Fisheries New Zealand
Tini a Tangaroa

Review of Sustainability Measures for pāua (PAU 2) for 2023/24

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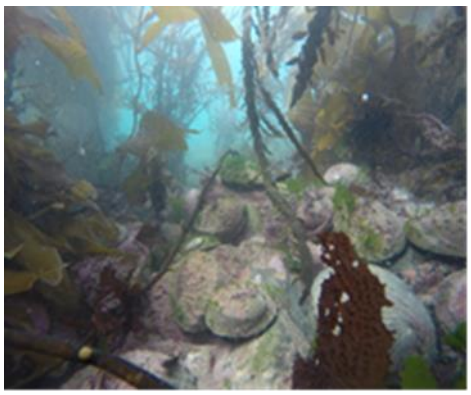
Stock being reviewed

Pāua (PAU 2) - East Cape, Hawke's Bay, Wairarapa, Wellington, and Taranaki

Blackfoot pāua and yellowfoot pāua – *Haliotis iris*, *Haliotis australis*



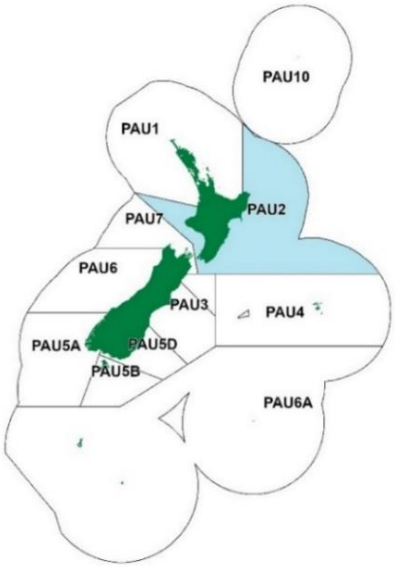


Figure 1: Quota Management Areas (QMAs) for pāua, with PAU 2 highlighted.

1 Summary

1. Fisheries New Zealand (FNZ) is reviewing the sustainability measures for pāua in Quota Management Area (QMA) PAU 2 for the 1 October 2023 fishing year (Figure 1).

2. FNZ is proposing to set a Total Allowable Catch (TAC) for PAU 2, noting that currently only a Total Allowable Commercial Catch (TACC) is set. As part of setting a TAC for PAU 2, FNZ is also seeking feedback on:

   (a) Options for customary and recreational allowances, as well as other sources of mortality caused by fishing for PAU 2, given they are currently not set; and
   (b) Whether changes to the recreational bag limit are needed for PAU 2.

3. PAU 2 is a shared fishery, highly valued by customary, recreational, and commercial fishers. Tangata whenua and recreational fishers in the Hawke's Bay, Wairarapa, and Taranaki have raised concerns about the sustainability of this stock, due to observed local depletion and high levels of pressure from recreational harvest. The Mai Paritu tae atu ki Turakirae Fisheries Forum (representing the iwi and hapū from Gisborne to South Wairarapa) are seeking a review of the recreational management options in PAU 2.

4. FNZ is proposing three options for PAU 2 (Table 1).

Table 1: Proposed management options (in tonnes) for PAU 2 from 1 October 2023.

Option	TAC	TACC	Allowances			Recreational Daily Limit
			Customary Māori	Recreational	All other mortality caused by fishing	
Current settings	N/A	121.19 t	N/A	N/A	N/A	10 per fisher*
Option 1	227.19 t	121.19 t	12 t	83 t	11 t	10 per fisher*
Option 2	192.19 t	121.19 t	12 t	48 t	11 t	5 per fisher*
Option 3	175.19 t	121.19 t	12 t	31 t	11 t	3 per fisher*

*Of each species (blackfoot pāua and yellowfoot pāua).

5. Commercial fishing controls limit commercial fishing to the south east portion of PAU 2. Given that commercial catch information is usually one of the primary data inputs used in analyses of stock status and is not available to inform an assessment of biomass in the wider PAU 2 area, and recreational catch is not required to be reported, the 2021 stock assessment only applies to the south east portion of PAU 2.

6. Commercial landings have remained steady over the last 20 years, relative to the TACC, and the 2021 stock assessment indicates that where commercial fishing occurs, the biomass is likely to be at or above the target. Given this stability and assessment of stock status, FNZ are not proposing changes to the commercial catch limits as part of this review.

7. Due to concerns of depletion in recreationally accessible areas, raised by tangata whenua and recreational fishers in the Hawke's Bay, Wairarapa, and Taranaki regions, it is uncertain whether current recreational effort is sustainable. The proposed allowances and recreational bag limits aim to restrict recreational harvest so that there is more certainty around the sustainability of the stock.

