NSW TOTAL ALLOWABLE FISHING COMMITTEE

ESTUARY GENERAL HAND GATHERING FISHERY

- Pipis
- Cockles
- Ghost Nippers
- Beachworms

DETERMINATION FOR THE 2021/22 FISHING PERIOD

14 May 2021

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 Estuary General Hand Gathering Fishery for the period 1 July 2021 to 30 June 2022.

Management recommendations & supporting actions

1. To support the setting of sustainable catch limits at various scales (e.g., regional or estuary) the Department develops a policy and any necessary statutory instruments for these fisheries to guide the TAFC when it considers determinations that seek to set sustainable catch levels below a state-wide level.
2. The Department takes immediate steps to ensure the commercial sector completes its logbooks; ensures there is an appropriate education and compliance regime in place to increase recreational sector compliance and in future provides coordinated Departmental advice to the TAFC regarding estimated total fishing mortality for each of the EGHG Fishery species/species groups.
3. Economic information be collected for the EGHG Fishery that focuses on assessing profitability in the fisheries and the underlying drivers and constraints to profitability.

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 Hand Gathering Fishery, during the fishing period 1 July 2021 to 30 June 2022, should be controlled and allocated through the following measures:

1. A TACC of **156 tonnes** for Pipis
2. A TACC of **45 tonnes** for Cockles
3. A TACC of **5.6 tonnes** for Ghost Nippers
4. A TACC of **8.5 tonnes** for Beachworms

Introduction

The Estuary General Hand Gathering (EGHG) Fishery is a multi-species, share managed fishery, spatially structured into seven regions (Appendix 1). 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: Pipi (*Donax deltoides*), Estuary Cockles (*Anadara trapezia*), Ghost Nipper (*Trypaea austaliensis*) and Beachworms (3 species of *Onuphidae*). Approximately 76 estuaries and over 100 beaches are accessed across all seven regions.

The TAFC met with a number of shareholders in the EGHG Fishery in Coffs Harbour on 19 April 2021 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 the NSW Department of Primary Industries. Current stock assessment reports on Pipis[1], Cockles[2], Ghost Nippers[3] and Beachworms[4] were also provided to the Committee by the Department.

Biological considerations

Pipis

Stock structure

Pipis (*Donax deltoides*) are considered to form a single genetic meta-population along the NSW coast, with a high level of bidirectional gene flow contributing to settlement and replenishment along the coast. However, in any given year most recruits are likely to come from the beach on which they settle or from nearby beaches[5]. Individual beaches may therefore be subject to short-term localised depletion if heavily exploited, but can be re-populated over time, provided there are healthy adult populations on nearby beaches.

Catches

Annual commercial Pipi catches increased from 80 tonnes in 1988 to around 200 tonnes per year over 1989-1995, before increasing rapidly to a peak of 670 tonnes in 2000. Catches then declined to a historical low of 9 tonnes in 2010.

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[1] Johnson, D.D. 2021. Stock assessment report 2020 – Estuary General Hand Gathering Fishery – Pipi (*Donax deltoides*). NSW Department of Primary Industries. Fisheries NSW, Port Stephens Fisheries Institute: 73 pp.

[2] Chick, R.C. 2021. Stock assessment report 2020/21 – Estuary General Fishery (Hand Gathering) – Estuary Cockle (*Anadara trapezia*). NSW Department of Primary Industries. Fisheries NSW, Port Stephens Fisheries Institute. 47 pp.

[3] Chick, R.C. 2021. Stock assessment report 2020/21 – Estuary General Fishery (Hand Gathering) – Ghost Nipper (*Trypaea austaliensis*). NSW Department of Primary Industries. Fisheries NSW, Port Stephens Fisheries Institute. 49 pp.

[4] Chick, R.C., Barnes, T. C. and Fowler, A. M. 2021. Stock assessment report 2020/21 – Estuary General Fishery (Hand Gathering) – Beachworms (Onuphidae). NSW Department of Primary Industries. Fisheries NSW, Port Stephens Fisheries Institute. 60 pp.

