

NSW TOTAL ALLOWABLE FISHING COMMITTEE

ABALONE FISHERY

DETERMINATION FOR THE 2023/24 FISHING PERIOD

14 April 2023

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 shareholding or 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. Currently, there is no formal harvest strategy for this fishery.

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.

This Determination is for the Abalone Fishery for the period 1 July 2023 to 30 June 2024.

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 T AFC recommends catch rates be standardised to explain factors that may have changed in the fishery, such as spatial changes and technological or effort creep.
2. A pre-recruit indicator of abalone coming into the fishery is needed to address a growing concern about recruitment patterns.

Determination

The Total Allowable Fishing Committee (T AFC), pursuant to Part 2A of the *Fisheries Management Act 1994*, determines that the commercial catch of Abalone should be controlled and allocated through the following measure:

1. A TACC of **100 tonnes** during the fishing period 1 July 2023 to 30 June 2024.

Introduction

The NSW Abalone Fishery extends the entire length of the coastline of NSW and is managed as a single stock, although there are four identified spatial management units in the fishery, which assist in pursuing sustainable fishing and monitoring the performance of the fishery (Table 1). The Abalone Fishery was developed through the 1960s and annual catches peaked around 1,200 tonnes in the early 1970s. This catch was not sustainable and the fishery was restricted in 1980 to control over-exploitation. Quota management was introduced in 1989 at 10 tonnes (t) per licence. In the early 2000s, the fishery experienced a sustained period of lower catches, with the TACC dropping to 110 t in 2007/08 and 75 t in 2009/10. The TACC was then increased and ranged between 120 and 130 tonnes from 2012/13 to 2017. Since 2018, the TACC has been 100 tonnes.

There are currently 44 shareholders in the fishery with shareholdings between 10 and 90 shares from a total pool of 3,454 shares. 35 shareholders hold the required minimum number of shares (70) to have an endorsement that authorises the taking of abalone. Quota can be traded within each fishing period, with a maximum of twice the initial shareholding able to be transferred to their existing shareholding¹.

Table 1: Spatial management units and fishing areas in the NSW Abalone Fishery

Spatial Management Unit	Fishing areas
1	Tweed, Port Stephens, Kiama, Ulladulla, South Brush, Batemans
2	Tuross, Narooma, Bermagui, Bunga, Moon Bay, Turingal, Long Beach
3	Eden, Saltwater, Bittagabee, Green Cape, City Rock
4	Wonboyn, Saltlake, Howe

The Abalone Fishery is subject to a range of spatial closures arising from the comprehensive system of marine protected areas in NSW waters. These include marine parks, aquatic reserves and intertidal protected areas in which commercial fishing is restricted or prohibited.

Abalone are subject to a regulated legal minimum length (LML) to assist in protecting the stock from over exploitation and ensure fish mortality does not result in the depletion of reef systems, whereby all abalone are removed. The LML for commercially harvested abalone was increased from 117 mm to 119 mm in 2018 and further increased to 120 mm and to 125 mm south of Womboyn in 2019. Recreational fishers are subject to a LML of 117 mm.

An annual assessment of the Abalone Fishery is commissioned each year by the Department of Primary Industries, with support from the Abalone Council of NSW². The TAFC met with fishery scientists, fishery managers, compliance officers and

¹ McKinnon, F (2023) Management Report for NSW Abalone Fishery: Report to the TAF Committee for the total allowable catch for the 2023-24 fishing period. Dept for Regional NSW

² Abalone Council of NSW (2023) Assessment of Abalone stocks in NSW: Submission to the TAC setting process for 2023/24, Sydney

participants in the Abalone Fishery in Merimbula, NSW on 28 March 2023 to discuss the current fishery assessment, economic conditions and compliance in the fishery.

There has been an undercatch of the TACC in the past three fishing periods due to the impacts of bushfires and floods and market disruptions from COVID-19. As of 28 March 2023, there was approximately 56 t of the TACC remaining to be caught, meaning a fourth fishing period of undercatch is likely.