8. FNZ welcomes feedback and submissions on the options proposed, or any other alternatives. It is noted that any changes to catch settings would come into effect 1 October 2023. Any change to the recreational daily limit would be implemented separate to amendments to the catch settings. Following the decision by the Minister for Oceans and Fisheries, a change to the recreational daily limit would be implemented via amendments to the Fisheries (Recreational Management Controls) Notice.

2 About the stock

2.1 Fishery characteristics

9. PAU 2 is a shared fishery highly valued by customary, commercial, and recreational fishers. PAU 2 includes blackfoot pāua (*Haliotis iris*), which makes up most of the pāua catch, and yellowfoot pāua (*Haliotis australis)* which are less abundant and are only caught in small numbers.[1]

10. Pāua are targeted by hand-gathering across the fishery. The use of underwater breathing apparatus (UBA) is prohibited when gathering pāua, so gathering is by free diving and wading where possible.

11. Recreational fishing occurs across most of the PAU 2 area where rocky reefs exist, with the coastline offering many accessible areas of rocky intertidal and subtidal reefs where pāua are found. Some areas of the coastline are also sandy and not suitable pāua habitat, particularly the coastline between Wellington and Taranaki.

12. In Taranaki and some portions of Hawke's Bay, blackfoot pāua are stunted and do not grow to the commercial and recreational minimum legal size of 125mm. A different recreational minimum legal size of 85mm was introduced for blackfoot pāua in the area between the Awakino and Whanganui Rivers from 1 October 2009.

13. A large proportion of PAU 2 is prohibited to commercial fishing by the Fisheries (Central Area Commercial Fishing) Regulations 1986 (Table 2). Commercial fishing controls and the stunted growth of pāua in certain areas mean the majority of the commercial fishing activity is confined to the south east portion of the stock, between Turakirae Head and Castlepoint (Figure 2).

[1] Fisheries New Zealand (2022). Fisheries Assessment Plenary, May 2022: stock assessments and stock status. Compiled by the Fisheries Science and Information Group, Fisheries New Zealand, Wellington, New Zealand.

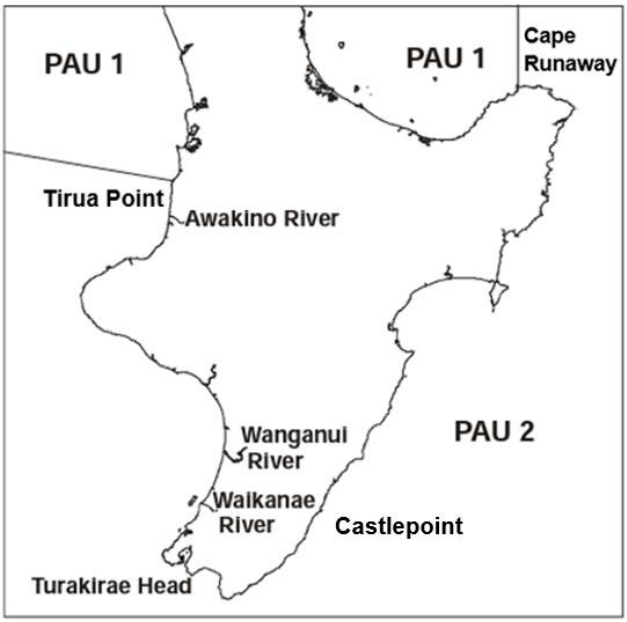


Figure 2: Boundaries of PAU 2, commercial fishing activity is confined to the south east portion of the stock, between Turakirae Head and Castlepoint.

Table 2: Relevant commercial fishing controls for PAU 2.

Fishing controls	Fisheries (Central Area Commercial Fishing) Regulations 1986
Commercial take of shellfish, including pāua, is prohibited within the Porirua Harbour	Regulation 9A
All methods of fishing except hand-held line are prohibited within Pukerua Bay, restricting commercial take of pāua within this area	Regulation 9B
Commercial take of pāua is prohibited from Cape Runaway to Blackhead Lighthouse	Regulation 10
Commercial take of shellfish, including pāua, is prohibited between Paritu and the Nuhaka Rover mouth, or within 2 nm of Mahia Peninsula and Portland Island	Regulation 12(1)
Commercial take of shellfish, including pāua, is prohibited within the Wellington Harbour	Regulation 12(2)
Commercial take of pāua is prohibited within 5 nm between Tirua Point and the Wanganui River mouth	Regulation 12(3)
Commercial take of pāua is prohibited within 5 nm between the Waikanae River mouth to Turakirae Head	Regulation 12(4)

2.2 Biology

14. Pāua are found in subtidal rocky coastal habitats, in shallow waters generally less than 10 m in depth. They often form large aggregations on rocky reefs. Although pāua are mobile, they only move over a small area and may be considered sedentary.

