

NSW TOTAL ALLOWABLE FISHING COMMITTEE

ESTUARY GENERAL FISHERY – HAND GATHERING

- PIPIS
- COCKLES
- GHOST NIPPERS
- BEACHWORMS

DETERMINATIONS FOR THE 2024/25 FISHING PERIOD

16 May 2024

Executive Summary

Preamble

The New South Wales (NSW) Total Allowable Fishing Committee (T AFC) 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 T AFC 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 T AFC 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 T AFC is not subject to the control or direction of the Minister as to any determination made. However, the Minister may direct the T AFC on the procedures to be followed and the matters to be taken into account in making a fishing determination.

There is no formal Harvest Strategy for this fishery sector.

This determination is for the Estuary General Fishery - Hand Gathering (EGF-HG) for the period 1 July 2024 to 30 June 2025.

Management recommendations & supporting actions

The T AFC provides the following recommendations to the Minister, NSW Fisheries and the fishing industry towards improving the management of the fishery:

1. The Pipi FIS surveys provide an important index of abundance of legal and sub-legal sized animals on key beaches and should be conducted every 2 - 3 years. The results of FIS surveys and of CPUE analyses, should be closely monitored to detect whether the Pipi stock increases or declines from current levels, particularly if catches increase to approach the TACC level.
2. DPI Fisheries consider further mechanisms to address the high risk of IUU in the Cockle fishery, including a seasonal closure in the recreational sector from 1 May to 30 November each year, further targeted compliance operations and increased penalties for non-compliance.
3. DPI Fisheries and operators continue to work together to improve the provision of accurate, timely and complete fishery logbook data.
4. The feasibility of initiating a program of fishery independent surveys (Cockle density and abundance) should be evaluated, to conduct periodic surveys in key estuaries that have been most heavily exploited in recent years. Results of such surveys could be used to implement a spatial (estuary-based) approach to management of Cockles, such as using spatial closures to allow recovery of overfished areas. A targeted FIS to measure pre-recruits could be particularly beneficial for management advice.

Determination

The Total Allowable Fishing Committee, pursuant to Part 2A of the *Fisheries Management Act 1994*, determines that the commercial catch of species in the Estuary General Fishery - Hand Gathering, during the fishing period 1 July 2024 to 30 June 2025, should be controlled and allocated through the following measures:

1. A TACC of **156.0 tonnes** for Pipis
2. A TACC of **35.0 tonnes** for Cockles
3. A TACC of **5.6 tonnes** for Ghost nippers
4. A TACC of **7.0 tonnes** for Beachworms

Introduction

The Estuary General Fishery - Hand Gathering (EGF-HG) is a multi-species, share managed fishery, spatially structured into seven regions. Commercial fishing businesses require an endorsement related to each region and a minimum shareholding related to each species to harvest or nominate an authorised fisher to harvest the species groups in the fishery. The four species groups are: Pipis (*Donax deltoides*), Estuary Cockles (*Anadara trapezia*), Ghost Nipper (*Trypaea australiensis*) and Beachworms (3 species of *Onuphidae*). Approximately 76 estuaries and over 100 beaches are accessed across all seven regions by the EGF-HG¹.

The TAFC met with DPI Fisheries and a number of shareholders in the EGF-HG on-line on 11 April 2024 to discuss fishery biology, catch and associated management issues. Written submissions by shareholders on the stock status of the fishery and other fishery management issues were provided to the Committee by DPI Fisheries. Current stock assessment reports on Pipis², Cockles³, Ghost Nippers⁴ and Beachworms⁵ were also provided to the Committee by the Department.

Biological considerations

Estuary Cockles

Stock structure

Estuary Cackle (*Anadara trapezia*) show a complex and poorly understood genetic structure in NSW estuaries, with genetically distinct populations apparently co-occurring across many estuaries⁶. It is not clear how these genetically distinct populations could be separately managed, given that they co-occur in estuaries. Recent genetic studies⁷ suggest a more homogeneous population structure with no separate populations evident within or among the estuaries other than perhaps Burriil

¹ Osterloh, I (2024). Management Report – Estuary General Fishery. Total Allowable Catch Determinations 2024-25. 53 pp.

² Johnson, D.D. 2024. Stock assessment report 2023/24 – Estuary General Hand Gathering Fishery – Pipi (*Donax deltoides*). NSW Department of Primary Industries. 63 pp.

³ Chick, R.C. 2024. Stock assessment report 2023/24 – Estuary General Fishery (Hand Gathering) – Estuary Cackle (*Anadara trapezia*). NSW Department of Primary Industries. 48 pp.

⁴ Chick, R.C. 2024. Stock assessment report 2023/24 – Estuary General Fishery (Hand Gathering) – Ghost Nipper (*Trypaea australiensis*). NSW Department of Primary Industries. 44 pp.

⁵ Chick, R.C. and Fowler, A. M. 2024. Stock assessment report 2022/23 – Estuary General Fishery (Hand Gathering) – Beachworms (*Onuphidae*). NSW Department of Primary Industries. Fisheries NSW, Port Stephens Fisheries Institute. 51 pp.