[5] Murray-Jones S. (1999) Conservation and management in variable environments: The surf clam, *Donax deltoides*. The University of Wollongong, Wollongong.

Catches over this period were primarily used for bait. From 2010 onwards, the fishery transitioned from a volume-based to a value-based fishery, supplying Pipis for human consumption in the restaurant trade, with catches increasing to around 150 tonnes per year from 2015 onwards[6].

Stock assessment

The NSW Pipi stock is assessed annually using several indicators derived from fishery-dependent commercial logbook catch and effort data. 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 rates[6].

Over the period 1990-2010, CPUE declined from a historical maximum of 218 kg/day in 1990 to a low of 17 kg/day in 2010. The combined decline of total catches and CPUE over this period indicated over-fishing and depletion of the NSW Pipi resource, at least on the harvested beaches. Catch-MSY analyses estimate that the stock had been depleted to about 10% of pre-exploitation levels by 2007.

Several management measures were implemented in response to this depletion, including spatial closures of some beach areas; a six-month temporal closure over the spawning season; a 45mm total length minimum size limit to allow spawning to occur at least once before harvesting and a daily catch limit of 40 kg per fisher. These measures resulted in a reduction in fishing pressure and an apparent rebuilding of the stock in the currently fished areas, in addition to existing stocks in unfished areas.

These substantial changes in the fishery also mean that CPUE cannot be easily compared before and after the management intervention. Current stock status therefore needs to be evaluated using trends in indicators since 2010. Coinciding with the increase in catch since 2010, nominal commercial CPUE increased from 5 kg/hr in 2010 to 16 kg/hr in 2019. A linear trend through nominal CPUE increased by 194% over 2009-2019, and a linear trend through standardised commercial CPUE increased by 135% over the same period. Catch-MSY analysis estimates that the resource increased above 20% B_0 (a commonly used limit reference level) in about 2012 to reach a current depletion level of about 33% of the B_0 pre-exploitation level. At a constant catch level of around 150 tonnes, the stock is projected to increase steadily towards 48% B_0 (a commonly used target reference level). Current harvest rates are estimated to be at, or slightly below, the target harvest rate required to maintain the stock near MSY.

Stock status

The NSW Pipi resource appears to have been depleted by overfishing to well below the limit reference level over the period 1990-2005, when annual catches averaged

[6] Johnson, D.D. 2021. Stock assessment report 2020 – Estuary General Hand Gathering Fishery – Pipi (*Donax deltoides*). NSW Department of Primary Industries. Fisheries NSW, Port Stephens Fisheries Institute: 73 pp.

about 370 tonnes. Since 2010, reductions in fishing pressure have resulted in an apparent rebuilding of the stock to about 33% of the pre-exploitation level, with increases in catches and CPUE. The stock is projected to continue rebuilding towards the target reference point at catch levels between 150 and 170 tonnes. Projecting the linear trends in commercial CPUE forward by one year and assuming that abundance will increase in proportion to these trends, indicates that the TACC for Pipis could be increased moderately above the current level of 147.4 to 156 tonnes for 2021/22.

Cockles

Stock structure

Estuary Cockle (*Anadara trapezia*) show a complex and poorly understood genetic structure in NSW estuaries, with genetically distinct populations apparently co-occurring across many estuaries[7]. It is not clear how these genetically distinct populations could be separately managed, given that they occupy the same habitat in estuaries. The Cockle resource is therefore currently managed as a single management stock. Visually distinguishing between different genetic populations in a single estuary, or setting catch limits at a sub-estuary level, would not be feasible at this time.

Catches

Total reported Cockle catches increased rapidly from 5 tonnes in 1988/89 to a historical peak of 93 tonnes in 1991/92. The fishery has shown three periods of decreasing average annual catch, averaging 82 tonnes per year over 1990/91 – 1993/94, 43 tonnes per year over 1994/95 – 2001/02 and 25 tonnes per year over 2002/03 – 2011/12. Catches then increased rapidly again to a recent peak of 79 tonnes in 2014/15 and averaged 65 tonnes per year over 2014/15 – 2018/19.