15. Growth rates and maximum size of pāua varies with latitude and is largely determined by water temperature and sea surface temperature[2], with growth generally faster in areas with lower mean monthly sea surface temperatures[3]. Sexual maturity ranges from 70 mm to 90 mm total length (TL) at an age of 3-5 years.[4]

[2] Naylor et al. (2016)

[3] Naylor et al. (2006)

[4] Hooker et al. (1997)

16. Large pāua feed primarily on drift algae that is unattached to the substrate, while small pāua graze on attached algae. Pāua are eaten by a range of predators. Large pāua are protected by their strong shells yet they are still vulnerable to rock lobsters[5] and large predatory starfish.[6] Smaller pāua are vulnerable to predation by fish such as blue cod[7], snapper[8], octopus[6], spotties[5], and triplefins.[5]

17. Pāua spawn directly into the surrounding water and spawning is understood to occur annually. Survival of pāua recruits after they have settled is greater in sheltered areas with reduced wave exposure, compared to areas exposed to swells.[9]

2.3 Management background

18. Pāua were introduced into the Quota Management System (QMS)[10] in 1987, with an October fishing year (1 October to 30 September). Prior to the introduction of the Fisheries Act in 1996 (the Act), a TAC and non-commercial allowances were not required and only a TACC was required to be set. Initially the TACC was set at 100 tonnes and after some minor increases due to quota appeals, the PAU 2 TACC has remained at 121.19 tonnes since the 1989/90 fishing year. The stock has not been reviewed since then as commercial catch, and stock assessment information regarding commercial catch, has been stable.

3 Status of the stock

19. A stock assessment was performed in 2021[11], and the best available information on the biomass of PAU 2 was reported in the May 2022 Fisheries Assessment Plenary report[12] (the Plenary). The stock assessment only applies to the south east portion of PAU 2, as the stock assessment was informed primarily by commercial catch information and commercial fishing controls limit commercial fishing to this area only.

20. The Plenary concludes that within the south east component of PAU 2, where commercial fishing occurs, the biomass of pāua is likely to be at or above the target of 40% unfished biomass, that current catch levels are very unlikely to cause the biomass of the stock to be at or below the soft and hard limits[13], and that overfishing is very unlikely to be occurring with current commercial catch levels.

21. The estimate of current biomass or maximum sustainable yield (MSY)[14] for the area outside of where commercial fishing occurs is unknown, given that catch inputs from commercial data are not available to inform an assessment of biomass in that area, and recreational catch is not required to be reported. Given this, and the observations of depletion raised by tangata whenua and recreational fishers in the Hawke's Bay, Wairarapa, and Taranaki, it is uncertain if the wider area of PAU 2 is at a level that supports MSY at this time.

22. For stocks in which the MSY is not able to be reliably estimated using the best available information, section 13(2A) of the Act specifies that decisions to set or vary the TAC must not

5 McCardle (1983)

6 Andrew & Naylor (2003)

7 Carbines & Beentjes (2003)

8 Francis (2003)

9 Naylor & McShane (2001)

10 For more information about the QMS go to https://www.mpi.govt.nz/law-and-policy/legal-overviews/fisheries/quota-management-system.

11 Neubauer, P (2022). The 2021 stock assessment of pāua (Haliotis iris) for PAU 2. New Zealand Fisheries Assessment Report 2022/35. 108 p

12 Fisheries New Zealand (2022). Fisheries Assessment Plenary, May 2022: stock assessments and stock status. Compiled by the Fisheries Science and Information Group, Fisheries New Zealand, Wellington, New Zealand.

13 Under the Harvest Strategy Standard, the default management target is 40% B_0 (unfished biomass), the soft limit is 20% B_0, and the hard limit is 10% B_0.

14 Maximum sustainable yield is the largest long-term average catch or yield that can be taken from a stock under prevailing ecological and environmental conditions, and the current selectivity patterns exhibited by fisheries. It is the maximum amount of fishing that a stock can sustain without impairing its renewability through natural growth and reproduction.

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. As the MSY is unknown for the wider PAU 2, a precautionary approach is proposed to set the TAC.

4 Catch information and current settings within the TAC

4.1 PAU 2 Commercial catch

23. Commercial catch history of PAU 2 is shown in Figure 3. Landings were around 100 tonnes when PAU 2 entered the QMS in 1986/87. Since the TACC was increased to 121.19 tonnes in 1989/90, landings have been extremely consistent with only minor fluctuations around the 121.19 tonne TACC, with the TACC fully utilised in most years (Figure 3).

