 3

## Strategic Planning Workshop for Snapper Research – Draft Notes

Location: SARDI, 2 Hamra Avenue, West Beach, Adelaide

Date: 1 March 2013

Attendance: Tim Ward (SARDI - Chair), Crispian Ashby (FRDC), Gavin Begg (SARDI), Paul Hamer (Vic), Mark Edwards (Vic), Travis Dowling (Vic), John Stewart (NSW). Rick McGarvey (SARDI), Alice Fistr (PIRSA), Alex Campbell (Qld), Gary Jackson (WA), Sean Sloan (PIRSA), Michelle Besley (PIRSA), Tony Fowler (SARDI), James Andrews (Vic), George Day (AFMA), Mike Steer (SARDI).

### 1. INTRODUCTION

#### FRDC:

- Considerable funding has been invested into Snapper research over the years
- In the recent “Status of Key Australian Fish Stock Reports” the status of Snapper is ‘undefined’ in some jurisdictions, ‘transitional-depleting’ in some regions of SA and ‘transitional-recovering’ in WA
- ‘Iconic’ high value species has been identified as being at risk to climate change in the South East Australia Program (SEAP)
- Workshop aim: identify cross-jurisdictional strategies and research priorities for Snapper

### 2. KEY ISSUES FOR EACH JURISDICTION

#### South Australia

- Different levels of stock status in different regions of State
- Structural changes in the fishery have compromised CPUE as indicator of relative biomass
- Require an independent estimate of biomass to feed in the existing stock assessment model
- Need to evaluate the value of spawning closures
- FRDC proposal to establish Daily Egg Production Method (DEPM) for stock assessment

#### Victoria

- Need a Management Plan – currently do not have one
- Require tools for regulating some sectors (recreational, charter, trawl)
- Need to manage resource sharing and allocation
- Need better stock assessment, performance indicators and harvest strategy
- Need robust recreational catch estimates
- Understanding of the fleet dynamics – currently it “is a bit of a mess”

#### NSW

- Department currently undergoing major structural changes
- Require a Snapper population model and ability to determine stock status
- Need performance indicators in improved stock assessment

- Better industry co-operation, engagement
- Understanding of the stock structure particularly on the northern coast and resource sharing with Queensland

#### Queensland

- Model would be improved by independent index of abundance
- Need to define stock boundaries, understand cross-jurisdictional movement, and understand important spawning and recruitment areas Improve the accuracy and precision of stock assessment
- Greater understanding of the fleet dynamics required
- "Quantify post release mortality, high grading and rate of discarding"

#### Western Australia

- Greater understanding of the recreational harvest
- Improved communication amongst stakeholders – emphasised through the MSC pre-assessment
- Effects of climate change on stock structure, spatial and temporal fishing patterns

#### Commonwealth

- Cross-jurisdictional management
- By-catch assessment in long-line sector

### **3. DPI VIC – tabled a draft TRF Proposal**

- Communication-based project
- Aim to develop communication material that summarises the coordinated work (research and management) to relevant stakeholders
- A means to ensure stakeholders are appropriately informed and engaged in the various research and management initiatives
- Use Snapper as a 'case-study'

#### Discussion:

Some of the points have already been covered in the National Stock Status Report.

Tactical nature of the application not clear-cut.

Considerable benefit to the recreational sector who are largely sheltered from the stock assessment process.

MSC accreditation requires clear management communication and community engagement among all sectors/stakeholder – so can see the need for the project.

Recent community engagement exercises have clearly identified the need for good education prior to undertaking research/management.

Would this project use Snapper as a case-study for this communication exercise?

Some issues are bigger than Snapper – i.e. what does “sustainability” mean for managers, economists, the public etc...

Fishers talking to fishers is extremely beneficial

This potential project will be developed further in consultation with FRDC.