The current TACC of 29.2 tonnes was based on average catches over the period 2009/10 – 2013/14, a period of lowest catches in the fishery. The average annual catch over the period 2009/10 – 2016/17, the period used to determine initial TACCs for a number of other Estuary General stocks was 44.7 tonnes.

Stock assessment

There are a number of shortcomings in the data available with which to estimate status of Cockle stocks. Of most concern, reporting of commercial catch and effort data in logbooks is incomplete and has been particularly poor in recent years. About 40% of catches of the allocated and reportedly used, 29.2 tonne TACC were not reported in 2019/20. 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

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

are therefore subject to substantial uncertainty and potential bias, in addition to being difficult to compare over time. Longer-term trends in important indicators like catch rate per unit of effort (CPUE) are particularly difficult to calculate and interpret.

Nonetheless, catches have recently increased to levels similar to the historically high catches in the early 1990s. Since 2011/12, this catch increase has been associated with increasing CPUE, particularly catch per fisher day, which increased by about 45% over 2011/12 – 2019/20. At an individual estuary level, CPUE has increased to above long-term average levels in Wallis Lake, Pambula Lake, Shoalhaven/ Crookhaven River. In Lake Illawara and Merimbula Lake, CPUE is below long-term average levels, but is fairly stable.

Stock status

As a result of the uncertainty in key indicators like CPUE, the stock status of Cockles in terms of biomass and fishing mortality rate is currently reported as undefined in the Status of Australian Fish Stocks reports, in terms of both depletion (biomass compared to the pre-exploitation level) and fishing mortality rate. However, coincident increasing catches and catch rates indicate that the resource is able to sustain recent catch levels and appears to be increasing. A moderate increase in the TACC to better reflect recent catch levels would likely be sustainable in the short-term.

Every effort must 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. If logbooks are not improved to become a reliable source of fisheries data, then the feasibility of initiating a programme of fishery independent cockle density and abundance surveys should be evaluated and costed. Results of such surveys in heavily exploited zones 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.

Ghost Nippers

Stock structure

Ghost Nipper (*Trypaea austaliensis*) 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. There are no published studies on the genetic stock structure of Ghost Nipper and they are assumed for management purposes to constitute a single management unit in NSW. However, the combination of brooding females and slow water movement along the estuarine beaches they inhabit suggest that recruitment in estuaries comes from adult populations in those same estuaries, so that populations within estuaries could constitute functionally separate biological stocks. This suggests that exploitation rates should be kept to moderate levels in all areas, to reduce the risk of depletion in any one estuary.

Catches

The total reported commercial catch of Ghost Nippers increased steadily from 1 - 2 tonnes in the early 1990s to around 4.5 tonnes in 2019/20. Catches fluctuated between 2 and 4 tonnes over 1995/96 – 2008/09 and have averaged 4.1 tonnes per year since 2009/10. Over the past decade, > 90% of this catch has been made in the Port Hacking area, supplying the Sydney recreational bait market. There is substantial recreational harvesting of Ghost Nippers for bait in estuaries north and south of Sydney, with estimates from surveys indicating a decline in recreational catches from about 7.5 tonnes in 2000/01 to about 2 tonnes in 2017/18.

Stock assessment

Commercial nominal CPUE in kg/fisher day has increased slightly since 2009/10. CPUE (in kg/hr) has fluctuated, but appears to have increased more substantially, with a linear trend increasing by 42% over 2009/10 – 2019/20[8]. These CPUE trends primarily reflect the status of the most heavily exploited Port Hacking area. Standardised CPUE for the Port Hacking area has been stable above the 10-year average since 2015/16 and 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. There are no indications of historical depletion in the catch series and CPUE indicators all appear to be increasing or stable above the 10-year average. This indicates that current catches are sustainable.

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.