⁶ Yardin, M. R. and Richardson, B. J. 1996. Status of *Anadara trapezia* (Deshayes) (Bivalvia: Arcodina) from Oyster Harbour, Albany (Western Australia) as compared with east Australian populations. Records of the Western Australian Museum, 18: 121–127.

⁷ Taylor, M.D., Chick, R.C., Doyle, F., Astles, K., Smoothey, A., Subramanian, S., Gillanders, B.M. and Santos, P.R. 2021. Maintaining productivity and access to Estuary Cackle across sectors through improved science-based decision making. Fisheries Research and Development Corporation (FRDC) Project 2021-003. <https://www.frdc.com.au/project/2021-003>

Lake. The NSW Estuary Cockle resource is therefore managed as a single management stock.

Fishery catch and effort

The NSW Estuary Cockle fishery was subject to a TACC of 29.2 tonnes in 2019/20 and 2020/21, based on average catches over the period 2009/10 – 2013/14. This was increased to 45 tonnes for 2021/22 and 2022/23, but following indications of decline in some estuaries, was decreased to 35 tonnes for 2023/34.

Total reported NSW Estuary Cockle catches increased rapidly from 5 tonnes in 1988/89 to a historical peak of 93 tonnes in 1991/92. The fishery has shown sequential periods of decreasing and then increasing catches, with annual catches averaging 43.1 tonnes p.a. over 1994/95 – 2001/02 and 26.7 tonnes p.a. over 2002/03 – 2011/14 and 65.4 tonnes p.a. over 2014/15 – 2018/19. Catches increased slightly in response to the TACC increase and have remained close to 90% of the TACC over the past three fishing periods.

Fishing effort is difficult to estimate consistently across numerous changes in reporting systems over the history of the fishery. Best estimates of numbers of days fished for Cockles indicate that effort remained below ~200 days fished over 1985 - 1997, increased rapidly to a peak of 850 days in 2005/06 and then declined again to average ~240 days/year over 2009 - 2014. Following a recent peak of ~470 days fished in 2014/15, effort again decreased to 44 days in 2020/21 and then increased to an estimated 196 days fished in 2022/23.

Stock assessment and status

No formal stock assessments have been conducted for NSW Estuary Cockles and the only indicators available to evaluate stock status are trends in commercial catch, effort, and nominal catch rates (CPUE). Assessments of Estuary Cockle stock status is compromised by incomplete reporting of catch and effort in logbooks (over 30% of catch unreported; over 40% of reported catch with no spatial data), and by poor spatial reporting in recent years. The way that fishing effort has been reported has also changed frequently over the years, historically reported in days fished estimated in different ways over different periods, and now reported in hours fished, but only by some fishers. Indicators calculated using the available commercial catch and effort data are therefore subject to high uncertainty and potential bias, in addition to being difficult to compare over time. Longer-term trends in important indicators like catch rates (CPUE) are particularly difficult to calculate and interpret.

Looking at statewide nominal CPUE, apart from a substantial drop and recovery over 2001/02 – 2009/10 (due to a marked but short peak in effort), nominal CPUE appears to have trended slowly but steadily upwards between 1995 - 2023. Regionally, CPUE in Wallis Lake has trended slowly upward, or at least remained stable around the long-term average, from 2009 - 2023. CPUE in Shoalhaven / Crookhaven Rivers has trended slowly upward from 2009 - 2016, but catches become low and CPUE, (while apparently high in 2021 and 2023), is unreliable after 2016. Catches have also been particularly low and CPUE unreliable in Pambula and Merimbula Lakes. In contrast, CPUE has declined in Lake Illawarra over the past

four years. Industry representatives have expressed the view that harvesting of cockles is driven by market size requirements, causing fishing effort to shift between areas.

As a result of the high uncertainty in CPUE, the stock status of NSW Estuary Cockles is currently reported as **Undefined** in the *Status of Australian Fish Stocks* (SAFS) reports, in terms of both depletion (biomass compared to the pre-exploitation level) and fishing mortality rate. Updated CPUE analyses presented in the 2024 assessment report remain highly uncertain, with conflicting indicators. There is therefore little scientific basis on which to revise the existing TACC.

Given the uncertainty and conflicting signals in the available indicators for Estuary Cockle status, the TACC should remain at the current level of 35 tonnes. Every effort should be made to ensure that all commercial cockle fishing catch and effort data are completely and accurately reported in commercial fishing logbooks, with accurate documentation of fishing method, fine-scale fishing area, fishing effort in actual hours fished and catch per fishing operation.

Recommendation

- The feasibility of initiating a program of fishery independent surveys (Cockle density and abundance) should be evaluated, to conduct periodic surveys in key estuaries that have been most heavily exploited in recent years. Results of such surveys could be used to implement a spatial (estuary-based) approach to management of Cockles, such as using spatial closures to allow recovery of overfished areas. A targeted FIS to measure pre-recruits could be particularly beneficial for management advice.

Pipis

Stock structure

Pipis (*Donax deltoides*) are considered to form a single genetic population stretching along the NSW coast and most likely extending as far north as Fraser Island, Qld, with a high level of bidirectional gene flow contributing to settlement and replenishment along the coast. The NSW population of Pipis is therefore managed as a single jurisdictional stock. However, in any given year most recruits are likely to come from the beach on which they settle, or from nearby beaches⁸. Localised populations may therefore be subject to short-term localised depletion, if heavily exploited, but are likely to be re-populated fairly rapidly, provided there are healthy populations on nearby beaches.