#### **4. SYNTHESIS**

Six priority areas were identified:

1. Increased formalisation of harvest strategies needed in SE Australia
  - Each jurisdiction at different levels of advancement in stock assessment and management
  - Models in place in WA (some areas), SA and Qld and required in NSW and Vic
  - Fishery independent estimates of abundance needed in SA, Qld and NSW (likely Vic)
  - Jurisdictions require FRDC's help in aligning and improving assessments of status
2. Stock Structure
  - Poorly understood - needed to place stocks into a management context
  - East coast – Vic/NSW/Qld?
  - West coast – Vic/SA?
  - WA – treated as separate management units
  - Stock structure cannot always be easily resolved especially if it is not temporally stable
  - Can a single stock approach for east coast and Vic/SA be justified?
  - Molecular-based project also has potential for stock assessment – ‘close-kin’ method
3. Communication.
  - Especially relevant to the recreational sector and broader community
  - “Critically” driven by issues of resource allocation
  - Is this really a Snapper research priority, or something that should be considered as part of the communication and extension plan in any project?
  - Also broader issue than Snapper
4. Incidental Fishing Mortality
  - High grading/post release survival
  - Not accounted for in some stock assessments
  - Information available needs to be distributed among jurisdictions
5. Recreational Catch
  - Determine the best method used to manage it – different issues in different jurisdictions; i.e. quantifying recreational harvest would be easier in Victoria than WA purely on the basis of area
  - Issue is broader than Snapper
  - Integration of recreational catch into stock assessment
  - Needed to address allocation issues
6. Climate Change and Environmental Drivers

#### **5. PRIORITY PROJECTS**

Need to address issues raised in National Fishery Status Report. There is a need to improve the current approach to the assessment and management of Snapper in most jurisdictions. It was agreed

that the approach taken in Shark Bay is well advanced (population model that utilises fishery independent estimate of abundance, but not well-defined harvest strategy).

Priorities projects identified.

1. Develop an integrated age/length based stock assessment model for the east coast 'stock'
  - enhance existing Qld model – Qld lead project
  - Use data from QLD, NSW and Vic (East Coast)
  - Assess need/benefits of fishery independent data (recruitment surveys)
2. Management strategy evaluation harvest management and resource sharing for multi-sector Snapper fishery for Victoria (western)
  - Underpin a new harvest strategy for commercial and recreational sectors
  - Use Snapper model developed by DPI Vic
  - Project currently under-consideration by FRDC
3. Need a fishery independent means of estimating Snapper biomass in several jurisdictions (SA currently, potentially Vic, NSW and Qld)
  - Daily Egg Production Method (DEPM) identified as suitable
  - SA to develop the method in known spawning areas in Spencer Gulf and Gulf St. Vincent and integrate results into their established stock assessment model.
  - Consult with WA and Vic
4. Need a national Snapper stock structure study – may provide insights into population size
  - High priority in medium term
  - Molecular technology will become more cost-effective and established in 5-10 years
  - It was agreed that agencies should start collecting tissue samples as part of their routine length/age sampling programs and store until method becomes cost-effective
  - Requirements for sample collection and storage to be determined and circulated among agencies
  - The cost of collecting tissue samples is expected to be negligible
5. Need better coordination of assessment and management
  - Snapper identified as priority and potential case study by AFMF
  - Potential to develop a steering committee (scientists and managers) to oversee projects, ensure coordination and maximise uptake of results

## CONCLUSION

### FRDC:

- Glad to see constructive conversation among the agencies that are working towards a common goal - to determine/develop the best management strategies/assessment for Snapper
- Endorse the development of the four key projects
- Encourage further cross-jurisdictional discussion in the development of the projects (*potential for development of a national Snapper steering group to oversee?*)

