NSW TOTAL ALLOWABLE FISHING COMMITTEE

OCEAN TRAWL FISHERY

- PRAWNS

DETERMINATIONS FOR THE 2024/25 AND 2025/26 FISHING PERIODS

18 March 2024

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.

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 the Ocean Trawl (OT) Prawn Fshery.

A TAFC video conference was held with interested shareholders on 14 February 2024 and representatives from the Department of Regional NSW (DPI Fisheries). A Stock Assessment report on Eastern School Prawns was provided by Dr Matt Taylor[1] and a Stock Status summary for Eastern King Prawns[2] presented by Dr Karina Hall.

Management recommendations & supporting actions

The TAFC provides the following recommendations to the Minister, Department of Regional NSW (DPI Fisheries) and the Ocean Trawl prawn fishing industry towards improving the management of the fishery:

1. As the first step towards developing a harvest strategy for the NSW Ocean Trawl – Prawning sector, the TAFC recommends that the Department work with stakeholders and scientists to identify one or more potential target biomass levels (or proxy catch rates) against which to manage the fishery.

2. Future assessments should then estimate and report the effort levels associated with maintaining the stock at the chosen target level/s, as well as the catch per unit effort (CPUE) rates associated with fishing at those effort levels and targets.

[1] Taylor, M.D. and Helidoniotis, F. 2024. Stock assessment report 2022/23 – Ocean Trawl (Ocean Prawn Trawl) – Eastern School Prawn (*Metapenaeus macleayi*). NSW Department of Primary Industries. Fisheries NSW, Port Stephens Fisheries Institute. 47 pp.
[2] Helidoniotis, F. and Taylor, M.D. 2023. NSW Stock Status Summary 2022/23 – Eastern King Prawn (*Melicertus plebejus*). NSW Department of Primary Industries, Fisheries. 21 pp.

3. A gradual reduction of the TACE to remove latent effort in the prawn fishery and reduce the potential for unsustainable levels of effort to occur is warranted. Therefore, a 10% reduction in the TACE to 487,800 SHUs for both the 2024/25 and 2025/26 fishing periods is recommended.

Determination

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

1. A TACE for prawns during the period 1 May 2024 to 30 April 2025 and 1 May 2025 to 30 April 2026 of a maximum 487,800 standardised hull units.

COMBINED SPECIES	**EFFORT LIMIT (standardised hull units)**
Eastern School Prawn (*Metapenaeus macleayi*) Eastern King Prawn (*Melicertus plebejus*)	487,800

Introduction

The Ocean Trawl (OT) Fishery is a share management fishery and access is limited to shareholders, or their nominated fishers, who hold sufficient shares to satisfy the minimum shareholding levels established in the Plan[3].

A range of input and output controls regulate the fishery. Boat capacity restrictions are enacted through a combination of boat specific restrictions set out in the Plan or on fishing boat licences. The maximum boat length applying to the OT Fishery is 20 metres, unless the boat historically operated in the fishery and was issued an exemption in 2007.

Effort quota management commenced for the Ocean Trawl – inshore prawn and offshore prawn sectors of the OT Fishery on 1 May 2019. The total allowable commercial effort (TACE) is determined for each new fishing period between 1 May and 30 April the following year. A share of the TACE is allocated, as quota, to holders of Ocean Trawl - prawn effort quota shares in proportion to the number of shares they hold. The first TACE determination was made for the fishing period 1 May 2019 to 30 April 2020 and was set at 542,000 standardised hull unit (SHU) days. This has been maintained at the same level for the past five fishing periods during the management transitional arrangements.

Prawn counts were introduced in the Ocean Trawl, Estuary Prawn Trawl and Estuary General fisheries to minimise the harvesting of prawns at times and in areas where prawns are below optimum size. The following prawn count limits apply to all waters of the OT Fishery:
• for Eastern King Prawns (*Melicertus plebejus*) - a maximum prawn count of 125 per 0.5 kilogram (includes mixed species catches consisting of greater than 10% Eastern king prawns by number of individuals), and

• for all other prawn species - a maximum prawn count of 180 per 0.5 kilogram.

Other management restrictions in the OT Fishery include trawl net restrictions, areas closed to trawling and a number of estuary and marine protected areas.