Fishery catch and effort

Annual commercial Pipi catches increased from 80 tonnes in 1988/89 to around 200 tonnes p.a. over 1989 - 1995, before increasing rapidly to a peak of 670 tonnes in 2000/01. Catches then declined to a historical low of 9 tonnes in 2010/11, prompting the implementation of various spatial closures, temporal closures and a

⁸ Murray-Jones, S., Ayre, D.J. (1997) High levels of gene flow in the surf bivalve *Donax deltoides* (Bivalvia: Donacidae) on the east coast of Australia. *Marine Biology* 128:83-89.

minimum legal limit (MLL) of 45mm total length. Catches over this period were primarily used for bait, but from 2010 onwards the fishery transitioned to a value-based fishery supplying Pipsis for human consumption in the restaurant trade. Catches increased to ~180 tonnes in 2016/17 before declining to 155 tonnes in 2018/19⁹. Pippi catches have been limited to a TACC of 147.4 tonnes in 2020/21 and 156 tonnes in 2019/20. Reported catches in these years were 128.3 tonnes and 82.5 tonnes respectively.

Reported effort (days fished) has also decreased substantially, from a historical peak of 5,610 days in 2001/02 to 2,219 days in 2021/22 and 1,989 days in 2022/23. Since 2009/10, with the introduction of daily catch and effort reporting, fishers have reported hours spent hand-gathering per fishing day. From the recent minimum of 1,802 hours in 2010/11, effort increased to 13,688 hours in 2015/16 and then declined to 6,780 hours in 2019/20. Effort has continued to decline under revised management arrangements to 5,617 hours fished in 2022/23.

Stock assessment and status

The NSW Pippi stock is assessed annually using several indicators derived from fishery-dependent commercial logbook catch and effort data, used in a number of modelling approaches. The key indicator is the trend in catch rate (catch per unit effort – CPUE), which provides an index of abundance of the harvested portion of the resource. Catch data are used in low information Catch-MSY assessments to estimate maximum sustainable yield and current depletion level. Catch and effort data are used in within-season depletion models to estimate exploitation rates⁹.

Evidence derived from these various assessment approaches in 2024 is conflicting. Standardised catch rates over the statewide fishery remained stable and above average from 2012/13 - 2018/19. Regionally, standardised catch rates for Region 1 and Region 3 remained stable and reported catches from Regions 1, 2 and 3 increased in 2022/23 compared to 2021/22. These indicate that recent fishing intensity has not resulted in biomass declines.

Estimates of exploitation rate differ substantially across Regions and between individual beaches, depending on targeting of specific beach areas. From 2018/19 to 2022/23, estimates of exploitation rates on eight beaches ranged from 20 - 55% in Region 1, 23 - 88% in Region 3 and 28 - 55% in Region 4. Exploitation rates therefore range from low to moderate (Regions 1 and 3) or low to high (Region 4), depending on the targeting of specific beaches. Despite high exploitation rates on some beaches, the MLL is estimated to be protecting between 40 - 57% of the spawning potential of the stock, despite high fishing mortality rates. These indicate that fishing intensity on the legal sized Pipsis is high on some beaches, but moderate on others.

Production modelling of the population estimates that the relative biomass (B) in comparison with estimated unfished or virgin biomass (B_0) are about 30% for Region

⁹ Johnson, D.D. 2024. Stock assessment report 2023/24 – Estuary General Hand Gathering Fishery – Pippi (*Donax deltooides*). NSW Department of Primary Industries. Fisheries NSW, Port Stephens Fisheries Institute: 64 pp.

1, 27% for Region 3 and 24% for Region 4, all well below a proxy target reference level of 48% B_0 . These estimates are highly imprecise, with B/B_0 typically ranging from as low as 3% to as high as 64%, and this analysis does not account for the component of spawning biomass that is unexploited and so not reflected in catch and CPUE data. However, there has been a consistent decline in estimated biomass across the fishery, with current estimates of biomass in relation to the level that would support harvesting at maximum sustainable yield (MSY) (B/B_{MSY}) across the fishery and in Regions 1 and 3 being slightly above 50%, and in Region 4 being slightly below 50%. This indicates that the assessed components of the stocks may be approximately half the level that should support harvesting at MSY level and that the TACC should be set below the 112 tonne estimate of MSY.

A consequence of high fishing mortality on Pipsis above the MLL is that, on many beaches, the bulk of the current population is now below the MLL. Preliminary fishery-independent surveys (FIS) recorded pre-recruits at all sampling locations on South Ballina, Killick, Yagon and Stockton beaches at high densities. Pre-recruits comprised 87% of the population at South Ballina, 70% at Killick, 90% at Yagon and 96% at Stockton. This creates somewhat of a dilemma for management. The absence of legal-sized Pipsis on these beaches will constrain catches, suggesting that a lower TACC may be needed, or at least that industry will not be able to catch the TACC. However, the existence of substantial populations of pre-recruits indicates that the population itself is healthy and, provided there are no environmentally induced mortality events, these sub-legal Pipsis should recruit to rebuild commercial stocks on these beaches in the short-term.

