Fisheries New Zealand
Tini a Tangaroa

Review of Sustainability Measures for Pāua (PAU 4) for 2019/20

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Pāua (PAU 4)

Haliotis iris, Haliotis australis

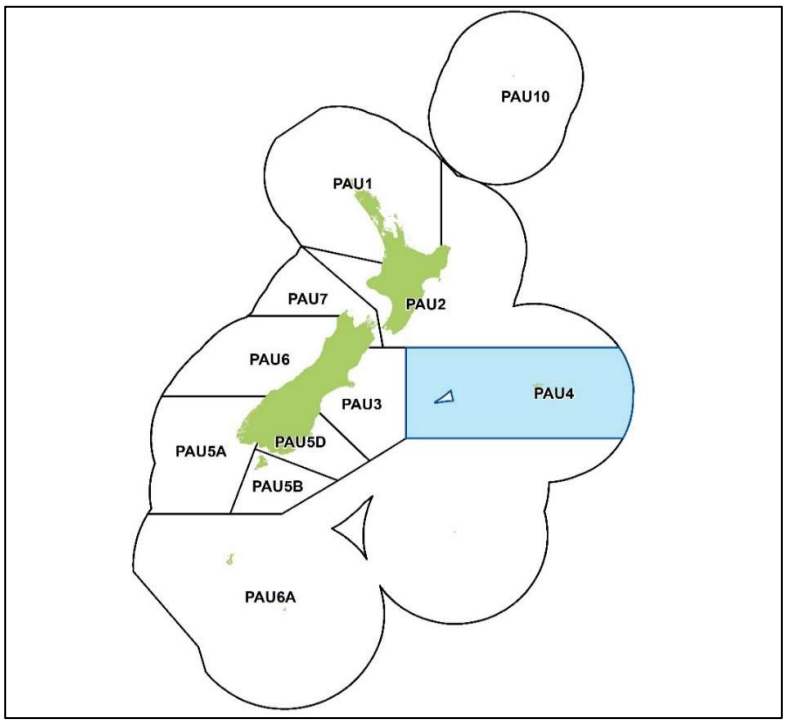

Figure 1: Quota management areas for the pāua fishery, with PAU 4 highlighted in blue

2 Summary

Fisheries New Zealand is reviewing the catch limits and allowances for pāua (*Haliotis iris, Haliotis australis*) in the Chatham Islands (PAU 4, see Figure 1). The primary driver for the review is the sustainability risk associated with depletion of pāua in this fishery.

A Total Allowable Catch (TAC) and allowances have not been previously set for PAU 4, as only a Total Allowable Commercial Catch (TACC) was required when it entered the Quota Management System (QMS). Option 1 therefore proposes the setting of a TAC plus allowances, with the TACC staying at the current level. The other options also propose the setting of a TAC for the first time.

The options are:

1. TAC set at 334 tonnes; 8 tonnes of allowances (customary 3 tonnes, recreational 3 tonnes, other mortality to the stock caused by fishing 2 tonnes), TACC stays at current level of 326 tonnes.
2. TAC set at 301.4 tonnes; 8 tonnes of allowances (customary 3 tonnes, recreational 3 tonnes, other mortality to the stock caused by fishing 2 tonnes), TACC cut by 10% (decrease from 326 tonnes to 293.4 tonnes).
3. TAC set at 269 tonnes; 8 tonnes of allowances (customary 3 tonnes, recreational 3 tonnes, other mortality to the stock caused by fishing 2 tonnes), TACC cut by 20% (decrease from 326 tonnes to 261 tonnes).
4. TAC set at 236.2 tonnes; 8 tonnes in allowances (customary 3 tonnes, recreational 3 tonnes, other mortality to the stock caused by fishing 2 tonnes), TACC cut by 30% (decrease from 326 tonnes to 228.2 tonnes).

3 Quota Management System

Pāua is managed under the QMS, with a 1 October to 30 September fishing year. A TAC and allowances have not been previously set for PAU 4, as only a TACC was required when it entered the QMS, and a review of the stock (which would lead to the setting of a TAC) has not been completed since then. See 7 *Current state of stock*, below for discussion of 2017 TAC decision and resulting court proceedings. For more information about the QMS go to https://www.mpi.govt.nz/law-and-policy/legal-overviews/fisheries/quota-management-system/.