Biological considerations

Eastern King Prawn

Stock distribution

Eastern King Prawn (EKP) constitute a shared stock along the eastern Australian coast between Hayman Island in Queensland (20°S) and north-eastern Tasmania (42°S). Post-larvae recruit to estuarine nursery grounds along the entire coast where they reside until adolescence, after which they emigrate to inshore waters and commence northward spawning migrations, often coinciding with a move into deeper water. Spawning usually occurs in offshore areas and the East Australian Current

[3] MacKinnon, F (2024) Ocean Trawl Fishery Management Report: Total Allowable Catch/Total Allowable Effort Determinations 2024/25. Department of Regional NSW

disperses larvae southward again[4]. Recruitment and year-class strength are therefore affected by estuarine conditions and rainfall patterns, resulting in variable recruitment for this short-lived (3 years maximum age) species.

Fishery

The stock is fished by Queensland and New South Wales, with about 80% of the recent annual commercial ocean catch taken by Queensland and about 20% by New South Wales[5]. In NSW, EKP are mainly fished in the the OT Fishery and the Estuary Prawn Trawl Fishery, with early catches taken primarily in estuaries. Catches have generally declined since the 1980s, associated with a general decline in effort, but particularly the closure of a number of estuaries and implementation of several recreational fishing havens in estuarine nursery areas to protect juveniles. The OT Fishery currently has higher catches that the estuarine fishery, ranging between 445 - 637 tonne over the last 5 years (2018 - 2022).

Annual catches have declined from around 900 tonnes prior to 2004 to an average of 565 tonnes since 2010. This has been associated with a substantial decrease in nominal (unstandardised) total fishing effort from an average ~19,700 days per year over 1994-09 to an average ~5,400 per year over 2010-23, associated with a substantial increase in catch rates since 2010.

Stock assessment

The combination of the protection of juveniles, decreased catch and substantial decrease in effort has resulted in a substantial improvement in stock status since the early 2000s. Driven by the increase in catch rates, the 2020 assessment for the shared EKP stock[6] estimated the 2019 spawning biomass across both jurisdictions to be 62% of the unfished 1958 B_0 level. Updated CPUE analysis[1] found that CPUE generally continues to fluctuate around recent high levels, indicating the stock remains near 60% B_0.

There are clear relationships between the fishing effort level expended on EKP and the resulting catch and CPUE obtained by NSW fishers. As would be expected, an increased catch is obtained with increased effort, but the increase is moderate. At the highest effort levels reported over 1994 – 2023 (26,000 – 29,000 days/yr) annual catches reached slightly over 1,100 tonnes. At recent low effort levels of ~5,000 days/yr, annual catches have ranged between 440 – 820 tonnes (Figure 1 left panel). There is a strong negative relationship between fishing effort and CPUE, with CPUE increasing substantially with reduction in effort. At higher effort levels between 11,600 – 29,000 days, nominal CPUE ranged from 26 – 46 kg/day. At recent lower effort levels of 4,000 – 6,600 days, CPUE has ranged between 71 – 142 kg/day (Figure 1 right panel). This has important implications for setting of optimal TACE effort levels and CPUE triggers as part of a harvest strategy for the stock.

[4] Helidoniotis, F. and Taylor, M.D. 2023. NSW Stock Status Summary 2022/23 – Eastern King Prawn (*Melicertus plebejus*). NSW Department of Primary Industries, Fisheries. 21 pp.
[5] Status of Australian Fish Stocks 2020. https://www.fish.gov.au/report/292-Eastern-King-Prawn-2020
[6] Helidoniotis, F., O'Neill, M.F., and Taylor, M.D. (2020) Stock assessment of eastern king prawn (*Melicertus plebejus*). Queensland Department of Agriculture and Fisheries, Brisbane.