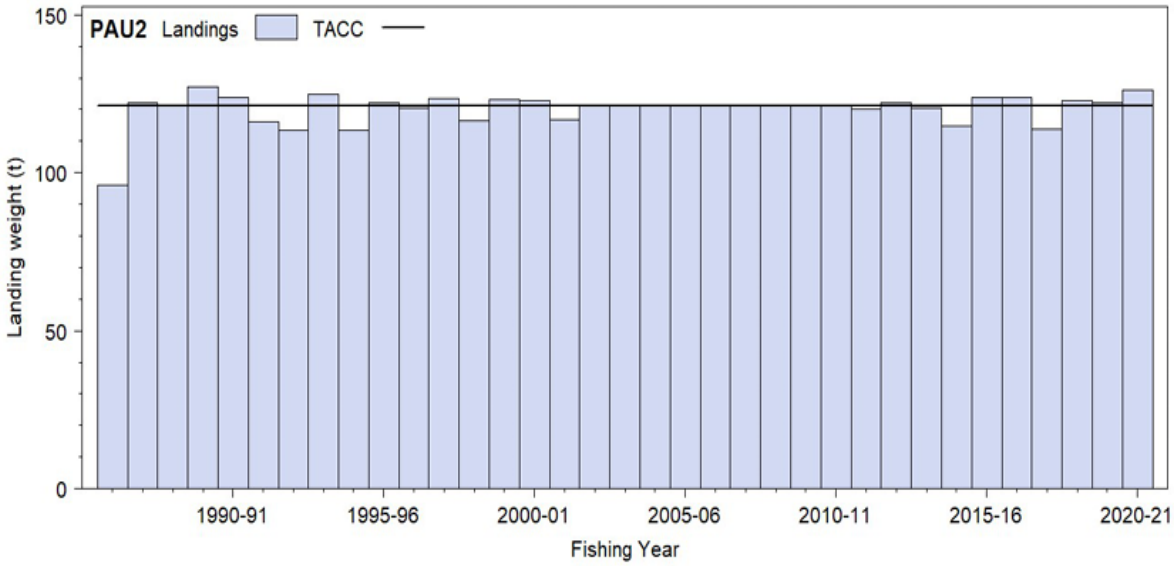


Figure 3: Reported commercial landings and TACC for PAU 2 (in tonnes).

4.2 Customary Māori

24. There is no customary allowance currently set for PAU 2, but there is evidence of considerable customary harvest of pāua in PAU 2 and most iwi have identified pāua as being a taonga species in their Treaty settlements with the Crown. Customary fishing activities along the area of the coastline spanning from Cape Palliser to Gisborne operate under the Fisheries (Kaimoana Customary Fishing Regulations) 1998 (the customary regulations), which require Kaitiaki to report details of customary authorisations and harvest to MPI.

25. Current customary reporting for pāua in PAU 2 is likely to underestimate customary harvest, as the way in which information from customary fishing authorisations is reported can vary between sacks of pāua, weight, or numbers of individual pāua. Uncertainty in the level of customary take is also influenced by the fact that large areas of PAU 2 have yet to be gazetted as rohe moana under the customary regulations. In these areas, customary catch is taken under the Fisheries (Amateur Fishing) Regulations 2013, where there is no requirement to report catch activity.

26. Based on information received from customary reports, customary catch in PAU 2 has fluctuated over the past 10 fishing years, with an average annual harvest of approximately 11 tonnes. Customary fishing is autonomously managed by tangata whenua and not constrained to an allowance. Customary fishing would be able to continue after the annual allowance is reached as it is not enforceable, however the customary allowance should be set at a level that adequately allows for customary harvest.

27. FNZ recognises that information from customary authorisations is likely to be an underestimate of customary harvest. Given uncertainty regarding the customary harvest of pāua, FNZ welcomes input from tangata whenua to inform advice on this allowance.

4.3 Recreational

28. Pāua is a popular recreational species exclusively harvested through hand gathering, either via free diving or gathering from shore. The Fisheries (Amateur Fishing) Regulations 2013 prohibit the use of underwater breathing apparatus (such as SCUBA) to take pāua within PAU 2 and other pāua stocks.

29. There is currently no recreational allowance set for PAU 2 and recreational fishers are not required to report the quantities of pāua they catch. Blackfoot pāua has a minimum legal size of 125 mm (excluding Taranaki where the minimum legal size is 85 mm) and yellowfoot pāua has a minimum legal size of 80 mm. Across PAU 2, fishers can take a recreational bag limit of ten pāua per person per day for each species.

30. The National Panel Survey of Marine Recreational Fishers (NPS) represents the best available estimate of recreational harvest. In 2017/18 the NPS estimated the recreational catch in PAU 2 at 83.22 tonnes.[15] The 2011/12 NPS gave a similar estimate of 81.85 tonnes (Table 3).

31. The 2017/18 NPS estimated that 17% of people harvest a bag size between one to three pāua per day, 14% between four to six pāua, and 69% between seven to ten pāua. The 2017/18 NPS estimated that 55.4% of people harvest ten pāua per day, which is the maximum daily limit, and that PAU 2 had the largest recreational harvest of pāua for any QMA. A further NPS is planned to take place between 1 October 2022 to 30 September 2023 and final results are not expected before early 2024.