## APPENDIX 4

# National Snapper Workshop II

### Summary of the National Snapper Workshop II: 8<sup>th</sup> December 2020

**Participants:** Jonathan McPhail (NTDITT), Rebecca Oliver (NTDITT), Thor Saunders (NTDITT), Illaria Catizone (FRDC), Crispian Ashby (FRDC), John Taunton-Clark (NZ Fisheries), Natalie Crouchman (AFMA) Michael Steer (SARDI), Anthony Fowler (SARDI) Shane Walters (WAPIRD), Phillip Bolton (NSWDPI), John Stewart (NSWDPI), Sean Tracey (UTAS), Michelle Wernner (VFA), Simon Conron (VFA), Dallas D'Silva (VFA), Justin D'Bell (VFA), Chad Lunow (QLDDAF), Amanda Northrop (QLDDAF), Keith Rowling (PIRSA), Skye Barrett (PIRSA)

### Introduction

A second National Snapper Workshop was held on the 8<sup>th</sup> December 2020 (see Agenda at Attachment A) with the objective of assessing progress with the management of Snapper and the implementation of the recommendations from the first National Snapper Workshop held in Adelaide. Due to COVID-19 restrictions, the workshop was held using Microsoft Teams. In support of the second workshop, a Survey Monkey was circulated and the information from that survey (once all jurisdictions provide the information requested), together with presentations from the first workshop, will be made available through either Dropbox or the proposed web portal being developed by the Australian Society for Fish Biology (ASFB) Fisheries Management Committee.

### Jurisdictional updates

Each jurisdiction provided an update on:

- a) developments to the management of the Snapper fishery since the workshop in Adelaide.
- b) responses to the recommendations from the first Snapper Workshop (see attachment B for recommendations).

### South Australia

*Management changes to the Snapper fishery following the first National Snapper workshop include:*

- Undertaking numerous programs to support the recovery of Snapper in South Australia.
- Established a Snapper Management Advisory Committee (SMAC) to support Snapper management in SA, in particular the South East - the rest of the state is closed.
- Implemented a Total Allowable Catch (TAC) for the 2020 South East Snapper season incorporating a Total Allowable Commercial Catch (TACC) and a Total Recreational Catch (TARC). The TARC includes the charter boat sector.
- Implemented a tag and reporting program for the recreational and charter boat sector to ensure compliance with the TARC.
- A FRDC program being run through SARDI/UTAS which is exploring data collection using an app paired to a traditional phone/diary survey
- The commercial sector was close to reaching their TACC, the recreational and commercial sector catch was low due to a range of factors such as COVID-19, weather.

- A review of the tag program, which identified that while it was more appropriate to implement an individual catch limit of 2 per person, mandatory reporting is required. The Charter Boat Fishery requested the tag program continued.
- Undertaking a restocking pilot study, partly in response to the September 2019 Snapper closure.

*Response to recommendations from the first National Snapper workshop:*

- SMAC is the engagement tool in SA to support input into the process for each of the sectors. Given this, PIRSA would support a state based Snapper guardians program initially, prior to broadening it to a national program.
- Support for a web portal for all Snapper related information; consideration should be given to aligning it with web portal that is being developed by the ASFB Fisheries Management Committee. The web portal will need to provide access for the recreational, commercial and the Indigenous sector.
- A Snapper MOU with Victoria has been established to support sharing of information for the South East stock.
- Support for a Snapper management workshop every three years, noting that it is important for jurisdictions to continue to understand the challenges, learning and successes associated with the task of recovering Snapper stocks.
- Working with Victoria to undertake joint stock assessments for the South East stock.
- Implementation of a mandatory reporting app for the recreational sector in the South East Management Region.

## **Western Australia**

*Management changes to the Snapper fishery following 2019 National Snapper workshop include:*

- A FRDC Research project in progress to understand movement and spawning of Snapper.
- A multi-species, multi-method harvest strategy is about to be released.

