NSW TOTAL ALLOWABLE FISHING COMMITTEE

OCEAN TRAWL FISHERY

- SILVER TREVALLY

DETERMINATION FOR THE 2023/24 FISHING PERIOD

27 February 2023

Executive Summary

Preamble

The New South Wales (NSW) Total Allowable Fishing Committee (TAFC) has statutory responsibilities set out in Part 2A of the *Fisheries Management Act 1994* (the Act) to determine the Total Allowable Commercial Catch (TACC) or Total Allowable Commercial Effort (TACE) by NSW fishers holding the relevant endorsement in some commercial fisheries. Various fishing regulations under the Act also contain provisions requiring the making of fishery determinations.

The TAFC is an independent statutory body established under Schedule 2 of the Act. In making a determination on catch or effort in a commercial fishery, the TAFC must consider the ecological, economic and social issues associated with each fishery and make determinations that 'on balance' pursue the objectives of the Act. As of February 2022, for determinations relating to the Ocean Trawl Fishery, the TAFC is required to make recommendations compatible with the finalised and adopted NSW Trawl Whiting Harvest Strategy.

The TAFC is not subject to the control or direction of the Minister as to any determination made. However, the Minister may direct the TAFC on the procedures to be followed and the matters to be taken into account in making a fishing determination.

This determination is for Silver Trevally (ST) in the Ocean Trawl Fishery (OTF) for the period 1 May 2023 to 30 April 2024.

Management recommendations & supporting actions

The TAFC provides the following recommendation to the Minister, NSW Fisheries and the fishing industry towards improving the management of the fishery:

1. Given the substantial decrease in the proportion of large mature fish in catches over the past decade and the apparent levels of discards in response to the minimum legal length (MLL), efforts should continue to obtain length-frequency composition data for retained and discarded fish, perhaps by means of a cooperative sampling program with industry.

Determination

The Total Allowable Fishing Committee, pursuant to Part 2A of the *Fisheries Management Act 1994*, determines that the commercial catch of Silver Trevally in the Ocean Trawl Fishery should be controlled and allocated through the following measure:

1. A TACC during the fishing period 1 May 2023 to 30 April 2024 of **12.0 tonnes.**

Introduction

The NSW Ocean Trawl Fishery (OTF) is a share management, multi-method, multispecies fishery with a gross value of production of around $23.6 million for 2019/20 (McKinnon 2023). The OTF is described in Schedule 1 of the *Fisheries Management Act 1994* (the FM Act) as:

a) the use of an otter trawl net (prawns) to take fish from any of the following waters:
   (i) inshore waters (not more than 3 nautical miles from the natural coast line),
   (ii) offshore waters (more than 3 nautical miles from natural coast line) and north of a line drawn due east from Barrenjoey Headland,
   (iii) the waters of Coffs Harbour;

b) the use of an otter trawl net (fish) to take fish from ocean waters (east of the natural coast line) that are north of a line drawn due east from Barrenjoey Headland and south of a line drawn due east from Smoky Cape (other than any waters in which use of an otter trawl net (fish) is prohibited under the regulations); and

c) the use of a Danish seine trawl net (fish) to take fish from ocean waters that are north of a line drawn due east from Barrenjoey Headland.

North of Barrenjoey Headland (Sydney) the OTF extends to the 4,000 metre depth contour, approximately 60 to 80 nautical miles offshore. South of Barrenjoey Headland the OTF extends seaward to three nautical miles offshore.
The OTF is subject to many spatial and temporal closures within these waters. Schedule 2 of the *Fisheries Management (Ocean Trawl Share Management Plan) Regulation 2006* details waters closed to ocean trawling.

The OTF is a share managed fishery. Access to the OTF is limited to shareholders, or their nominated fishers, who hold sufficient shares to satisfy the minimum shareholding levels established for each share class in the Plan. Minimum shareholdings apply to all 'access' share classes in the OTF and are used to determine if a shareholder (or their nominated fisher) is eligible for an endorsement authorising a particular commercial fishing activity in respect of that share class. A summary of the 'access' share classes and associated minimum shareholding is provided in Table 1.