Based on the balance of the above evidence, the status of the NSW Pipi stock has been classified as **Sustainable** under the *Status of Australian Fish Stocks* (SAFS) reports, indicating that the biomass of Pipsis is currently unlikely to be depleted and the current level of fishing mortality is unlikely to cause the stock to become recruitment impaired. However, the evidence is conflicting, raising concerns regarding harvest rates and low populations of legal sized Pipsis on targeted beaches.

Although the evidence on stock status is conflicting and uncertain, on balance it indicates that current levels of catch and fishing mortality seem to be sustainable. The TACC can be maintained at the current level of 156 tonnes.

Recommendation

- The Pipi FIS surveys provide an important index of abundance of legal and sub-legal sized animals on key beaches and should be conducted every 2 - 3 years. The results of FIS surveys and of CPUE analyses, should be closely monitored to detect whether the Pipi stock increases or declines from current levels, particularly if catches increase to approach the TACC level.

Ghost Nipper

Stock structure

Ghost Nipper (*Trypaea australiensis*) form a large component of the invertebrate fauna inhabiting low energy intertidal beaches and mudflats along the eastern and southern coast of Australia, and are common in many NSW estuaries. Stock size and structure of NSW Nipper populations is dynamic. A recent study described a lack of genetic population structure in NSW from samples collected at locations spanning ~250 km of the NSW central-south coast (Port Hacking, Shoalhaven Heads and Moruya)¹⁰. Due to apparent gene flow among locations, nippers in NSW are assessed and managed as a single management unit.

Fishery catch and effort

The Estuary General Ghost Nipper fishery is managed through a combination of input controls (gear restrictions) and a Total Allowable Commercial Catch (TACC) of 5.1 tonnes in 2019/20 (determined from the 8-year maximum of annual catches from 2009/10 to 2016/17) and increased to 5.6 tonnes for 2020/21 onwards.

Catch and effort are well reported in commercial logbooks, including spatial reporting of fishing area. The total reported commercial catch of Nippers increased steadily from 1 – 2 tonnes in the early 1990s to 3.9 tonnes in 1996/97 and then fluctuated from 2.0 tonnes in 2001/02 to 4.1 tonnes in 2002/03 and 2.1 tonnes in 2008/09. Since then, catches have fluctuated interannually, but generally increased steadily from 2.6 tonnes in 2010/11 to between 4 - 5 tonnes over the past few years. Reported commercial catches have therefore been over 80% of the current TACC of 5.6 tonnes since 2020/21.

Over the past decade over 90% of this catch has been made in the Port Hacking area, supplying the Sydney recreational bait market. There is substantial recreational harvesting of Nippers for bait in estuaries north and south of Sydney. Recreational harvest surveys have estimated the recreational Nipper catch to have decreased from ~9.1 tonnes in 2000/01 to ~3.9 tonnes in 2013/14, ~2.0 tonnes in 2017/18, ~2.2 tonnes in 2019/20 and ~2.0 tonnes in 2021/22. The estimated Aboriginal cultural catch is low, but the cultural catch of bait, including nippers, is important in delivering economic benefits to the community¹¹.

Stock assessment

Commercial nominal CPUE in kg/fisher day has increased slowly from ~2.5 kg/day in 1993/94 to 7.8 kg/day in 2000/01. There was then an apparently anomalous period of high CPUE ranging between 11.7 – 33.2 kg/day between 2001/02 – 2008/09. Since then, fishery-wide nominal CPUE has remained stable, with catch and effort

¹⁰ Kirby, R.L., Froehlich, C.Y.M., Greaves, S., Selma Klanten, O. and Wong, M.Y.L. 2024. Lack of population structure in an important fishery species of mud shrimp, *Trypaea australiensis*. *Fisheries Management and Ecology*. <https://doi.org/10.1111/fme.12682>

¹¹ Schnierer, S. 2011. Aboriginal fisheries in New South Wales: determining catch, cultural significance of species and traditional fishing knowledge needs. Project No. 2009/038. Report to the Fisheries Research and Development Corporation, Canberra.

increasing slowly in parallel. Standardised CPUE for the Port Hacking area where much of the catch is taken, having remained stable above the long-term average over 2014/15 to 2019/20, has declined since then, to below the long-term average in 2022/23. However, surveys indicate that harvest rates in this most heavily fished area are probably less than 10% of the resource in this area. Other estuaries north and south of Sydney are comparatively lightly exploited by recreational fishers mainly during holiday seasons.

Stock status

Based on the above indicators, the NSW Ghost Nipper resource is classified as **Sustainable** under the *Status of Australian Fish Stocks* framework. There are no indications of historical depletion in the catch series, fishery wide CPUE appears to be stable and catches have been slowly increasing as effort has increased, indicating that current catches are sustainable at the current TACC level of 5.6 tonnes.

Beachworms

Stock structure

Beachworms in NSW refers to three species of polychaete worms (Onuphidae) harvested from the intertidal zone of beaches for use as bait. The Stumpy or Kingworm (*Australonuphis teres*) makes up the bulk of the catch, with smaller quantities of Slimy (*A. parateres*) and Wiry (*Hirsutonuphis mariahirsuta*) worms. Assessment results presented here are therefore derived primarily from data for the Stumpy worm.