[8] Chick, R.C. 2021. Stock assessment report 2020/21 – Estuary General Fishery (Hand Gathering) – Ghost Nipper (*Trypaea austaliensis*). NSW Department of Primary Industries. Fisheries NSW, Port Stephens Fisheries Institute. 49 pp.

Catches

Reported annual commercial catches of beachworms increased from 3.8 tonnes in 1984/85 to a historical high of 37.7 tonnes in 1996/97 and averaged 20 tonnes per year over 1997/98 – 2004/05. Catches then declined steadily from 2005 onwards to 5.4 tonnes in 2019/20. Anecdotal information provided by fishers ascribes this decline to recreational anglers changing to using plastic baits rather than beachworms. Over 2009/10 – 2019/20, commercial catches have averaged 7.4 tonnes per year.

Recreational anglers are permitted to take up to 20 beachworms per day. Results of recreational angling surveys estimated the recreational harvest at about 2.9 tonnes in 2000/01; 2.5 tonnes in 2013/14 and 1.5 tonnes in 2017/18. While these estimates have a level of uncertainty associated with them, this apparent decline probably also reflects the switch to use of plastic baits by recreational anglers. The catch by indigenous 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. In contrast to the decline in catches, commercial unstandardised catch rates (CPUE) remained stable at or above 3 kg/fisher day over much of the period 1994/95 – 2019/20, only dropping below that level briefly over 2006/07 – 2007/08. Catch per fisher day has decreased slightly since 2009/10, whereas catch per hour has increased slightly, as a result of the hours fished per day decreasing from about 3.5 hrs/day in 2014/15 to 2.5 hrs/day in 2019/20[9].

At the level of the four most important Estuary Regions (Appendix 1), standardised CPUE (catch/hr) has remained stable at or above the recent 10-year average in Regions 3 (Wooli – Laurieton), 4 (Laurieton – Tuggerah Lakes) and 6 (Wollongong – Ulladulla), and has only declined to below the 10-year average in the northernmost Region 1 (Tweed Heads – Evans Head).

Catch-MSY modelling estimates that high catches over 1994 to 2012 exceeded the long-term target harvest rate of the exploited portion of the resource, resulting in the multi-species stock currently being at a depletion level of about 31% of the pre-exploitation level (B_0). However, harvest rate is now at or below the target level and the assessment indicates that the stock has been rebuilding since 2012. This model estimates the lower 95% confidence interval of MSY for this stock to be about 8.9 tonnes, which is close to the current TACC of 8.5 tonnes. Projections at a

[9] Chick, R.C., Barnes, T. C. and Fowler, A. M. 2021. Stock assessment report 2020/21 – Estuary General Fishery (Hand Gathering) – Beachworms (Onuphidae). NSW Department of Primary Industries. Fisheries NSW, Port Stephens Fisheries Institute. 60 pp.

constant catch of 8.5 tonnes indicate that the resource should continue to rebuild towards the 40% B_0 target level.

Stock status

The NSW beachworms stock is currently classified as sustainable. Based on trends in CPUE, the stock appears to have remained stable at recent average catch levels for at least the past decade, with most CPUE indices being at or above the recent 10-year average. The stability in CPUE indicates that the current catches are sustainable. However, lack of significant increases in CPUE indicates that the TACC should remain at the current level, until increases in CPUE indicate an increase in stock size.

Economic considerations

Information on economic performance across the four species/species groups is limited and this lack of data prevents a robust assessment of profitability in the fisheries. 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.

Pipi and Cockle

The NSW Cockle Fishery has always serviced the seafood market. In contrast, the NSW Pipi fishery transitioned from a low value fishery for the recreational bait market to a predominantly high value seafood resource. Pipis are utilised by the restaurant trade as well as being consumed at home. Economically, Pipis are the most valuable component of the EGHG 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 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 approximately $19.00 per kilo. Although variable, prices have shown a general upward trend from 2012/13, but prices peaked in 2009/10 at approximately $35 per kilo. 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 $8.50 per kilo from 2006/07 to 2019/20. Although variable, there has been a general upward trend in prices during this period with the highest price in the period 2019/20.