Table 1: Minimum shareholdings and numbers of endorsements

Access share class	Minimum shareholding	No. of endorsements
OT – inshore prawn	50	110
OT – offshore prawn	50	101
OT – deepwater prawn	25	15
OT – fish northern zone	50	28

McKinnon, F 2023. Ocean Trawl Fishery Management Report – Total Allowable Catch Determinations 2023/2024 – Bluespotted Flathead, Eastern School Whiting, Stout Whiting, Silver Trevally. Report to the TAF Committee for the 2023 to 2024 fishing period. Department of Regional NSW, 43 pp.

The TAFC was directed in 2021 to make a determination in relation to four of the finfish species taken in this fishery – Trawl Whiting (Eastern School Whiting and Stout Whiting), Bluespotted Flathead and Silver Trevally. Trawl Whiting and Bluespotted Flathead has determinations recommended for two fishing periods

(2021-22 and 2022-23). Silver Trevally (ST) has a determination for one year (2022-23) due to its poor stock status.

A video conference meeting was held for industry shareholders and a representative of the NSW Professional Fishermen's Association on 8 February 2022, to discuss the ST stock assessment and as an opportunity to raise any management issues. A number of written industry submissions on ST were received prior to the meeting. The TAFC also met with scientists and managers from NSW DPI (Fisheries) to gain additional information on the stock assessment, management and compliance issues.

Biological considerations

Silver Trevally

Silver Trevally (*Pseudocaranx georgianus*, ST) are relatively long-lived and slow growing, attaining a maximum age of at least 25 years, although maturing at a relatively early age of 2 - 4 years at 18 - 24 cm fork length[1]. Stock structure is poorly understood, but adults have been found to have restricted post-settlement movement, potentially leading to ecological stock structuring over moderate (100s of km) spatial scales. For the purposes of the 2023 assessment, it was considered likely that NSW, the Commonwealth Southern and Eastern Scalefish and Shark Fishery (SESSF) and Victoria share the same stock of ST, given adjacent contiguous coastline, dynamic environment and broadcast spawning behaviour of the species[2].

The taxonomy of the genus is in revision and it is recognised that there are two species of silver trevally on the Australian east coast with a more northern form provisionally identified as *Pseudocaranx* "dentex" and its exact range in northern NSW is unknown[2]. While this northern form is recorded in recreational catches in far northern NSW (D.McPhee, pers. obs.), the available evidence indicates that it does not currently constitute any part of the catch in the NSW OTF.

Catches

Estimated total annual ST catches in all NSW fishing sectors (Ocean Trawl Fishery, Ocean Trap and Line, Estuary General, Ocean Hauling) declined steadily from more than 1,000 tonnes (t) per year over 1984 – 1990, to 451 t in 1997-98, 42 t in 2020-21 and 34.8 t in 2021-22[3]. OTF sector-only catches declined from 205 t in 2006-07 to 57 t in 2007-08, following introduction of a 30 cm total minimum legal length (MLL).

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[1] Rowling, K. R., & Raines, L. P. 2000. Description of the biology and an assessment of the fishery for silver trevally *Pseudocaranx dentex* off New South Wales. NSW Fisheries Research Institute, Cronulla, 70 p.

[2] Fowler, A.M., Liggins, G., and Chick, R. C. 2023. Stock assessment report 2022/23 - Silver Trevally (*Pseudocaranx georgianus*). NSW Department of Primary Industries - Fisheries: 53 pp.

[3] Bearham, D., Robert, M., Chaplin, J. A., Moore, G. I., Fairclough, D. V., & Bertram, A. (2019). Molecular evidence of three species in the Pseudocaranx dentex complex (Carangidae) in Australian waters. *Marine and Freshwater Research*, *71*(4), 518-531.

After increasing again to 145 t in 2013-14, catches in the OTF declined to a low of 7.8 t in 2019-20, increasing to 10.8 t in 2021-22.

There is a significant NSW recreational catch of ST. Four surveys of recreational fishing have been conducted at the state-wide level in NSW, with retained catch weights estimated from the number of individuals being 100 t in 2000-01, 27 t in 2013-14, 8 t in 2017-18 and 13 t in 2019-20[2]. Annual landed catches of ST in the Commonwealth Southern Eastern Scalefish and Shark Fishery (SESSF) off southern NSW have decreased from over 200 t between 2010 – 2011, to 36.4 t in 2020 and 19.2 t in 2021[3]. The estimated combined landed catch by all sectors in 2021 was 96.4 t.