Table 3: Recreational harvest estimates of pāua in PAU 2 from 2011/12 NPS and 2017/18 NPS, +/- represents a 95% confidence interval (CI).

Year	Method	Number of pāua	Total weight (t)	95% CI (t)
2011/12	Panel Survey	286 182	81.85	± 24.06
2017/18	Panel Survey	283 240	83.22	± 24.47

32. In the absence of any new survey information since 2017/18, it is expected that recreational catch of pāua from PAU 2 has increased since this estimate. Observations from tangata whenua and recreational fishers along the Hawke's Bay, Wairarapa, and Taranaki coastlines indicate that these regions have experienced increased recreational fishing effort for pāua in recent years, especially during the summer months. Pāua populations in some areas of PAU 2 are likely receiving high levels of pressure from recreational fishers, especially when located in close proximity to major centres and/or are easily accessible by road.

4.4 Other sources of mortality caused by fishing

33. The other sources of fishing mortality allowance accounts for mortality that occurs due to any fishing activity that is not otherwise accounted for in the TAC. There is currently no allowance set for other sources of mortality caused by fishing for PAU 2.

34. Pāua can easily die from wounds caused by removal from the substrate, often from divers using sharp edged tools. Sub-legal pāua may be subject to incidental mortality if they are cut when being removed and measured, and mortality may result from pāua being returned to unsuitable habitat or wounded pāua becoming more vulnerable to predators.

35. Research suggests that incidental mortality associated with commercial fishing for pāua is about 0.3% of landed catch.[16] Incidental mortality for commercial landings in PAU 2 would equate to

[15] Wynne-Jones, J., et al (2019)

[16] Gerring (2003)

an average of less than 1 tonne annually. Incidental mortality from recreational and customary harvest is also assumed to occur, however the extent of this is uncertain.

36. Another potential source of mortality caused by fishing for PAU 2 is illegal harvest or poaching of pāua. The Plenary[17] reports that illegal harvesting is likely high around Wellington and on the Wairarapa coast. Although current quantitative levels of illegal harvest are uncertain for PAU 2, the 2021 stock assessment[18] acknowledges it is likely to be occurring and sets this at 10 tonnes in the model for the 2021 stock assessment.

5 Treaty of Waitangi obligations

37. Section 5 of the Fisheries Act 1996 requires that the Act be interpreted and people making decisions under the Act to do so in a manner that is consistent with the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992 (the Settlement Act). The Settlement Act provides that non-commercial customary fishing rights continue to be subject to the Principles of the Treaty of Waitangi and give rise to Treaty obligations on the Crown.

38. Section 10 of the Settlement Act requires the Minister to develop policies and programmes to give effect to the use and management practices of tangata whenua. Consistent with this section, the Ministry has worked with iwi to develop engagement processes that enable iwi to work together to reach a consensus where possible and to inform the Ministry on how tāngata whenua wish to exercise kaitiakitanga in respect of fish stocks in which they share rights and interests and how those rights and interests may be affected by sustainability measures proposed by the Ministry.

5.1 Input and participation of tangata whenua

39. Section 12 (1)(b) of the Fisheries Act requires that before undertaking any sustainability process the Minister shall provide for the input and participation of tangata whenua who have a non-commercial interest in the stock or an interest in the effects of fishing on the aquatic environment in the area concerned. In considering the views of tangata whenua, the Minister is required to have particular regard to Kaitiakitanga.[19]

40. Input and participation of tangata whenua into the sustainability decision-making process is provided mainly through Iwi Fisheries Forums, which have been established for that purpose. Each Iwi Fisheries Forum can develop an Iwi Fisheries Plan that describes how the iwi in the Forum exercise kaitiakitanga over the fisheries of importance to them, and their objectives for the management of their interest in fisheries. Iwi Fisheries Forums may also be used as entities to consult iwi with an interest in fisheries.[20]

41. Tangata whenua with interests in PAU 2 have expressed concern for the sustainability of the stock, particularly in recreationally accessible areas. Concern is largely due to observations of localised depletion and high levels of pressure from recreational harvest, reported to have increased in recent years in recreationally accessible areas.

42. PAU 2 covers the rohe of Ngāti Porou, Mai Paritu tae atu ki Turakirae, Rangitaane – North Island, Nga Hapū o Te Uru o Tainui and Te Tai Hauāuru Fisheries Forums.