The price per kilo of Pipis and Cockles is sensitive to volume. Their prices are also linked, as there can be a level of substitution between them in the marketplace.

However, the exact nature of the interrelationship is not well informed by empirical data. Preliminary estimates of price flexibilities from the 2020 determination suggest a 10% increase in Pipi catch would decrease Pipi price by around 2.7%. For Cockles, preliminary estimates of price flexibilities from the 2020 determination suggest a 10% increase in Cockle catch would decrease cockle price by approximately 1%. It should be stressed that these values are a guide only that require further refinement by relevant empirical data. No new information is available to update the price to volume relationship. Nonetheless, it can be assumed that prices will be sensitive to significant changes in the TACC (e.g., greater than 10%) based on current information, with any such increase in the TACC offset by a small reduction in price. Further market development and promotion over time may change this relationship, if consumer demand increases.

Ghost Nipper and Beachworm

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. Although not quantified, the supply of live bait can contribute positively to enhancing recreational fishing tourism activities. COVID-19 restrictions in NSW had an impact on recreational fishing participation during 2020 and this may have flowed through to reduced demand for live bait.

There is no information on landed or wholesale prices for ghost nippers and beachworms.

Quota Transfers and Holdings

The EGHG Fishery quota market has had little time to develop, although trading has taken place. Initial allocations for all four species/species groups resulted in quota being concentrated in a small number of 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. Quota was allocated only at the end of 2018-19 and uncertainties in the economy because of COVID, have also partly coincided with the new operation of the quota market.

Over half of the Beachworm quota shares were initially allocated to five fishing businesses and over 80% was initially allocated to 11 businesses. As at 25 March 2021, this general distribution of Beachworm quota shares remains the same. However, some consolidation of Pipi quota share holdings has occurred. Initially, Pipi quota shares were allocated to 58 fishing businesses, with over half allocated to 10 fishing businesses and about 80% allocated to 23 fishing businesses. As at 25 March 2021, there were 49 fishing businesses with Pipi quota shares with over 50% allocated to seven fishing businesses and 80% allocated to 17 fishing businesses. No information could be sourced on the initial allocation of cockle quota shares, but

as at 25 March 2021, 80% of the cockle quota was allocated among four fishing businesses.

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 and some further but marginal consolidation has occurred to 97% as at 25 March 2021. The economics of the fishery, including enhanced regional economic benefits, would be increased by greater access to suitable harvest areas outside of Port Hacking. This 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.

Recommendation

- *Economic information be collected for the EGHG Fishery that focuses on assessing profitability in the fisheries and the underlying drivers and constraints to profitability.*

Fishery management considerations

General Issues

Like many NSW fisheries the commercial EGHG Fishery is adapting to a new quota management system that involves individual transferable quota for each species (or species group) under total allowable commercial catches (TACCs) determined by the TAFC. It is therefore expected that there will be some transitional issues with data reporting, development of management arrangements and the enforcement of these new arrangements. The transition also came on top of the COVID-19 pandemic which has had a significant effect on the catching of quota and fish markets.

The EGHG Fishery is comprised of four species - Pipis, Cockles, Ghost Nippers and Beachworms, with a total GVP of around $3 million per annum. The EGHG Fishery is the major source of bait for recreational fishers, who do not catch their own, particularly in the Sydney area. Many commercial fishers hold multiple endorsements and quota, meaning they can fish in multiple regions for multiple species. This catch and effort flexibility has both benefits and risks for management.

For fishing businesses, having the flexibility to swap between target species enables better adaptation to supply and demand issues. For example, in some years a species may be less available due to weather or biotoxin events along part of the coast, but readily available in other estuaries. Similarly, the market for one species may be delivering better financial returns than for another. Some species have strong seasonal demand and holding quota for several species gives a fishing business a greater opportunity to maintain cash flow throughout a larger part of the year.