4 Legal basis for managing fisheries in New Zealand

The Fisheries Act 1996 provides the legal basis for managing fisheries in New Zealand, including the Minister's responsibilities for setting and varying sustainability measures. See the separate document *Overview of legislative requirements and other considerations* on the Fisheries New Zealand sustainability consultation webpage (https://www.fisheries.govt.nz/news-and-resources/consultations/review-of-sustainability-measures-for-1-october-2019) for more information.

5 Treaty of Waitangi obligations

5.1. Input and participation of tangata whenua

Iwi and imi (Moriori) engagement on PAU 4 has been ongoing, and input has been sought on the TAC settings. Information on the proposal to consult on PAU 4 was provided to Ngāti Mutunga o Wharekauri and Moriori and their input sought at several meetings over the past six months. They requested notification 6-weeks prior to release for public consultation, and this has been met. Most recently, the Chatham Island Community Fisheries Forum, of which iwi and imi are members, was provided information and discussed potential options at a meeting facilitated by Fisheries New Zealand on 22 May 2019.

5.2. Kaitiakitanga

Iwi/Imi have developed the Chatham Islands Forum Fisheries Plan. Pāua was identified as a taonga species in the fisheries plan.

The proposals in this paper in relation to the Forum Fisheries Plan have been discussed with iwi and imi, through the Mandated Iwi Organisation (MIO) chairs and Runanga Managers on the island, as well as Kaitiaki. Based on these discussions, Fisheries New Zealand considers that the management options presented in this consultation paper are in keeping with the objectives of these plans, in particular:

- Kaitiakitanga is fundamental to the management of all fisheries resources;
- Thriving sustainable fisheries are enduring for present and future generations; and
- Fisheries and fisheries areas of cultural significance are protected, maintained and enhanced.

6 Relevant plans, strategies, statements and context

Concerned about the decline of the PAU 4 fishery and local depletion, in 2018 the fishing industry developed a Fisheries Plan (the Plan), and submitted it to the Minister for approval under section 11A of the Act. The Minister approved the Plan in March 2019. The Minister must take the Plan into account before setting or varying any sustainability measure (such as a TAC).

The core objective of the Plan is to reverse the pāua decline and restore local abundance. The Plan operates within the regulatory settings including the constraints of the TACC and other sustainability measures, such as minimum legal size set under the Fisheries Act 1996.

The Plan restricts the level of commercial harvest through voluntary shelving of Annual Catch Entitlement (ACE) to achieve catch reductions to ensure sustainable utilisation. Additionally, the Plan seeks to control fishing activity through catch spreading, variable minimum harvest sizes and enhancement of local pāua populations.

A link to the Plan is contained in Section 17.

7 Current state of the stock

Pāua are large sea snails that are highly valued by Māori and Moriori, recreational fishers and the commercial fishing industry. Pāua have always been a food source for Māori/Moriori, and play a significant role in manaakitanga ki ngā manuhiri (hosting of visitors).

Black-foot pāua (Haliotis iris) make up most of the pāua fishery, while yellow-foot pāua (Haliotis australis) are only caught in small numbers.

Pāua are herbivores which can form large aggregations on reefs in shallow subtidal coastal habitats. Movement is minimal and the species is considered sedentary. Pāua are broadcast spawners and spawning is thought to be annual. Habitat-related factors are important in determining the growth and survival of juvenile pāua, including wave exposure, habitat structure, availability of food, and population density.

The TAC for PAU 4 can be set or varied under s13 of the Act. In cases such as PAU 4, where there is uncertainty around estimates of the biomass that will produce maximum sustainable yield (*MSY*), s13(2A) of the Act provides for the Minister to use the best available information to set a TAC that is not inconsistent with the objective of maintaining the stock at or above, or moving the stock towards or above, the *MSY* level.

In accordance with the Fisheries New Zealand Harvest Strategy Standard for New Zealand Fisheries, the target biomass for PAU 4 is 40% of the unfished biomass (B_0), as a proxy for *MSY*, with a soft limit of 20% B_0 and a hard limit of 10% B_0. However, given the difficulty associated with reliably estimating the biomass of pāua, the status of the fishery in relation to the target and limits is uncertain. The best available information is commercial catch and effort data and anecdotal information from fishers. This information suggests that the fishery is declining. In particular, analyses of commercial catch and effort data and pāua length carried out in 2017 and 2019 suggest substantial depletion of the resource may have occurred since 2001-02.

Concerns regarding the sustainability of the fishery led to the industry shelving between 10% and 20% of PAU 4 ACE between 2010 and 2017. However, based on best available information this did not address the decline in the fishery. Therefore, in 2017 the Minister of Fisheries decided to set a TAC and lower the TACC by 40%.