43. The Mai Paritu tae atu ki Turakirae Fisheries Forum have proposed a reduction of the recreational daily bag limit for pāua within the forum's rohe moana. Their view as kaitiaki is that the exercise of kaitiakitanga requires them to sustainably manage the fishery for existing and future generations. They have observed that recreational fishing is increasing within their rohe

[17] Fisheries New Zealand (2022). Fisheries Assessment Plenary, May 2022: stock assessments and stock status. Compiled by the Fisheries Science and Information Group, Fisheries New Zealand, Wellington, New Zealand

[18] Neubauer, P (2022). The 2021 stock assessment of pāua (Haliotis iris) for PAU 2. New Zealand Fisheries Assessment Report 2022/35. 108 p

[19] The Fisheries Act defines Kaitiakitanga to mean "the exercise of guardianship; and, in relation to any fisheries resources, includes the ethic of stewardship based on the nature of the resources, as exercised by the appropriate tangata whenua in accordance with tikanga Māori", where tikanga Māori refers to Māori customary values and practices.

[20] However, FNZ also engages directly with iwi (outside of Forums) on matters that affect their fisheries interests in their takiwa and consults with any affected Mandated Iwi Organisations and Iwi Governance Entities where needed.

moana, threatening the local abundance of pāua. To allow the fishery to return to healthy levels, they believe recreational effort should be reduced and have suggested a reduction from ten pāua to either five or three pāua per fisher per day.

44. FNZ will undertake further engagement with Iwi Fisheries Forums during consultation to seek input on the options outlined in this proposal and FNZ welcomes any input and submissions from tangata whenua on these options.

5.2 Kaitiakitanga

45. Information provided by forums, and iwi views on the management of fisheries resources and fish stocks, as set out in Iwi Fisheries Plans, are ways that tangata whenua can exercise kaitiakitanga in respect of fish stocks.

46. Rangitaane – North Island, Nga Hapu o Te Uru o Tainui and Te Tai Hauāuru have an Iwi Fisheries Plan. FNZ considers the proposed management options are in keeping with the objectives of the plans, which generally relate to active engagement with iwi and the maintenance of healthy and sustainable fisheries, consistent with expression of kaitiakitanga.

47. Mai Paritu tae atu ki Turakirae do not have an Iwi Fisheries Plan, however they are also exercising kaitiakitanga by observing changes in the health of the fishery, identifying causes of decline, and proposing action to improve the stock and environment, as expressed in their proposal to reduce the recreational bag limit for pāua.

48. Customary tools utilised under the Fisheries (Kaimoana Customary Fishing) Regulations 1998 and the Fisheries Act 1996, provide for tangata whenua to manage local fisheries in ways that best fits local customary practices in the form of mātaitai, taiāpure and temporary closures. Table 4 lists the customary fisheries management areas that fall within PAU 2.

Table 4: Customary fisheries management areas within PAU 2.

Customary area	Management type
Porangahau Taiāpure Palliser Bay Taiāpure	**Taiāpure** All types of fishing are permitted within a Taiāpure. The management committee can recommend regulations to manage commercial, recreational, and customary fishing.
Hakihea Mātaitai Horokaka Mātaitai Toka Tāmure Mātaitai Te Hoe Mātaitai Moremore Mātaitai	**Mātaitai Reserve** Commercial fishing is not permitted within mātaitai reserves unless bylaws state otherwise.
Waimārama Temporary Closure – *blackfoot pāua*	**Temporary Closures** Section 186A temporary closures are used to restrict or prohibit fishing of any species of fish, aquatic life or seaweed or the use of any fishing method.

49. FNZ considers the proposed options in this paper will impact positively on these customary fisheries management areas, as they aim to increase the sustainability of pāua stocks by constraining the recreational harvest of pāua.

50. Commercial fishing is prohibited in all mātaitai. The Horokaka, Toka Tāmure, and Te Hoe Mātaitai have bylaws that prohibit the take of pāua from within the mātaitai areas. The temporary closure at Waimārama prohibits the take of pāua within the closure area under section 186A. There are no regulations relating to pāua in the Porangahau Taiāpure and Palliser Bay Taiāpure and no other bylaws relating to pāua in any other mātaitai within PAU 2.

51. FNZ are seeking input from tangata whenua on how the proposed options for PAU 2 may or may not provide for kaitiakitanga as exercised by tangata whenua, and how tangata whenua consider the proposals may affect their rights and interests in this stock.

6 Current and proposed settings within the TAC

52. Under section 13(2A) of the Act, if the Minister is satisfied that the maximum sustainable yield (MSY) cannot be reliably estimated using the best available information, the Minister must set the TAC using the best available information and in a way that 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 MSY.

53. Three options are proposed for the TAC and allowances (customary, recreational, other sources of mortality caused by fishing). However, all options proposed will result in the same current TACC.

54. FNZ propose that the least conservative option for the TAC could be set using the estimate of current utilisation. This is considered the best available estimate of current utilisation as commercial catch has been consistent for many years and the harvest estimates from the NPS were very similar in 2011/12 and 2017/18 (81.85 tonnes and 83.22 tonnes respectively). However, due to uncertainty whether the estimate of recreational harvest is sustainable, FNZ is also proposing consideration of more conservative options that aim to restrict recreational harvest.