However, such flexibility also brings risks and for the EGHG Fishery, the most obvious is the ability to aggregate quota (through lease and/or permanent transfer) and fish it all in one area (e.g., a single estuary). Such a concentration of catch may cause localised depletion and affect all fishers in that area. While this risk is not immediately apparent in the EGHG Fishery, it is always preferable to have the policy and statutory tools ready to be used prior to localised depletion arising.

One of the challenges faced by the TAFC is that currently there is no developed and accepted Departmental policy or statutory regime to apply regional (e.g., estuary scale) catch limits. For some fisheries, the Department has accepted such an approach when it has been recommended by the TAFC (e.g., Red Sea Urchin) while for others it has not (e.g., Abalone). Without a policy to guide when regional catch limits will be applied, the TAFC is compelled to take a more precautionary approach to determining TACCs in the EGHG Fishery and other similar fisheries.

An example of this precaution is the commercial Ghost Nipper fishery, which while sustainably fished, almost all the catch is taken in Port Hacking. There may be scope to increase the Ghost Nipper TACC at a future date, but this additional catch must come from outside Port Hacking, if the catch within Port Hacking is to remain sustainable. The reason for this, as with all EGHG Fishery species, is that they are effectively separate biological units at the estuary or regional scale and management needs to reflect this population structure.

Recommendation

- *To support the setting of sustainable catch limits at various scales (e.g., regional or estuary) the Department develops a policy and any necessary statutory instruments for these fisheries to guide the TAFC when it considers determinations that seek to set sustainable catch levels below a state-wide level.*

A significant factor constraining Pipi and Cockle harvest is food safety. For industry, the commercial cost of having a beach closed can be significant and the cost of surveying and opening new harvest areas is high. Industry advice was that this can take around two years and cost tens of thousands of dollars, with no guarantee of a positive outcome. While public health must always be at the forefront in any food production activity, an affordable way for smaller fisheries to sustainably grow is also necessary. Any sustainable growth strategy must include some areas in each estuary remaining closed to protect sources of recruitment and repopulate fished areas.

The EGHG Fishery species are shared with other fishing sectors. There is a significant recreational harvest for bait and all species are harvested by Aboriginal fishers. Recreational and Aboriginal fishers are subject to possession limits, but there is a reported high level of non-compliance, up to 80% for some species. The magnitude of illegal, unregulated and unreported (IUU) fishing has not been measured, but the Cockle fishery is of particular concern (see below). There are also inconsistencies between catches reported in commercial logbooks and quota reporting. Furthermore, in some fisheries a large proportion (up to 40%) of logbooks

are not completed in terms of catch and effort data. This has serious consequences for stock assessments based on these data and the determination of TACCs by the TAFC. Such widespread data gaps increase uncertainty in assessments and require more precautionary catch levels to be determined.

To address non-compliant fisher behaviour (all sectors) requires management, science and compliance to work effectively together to educate harvesters about the rules, explain the significant consequences of not complying with them and enforce the rules. To support enforcement, a person should not be able to recreationally and commercially fish at the same time and what constitutes a commercial quantity of catch must be defined in the regulations, so that appropriate penalties can be applied.

Recommendation

- *The Department takes immediate steps to ensure the commercial sector completes its logbooks; ensures there is an appropriate education and compliance regime in place to increase recreational sector compliance and in future provides coordinated Departmental advice to the TAFC regarding estimated total fishing mortality for each of the EGHG Fishery species/species groups.*

Cockles

There is limited data with which a sustainable TACC can be set for this fishery. However, based on experience elsewhere in Australia and New Zealand, the TAFC considers that shellfish like Cockles hold considerable growth potential. The current TACC (29.2 tonnes) was set by the Department for the 2019-20 fishing year and remained unchanged by the TAFC for 2020-21. It reflects the average catch for the years 2009-14, which is about half the average catch from 2015-19.