Biological considerations

Biology and stock structure

The NSW abalone fishery harvests Blacklip Abalone (*Haliotis rubra*). Spawning larvae are dispersed by ocean and tidal currents for one week after spawning and once settled, are highly resident, forming aggregations on suitable reef habitat, often in substantial localised densities. Aggregations typically are genetically indistinguishable from one another and do not constitute separate biological stocks. The species grows and matures slowly, reaching a maximum age between 20 and 50 years. Aggregations can be rapidly fished down and are susceptible to serial, localised depletion.

Abalone are susceptible to hyperstable catch rates, which occur when catch rates remain constant while the actual population declines. They are often associated with aggregating behaviour and create an illusion that population levels are stable, when they are not, thus potentially masking fishery declines. This has important implications. First, it means fishery-dependent data usually will not detect the changes in abundance, or density in areas beyond where the fishery is operating. Second, it also means that the abundance seen by the fishery and by industry participants, is not indicative of the broader stock abundance, setting up potential tension and disagreement between scientists, managers and stakeholders.

Stock assessments and performance indicators

Formal stock assessments that estimate abalone stock status are not currently conducted in NSW. In their absence, key performance indicators are used to provide evidence on trends in the stock. All indicators rely on fishery dependent data and care must be taken with stock inferences, because fisheries dependent data is often confounded by regulatory, or socio-economic changes.

There are three main performance indicators used to inform management advice. Two of these are derived from fisheries logbook data and the third is derived using data captured by automated dive loggers, now used by most divers:

1. Catch rates (kg caught per dive hour) by area and SMU are calculated from logbook catch and effort data, providing an index of relative abundance of retained (legal sized) abalone.
2. Standardised average weights of harvested abalone by area and SMU are estimated from counts and bin weights of landed abalone, providing an index of the size being attained by mature adults in the population under current fishing pressure.

3. A biomass index based on density obtained by dive loggers and area of suitable abalone habitat. These are compared to catches to estimate harvest fractions by area.

The main indicator of the NSW abalone fishery, catch rates, typically are assumed to represent the biomass available to the fishery, but they may also change with size limits and the technology used to catch the fish. Comparatively, long-term abalone catch rates are high and there is concern that these do not reflect changes in stock biomass. If catch rates are used as indicators in the fishery, they should be standardised against explanatory variables in the fishery, such as changing spatial characteristics, gear and technology. The committee recommend that catch rates are standardised to factor in changes that may have occurred in the fishery over time.

Average weight of abalone is also a fishery dependent indicator and risks being biased towards larger animals, partially by sequential increases in the legal minimum length over the history of the fishery, but also by active selection by divers of larger abalone to meet domestic market preferences.

Stock status

The T AFC view the assessment report as a reflection of the stock status in the currently fished SMUs. The assessment report showed that after fluctuating between 2000 and 2009, catch rates increased rapidly in all four SMUs from 2010 –2015, from about 20 kg/hr to between 35 kg/hr (SMU 1) and 60 kg/hr (SMU 4). The reason for this increase is not clear and an investigation standardising the explanatory factors would provide assurance of the biomass trend over that period.

Short-term trends are probably more reliable indicators. Between 2015 – 2017 catch rates declined, then increased in 2020 and 2021, but have declined again afterwards in all SMUs.

After a period of stability over 2000 – 2008, standardised average weight of landed abalone increased, in all SMUs over 2009 – 2022. There is a serious concern that higher average weight of fish, combined with static to declining catch rates, is masking declining numbers and recruitment failure in the fishery. An indicator of pre-recruits coming into the fishery is strongly needed to address this concern.

Trends in the logger-based estimates of legal sized abalone density are complicated by size limit changes. SMU 1 shows signs of continued decline, even under light exploitation. This also means that there is little data available from the area to make a confident assessment. Trends in SMU 2, 3 and 4 have fluctuated and indicate that density, from the perspective of the fishery appears not to have declined markedly.

The current TACC of 100 tonnes is not likely to threaten the stock for the 2023-24 fishing period, but there are growing concerns and uncertainty about the state of the stock, and reconsideration of the TACC should be made without obvious improvements in stock biomass. The move to have spatial catch caps is regarded as a promising management strategy, but the T AFC is concerned that there is a large uncertainty regarding biased indicators, the effects of a changing climate and other sources of mortality. All represent a persistent and potentially compounding risk.

Recommendations

- The committee strongly recommend catch rates be standardised to explain factors that may have changed in the fishery, such as spatial changes and technological or effort creep.
- A pre-recruit indicator of abalone coming into the fishery is needed to address a growing concern about recruitment patterns.