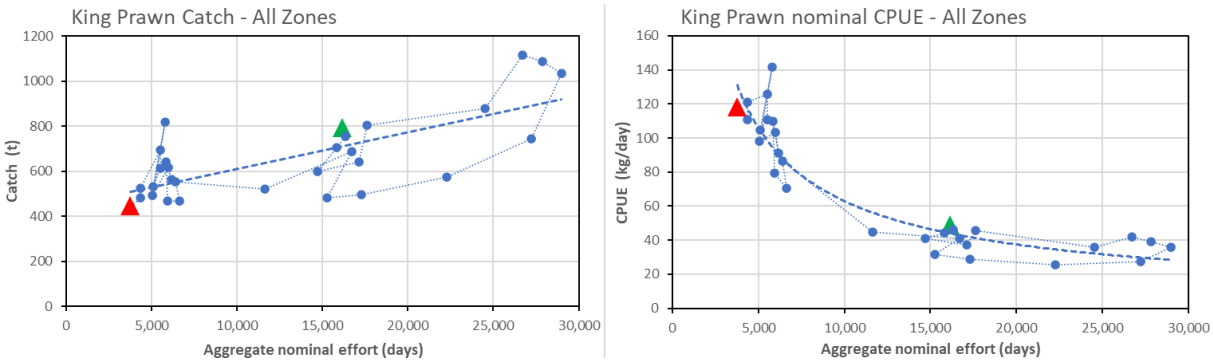

Figure 1. Plots of NSW total annual commercial catch (all zones) and CPUE (kg/day) of Eastern King Prawns plotted against aggregate nominal effort (total days fished over the period 1993/94 to 2022/23). Green triangles indicate the start of the data series in 1993/94, red triangles indicate the final year 2022/23, and dashed lines are trendlines fitted to the data.

Eastern School Prawn

Stock distribution

Eastern School Prawn (ESP) occur throughout eastern and south-eastern Australia, being most abundant in NSW waters, but also abundant in Queensland at latitudes south of Moreton Bay, and infrequently abundant in eastern Victorian waters[7]. They are considered to constitute a single genetic stock across this range. The species resides in estuaries for the early stages of its life but generally moves to inshore waters adjacent to the mouths of estuaries as maturity occurs, where spawning occurs. Recruitment and year-class strength are therefore affected by estuarine conditions and rainfall patterns, resulting in variable recruitment for this short-lived species.

Fishery

ESP are harvested from estuarine and inshore ocean regions across much of their range. Most of the catch is taken in NSW with only minor harvests in Queensland and Victoria reported in recent years (Taylor *et al.* 2021b). Within NSW, fishing for ESP occurs in the OT Fishery, the Estuary Prawn Trawl Fishery (EPTF) and the Estuary General Fishery (EGF). Over 1998 – 2023, 31% of the catch was taken in the EGF, 51% in the EPTF and only 18% in the OT Fishery. The proportion of effort over 1998 – 2023 was 37% in the EGF, 50% in the EPTF and 13% in the OT Fishery.

Annual combined catch by all sectors has fluctuated substantially across the history of the fishery between about 500 – 1,500 tonnes, averaging 785 tonnes over 2010 – 23 (average 154 tonne by the OT Fishery). In contrast, effort has declined substantially and steadily from a reported 49,657 days in 1985 to a minimum of 4,493 days in 2023. The only sector subject to the TACE is the OT Fishery, in which effort has declined from 4,963 days in 2000 to a minimum of 438 days in 2019;

[7] Taylor, M.D. and Helidoniotis, F. 2024. Stock assessment report 2022/23 – Ocean Trawl (Ocean Prawn Trawl) – Eastern School Prawn (*Metapenaeus macleayi*). NSW Department of Primary Industries. Fisheries NSW, Port Stephens Fisheries Institute. 47 pp.

increasing again to 1,357 days in 2022. Total effort has averaged 8,920 days across all sectors over 2010 – 23, and 1,266 days in the OT Fishery. The steady decline in effort is associated with a steady and substantial increase in catch rates throughout the period 1985 – 2023.

Stock assessment

Four standardized CPUE series were available for the 2024 assessment for ESP, being for the EPTF and OT Fishery sectors across two historical time periods[4]. Recent CPUE in both of these sectors has fluctuated without trend around the recent decadal average, indicating little change in stock abundance since about 2010. The base case assessment and several sensitivities indicate stock status to be above 60% B_0, having been stable near that level since about 2010.