Stock assessment and stock status

Considerable effort has been made by NSW DPI assessment staff to improve data and stock assessments for ST since the 2021 assessment. A combined, historical catch series has been constructed, addressing questions regarding double-reporting by NSW and/or Commonwealth vessels in some years. The updated production modelling component of the assessment now incorporates agreed catch and catch per unit of effort (CPUE) data from NSW, the SESSF and Victoria. Production modelling is now conducted using the JABBA assessment software, which can integrate numerous separate CPUE series over different periods and uses Bayesian analysis to quantify uncertainty around results. Length-based modelling has been conducted using improved Stock Synthesis - Length Only (SS-LO) software, which is able to integrate length composition data from multiple years and account for varying selectivity, to produce estimates of biomass depletion using length-composition data as an alternative to using CPUE abundance indices.

Results of the 2023 production modelling assessment continue to indicate, with increasing confidence, that the Southern and Eastern Australian stock of ST has been depleted to near or below a limit reference level of 20% B_0 with about a 50% probability that the stock is below this limit level. A comprehensive range of sensitivity analyses gives median estimates of depletion that range from slightly below to slightly above this limit.

Length-based assessment results confirmed previous analyses regarding the substantial decline in large (> 30 cm fork length) fish in NSW commercial catches in the 1990s. The proportion of fish larger than 30 cm fork length in NSW commercial catches has decreased from around 70% in 1993 and 1994 (onboard observers), to 40% in 1997 (onboard observers), 14% in 2008 (fish market sampling), 6% in 2019-20 (fish market sampling) and only 1.2% in 2021-22[2]. In 2022, it was estimated that the northern OTF was discarding 16% - 38% of the total ST catch by weight, largely due to them being under the MLL. The length-only analyses estimate greater depletion that the production modelling, with current biomass estimated to be 5% or less of B_0. This result is driven by the disappearance of large fish from the catch and assumptions regarding other biological productivity factors in the model.

The most recent standardised CPUE assessment for the Commonwealth SESSF estimates that the status of the portion of the ST stock fished by the Commonwealth

has improved, following a rapid decline over 2017 - 2019 to an estimated 12% of the B_0 CPUE index level. The most recent CPUE index for 2021 is estimated to be at 76% of the B_{48} target or 36% of the B_0 CPUE level. CPUE is known to vary inter-annually as a result of factors other than stock size (market demand, targeting, spatial availability), so averages across a number of years are usually used. Average CPUE over the recent four years (2018 – 2021), which is used as the basis for calculating RBCs under the Commonwealth harvest strategy Tier 4 control rule, is estimated to be at 50% of the B_{48} target[4].

If the target reference period CPUE level in the Commonwealth assessment is adjusted for the estimated depletion level over that reference period from the NSW assessment, then there is good agreement between these two assessments. The consistency between results obtained using a number of CPUE indices provides some confidence in these production modelling results. There are promising signs of a small increase in ST stock size across these two assessments over the past two years, indicating that the stock may be able to commence rebuilding under recent catch levels.

The conflict between the production modelling and length-based modelling is not surprising, given that these two approaches are modelling different indicators, which index different components or characteristics of the stock. All of this information, for all fleets, needs to be integrated into a joint assessment within which the influence of different indicators can be appropriately weighted.

Given the depleted state of the ST stock, every effort must be made to maintain catches by all jurisdictions and fleets at recent (2021-22) levels of 100 t or less, to keep fishing mortality at current levels and facilitate the rebuilding of the stock. The OTF currently only takes about one-third of the commercial NSW ST catch, with similar proportions taken in the Ocean Trap and Line (OTL) and Estuary General (EG) fisheries, so efforts to maintain or reduce catches should include all sectors. NSW DPI should work together with the Commonwealth to try and ensure that this catch control is achieved across the NSW and SESSF fisheries.