*Response to recommendations from the first National Snapper workshop:*

- A Snapper Guardians program is in place, which is primarily based on releasing juvenile Snapper in Cockburn Sound; its primary use is as a method for engaging stakeholders and to promote community stewardship. There would be some benefits/key linkages to taking a national approach.
- The SAFS process may provide an opportunity for the collation of all Snapper information and for fisheries managers to meet and discuss management of Snapper.
- Data sharing arrangements with the Commonwealth are in place.
- The 'best practice' tool box for Snapper management developed at the 2019 National Snapper Workshop is a good reference for the development of harvest strategies. In particular, each fishing sector may have differing objectives and targets, which are aligned with their aspirations and will need compromise to achieve.
- Support for a National Snapper Workshop every three years. The workshop needs to be tailored towards harvest strategies and identify what has worked and what hasn't. Each state is at different stages with their harvest strategies and the workshop would provide a great opportunity for each jurisdiction to learn from each other.

## **Northern Territory**

*Management changes to the Snapper fishery following the 2019 National Snapper workshop include:*

- Continuing to progress Snapper management in NT.

*Response to recommendations from the first National Snapper workshop:*

- Support the concept of a National Snapper Guardians program, however it must include clear overarching objectives.
- The ASFB Fisheries Management Committee is currently in the process of rolling out Trello. It is a web portal program that provides a centralised location for all information on a range of topics and will be ideal for information on Snapper management. Fisheries Managers from particular jurisdictions have been testing the platform and next step is to seek approval from AFMF to provide access to all fisheries managers. The platform can provide an external access, however this would be at an extra cost to manage (i.e. security).
- MOU's developed with QLD for a range of key species.
- Support a workshop every three years, which could provide an opportunity for all stakeholders to work on particular issues/wicked problems. It is also an opportunity to relay information on research projects or management that has supported recovery of Snapper stocks.
- The SAFS process has identified that there are numerous different Snapper models used across Australia. It would be appropriate for all modellers to attend a workshop to explore, develop and standardise these models.

## **Queensland**

*Management changes to the Snapper fishery following the 2019 National Snapper workshop include:*

- Currently developing harvest strategies.
- Implemented a FADs program that has been successful for the charter boat sector.
- Undertaken a MSE, which may change the tools QLD use to manage fisheries.
- Moving to Stock Synthesis - a NOAA based stock assessment model to model snapper.
- Support for a further National Snapper Workshop which will provide an opportunity to learn from other jurisdictions, in particular limit and target reference points.
- Undertaking a 'Fishing for Change' program, which is to understand the social values of each sector and how QLD fisheries can work closely with these sectors.
- Recreational fishing survey released.
- Review of the fishing community engagement.

*Response to recommendations from the first National Snapper workshop:*

- Need to understand the purpose and objectives of a Snapper Guardians program.
- Qld are collaborating and sharing information with NSW's on Snapper.
- Fully support the need for a Snapper reporting app. and see it as an important part of the Snapper Guardians program.
- The National Snapper Workshop report could be improved by including a table of management arrangements that have supported recovery of Snapper stocks.

## **New South Wales**

*Management changes to the Snapper fishery following the 2019 National Snapper workshop include:*

- A rolling program of biennial recreational fishing surveys are underway that will provide better information on Snapper catch from the recreational sector.
- There are challenges associated with making changes to management when stocks are classified as sustainable. It is anticipated that as specific harvest strategies are developed in NSW, there will be opportunity to work with the fishing sectors to improve the performance of fisheries.

*Response to recommendations from the first National Snapper workshop:*

- The Snapper Guardians program would raise the profile of the species in NSW and support improved management and science of Snapper.
- The sharing of information or having a platform of information is very important for our stakeholders.
- A workshop that shares information on the challenges, learnings and successes of Snapper management and science is very important.
- NSW would be open to the consideration of a reporting app for the recreational and charter boat sector if there was a clear requirement and the benefits were apparent.

## **Victoria**

*Management changes to the Snapper fishery following the 2019 National Snapper workshop include:*

- Currently developing a recreational fishing only Snapper harvest strategy, given most access has been removed from the commercial sector. The committee that is developing this harvest strategy has only met once.