As for EKP, there are clear relationships between the fishing effort level expended on ESP and the resulting catch and CPUE obtained by NSW fishers. As would be expected, an increased catch is obtained with increased effort, but the increase is moderate. At the highest effort levels reported over 1994 – 2023 (>40,000 days/yr across all sectors) annual catches ranged over 1,100 – 1600 tonne. At recent low effort levels of ~4,500 – 11,500 days/yr across all sectors, annual catches have ranged between 420 – 1050 tonne (Figure 2 left panel). There is a strong negative relationship between fishing effort and CPUE, with CPUE increasing substantially with a reduction in effort. At effort levels between 14,500 – 49,600 days, nominal CPUE ranged from 17 – 61 kg/day. At recent lower effort levels of 4,500 – 11,500 days, CPUE has ranged between 63 – 125 kg/day (Figure 2 right panel). This has important implications for setting of optimal TACE levels and CPUE triggers as part of a harvest strategy for the stock.

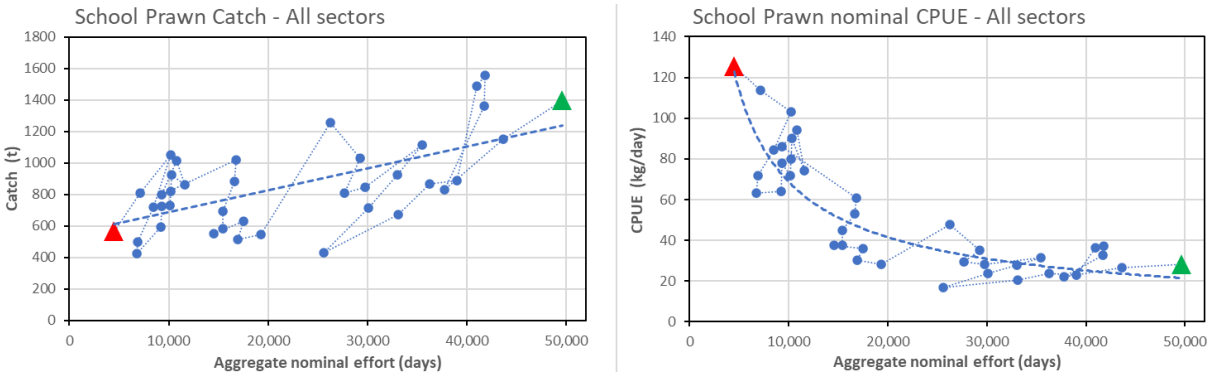

Figure 2. Plots of NSW total annual catch (all sectors) and CPUE (kg/day) of School Prawns plotted against aggregate nominal effort (total days fished over the period 1984/85 to 2022/23). Green triangles indicate the start of the data series in 1984/85, red triangles indicate the final year 2022/23, and dashed lines are trendlines fitted to the data.

Consideration of the TACE

The most recent stock assessments provided by NSW DPI unfortunately do not provide the information required to support a scientifically-based recommendation on a TACE for the OT Fishery. The assessment results are primarily relevant to setting a TACC for the stock, focusing on estimates of MSY, with B_{MSY} being an implied target for the School Prawn assessment. The review of CPUE indicators for the King Prawn stock also relates back to stock status expressed in terms of B_0.

Current biomass of School Prawns is estimated to have been fairly stable around 60% of B_0 since 2010, with CPUE (in the recent catch/hour series) also stable or fluctuating without trend around the recent average. Biomass of Eastern King Prawn was similarly estimated to be at about 62% of B_0 in the 2020 joint assessment of the shared Queensland / NSW stock. Since then, aggregated nominal CPUE has remained stable or decreased slightly, after increasing steadily from 2005 – 2020. For both prawn stocks, biomass has therefore been at or above 60% B_0 for almost the past ten years. There is therefore no current concern regarding stock status in terms of relative biomass.

However, the stock has remained stable at these high abundance levels under fishing effort levels well below those potentially allowed for by the interim TACE of 542,000 SHUs (approximately 14,369 days). The trend in approximate (summed) total effort by the Ocean Trawl – Prawning sectors over 1998 – 2023 is shown in Figure 3. There was a substantial reduction in fishing effort after the period over which the interim TACE was calculated, with subsequent effort by sectors subject to the TACE averaging 6,714 days (47% of the TAE) over 2010 – 2023, and 5,802 days (40% of the TAE) over 2016 – 2023.