Economic considerations

Details of the economic characteristics of the abalone fishery, namely catch, price, gross value of production (GVP), quota transfers, reported share trading prices and management charges, are provided in the most recent management report (McKinnon 2023). Information on productivity factors directly affecting the economic performance of the fishery, namely catch, effort and catch rate for the fishery overall and by fishing area and Spatial Management Unit (SMU), is provided in the report Assessment of Abalone Stocks in NSW.

Table 2 compares key economic indicators for the 2019/2020 and 2020/2021 financial years derived from BDO EconSearch (2022 and 2023). For 2019/2020, this information was derived from 11 of 28 active fishing businesses, while for 2020/21 it was derived from 9 of 23 active businesses.

Table 2: Summary of Key Economic Indicators for 2019/2020 and 2020/2021 Financial Years.

Year	Parameter Value	
	2019/2020	2020/2021
Indicator		
Catch	83 tonnes	94 tonnes
Gross Value of Production (GVP)	\$3.6 million	\$2.3 million
Price per kilo	\$43.25 ³	\$23.95
Fisheries fees (% of GVP)	4.9%	6.5%
Rate of Return on Total Boat Capital	6.6%	2.2%
Active Share Value per Active Business	\$892,250	\$1,251,663
Gross State Product (direct + flow-on) (GSP)	\$4.9 million	\$2.9 million
Employment (direct + flow-on)	33 FTE	32 FTE
Net Economic Return	\$1.6 million	\$0.4 million

The most significant difference between the years presented in Table 2 is the difference between price per kilo, which influences other parameters including GVP, GSP and net economic return. This difference does not represent a fall in price per kilo of abalone or a change in product, but rather a difference between how the price was derived. For the 2019/2020 financial year and the preceding years, price was derived from Sydney Fish Market (SFM). As pointed out in last year's Determination and advised by industry participants, because of the low volume of abalone sold through the SFM, the price is not representative of the landed price overall. The estimate for the 2020/2021 financial year was derived from SFM data, but importantly augmented with information from one abalone processor. The precision of this estimate can be improved by inclusion of price information from additional abalone processors.

³ This beach price is lower than the \$54.53 listed in Table 5 for the same period listed in McKinnon (2022).

Share transactions for both the 2020/21 and 2021/22 fishing periods and the completed part of this season remain low in frequency and volume. It is not compulsory for prices to be recorded or recorded accurately in share transfer application. The following information on share transfers was provided in the NSW Abalone Fishery Management Report 2023/24.

- For the 2020/21 fishing period, there was one share transfer of 80 shares valued at \$600,000 (\$7,500 per share).
- For the 2021/22 fishing period, there were four share transfers for a total of 190 shares. Value was reported for 120 shares totalling \$1,240,000 with an average value of \$10,333 per share.
- For the current fishing period, there have been three share transfers for a total of 40 shares. Value was reported for two of the share transfers, 20 shares combined, and totalled \$150,000 (\$7,500 per share).

The low number and volume of share trades, together with incomplete data on share trades does not make it possible to robustly determine recent trends in share price. The lack of compulsory recording of prices associated with share prices and the validation of any prices provided is an area where economic data collection can be improved with limited or no additional management cost.

For the last three financial years, quota transfers as a percentage of the overall quota are historically high: 60.8% in 2019/2020, 62.9% in 2020/2021, and 60.7% in 2021/2022. In comparison, for the period of 2008/2009 to 2018 (calendar year), the value was approximately 30%. This difference most probably reflects impacts to fishing, logistics and markets associated with COVID -19 disruptions and recovery from these disruptions.

The estimated illegal, unregulated and unreported (IUU) catch of abalone in NSW is high, according to Fisheries Compliance and involves organised crime in some instances. The impacts of this IUU fishing on the demand for legal abalone and legal price per kilo of abalone is uncertain. Industry participants reported that the quality and presentation of illegally caught abalone is lower than that obtained legally.

Fishery management considerations

The NSW Abalone Fishery is managed through legislative instruments and a co-management arrangement between the NSW Government and Abalone Council of NSW. A commercial fishing licence with an endorsement for abalone that is granted when a person has a minimum of 70 shares.