Industry did not agree with this decision, instead submitting that 40% of PAU 4 ACE be shelved in lieu of a TACC reduction. PauaMAC4 (on behalf of pāua quota owners and harvesters) and others[1] initiated legal proceedings and obtained (by consent) interim relief in the form of a court order that until these proceedings are resolved, the decisions not be put into effect. As part of these proceedings, industry agreed as an interim measure to voluntarily shelve 40% of PAU 4 ACE, to achieve the desired reduction of commercial fishing effort that would have otherwise been implemented through a TAC and TACC reduction. This shelving arrangement was recorded in orders made by the court, to which industry has adhered.

These legal proceedings have now been settled, but industry has committed to continue to shelve ACE via the PAU4 Fisheries Plan. Under the PAU4 Fisheries Plan an operating plan is agreed annually setting out the specific measures that will apply. Under the Annual Operating Plan for 2019-20, PAU 4 quota owners have committed to continue to shelve sufficient ACE to achieve a total commercial harvest reduction of 40%.

[1] Te Ohu Kaimoana and PauaMAC7

8 Recent catch levels

Fishers primarily gather pāua by hand while free diving. However, the use of underwater breathing apparatus in the PAU 4 fishery is allowed to address safety concerns related to diver-shark interactions.

The commercial sector accounts for the majority of the harvest in PAU 4. As a result of voluntary shelving of ACE, the TACC has not been fully caught since the 2009/10 fishing year.

Landings for PAU 4 are shown in Figure 2.

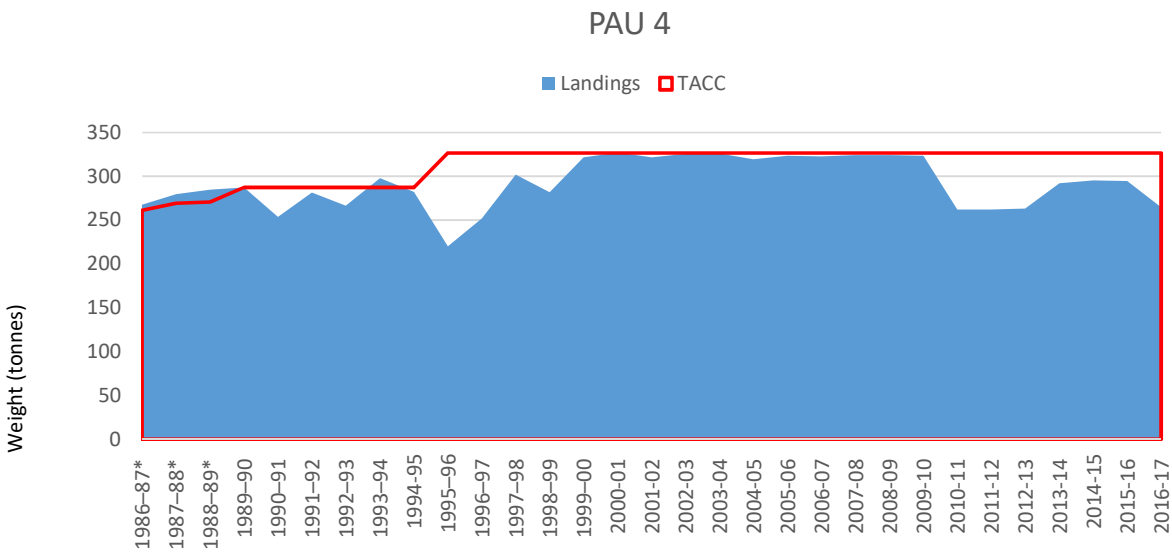

Figure 2: Reported commercial catch and TACC for PAU 4 from 1983-84 to the present

Reported customary catch numbers fluctuated between 1000 and 4300 pāua between 2010 and 2013. There is no recreational catch estimate for PAU 4. Due to the limited population on the Chatham Islands and its isolation, it is likely that recreational catch is small.

9 Projections of biomass

Currently, there is a lack of reliable data to effectively quantify the biomass of the fishery and therefore the current status of the fishery in relation to the target biomass, and soft and hard limits is unknown. However, analyses of commercial catch and effort data and pāua length carried out in 2017 and 2019, and anecdotal information from fishers, indicate that the fishery has declined, and without change we may assume this trend will continue.