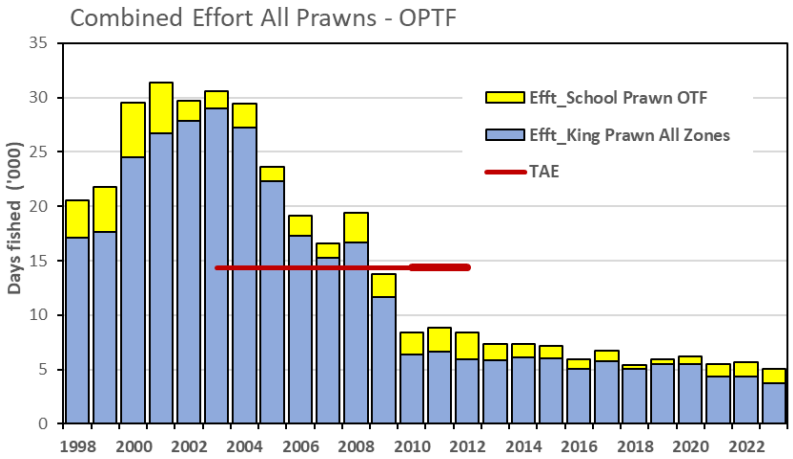

Figure 3. Historical trend in approximate total fishing effort (days fished) by the NSW ocean prawning sectors subject to the TAE, being the OTF sector in the School Prawn fishery and the OTF-Prawning sector in the King Prawn fishery. The red-line indicates interim TAE level of 14,369 days, and the ITCAL period over which it was calculated from historical effort.

It therefore seems that current effort levels are appropriate to maintaining these two stocks at about 60% of unfished B_0. If 60% B_0 were to be considered an appropriate target for these stocks, then an appropriate TACE could be about 40% - 50% of the current TACE. If B_{MSY} were to be considered an appropriate target, then the TACE could be substantially higher than the current actual effort, but the level of effort at MSY (E_{MSY}) has not been provided for the NSW assessments.

However, if fishing were to be conducted at these higher effort levels, then it is likely that catch rates would reduce substantially, probably to about half the current levels. This would essentially require double the current effort to achieve recent catches, with increased operating costs and little economic benefit. Provided the TACE is set at a level appropriate to maintaining the stock at a specified target, it can function effectively as a constant-effort harvest control rule, together with CPUE triggers, with catches decreasing if stock abundance and CPUE decrease. Given the likelihood that the TACE would need to be reduced to maintain the current economic performance of the fishery, consideration could be given to an initial TACE reduction.

Recommendations

- As the first step towards developing a harvest strategy for the NSW Ocean Trawl – Prawning sector, consideration needs to be given to specifying one or more potential biomass targets against which to manage the fishery. Potential targets could include B_{MSY} (the theoretical biomass level supporting maximum sustainable catches), 60% B_0 as a bio-economic target offering sustainable high catch rates, or some levels in between.
- Future assessments should then estimate and report the effort levels associated with maintaining the stock at the chosen target level/s, as well as the CPUE rates associated with fishing at those effort levels and targets.

Fishery Management considerations

The Ocean Trawl (OT) Fishery is a share managed, multi-species fishery that fishes using otter trawl and Danish seine trawl nets. The fishery is made up of four different endorsement types that differ by area fished, gear type and catch composition. The OT Fishery is managed using a suite of input and output controls, including limited entry, controls on fishing gear, and temporal and spatial closures. Minimum Legal Size (MLS) limits, TACCs and ITQs apply to a number of fish species taken in the OT Fishery. A total allowable commercial effort (TACE) quota applies to fishers operating in the OT Fishery under inshore prawn and offshore prawn endorsements.

Inshore and offshore prawn endorsements primarily target EKP and ESP, however substantive amounts of Eastern School Whiting, Cuttlefish, Octopus (Hammer), Balmain Bug and Stout Whiting are also caught. There is no harvest strategy currently in place, or under development for prawns, however there is a harvest strategy for trawl whiting, which informs the TACCs for those species.