A total allowable commercial catch (TACC) is applied to the fishery under which individual transferable quota (ITQ) is allocated in proportion to a person's shareholding. The TACC determines the TACC for each fishing period that provides a weight value in kg per share. Other fishery controls are minimum legal sizes, a maximum quota holding, controls on fishing gear and areas closed to fishing (including marine protected areas). The TACC had historically been fully caught until the COVID-19 pandemic. In the current fishing year (2022-23), industry expects to catch most, but probably not all of the 100 tonne TACC.

The fishery is divided into four spatial management units (SMUs) with most of the catch coming from the southern half of SMU 2 and SMUs 3 & 4. Geographically these are Tathra to Eden, Eden to Womboyn and Womboyn to Cape Howe, respectively.

Two primary state-wide indicators are used to ascertain whether the commercial harvest is sustainable: average catch rate for the whole fishery of > 40kg/hr and the harvested fraction of the legal sized stock being < 10% for the whole fishery. While the most recent average catch rate was marginally greater than 40kg/hr (at 43kg/hr) the harvest fraction (< 10% of legal sized stock) was exceeded (12.3%). Similarly, surplus production modelling and biomass estimates show the stock in general decline over recent years.

Both the minimum size limits (generally 120mm, but 125mm south of Womboyn and 117mm in a special management area) and TACC (100 tonnes) provide additional stock protection should one or both primary indicators be breached or not have the desired effect of protecting the stock. However, localised stock depletion is not addressed, as state-wide indicators are used along with three regional catch caps that reflect historic catch (to be introduced shortly). There is no recruitment index for the fishery which can affect the interpretation of other fishery indicators, such as the increasing average harvest size of legal-sized abalone.

Abalone industry participants at the T AFC stakeholder meeting held in Merimbula on 28 March 2023 considered issues including fine-scale depletion/abundance management, three regional catch caps (to be introduced later this fishing period) and the opening of a stretch of coast to fishing at a 117mm size limit (with any catch being deducted from quota holdings under the TACC). The latter received general endorsement from industry, while the other two received a variety of opinions.

Abalone is also caught by recreational and Aboriginal fishers. The former's catch is considered to be at no more than 10 tonnes pa (with a possession limit of two per person), although estimated catches from recreational surveys are nearer 1 t p.a. Catch estimates for abalone from current recreational survey methodologies are highly likely to be imprecise due to the small number of recreational fishers that record abalone catch. The permitted Aboriginal catch is estimated at less than 1 t p.a., although there are no accurate records available.

The estimated illegal, unregulated and unreported (IUU) catch was estimated at 20 t p.a. in 2021-22, but according to compliance officers this has now broadened to between 20-50 t p.a. for 2022-23. However, the T AFC did not receive any quantitative information that supported this increase in the range of the estimate. Nonetheless, IUU catch in the fishery remains high and the T AFC noted that there was considerable uncertainty about the exact quantum and effect of IUU fishing on the abalone stock. IUU abalone catch is a serious issue, involving organised crime in those jurisdictions with abalone fisheries. NSW Fisheries Compliance uses both deterrence and prosecutions to counteract offenders with varying degrees of success. Planned further compliance work in this area to reduce these uncertainties by the Department was supported by the T AFC.

There remain differences in abalone minimum size limits between the recreational (117mm) and commercial (117, 120 & 125 mm) sectors. These differences within and between sectors make management and compliance more complex and the scientific basis for them is difficult to discern.

The Aboriginal harvest of abalone remains to be resolved and the courts remain the primary means to do so. However, resolving what is largely a resource ownership issue is best done through public policy and statutory means.

Departmental responses regarding progress against T AFC recommendations made in 2021 & 2022

- 1. The T AFC recommends that the Abalone Industry and Department complete the development of a NSW Abalone Fishery Harvest Strategy with the aim of implementing it no later than 1 July 2023.*

No progress.

- 2. In the absence of formal area-based catch limits, legal minimum lengths at current sizes are the most important measure preventing over-fishing of spawning adult abalone. These should be retained at current levels.*

The LML for remains at 120 mm in waters north of Wonboyn and 125 mm in waters south of Wonboyn.