There is evidence of multiple genetic groups of Stumpy worms along the NSW coast, but with no clear geographic distribution patterns and high genetic flow between them. All three species are broadcast spawners with larvae potentially being distributed widely by tides and ocean currents. For the purposes of assessment and management, it is therefore assumed that beachworms in NSW constitutes a single multi-species management unit.

Fishery catch and effort

The NSW Beachworm fishery has been managed using a combination of input controls (gear restrictions) and a TACC set for the 2019/20 fishing year at 7.7 tonnes (the 8-year average total catch from 2009/10 to 2016/17) and at 8.5 tonnes/year since 2020/21. Reported annual commercial catches of beachworms increased from 3.8 tonnes in 1984/85 to a historical peak of 37.7 tonnes in 1996/97. Catches dropped to 19.2 tonnes in 1998/99 and have declined slowly but steadily since then, to a historical low of 3.2 tonnes in 2001/02 and 2002/03.

Reported fishing effort has shown similar trends, increasing and then decreasing in parallel with catches. Reported effort increased from 945 days fished in 1984/85 to a peak of 7,442 days in 1996/97, and has declined steadily since then to ~1,300 days per year over 2021 - 2023.

Results of recreational angling surveys estimate that state-wide levels of recreational catch have declined from ~2.9 tonnes in 2000/01 and ~2.4 tonnes in 2013/14 to ~1.5 tonnes in 2019/20 and ~0.9 tonnes in 2021/22, noting that these are likely minimum estimates. This decline may also reflect the switch to use of plastic baits by recreational anglers. The catch by Aboriginal fishers has been estimated at <0.5 tonnes per year.

Stock assessment

NSW beachworms are currently assessed using fishery dependent catch and effort information, particularly catch rates (catch per unit effort – CPUE), which provides indices of abundance for the various estuary Regions. Recent statewide catches have been low, averaging only ~3.2 tonnes over the past two fishing periods (about 38% of the TACC), with regional catches (in Regions 1, 3, 4 and 6, accounting for 98% of total annual catch) also being at historically low levels.

Given the parallel trends in catch and effort, statewide nominal CPUE has fluctuated substantially, but mainly without trend, since 1994/95, around a 1995 - 2023 average level of 3.2 kg/day. Nominal CPUE declined to 2.3 kg/day in 2007/08 and has declined since a peak of 3.8 kg/day in 2018/19 to 2.4 kg/day in 2022/23. This decline in overall CPUE seems to be largely reflective of a decline in Region 6, with CPUE indices in Regions 1, 3 and 4 essentially being stable since at least 2016/17.

Relevant to these apparent declines in catch rates over the past four fishing periods, it must be noted that Beachworms are known to be susceptible to environmentally driven mortality, including to freshwater inundation of the flat, sandy beaches that they inhabit. Recent repeated floods in the NSW region since 2021 have certainly resulted in dramatic increases in freshwater outflows from estuaries and likely had a negative impact on shallow water intertidal organisms. This would have contributed to declines in abundance and catch rates in affected areas.

Stock status

Mainly in response to indications of declining catch and catch rates over the past four years, NSW Beachworm stock status is currently classified as **Depleting** under the *Status of Australian Fish Stocks* (SAFS) national reporting framework. This is a change to the status classification of sustainable at the time of the last determination, and reflects trends in indicators only over the past few years.

As mentioned, declines in these trends may be partially due to negative impacts of flood events. Nonetheless, given that the current TACC is substantially under-caught, implementation of a precautionary decrease in the TACC is warranted, at least until CPUE is seen to increase.

CPUE should continue to be closely monitored to detect whether stock abundance increases in regions in which it has declined (indicating recovery from flood impacts), or continues to decrease, possibly warranting further decreases in the TACC.

Economic considerations

Introduction

EG-HG activities are generally augmented by other commercial fishing activities in the Estuary General Fishery. BDO EconSearch (2022) have undertaken a review on economic and social indicators for the EG-HG. This information is aggregated across the Estuary General Fishery, which limits its direct application to just the hand gathering components of the fishery.

While no quantitative information is available, an understanding of the nature of the Ghost Nipper and Beachworm fisheries leads to the conclusion that capital investments in gear and vessels are low compared to many other fisheries. While capital investment to harvest Pipi and Cockle is also low, the cost of marine biotoxin management planning to permit human consumption is high and this cost significantly influences the spatial scale over which harvesting is economically viable.

Pipis and Cockles

The NSW Pipi fishery transitioned from a low value fishery for the recreational bait market to a predominantly high value seafood resource. In contrast, the NSW Cockle Fishery has always serviced the seafood market. Pipis are utilised by the restaurant trade as well as being consumed at home. Economically, Pipis are the most valuable component of the EG-HG Fishery. Pipis from NSW compete with Pipis from South Australia and Victoria in the marketplace. The Pipi catch in the South Australian fishery is substantially larger than the NSW Fishery, although the closed season in South Australia between 1 June and the 31 October creates a potential temporal market opportunity for the NSW Fishery. When NSW beaches are closed to the take of Pipis for human consumption due to biotoxin levels, commercial fishers are still permitted to take and sell Pipis for bait. This provides them an alternative market during these times, albeit at a lower price. Based on Sydney Fish Market prices, Pipis fetched \$24.26 per kg in 2022/23 which represents a slight increase from the \$23.00 per kg in 2021/22. Although variable, prices have shown a general upward trend from 2012/13. Prices peaked in 2009/10 at approximately \$35 per kg. No information could be sourced for the price of Pipi for bait.