10 Current TAC and allowances

There is no TAC for PAU4: under the Fisheries Act 1983 a TAC was not required. Only a TACC was required when it entered the QMS, and a TAC has not been set since then.

11 Current other controls

The minimum legal size for harvesting black-foot pāua is 125mm (shell length), while yellow-foot pāua have a minimum legal size of 80mm. A daily limit per fisher of 10 black-foot pāua and 10 yellow-foot pāua applies for recreational fishers. Pāua may only be hand-gathered by free-diving, or by

underwater breathing apparatus (only for commercial divers that meet specific reporting and monitoring requirements).

The recently approved PAU 4 Fisheries Plan includes measures relating to the voluntarily shelving of ACE, commercial catch spreading, variable minimum harvest sizes and enhancement of pāua populations.

12 Options – the TAC, Allowances and TACC

As this is the first time a TAC is being set for the PAU 4 fishery, customary, recreational, and other sources of mortality allowances are required. A range of TAC options are proposed to ensure the fishery is sustainable. In making any decisions under the Act the Minister must take into account the recently approved PAU 4 Fisheries Plan, including that commercial fishers will be voluntarily shelving ACE under this plan.

In setting a TACC, the Minister must have regard to the TAC and allow for customary non-commercial fishing interests, recreational fishing interests, and all other mortality to the stock caused by fishing (s 21 of the Act). The proposed allowances for these sectors are considered sufficient to provide for current harvest amounts (refer **Table 1**).

Table 1: Proposed management settings in tonnes for PAU 4 from 1 October 2019

Option	Total Allowable Catch	Total Allowable Commercial Catch	Allowances		
			Customary	Recreational	All other mortality to the stock caused by fishing
Option 1	334	326	3	3	2
Option 2	301.4	293.4 ↓ (10%)	3	3	2
Option 3	269	261 ↓ (20%)	3	3	2
Option 4	236.2	228.2 ↓ (30%)	3	3	2

Option 1 – set TAC and allowances, retain current TACC

Set the TAC at 334 tonnes, TACC remains at 326 tonnes and 8 tonnes in allowances (customary 3 tonnes, recreational 3 tonnes, and other mortality to the stock caused by fishing 2 tonnes).

Option 2 – set TAC and allowances and reduce TACC by 10%

Set the TAC at 301.4 tonnes, reduce the TACC to 293.4 tonnes (10% decrease from 326 tonnes to 293.4 tonnes) and 8 tonnes in allowances (customary 3 tonnes, recreational 3 tonnes, and other mortality to the stock caused by fishing 2 tonnes).

Option 3 - set TAC and allowances and reduce TACC by 20%

Set the TAC at 269 tonnes, reduce the TACC to 261 tonnes (20% decrease from 326 tonnes to 269 tonnes) and 8 tonnes in allowances (customary 3 tonnes, recreational 3 tonnes, and other mortality to the stock caused by fishing 2 tonnes).

Option 4 - set TAC and allowances and reduce TACC by 30%

Set the TAC at 236.2 tonnes, reduce the TACC to 228.2 tonnes (30% decrease from 326 tonnes to 228.2 tonnes) and 8 tonnes in allowances (customary 3 tonnes, recreational 3 tonnes, and other mortality to the stock caused by fishing 2 tonnes).

13 Uncertainties and risks

There is a lack of data on the status of PAU 4. Catch per unit of effort (CPUE) is an unreliable indicator of pāua abundance in PAU 4, due to historically inaccurate CPUE reporting by fishers. In addition, since 2013, commercial pāua divers in PAU 4 have been able to use underwater breathing apparatus, which is likely to have improved the efficiency of divers. Overall, this uncertainty has led to the results from all previous stock assessments for PAU 4 being rejected by Fisheries New Zealand Shellfish Working Group (SFWG).

In early 2017, a more sophisticated analysis of CPUE and length–frequency (collected by measuring the length of pāua) trends was undertaken. The analysis attempted to reconstruct scenarios of past trends and the current status of the fishery by using all available data from pāua catch effort landing return (PCELR) forms, data loggers, recent commercial length-frequency data, and also diver questionnaires and interviews. This analysis highlighted the uncertainty around the real trends in the fishery, and suggested potential substantial depletion of the resource has occurred since 2001-02. The scientific methodology and results were accepted by the SFWG, and the analysis was updated in 2019, however, uncertainty in the reliability of PCELR data used to inform the analysis remains. As CPUE is the main driver of estimated biomass in pāua assessments, these limitations lead to considerable uncertainty about the stock status and trends.