55. FNZ welcomes feedback and submissions on these options.

6.1 Current settings

TAC: N/A	**TACC:** 121.19 t	**Customary**: N/A	**Recreational**: N/A	**Other mortality**: N/A

6.2 Option 1

TAC: 227.19 t	**TACC:** 121.19 t	**Customary**: 12 t	**Recreational**: 83 t	**Other mortality**: 11 t

56. Option 1 proposes to set a TAC for PAU 2 at a level that accounts for current removals from the fishery. Although a reliable estimate of biomass is unknown for the wider area of PAU 2, the best estimate of the stock biomass from the commercially fished area indicates that the biomass is likely to be at or above the target. Using this information to set the TAC would be consistent with the objective of maintaining the stock at or above, or moving the stock towards or above, a level that can produce MSY, in accordance with section 13(2A).

57. FNZ considers that the TAC could be set at 227.19 tonnes based on current utilisation, as the stock assessment indicates that in the commercially fished area and with current commercial catch, the biomass is likely to be at or above the target and the recreational harvest estimate has been consistent across the 2011/12 and 2017/18 NPS.

6.2.1 Allowances

58. Under all options, a customary Māori allowance of 12 tonnes for PAU 2 is proposed. This is based on the average harvest from customary reports across the last 10 fishing years but recognises these likely underestimate current customary harvest levels, due to a variation of metrics used in customary reports (sacks of pāua, weight, or numbers of individual pāua). FNZ welcomes input from tangata whenua to inform advice on this allowance.

59. For Option 1, a recreational allowance of 83 tonnes is proposed. Although there is limited information on whether the current estimate is contributing to a sustainable level of harvest in PAU 2, this proposal accounts for the current estimate of recreational catch from the 2017/18 NPS. However, it should be noted that setting the allowance at this level would not address the concern of depletion in recreationally accessible areas.

60. All options propose that an allowance of 11 tonnes is set for other sources of mortality caused by fishing. This allowance recognises that although PAU 2 is a target fishery, there may be mortality associated with injury during removal of sub-legal pāua from the substrate or from being returned to unsuitable habitat, estimated at approximately 1 tonne for commercial

landings annually. There is also mortality attributed to illegal harvest of pāua, quantitative information for this is uncertain, however the 2021 stock assessment set this at 10 tonnes.

61. All options propose that the existing TACC of 121.19 tonnes is retained. The current TACC is at a level consistent with current commercial catch levels, which have remained stable since the 1990s.

6.2.2 Recreational settings

62. To maintain consistency with the proposals in Option 1, which propose to set a TAC that provides for current estimates of utilisation within the fishery, no change to the current recreational daily bag limit of ten pāua per fisher is proposed for this option.

6.3 Option 2

TAC: 192.19 t	**TACC:** 121.19 t	**Customary**: 12 t	**Recreational**: 48 t	**Other mortality**: 11 t

63. Option 2 proposes to set a TAC at a more cautious level of 192.19 tonnes, acknowledging that it is uncertain whether current levels of utilisation will maintain the entire stock at or above MSY. This option provides more certainty around the sustainability of the stock by setting the TAC at a lower level than Option 1 and divides catch among the allowances in a way that reflects a more cautious approach for recreational harvest.

6.3.1 Allowances

64. As noted in Option 1, a customary Māori allowance and other sources of mortality caused by fishing are proposed to be the same under all options to reflect the current harvest estimates. It is also proposed that the TACC is maintained in all options, at a level consistent with current commercial catch levels.

65. Option 2 proposes to set the recreational allowance at 48 tonnes, with a recreational bag limit of five pāua as discussed below, reflecting a more cautious approach and providing more certainty that recreational catch is at a sustainable level. This option acknowledges that the current estimate from the last NPS may not be an appropriate allowance, based on concerns of depletion in recreationally accessible areas, raised by tangata whenua and recreational fishers in the Hawke's Bay, Wairarapa, and Taranaki regions.

66. Given there is uncertainty on whether the current estimate is contributing to a sustainable level of harvest in PAU 2, this option would provide more certainty than Option 1 that the stock is being maintained at or above, or moving the stock towards or above, a level that can produce MSY.

6.3.2 Recreational settings

67. FNZ is proposing to reinforce a cautious approach to the recreational allowance by using the management control of a reduction in the recreational daily bag limit for PAU 2. Option 2 proposes that the recreational bag limit be decreased from ten to five pāua per fisher per day. This reduction recognises that there is uncertainty in whether the current daily limit is contributing to sustainable levels of utilisation, noting the concern from tangata whenua and some recreational fishers. The reduction applies to both blackfoot pāua and yellowfoot pāua, no more than five of each species could be collected per fisher per day.