Sydney Fish Market prices for Cockles have ranged from approximately \$3.00 to just under \$14.00 per kg from 2006/07 to 2022/23. Although variable, there has been a general upward trend in prices during this period with the highest price in the period recorded in 2021/22. The price per kilo for the 2022/23 is approximately \$13.80 per kg. The continuing high price for Cockles is likely to be contributing to IUU fishing for the species.

Beachworms and Ghost Nippers

Both Ghost Nippers and Beachworms are not sold in a traditional seafood market, as they are destined solely for the recreational fishing bait market. Ghost Nippers are sold live in NSW, although some value-added frozen products are emerging in Queensland. Beachworms are sold live or as a cured/frozen product. Live products are sold directly to specialist bait shops and the provision of these baits to

recreational anglers allows these shops to differentiate themselves in the marketplace. The local demand for these products will be influenced by whether they can be easily accessed by recreational fishers for their own use. Although not quantified, the supply of live bait can contribute positively to enhancing recreational fishing tourism activities as well as servicing dedicated local anglers. BDO EconSearch (2023) identified a price of \$1.36 per beachworm, but no estimates for nippers are available in that report.

Quota Usage, Transfers and Holdings

Initial allocations for all four species/species groups resulted in quota being concentrated in a small number of fishing businesses. This initial quota allocation largely reflected historical catch for each species, although all fishers that held access shares for the period considered in the allocation formula received at least a small allocation. Over half of the Beachworm quota shares were initially allocated to five fishing businesses and over 80% were initially allocated to 11 businesses. The general distribution of Beachworm quota shares remains the same with five shareholders holding 54% of Beachworm quota shares. Quota usage during the current fishing period is low at approximately 31% with 72% of the fishing period completed. This is similar to the temporal pattern quota usage in the preceding fishing period. Eighty-five percent of the beachworm quota has been caught in regions 3 and 4 during the current fishing period.

Some consolidation of Pipi quota share holdings has occurred, although it appears to have slowed. Initially, Pipi quota shares were allocated to 58 fishing businesses, with over half allocated to 10 fishing businesses. Currently there were 52 fishing businesses with Pipi quota shares with approximately 62% allocated to nine fishing businesses. This has not significantly changed since 2020/21. At the time of writing, quota usage for the current fishing period is 63% with 72% of the fishing period completed. At a comparable stage of the 2021/22 season quota usage was 50%.

Eighty percent of the cockle quota was allocated among three shareholders and 99% of Cockle quota shares are distributed among 10 shareholders. Cockle quota usage during the current fishing period is high with approximately 79% taken, which is similar to the previous season with 72% of the fishing period completed. Fourteen Cockle quota transfers occurred during the 2023/24 fishing period totalling 8% of Cockle quota allocation.

Quota shares for Ghost Nippers are highly concentrated and the harvest is focussed in Port Hacking. Around 95% of Ghost Nipper quota shares were allocated to just three fishing businesses. Quota usage during the last fishing period is low with only 50% of the quota used with 63% of the fishing period completed. It is higher than the quota usage (41%) at the same stage of the previous fishing year. One shareholder (through two fishing businesses) represents 80% of the reported quota usage.

The economic benefits from Ghost Nipper harvest, including enhanced regional economic benefits, would be increased by greater access to suitable harvest areas outside of Port Hacking. This however is a policy decision for DPI Fisheries in consultation with stakeholders and not part of the remit of the TAFC. It could

potentially be undertaken by expressions of interest by suitable fishing business for access to additional quota shares and regionalisation of quota and management arrangements. An alternative would be to increase the volume of Ghost Nippers able to be harvested per quota unit outside of Port Hacking. Any further development of the Ghost Nipper fishery would need to ensure that existing quota holders are treated equitably.

Considerations for Current TACC Setting

There is no strong economic imperative for either an increase or decrease in the TACC for Pipis. For Pipis, Marine Biotoxin Management Plans represent a significant cost of production and operational impost and represent a significant constraint on the fishery. From anecdotal evidence, this cost is increasing and biotoxin testing is harder to obtain, meaning that timely access to beaches for harvesting cannot be guaranteed. Further, the need for biotoxin testing limits where Pipis can be harvested from, meaning that beaches where catch rates may be higher and could otherwise be harvested for greater economic benefit cannot legally be accessed for human consumption.

For Cockles, market demand continues to be high. Industry reported that catches are limited by available quota and the TACC, and not by the availability of Cockles in the water or market demand. Further, as discussed elsewhere in this report, IUU is likely to be high and this includes product illegally sold. The impact on market demand and price of Cockles sold illegally is uncertain. Under the current management regime, Cockle harvesters can make business decisions as to when they harvest their Cockles. As such, they can spread their harvesting effort over the quota year to best meet market demands. The concept of individual transferable quota units, and the obligations that they bring (e.g. prompt and accurate reporting of catch and effort) may not be fully understood by all participants in the fishery.