Recreational fishers are subject to a 10-litre bag limit per person for prawns. Interactions between recreational fishers and the OT Fishery are presumed to be relatively low, although some interactions may occur when trawlers target inshore species such as ESP. The National Recreational and Indigenous Fishing Survey in 2001 estimated an average of 32 tonnes of prawn caught each recreational prawn fishing season.

The Department uses a risk-based approach to fisheries enforcement activities that uses State-wide and fishery specific risk analysis. Compliance strategies employed include intelligence gathering and analysis, education, targeted patrols, and covert and overt operations. Reports to the TAFC focus on matters relevant to TACC/TACE/ITQ managed fisheries, with quota evasion the major risk of concern. Trawlers in the OTF are also known to catch large quantities of Eastern rock lobster and unlawful retention is known to occur, presenting a high risk of IUU product entering the black market. A significant number of prosecutions and penalties have been issued and the fishery has been rated as high risk by the Department, however non-compliance issues in the fishery are not likely to compromise the effectiveness of the TACE.

Currently, vessels in the OT Fishery are not required to carry either a vessel monitoring system (VMS) or AIS, which reduces the ability to detect a number of quota evasion risks, including transhipment at sea, landing catch without declaring it, or reporting catch from areas where no TACC/TACE applies. The lack of verifiable spatial data is also a risk for the stock assessment, with industry logbooks the only significant source of this information. The Department advises that a small number of vessels are currently trialling VMS units, with use of VMS expected to increase due to an impending requirement by Parks Australia that all commercial fishing vessels transiting or conducting fishing activities in Australian Marine Parks carry an operating VMS.

EKP catches and effort saw historic highs in 2002/03 – 2004/05, followed by a decline through to 2009/10 and have remained relatively stable since. The last full stock assessment indicated biomass levels around 60% of unfished levels.

Catches of ESP are highly variable, driven by the substantial influence of environmental conditions on abundance and fisher behaviour. However, the stock has remained relatively stable since 2009/10, with biomass estimated to be well above B_{MSY} and fishing mortality below F_{MSY}.

Department scientists and industry participants in the fishery have observed that environmental fluctuations including extreme rainfall and La Nina events have an effect on catch rates and species condition. Increasing variability and extreme rainfall effects as a result of climate change may therefore contribute to increased variability in stock biomass and catch rates in the fishery. The Department should monitor

these conditions and the effect of a changing climate on prawn stocks and catch rates to inform future management.

Conclusions

The current TACE was first determined in 2019 as a “transitional TACE” based on principles and methodology used for calculating Interim Total Commercial Access Levels (ITCALs). At the time there was a recognition that more robust TACEs would be developed over time, once the TACE and ITQ framework was more established, as demonstrated in the use of terminology such as “transitional” and “interim”.

To minimise disruption in the initial implementation, the ITCAL was set at the time at twice recent effort levels (average effort in the three years 2009/10-2011/12) plus 10%. Since 2019/20, usage of the TACE has fluctuated between 33-42%. This level of effort is currently maintaining the biomass and catch rates at sustainable levels; however the TACE allows for a significant increase in effort, which would erode the stocks and catch rates to levels that may compromise the sustainability and economic viability of the fishery.

While it is unlikely that there will be a sudden increase in effort in the short term, changes in the market, crew availability and weather conditions can all effect targeting behaviour and effort levels in the fishery. As such, the TAFC considers a gradual reduction of the TACE necessary, to remove the latent effort and reduce the potential for unsustainable levels of effort to occur. The TAFC therefore recommends a 10% reduction to the TACE to 487,800 SHU for both the 2024/25 and 2025/26 fishing periods.

The prawn trawl fishery does not currently have a harvest strategy or target reference point to inform the development of a TACE. The TAFC recommends that the Department work with stakeholders and scientists to identify target biomass levels (or proxy catch rates) for the fishery, to inform the development of more strategic and targeted future TACEs.

Economic considerations

Any proposed change in the TACE, requires some understanding of the likely economic impact on Fishing Businesses (FB).