*Response to recommendations from the first National Snapper workshop:*

- Victoria already has a Snapper Guardians program and all the initiatives are implemented by the recreational sector. Supportive of a national approach.
- Supportive of a three yearly National Snapper Workshop.
- Has a MOU with SA to support sharing of information for the South East stock.
- Made management changes to the Commonwealth Snapper MOU, which has improved operational efficiency and reduced catches.

## **Tasmania**

*Management changes to the Snapper fishery following the 2019 National Snapper workshop include:*

- Climate change is impacting Tasmania, which has seen a movement of Snapper to their waters. Through their engagement with the recreational sector they have received information about potential spawning Snapper, however further research is needed to understand whether those juveniles are surviving.

*Response to recommendations from the first National Snapper workshop:*

- Supportive of a Snapper Guardians program, however it will need to have a coordinated approach.
- Tasmania are keen to be involved in National Snapper workshops to understand the science and management being implemented and the tools to do this.
- Joint stock assessments are required to support management and recovery of a depleted species.
- Their national SAFS process has identified the various fishery models across Australia. There is a need to standardise these models and a workshop would provide an avenue to support this.



- Raised concerns about the use of an app, it needs to be fit for purpose and the right information needs to be collected.

### **Commonwealth**

*Management changes to the Snapper fishery following the 2019 National Snapper workshop include:*

- Continue to implement MOU's with each state and territory.
- Have implemented arrangements in SA to support recovery of stocks.

*Response to recommendations from the first National Snapper workshop:*

- Supportive of a national coordinated Snapper Guardians Program.
- Supportive of National Snapper Workshops.
- The current MOU's with each jurisdictions provide for sharing of information.

### **New Zealand**

- The latest stock assessments in NZ have indicated that the SNA7 and SNA8 stocks are back to target levels, which may lead to a review of the management arrangements. The largest Snapper stock (SNA1) is scheduled for an assessment update in 2022.

### **Collective discussion on progression of recommendations:**

#### **1. Establishing a national coordinated Snapper Guardians Program**

- Given jurisdictions already have engagement strategies for each of the sectors and that the Snapper Guardians Program is already occurring in WA and Vic, participants suggested that the most appropriate approach is for each jurisdiction to co-ordinate its own Snapper Guardians Program. The next National Snapper Workshop could provide an opportunity for greater coordination and the development of a national Snapper Guardians program.

#### **2. Develop a web portal that provides a centralised location for all Snapper information**

- Explore the possibility of using the SAFS website as a location to share information.
- The ASFB Fisheries Management Committee is currently in the process of rolling out Trello. Trello has been develop as a depository of information (such as Harvests strategies, allocations, management plans etc), but access will only be for fisheries managers. Trello has the ability to provide external access for recreational, commercial and Indigenous sectors; however, this would be at an extra cost.
- It was highlighted that the web portal should include a range of key species. Trello could be used as the web platform and use Snapper as a case study. Further details are required about how to include the recreational, commercial and indigenous sector in the platform, who manages the platform and who pays to make changes and to keep it up to date.

#### **3. Jurisdictions to meet to discuss and collaborate on improving sharing of information and management of shared Snapper stocks, using the MOU developed by SA/VIC as a case study**

- Participants discussed that most jurisdictions have MOU's or are in the process of developing one to support collaboration and sharing of information.

#### **4. A 'National Snapper Workshop' held every three years to report on outcomes**

- Participants discussed that during or after the ASFB conference would provide an opportunity to hold a National Snapper Workshop. It may also be an opportunity to workshop the management of other key species (Kingfish, KGW, Australian Salmon).