14 Environmental interactions

Diving for pāua is selective and not associated with a bycatch of associated or dependant species. Fisheries New Zealand is not aware of specific impacts of pāua harvesting on inshore benthic community structure. No habitats of particular significance for fisheries management have been identified in PAU 4, and it is considered unlikely that the method of hand-gathering while diving would have a demonstrable adverse effect on habitat.

15 Analysis of options for setting and varying the TAC, TACC and allowances

In making decisions under the Act as to the appropriate level at which to set the TAC for PAU4, the Minister must consider his legal obligations under the Act. In circumstances such as this, where there is uncertainty around the estimates of the biomass that will produce MSY, the Minister has to be satisfied the TAC is not inconsistent with the objective of maintaining the stock at or above, or moving the stock towards or above, a level that can produce the MSY.

He must also take into account the recently approved PAU 4 Fisheries Plan, which includes a requirement for commercial fishers to voluntarily shelve PAU4 ACE. Under the PAU 4 Annual Operating Plan for 2019-20, PAU 4 quota owners have committed to:

> *"…achieve a level of 40% ACE shelving (assuming a TACC of 326.543 tonnes).*
>
> *If the PAU4 TACC is cut from 1 October 2019, the level of ACE shelving may be reduced in order to achieve a total commercial harvest reduction of 40%."*

The PAU 4 Fisheries Plan includes additional measures such as catch spreading, a variable minimum harvest sizes and enhancement of local pāua populations, all of which may move the fishery towards the desired biomass level at a faster rate.

Therefore, the TAC option chosen by the Minister will depend partly upon the weight he puts on the plan, as set out below.

Option 1 would set a TAC that retains the current TACC of 326 tonnes. The status of the fishery in relation to MSY is uncertain, however, the best available information suggests that the fishery has declined under the current TACC. Therefore this option, on its own, will not address this decline and is likely to be inconsistent with the objective of maintaining the stock at or above, or moving the stock

towards or above, a level that can produce the MSY. The Minister may take into account, however, the effect that the plan is expected to have, including whether it will contribute to the biomass being restored to a level that will produce MSY. Under this option the Minister would need to place significant weight on the effect of the plan in achieving this objective.

Based on recommended port prices of $39.00/kg for PAU 4 in 2019/2020, if the TACC is fully caught under Option 1 it would equate to $12.71 M in commercial earnings.

Option 2 would set a TAC that reduces the TACC by 10%. Given that the shelving of 10-20% of ACE in the 10 years before the 2017 stock assessment did not address the decline in abundance, this option, on its own, is also likely to be inconsistent with the objective of maintaining the stock at or above, or moving the stock towards or above, a level that can produce the MSY. Again the Minister may take into account the effect that the plan is expected to have, including whether it will contribute to the biomass being restored to a level that will produce MSY.

Reducing the TACC by 10% would result in a potential loss of revenue for fishers estimated at $1.27 M if the TACC was fully caught (noting that industry has already committed to continue to shelve ACE). If the TACC is fully caught under option 2 it would equate to $11.44 M in revenue (based on port price).

Option 3 would set a TAC that reduces the TACC by 20%. Given it reduces the TACC by an amount equal to the highest level of ACE shelving in the 10 years before the 2017 stock assessment, it provides a greater likelihood of addressing this decline in the fishery, and is less likely than Options 1 and 2 to be inconsistent with the objective of maintaining the stock at or above, or moving the stock towards or above, a level that can produce the MSY. On its own, however, reducing the TACC by 20% may not rebuild PAU 4 towards MSY, or may not rebuild it to this level over an appropriate timeframe. Pāua are slow growing, and increases in abundance will vary depending on the spread of fishing effort and environmental factors over small spatial scales. Under this option the measures in the plan will help to address this and increase the likelihood of a more rapid rebuild to a level that will produce MSY.

A reduction in the TACC by 20% would result in a potential loss in revenue estimated at $2.54 M if the TACC was fully caught (noting that industry has already committed to continue to shelve ACE). If the TACC is fully caught under option 3, it would equate to $10.18 M in revenue.

Option 4 would set a TAC that reduces the TACC by 30%. It is the most likely of the four TAC options to move the PAU4 stock towards or above, a level that can produce the MSY, and places less weight on the effect that the plan is expected to have in contributing to the biomass being restored to a level that will produce MSY.