It is concerning to note that vessel identifiers are no longer a reporting requirement for NSW commercial fishers[2]. Vessel ID is one of the most important factors affecting fishing power and usually has the strongest effect on CPUE standardisation. Options should be considered for requiring the reporting of vessel identifiers as part of commercial catch and effort reporting requirements.

Recommendation

- Given the substantial decrease in the proportion of large mature fish in catches over the past decade and the apparent levels of discards in response to the MLL, efforts should continue to obtain length-frequency composition data for retained and discarded fish, perhaps by means of a cooperative sampling program with industry.

[4] Sporcic, M. (2022). Draft Tier 4 assessments for selected Tier 4 SESSF species (data to 2021). Technical paper presented to the SERAG, SERAG 5 – 6 October 2022. CSIRO Oceans and Atmosphere, Hobart. 15 p.

Economic considerations

Silver Trevally (ST) currently make a minor economic contribution to the NSW OTF. ST is a low to mid-priced species with good market acceptance in NSW. ST from the NSW OTF competes on the market floor with silver trevally imported from New Zealand, which tend to be larger than those caught in the NSW OTF, as well as tropical trevally species.

The major current economic consideration for ST is to set a TACC that allows for some retained fish as bycatch, while constraining target fishing for the species. Successful rebuilding of the stock will potentially provide future economic opportunities and this should be seen as a clear additional incentive to rebuild the stock.

Fishery management considerations

The TAFC determined an OTF Silver Trevally TACC of 20 t in 2021-22 and 2022-23, given both the disruption of fishing from COVID and that the stock was assessed as being around 10% of initial biomass, which is well below the limit reference point (LRP) of 20% commonly used in Australian fishery harvest strategies. A revised stock assessment was presented to the TAFC in 2023, based on production and length-based models. The stock assessment based on production modelling suggests that a reported catch of less than 100 t per annum should lead to gradual stock rebuilding assuming average recruitment. However, given significant discarding is known to occur in all fisheries and sectors, and the assumption of average recruitment carries its own risks given the stock is below B_{20}, then the likelihood of the expected recovery less clear. Note that if the length-based model is correct ($B_{current}$ ~ 5% B_0) then a reported catch of well under 100 t would be required to enable stock recovery with a heightened risk of years of impaired recruitment, even under favourable environmental conditions.

A further consideration is the warming of ocean waters due to climate change. Species with biology like ST are known to be negatively affected, with SE Australia being a warming hotspot. This will likely impede stock recovery in the north of its range, as warm-tolerant species move south with rising ocean temperatures. It is unclear whether sufficient ST habitat exists in the south of its range to counter this effect. Other climate change impacts such as ocean acidification and trophic interactions are not well understood for this species.

From a management perspective, the question arises about how much should be invested in rebuilding the stock? In the 1980s and 1990s, OTF Silver Trevally catches often exceeded 500 t per annum and the production model suggests that if the stock is rebuilt to around B_{40} then a sustainable catch of around 400 tonnes per annum should be possible, noting this would be shared across all commercial fisheries and sectors. Such a fishery would add several million dollars per annum to fishery revenue. Investing in a rebuilding plan should be seen in this context along

with the attendant risks noted in this report and not just as a cost to government and/or industry.

For the reasons described above, the most urgent need remains minimising overall fishing mortality of ST and within that the reported catch (retained and discarded) from the OTF. Recent catches from this fishery (all less than 11 tonnes p.a.) may already constitute unavoidable bycatch, based on advice from both industry and fishery scientists at the 8 February 2023 meeting of the TAFC.

Given the need to minimise total fishing mortality to better enable ST to rebuild and that recent reported catches likely reflect unavoidable bycatch in the OTF, the TAFC has determined a 12 t TACC for 2023-24.

The TAFC strongly encourages NSW DPI to reduce the recreational possession limit for ST from 10 to 5 per person in line with arrangements for Eastern Gemfish, which is similarly depleted.

The TAFC noted there were only minor compliance concerns relating to the landing of undersized ST.

Progress Report Against TAFC Recommendations from 2021/22 (relevant to Silver Trevally)

The TAFC made recommendations in 2021 to support the improved management of the fishery. They are stated below with a response on progress from the Department.