Both the Department's original decision and the subsequent determination appear to be inconsistent with the DDG Fisheries letter to the TAFC chair in 2018 that states '*The TACs have been set at levels that ensure that for the coming year the industry can continue production at or around recent levels, while conserving fish stocks*.'. The reference years (2009-14) that were used to set the original Cockle TACC are also inconsistent with the reference years for other EGHG Fishery quota species. Furthermore, no evidence was, or is, available that Cockle stocks were, or are, being harvested at unsustainable levels in the period immediately prior to quota being allocated, noting the data quality issues referred to earlier.

To address the inconsistencies in quota setting reference years; better meet the statement in the DDG's letter and recognise that cockles are not being overfished, the 2021-22 TACC for the EGHGF cockle fishery should be increased to the average catch for the period 2009-17, which was 45 tonnes.

The TAFC noted that despite the recent halving of the commercial catch, there has been little price response from the Cockle market. This may suggest that the supply of Cockles has not changed significantly, or that price is not very responsive to supply. The latter has been considered in the economics section of this

determination and notes that there is a relationship between supply and price. Consequently, an increase in IUU fishing remains a plausible explanation for the lack of price response.

Non-compliance is recognised as a serious problem with up to 40% of commercial logbooks incomplete and up to 80% of recreational fishers not complying with the possession limit of 20 cockles per person. This limit was decreased from 50 per person in October 2020, following complaints from commercial fishers that some groups of recreational fishers were removing large amounts of cockles that could be sold as commercial quantities.

Pipis

The pipi harvest accounts for two thirds of the GVP of the EGHG Fishery and by far the largest TACC by weight (147.4 tonnes). Once a source of bait, the commercial catch is now mostly for human consumption and is subject to strict food safety requirements. Historically overfished when annual catches averaged around 300 tonnes per annum, pipis are now assessed as sustainable, with the stock at around 35% of initial biomass in areas open to commercial fishing. There is also a commercial minimum legal size (4.5 x 3.2 cm). The most recent stock assessment indicates that fishing mortality of around 150 tonnes will result in an increasing biomass, while above 175 tonnes rebuilding is unlikely. Following further scientific analysis, an increase in the 2021-22 TACC to 156 tonnes has been determined by the TAFC.

Ghost Nippers

Port Hacking is the main Ghost Nipper fishing region in NSW and is regarded as sustainable. It supplies the Sydney market with bait. Small commercial catches are also taken in the Shoalhaven/Crookhaven, Myall and Hawkesbury Rivers. The historic commercial catch peaked at 5.1 tonnes per annum against a current TACC of 5.6 tonnes. The commercial fishery appears stable and there is no evidence to suggest a change should be made to the TACC in 2021-22.

Ghost Nippers are important to Aboriginal people, but quantifying historic catch at the state level remains problematic. The recreational catch is estimated between 2-4 tonnes per annum and IUU catch is regarded as low.

Beachworms

Several species of Beachworm are managed under a single TACC, which is currently 8.5 tonnes. This is slightly above the historic average catch (2009-10 to 2016-17) of 7.7 tonnes. The harvest appears to be in long-term decline, due to a changing market away from the use of live bait and towards plastic lures, although for the catch of some species and for some groups of recreational fishers Ghost Nippers remain important. There are no sustainability concerns with the current TACC and the most recent assessment suggests that TACCs of up to 12-13 tonnes may be sustainable. However, catch rates in some areas are in decline (e.g., Region 1) so any increase in TACC would require regional or estuary-based limits to be applied. A clear policy on the application of such limits is required before any TACC

increases should be made. The TACC for beachworms should remain at 8.5 tonnes for 2021-22.

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 Hand Gathering Fishery should be controlled and allocated through the following measures:

Species	Catch Limit 2021/22 (tonnes)
Pipi (*Donax deltoides*)	156
Cockles (*Anadara trapezia*)	45
Ghost Nipper (*Trypaea australiensis*)	5.6
Beachworms (3 species of *Onuphidae*)	8.5

Signed (for and on behalf of the TAFC)

William Zacharin
Chair, TAFC

14 May 2021

Appendix 1: Map of NSW coastline showing the main ports of landing, broad fishing zones and estuary fishing regions (1 to 7) for commercial catch and effort reporting.