This option has the highest potential economic impact of all options in the short term (noting that industry has already committed to continue to shelve ACE). A reduction in TACC by 30% would result in a potential loss in revenue estimated at $3.81 M if the TACC was fully caught. If the TACC is fully caught under option 4 it would equate to $8.90 M in revenue.

A summary of the potential changes to commercial revenue resulting from these TAC and TACC options is provided in Table 2, below. These changes assume that the TACC would be fully caught, which is not the case. PAU 4 quota holders have committed, through the recently approved PAU 4 Fisheries Plan, to shelve ACE to ensure a total commercial harvest reduction of 40% for the 2019/2020 fishing year.

Table 2: Potential changes to commercial revenue of the proposed options, based on recommended port prices of $39.00/kg for PAU 4 in 2019/2020, and assuming that the TACC is fully caught.

Stock	TACC	Change from current setting (t)	Predicted revenue change ($ p.a.)
Option 1 *(current setting)*	326	No change	No change
Option 2	293.4	32.6↓ (10%)	1,271,400 ↓
Option 3	261	65 ↓ (20%)	2,535,000 ↓
Option 4	228.2	97.8 ↓ (30%)	3,814,200 ↓

Customary Fishery

No allowance for customary non-commercial interests has been made for PAU 4. Reported customary catch numbers fluctuated between 1000 and 4300 individual pāua between 2010 and 2013. Considering an average pāua weight is 280g, the maximum reported customary take equates to 1.2 tonne. Given the uncertainty around historic customary harvest amounts, Fisheries New Zealand considers the proposed three-tonne customary allowance sufficient to provide for current customary harvest levels.

Recreational

There is no recreational catch estimate for PAU 4. Due to the limited population on the Chatham Islands and its isolation, it is likely that recreational catch is small. Fisheries New Zealand proposes a three-tonne allowance as sufficient to allow for current recreational harvest, taking into account recreational effort from fishers that visit the island and the needs of the local community.

There are various potential other sources of mortality of pāua caused by fishing, which Fisheries New Zealand is not able to quantify accurately. Pāua can die from wounds caused by removal from the reef. Additionally, pāua may die from desiccation, osmotic stress and temperature stress if they are brought to the surface and/or kept out of water for a prolonged period of time. Sub-legal pāua may be subject to handling mortality in the fishery if they are removed from the substrate to be measured. Further mortality may also result indirectly from being returned to unsuitable habitat such as being lost to predators.

Previous research suggests that incidental mortality of pāua from fishing could be approximately 0.3% of the landed catch, which would be less than 1 tonne under each proposed option. Considering that estimate does not account for mortality from illegal catch, Fisheries New Zealand proposes an allowance of 2 tonnes to include all likely other sources of mortality.

Questions for submitters on options for setting the TAC, TACC and allowances

- Which option(s) do you support for setting the TAC, TACC and allowances? Why?
- If you do not support any of the options listed, what alternative should be considered? Why?
- Are the allowances for customary fishing appropriate? Why?
- We ask tangata whenua to provide any additional information you may have on customary catch.
- Are the allowances for recreational fishing appropriate? Why?
- Are the allowances for other sources of mortality appropriate? Why?
- Are there any other management controls that should be considered for the PAU 4 fishery? Why?

Please provide detailed, verifiable information and rationale to support your views.

16 Deemed values

Fisheries New Zealand is not proposing that any changes be made to the deemed values for PAU 4.

17 Referenced reports

Fisheries Assessment Plenary May 2019: https://www.fisheries.govt.nz/news-and-resources/science-and-research/fisheries-research/

Chatham Islands Fisheries Forum Plan (2011/2016). Rekohu/Wharekauri. 40 pages.

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Hartel, B & Davey, N (2015) Mean weight estimates for recreational fisheries in 2011-12. New Zealand Fisheries Assessment Report 2015/25. Ministry for Primary Industries, Wellington, New Zealand.

Neubauer, Philipp (2017). Trend scenarios and status of PAU 4 based on adjusted CPUE, 16 pages. Unpublished report prepared for the Ministry of Primary Industries.

18 How to get more information and have your say

Fisheries New Zealand invites you to make a submission on the proposals set out in this discussion document. We must receive your submission by 5pm on 26 July 2019. Please see the Fisheries New Zealand sustainability consultation webpage (https://www.fisheries.govt.nz/news-and-resources/consultations/review-of-sustainability-measures-for-1-october-2019) for related information, a helpful submissions template, and information on how to submit your feedback. If you cannot access the webpage or require hard copies of documents or any other information, please email FMSubmissions@mpi.govt.nz.