For Beachworms and Nippers there is a lack of economic information in which to guide quota setting. Both fisheries appear to be able to meet market demand with no significant changes to the market demand predicted. The proposed reduction in Beachworm quota is unlikely to impact bait supply for specialist bait and tackle stores.

From discussion with industry, it appears that quota is being held by fishing businesses and not used or transferred to other businesses that desire additional quota units. This is particularly the case for Cockles. While there are several reasons for this, it represents opportunity cost for some of these businesses. DPI Fisheries should strongly consider a fit for purpose education campaign to reinforce the flexibility of quota arrangements and the methods by which shareholders can identify willing traders of shares.

Fishery management considerations

General Issues

The commercial EG-HG management system is based on individual transferable quota for each species (or species group) under total allowable commercial catches

(TACCs) determined by the T AFC. The EG-HG has four sub-fisheries - cockles, pipis, nippers and beachworms – which are managed via a suite of input and output controls, including minimum size limits, spatial and temporal closures, restrictions on gear and harvest methods, and a minimum legal length for pipis, in addition to quota and TACCs. Many commercial fishers hold multiple endorsements and quota, meaning they can fish in multiple regions for multiple species.

Biosecurity measures are also in place to ensure Cockles and Pipis are safe for human consumption. Maintaining areas open to commercial fishing and opening new areas to harvesting is subject to significant data gathering, time and cost, many of which have risen over the past three fishing periods. This is placing greater pressure on the commercial fishery to get a return on their investment in the fishery.

The EG-HG is a significant source of bait for recreational fishers (Beachworms, Nippers and some Pipis) particularly in the Sydney region. In addition to the commercial catch, there is a significant recreational and Aboriginal harvest for bait and human consumption across the four species. Possession limits apply to both sectors, but there is a significant level of non-compliance along with a likely high level of illegal, unregulated and unreported (IUU) catch.

There are a number of issues with reporting in the commercial fishery, with discrepancies between reported catches and quota usage, and gaps in spatial and effort data. While there have been some improvements recently, this issue remains significant, particularly in the Cocker fishery. The reporting issues undermine confidence in the data being used to inform management and increases uncertainty in stock assessments, which results in a need for more precautionary TACC levels.

The T AFC noted that DPI Fisheries have commenced a trial of VMS in the Estuary General Fishery and are currently considering how this technology could be implemented in the EG-HG fishery. In addition to supporting improved compliance and reporting, the enhancement of spatial data could also facilitate the implementation of finer scale spatial management mechanisms.

State-wide TACCs are a blunt management tool for benthic invertebrate species. This fishery and its sub-fisheries, feature a relatively small number of operators with strong geographical preferences and multiple endorsements, who can shift with market and other operational demands. As a result, the ability of the fishery dependent data to provide insights into stock abundance is compromised and there is a significant potential for hyper-stability of catch rates to hide localised depletion events. The T AFC encourages DPI Fisheries to pursue improved spatial reporting and finer scale spatial management approaches for this fishery where practical.

Cockles

The TACC for Cockles was 35 tonnes in 2023/24, a reduction from the 45 tonne TACC in place for the previous two fishing periods. At a state-wide level, catch rates

look relatively stable, although at a local level there are variable trends in key estuaries. However, using catch rate data as indicators of biomass needs to be viewed with caution, given sporadic reporting of catch and effort at an estuary level and changes in fisher behaviour due to market factors.

The TACC has been fully caught (or close) since it was introduced in 2018/19 and is likely to be fully utilised before the end of the 2023/24 season. With market demand greater than the TACC can supply, the risk of quota evasion, recreational fishers exceeding possession limits and IUU fishing are high.

Industry and DPI Fisheries have been working to address reporting problems in the Cockle fishery. However, there continue to be issues with low logbook returns and gaps in catch and spatial reporting. This undermines the data available to inform management and elevates the risk of quota evasion. The TAFC recommends that DPI Fisheries and operators continue to work together to improve the provision of accurate, timely and complete logbook data.

Cockles are known to be culturally important to the indigenous community, although the total quantity caught by this sector is estimated to be low. The recreational catch of Cockles is unquantified, but considered likely to be significant. Compliance evidence shows that many recreational fishers are taking advantage of the possession limit rules.

The TAFC was informed that IUU catch is likely very high and may be increasing, however no quantification of the tonnage seized or estimates of potential IUU catch were provided to the TAFC. A high level of IUU catch can seriously undermine fishery management and the commercial sector. It is also worth noting that the illegal take and sale of Cockles has potential consequences for human health, as some recreational harvest and IUU catch is very likely to come from areas with no biosecurity plan, thereby exposing consumers to shellfish toxins and disease. The TAFC recommends that the Department explore further mechanisms to address the high risk of IUU in the Cockle fishery, including a seasonal closure in the recreational sector from 1 May to 30 November each year; further targeted compliance operations and increased penalties for non-compliance.