- 3. Options should be explored for gathering information on current densities and size-frequency distributions of abalone underwater, including sub-legal sized abalone. This is important to updating the information gathered during the 2013 fishery independent survey on spatial stock distribution and densities, to ensure that scaled estimates of population density, biomass and harvest fraction by area are reliable. Data on abalone population size-frequency distribution could be cost-effectively collected through use of industry divers to gather random size frequency data during a small number of dives each year in each area, as part of a scientifically designed, industry run survey program.*

No progress.

- 4. Consideration be given to scaling fines for illegal fishing from the current flat \$500 to up to \$10,000 commensurate with the value of the abalone that is stolen. This would be a greater and more immediate deterrent to reoffending. Abalone special penalties in other jurisdictions can provide guidance in this respect.*

No progress.

- 5. The Committee notes the high reliance on fishery-dependent data to inform the primary and secondary indicators of stock status. The Committee recommends that NSW DPI and the commercial industry address the potential for bias in fishery-dependent data by applying an independently designed and statistically structured data collection and monitoring program as a regular validation tool.*

As part of developing new spatial catch and size limits for the Fishery, an independent survey, sampling length-frequency and collection rate of abalone at 23

sites between Cape Howe to Bermagui, was completed during October 2022. The aim of the survey was to provide baseline information to assist evaluation of the impacts of opening a specified area to a 117 mm LML. The survey has provided recent information on current densities and size-frequency distributions of abalone, including sub-legal sized at the sample sites that will contribute to future stock assessment research. The program, which supported industry to collect the data, will potentially lead to future data collection to assist the development of finer spatial scale management arrangements, which may be incorporated in the future harvest strategy for the Fishery.

6. *The Committee recommends an independent review of the stock assessment be conducted to be consistent with best practice.*

No progress.

7. *NSW DPI seeks advice from abalone processors and/or fishers on abalone prices for input into management reports and not rely on Sydney Fish Market prices for abalone.*

Completed. Refer to Prices and fishery value above.

T AFC comment against progress

Regarding recommendation 1, the T AFC continues to encourage DPI to complete the abalone harvest strategy to provide greater certainty for the T AFC and industry about how the fishery is to be managed. The T AFC notes the response to Recommendation 2, which now needs to be modified considering the reduction in commercial size limit to 117mm for part of the coast. Regarding the progress against Recommendations 3 and 5, the T AFC reaffirms the importance of an independent survey to verify and support the fishery dependent indicators used to assess fishery status. The last independent fishery survey was undertaken almost a decade ago (2013). While the T AFC understands Recommendation 4 may take some time to implement, without it there is little deterrence for continued widespread and significant abalone theft. Given the reported declining status of all abalone fisheries in Australia, an independent review of the stock assessment (Recommendation 6) is urgent and necessary, particularly in light of the harvest strategy development. Despite a claim that Recommendation 7 is complete, there is price data from only one processor and further efforts must be made to ensure that more than 50% of the catch is covered by the reported price data (currently it is less than 15%).

Management summary

Recent fishery management arrangements helped stabilise the fishery after a period of overfishing. However, current fishery indicators are mixed with the majority in decline, although not to the point of triggering a change in fishery status and therefore, the 100 tonne T ACC should remain for the 2023-24 fishing period. Notwithstanding this, based on current fishery indicator trends, there is a reasonable risk that fishery status may change for the negative in 2024. The absence of an agreed set of harvest strategy indicators, reference points and control rules means

current fishery status can be disputed and management actions made more difficult to implement/defend.

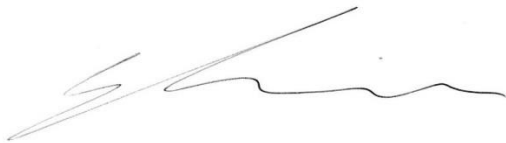
Determination

The Total Allowable Fishing Committee (TAFC), pursuant to Part 2A of the *Fisheries Management Act 1994*, determines that the total allowable commercial catch of Abalone should be controlled and allocated through the following measure:

1. A TACC of 100 tonnes during the fishing period 1 July 2023 to 30 June 2024

Species	Catch Limit 2023/24 (tonnes)
Abalone (<i>Haliotis rubra</i>)	100

Signed (for and on behalf of the TAFC)



William Zacharin
Chair, TAFC

14 April 2023