Impacts will be greater for those FBs which are close to full utilisation of their current SHU allocation. Analysis of utilisation data over the last four financial years (2019/20-2022/3) indicates that this utilisation varies considerably. This was explained by information provided to the TAFC during the public consultation. FBs fish to market and species availability, utilising other endorsements or undertaking more fishing inshore for ESP (and thus using less fishing days), or undertaking more fishing offshore for EKP (and utilising more fishing days). Utilisation in any one year will depend on these and other operational factors.

Figure 4 demonstrates the variation in utilisation by showing the minimum and maximum SHU used over 2019/20-2022/23 for FBs who used over 75% of their SHU in any year.

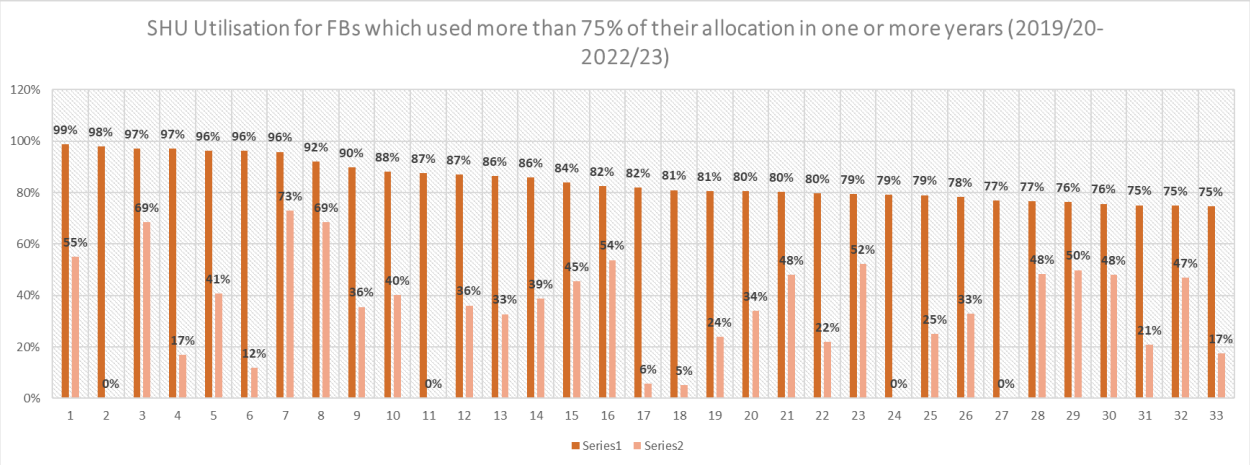

Figure 4. Effort utilisation in the OT prawn fishery

Given this variability, assessing impact under a median SHU utilisation scenario (for years where catch was recorded) and a maximum percentage utilisation scenario, provides an indication of the potential impact on FBs of a reduction in the TACE and the number of additional SHUs that could be required (lease or buy) to maintain their current operation. However, estimating the likely cost impact requires more individual economic data by FB as well as lease/sale prices of SHU. Neither of these are currently available.

Under a median SHU utilisation scenario, no additional SHUs would be required by any FB, if TACEs are reduced by 10%.

Under a maximum utilisation scenario (i.e. using the maximum percentage utilisation of FBs), 9 FBS may need to access additional SHUs by an additional 2% -7% above their current allocation, noting that these same FBs also have a minimum utilisation of 0-69%. The costs of leasing or buying additional SHUs is likely to be low, as around 60% of SHUs are not being used.

Determination

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

1. A TACE for prawns during the period 1 May 2024 to 30 April 2025 and 1 May 2025 to 30 April 2026 of a maximum 487,800 standardised hull units.

COMBINED SPECIES	**EFFORT LIMIT (standardised hull units)**
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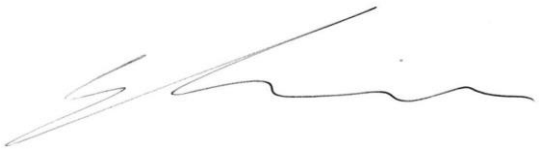
Signed (for and on behalf of the TAFC)



William Zacharin
Chair, TAFC

18 March 2024

Alice McDonald – Fisheries Management member

Sevaly Sen – Deputy Natural Resource Economist member

Andrew Penney – Deputy Scientific member