Poor quality data combined with large data gaps remains the dominant stock assessment issue and underlies why the stock status remains classified as **Undefined**. Anecdotal information from operators suggest that healthy numbers of Cockles are present in some areas, with markets being the main driver of the size and number of Cockles being harvest, rather than abundance. The available data presents differential catch trends across key estuaries, with catch rates stable in some estuaries, while others are decreasing. However, given the logbook reporting issues, the TAFC has reduced confidence in catch rates as a reliable proxy for abundance. What is clear is a movement of effort through different estuaries over time, with serial depletion events occurring in the past, where catch peaks have been

followed by low catches at a local scale. This vulnerability to localised and serial depletions, together with the significant and potential increasing IUU risk, suggests the precautionary TACC of 35 tonnes should be maintained.

Recommendations

- DPI Fisheries consider further mechanisms to address the high risk of IUU in the Cockle fishery, including a seasonal closure in the recreational sector from 1 May to 30 November each year, further targeted compliance operations and increased penalties for non-compliance.
- DPI Fisheries and operators continue to work together to improve the provision of accurate, timely and complete fishery logbook data.

Pipis

The current Pipi TACC is 156 tonnes and although catches have fallen well short of the TACC in the previous two seasons, catch rates have increased in 2023/24 and catches are likely to be closer to the TACC this season. DPI Fisheries have concluded that the status of the NSW pipi stock is **Sustainable**, based on an updated stock assessment, supported by a Fishery Independent Survey (FIS). With landings and catch rates showing positive signs in some regions and large numbers of undersized Pipsis detected on key beaches in the FIS, there is reasonable confidence that at a State-wide level the stock can sustain the current TACC.

It should be noted though that the State-wide assessment can hide localised depletion events, where fishing effort is high and the effects that changes in fisher behaviour may be having on catch rates and local populations. However, these risks are buffered by the commercial MLL, which protects a large proportion of spawning animals and supports recruitment to the adult stock.

Considering the above, the TAFC has determined that the TACC for Pipsis should remain at 156 tonnes for the 2024/25 fishing period. However, in some areas where fishing effort has been high, catch rates may fall, before small Pipsis recruit to the fishery. If regionalisation and finer-scale management is a strategy the industry wants to pursue, this action can be considered by DPI Fisheries.

Ghost Nippers

The Nipper fishery supplies the Sydney Fish Market with bait, with most of that harvest coming from Port Hacking and some minor contributions from Shoalhaven/Crookhaven, Myall and Hawkesbury Rivers. The Nipper stock has been assessed to be sustainable by DPI Fisheries, although there are some recent adverse trends, with catch rates in Port Hacking declining in the last year.

Nippers are known to be culturally important to Aboriginal people, but catches by this sector have not been quantified, something that should be considered in the future

for all culturally important species. The recreational catch is estimated to be between 2.0-2.5 tonnes per annum and IUU catch is regarded as low.

Given commercial fishery catch rates remain reasonably stable and the TACC is not constraining commercial catch (4-5 tonnes p.a.), there is no compelling reason to change the TACC. The TAFC has therefore determined that the current TACC of 5.6 tonnes should remain for the 2024-25 fishing year.

Beachworms

A single TACC for all of NSW is used to manage several species of beachworm. An updated assessment considers the fishery to be “depleting” with catches in the last two years being the lowest on record and catch rates decreasing since a peak in 2018/19. Catch rates in this fishery are likely to be affected by environmental effects, and given the small number of operators, changes in fisher behaviour (for market or other reasons) are also likely to have an impact. Localised depletion of key beaches will also impact State-wide data and trends.

Recreational harvests are managed by a bag limit and catches are estimated to be around 0.9 tonnes, although there is significant uncertainty associated with this estimate.

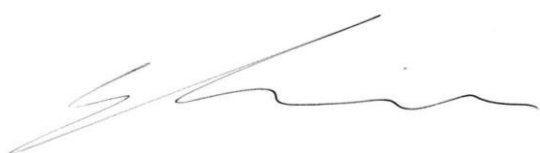
Catches and catch rates in some regions are below long-term averages and catch rates in three of the four main Regions are declining. While the TAFC notes the potential for a range of environmental factors and markets for other species to be influencing the catch rates, the TAFC must act with precaution given the negative signals coming from the available data and the assessment by DPI Fisheries that the stock status is **Depleting**. The TAFC therefore determines that the state-wide TACC is reduced from 8.5 to 7.0 tonnes for the 2024/25 fishing year.

Determination

The Total Allowable Fishing Committee (TAFC), pursuant to Part 2A of the *Fisheries Management Act 1994*, determines that the commercial catch of species in the Estuary General Fishery - Hand Gathering sector should be controlled and allocated through the following measures:

Species	Catch Limit 2023/24 (tonnes)
Pipi (<i>Donax deltoides</i>)	156.0
Cockles (<i>Anadara trapezia</i>)	35.0
Ghost Nipper (<i>Trypaea australiensis</i>)	5.6
Beachworms (3 species of <i>Onuphidae</i>)	7.0

Signed (for and on behalf of the TAFC)



William Zacharin
Chair, TAFC

16 May 2024

Alice McDonald – Fisheries Management member

Daryl McPhee – Natural Resource Economist member

Andrew Penney – Deputy Scientific member