NSW Fisheries works collaboratively with the fishing industry to introduce a Vessel Monitoring System (VMS) to the Ocean Trawl Fishery to support improved fisheries assessments and industry compliance reporting.

NSW DPI has participated in a competitive grant funding program by Parks Australia aimed at increasing the adoption and use of electronic and vessel monitoring systems on commercial fishing vessels that may transit or operate in Australian Marine Parks. This funding application was submitted in response to Parks Australia's advice that they will require all commercial fishing vessels transiting or conducting fishing activities in Australian Marine Parks to carry an operating vessel monitoring system from early 2024. In addition to this, NSW DPI is further considering the suitability of a broader application of these systems for NSW commercial fisheries.

NSW Fisheries should take immediate action in all its fisheries and fishing sectors that harvest Silver Trevally to reduce fishing mortality to unavoidable bycatch levels to support stock recovery. Furthermore, NSW needs to work closely with other jurisdictions to immediately reduce Silver Trevally catches, particularly in the Commonwealth fishery.

Approval of the NSW Trawl Whiting Harvest Strategy will allow prioritisation of other trawl species to be undertaken to develop a fishery level harvest strategy. Clarification of management arrangements between NSW and the Commonwealth

for the Southern Fish Trawl Restricted Fishery will assist any rebuilding management actions proposed for this species.

Given the increase in discards and the decrease in the mean size and proportion of mature fish in Silver Trevally landed catches, options should be explored to obtain length-frequency composition information for retained and discarded fish, perhaps by means of a cooperative industry sampling program, to monitor any stock recovery.

The NSW DPI fishery monitoring program includes stock assessment work on key commercial species; use of scientific observers to record information on catches of target species and by-catch; collection of catch and effort data; and port monitoring of landed fish products (e.g., collecting data on fish length and age). Port monitoring involves the collection of length (and age samples where relevant) of a set of commercially targeted species. Silver trevally is currently a component of the port monitoring program. Further information is provided in the NSW DPI Silver Trevally Stock Assessment Report 2021.

Facilitation of information exchange around the quota market would help with quota lease and quota transfer and improve the economic potential of the fishery. Promotion of the FishOnLine noticeboard may help in this regard.

NSW DPI recognises that promotion of quota transfer options within industry and ongoing industry education is required to promote the benefits and access to quota trading.

Progress Report Against TAFC Recommendations from 2022/23 (relevant to Silver Trevally)

The TAF Committee made recommendations in its Report and Determination for the Ocean Trawl Fishery for the 2022/23 fishing period to support improved management of the fishery. They are stated below with a response on progress from the Department.

NSW should develop a Silver Trevally rebuilding plan and a process to achieve proportional catch reductions in consultation with other relevant NSW fisheries stakeholders and AFMA.

A rebuilding plan is yet to be developed for Silver Trevally.

A fishery level harvest strategy to deal with additional trawl target species for the Ocean Trawl Fishery is being considered in the priorities for the NSW Harvest Strategy program.

In reviewing the progress reported above against the 2021-22 and 2022-23 management recommendations, the TAFC notes that none have been fully implemented, with minor progress on one or two. Until there is effective action taken to reduce overall Silver Trevally fishing mortality, supported by a VMS system and under the guidance of an agreed rebuilding plan, the status of this stock is unlikely to change and any future economic benefits from rebuilding will be delayed.

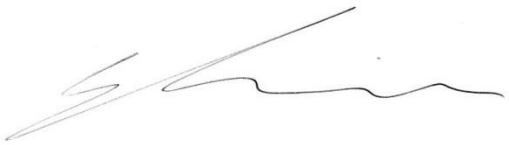
Determination

The Total Allowable Fishing Committee, pursuant to Part 2A of the *Fisheries Management Act 1994*, determines that the commercial catch of Silver Trevally in the Ocean Trawl Fishery should be controlled and allocated through the following measure:

1. A TACC during the period 1 May 2023 to 30 April 2024 of **12.0 tonnes.**

Species	**Catch Limit (tonnes)**
Silver Trevally	12.0

Signed (for and on behalf of the TAFC)



William Zacharin
Chair, TAFC

27 February 2023