- Hold a National Snapper Workshop yearly via teams or zoom. This could align with the current FMC meetings (present and discuss fisheries management issues).
5. Fisheries managers, scientists and industry to look for other opportunities to provide updated information on Snapper management, research and engagement.
- COVID-19 has significantly impacted conferences and workshops, however fisheries managers, scientists and industry will look for opportunities to provide updates on Snapper management, research and engagement.
6. Scientific modellers to hold a workshop to develop key elements of a national Snapper stock assessment model.
- A national approach to a Snapper stock assessment model is required. Snapper could be used as a case study to bring all modellers together to develop and standardise a national Snapper stock assessment model.
  - FRDC indicated they were interested in the approach and were considering bringing together modellers from around Australia at a workshop and invite international modellers to provide their experience. The workshop could also be used to produce a guideline or step-by-step process for stock assessment models.
7. Additional panel recommendations
- UTAS and SARDI are currently undertaking a project to evaluate smart-phone applications to collect recreational fishing estimates based on the phone diary surveys. It will be trialled as part of the recreational fishing survey in SA.

# National Snapper Workshop II

## National Snapper Workshop II: 8 December November 2020

**Venue:** Teleconference, Microsoft teams

**Time:** 10:00 am to 1:00 pm (ACST)

**Chair:** Ian Cartwright

**Participants:** Jonathan McPhail (NTDITT), Rebecca Oliver (NTDITT), Thor Saunders (NTDITT), Illaria Catizone (FRDC), Crispian Ashby (FRDC), John Taunton-Clark (NZ Fisheries), Natalie Crouchman (AFMA) Michael Steer (SARDI), Anthony Fowler (SARDI) Shane Walters (WAPIRD), Phillip Bolton (NSWDPI), John Stewart (NSWDPI), Sean Tracey (UTAS), Michelle Wernner (VFA), Simon Conron (VFA), Dallas D'Silva (VFA), Justin D'Bell (VFA), Chad Lunow (QLDDAF), Amanda Northrop (QLDDAF), Keith Rowling (PIRSA), Skye Barrett (PIRSA)

Time	Item	Lead
10:00 am	Welcome and purpose of the Workshop	Chair
10:10 am	Recap from National Snapper Workshop held in 2019	Chair
10:30 am	Update from each jurisdiction on the progression of recommendations from the National Snapper Workshop held in 2019	Chair
12:00 pm	Discussion on how can we progress the recommendations from the workshop	Chair
12:45 pm	Next steps	Chair
1:00 pm	Close	Chair

# **Recommended collective actions from the National Snapper Workshop in Adelaide:**

## **Workshop recommendations**

The following recommendations were developed in plenary session with workshop participants:

1. Recreational, charter boat, commercial and indigenous executive officers from across the jurisdictions to hold a workshop to discuss establishing a national coordinated Snapper Guardians Program.
2. Develop a web portal that provides a centralised location for all information on Snapper and a networking opportunity for all stakeholders.
3. Jurisdictions to meet to discuss and collaborate on improving sharing of information and management of shared Snapper stocks, using the MOU developed by SA/VIC as a case study.
4. A national Snapper Workshop is held every three years to report on outcomes, sharing of information, ensuring a consistent approach to sustainable stocks.
5. Fisheries managers, scientists and industry to look for other opportunities to provide updated information on Snapper management, research and engagement such as ASFB annual conferences, World Fisheries Congress, National Recreational Fishing Conference, Seafood Directions.
6. Scientific modellers to hold a workshop to develop key elements of a national Snapper stock assessment model.

## **Additional panel recommendations**

The Panel suggests that consideration also be given to the following:

1. Development of joint stock assessments for stocks that straddle State/Commonwealth boundaries, where appropriate.
2. Data sharing, joint stock assessments and related matters should be recognised through cooperative management arrangements, both informal (MOUs, e.g. Vic/SA) and formal (OCS).
3. Priority be given to the development and implementation of a Snapper reporting app for recreational and charter fishing in all jurisdictions with a supporting education/extension program, alongside a commitment from all jurisdictions to share data.