68. This option is also consistent with the proposal from the Mai Paritu tae atu ki Turakirae Fisheries Forum to reduce the recreational daily bag limit from ten pāua to either five or three pāua within the forum's rohe moana. Setting the recreational daily bag limit for PAU 2 to five pāua per fisher is also a management control consistent with the daily limit in PAU 7.

69. FNZ has estimated that a recreational allowance of 48 tonnes, reinforced with a bag limit of five pāua per fisher per day, could decrease the recreational harvest estimate by approximately 42%, based on the current estimate of recreational harvest from NPS 2017/18.

6.4 Option 3

TAC: 175.19 t	**TACC:** 121.19 t	**Customary**: 12 t	**Recreational**: 31 t	**Other mortality**: 11 t

70. Option 3 proposes to set the TAC at 175.19 tonnes, the most cautious of the three options considered in this consultation. Given there is considerable uncertainty whether current levels of utilisation will maintain the entire stock at or above MSY, this option provides the most certainty around the sustainability of the stock and places the least weight on providing for utilisation.

6.4.1 Allowances

71. As noted in Option 1 and Option 2, a customary Māori allowance and other sources of mortality caused by fishing are proposed to be the same under all options to reflect the current harvest estimates. It is also proposed that the TACC is maintained in all options, at a level consistent with current commercial catch levels.

72. Option 3 proposes to set the recreational allowance at 31 tonnes, with a recreational bag limit of three as discussed below, acknowledging that the current harvest estimate from the last NPS may not be appropriate for the allowance. This is due to concerns expressed by tangata whenua and recreational fishers that recreationally accessible areas are experiencing high levels of pressure from recreational harvest.

73. This option places the most weight on the uncertainty and concerns of high recreational pressure in recreationally accessible areas throughout PAU 2. Although it places the least weight on utilisation, it would provide the most certainty that recreational catch is at a sustainable level and that the stock is being maintained at or above a level that can produce MSY.

6.4.2 Recreational settings

74. FNZ is proposing that a further reduction to the recreational daily limit is used to reinforce the reduced recreational allowance. Option 3 proposes that the recreational bag limit is decreased from ten to three pāua per fisher per day. The reduction applies to both blackfoot pāua and yellowfoot pāua, no more than three of each species could be collected per fisher per day.

75. This recognises that there is uncertainty in whether the current daily bag limit is contributing to sustainable levels of utilisation and is consistent with the proposal from the Mai Paritu tae atu ki Turakirae Fisheries Forum to reduce the recreational daily bag limit.

76. FNZ has estimated that a recreational allowance of 31 tonnes, reinforced with a recreational bag limit of three pāua per fisher per day, would decrease the recreational harvest estimate by approximately 63%, based on the current estimate of recreational harvest from NPS 2017/18.

6.5 Other recreational management approaches

77. Options 2 and 3 propose a reduction to the recreational daily bag limit for the entire QMA (the entirety of PAU 2, which comprises Cape Runaway, East Cape around to Tirua Point, north of Taranaki). Implementing this measure would require an amendment to the Fisheries (Recreational Management Controls) Notice, following the decision by the Minister for Oceans and Fisheries.

78. Varying the minimum legal size or accumulation limit of pāua for the entirety of PAU 2 could also be amended via the Fisheries (Recreational Management Controls) Notice, although this would require further engagement and analysis as these management approaches are not proposed in this review.

79. It is important to note that varying the recreational daily bag limit, minimum legal size, or accumulation limit for pāua within a localised area of PAU 2, or alternative approaches to recreational management, would require an Order in Council, which is subject to cabinet and regulation drafting procedures, as well as further engagement, consultation, and analysis.

80. FNZ welcomes feedback on approaches to the recreational management for PAU 2, either in addition or alternative to a reduction to the recreational daily bag limit proposed for PAU 2.

7 Environmental interactions

81. The key environmental principles which must be taken into account when considering sustainability measures for pāua are as follows:

    a) Associated or dependent species should be maintained above a level that ensures their long-term viability (associated or dependent species include marine mammals, seabirds, fish, and invertebrates caught as bycatch);

    b) Biological diversity of the aquatic environment should be maintained (any benthic impacts from fishing are an important consideration in relation to this principle); and

    c) Habitats of particular significance for fisheries management should be protected.

7.1 Associated or dependent species

82. Pāua fishing by all sectors is highly selective and restricted by hand-gathering within the intertidal and shallow subtidal areas. There are no reported marine mammal or seabird interactions associated with PAU 2 and incidental bycatch is minimal, limited to epibiota organisms (attached to or within the shell of pāua) such as coralline algae and several boring or spiral shelled polychaete worms.[21]

83. FNZ notes there is no observer coverage for PAU 2, due to the selective method of diving used to commercially harvest pāua. The selectivity of diving for pāua by all sectors is of low risk to associated or dependent species and all options proposed are not expected to significantly change the level of bycatch in the fishery.

7.2 Biological diversity

84. Benthic interactions from pāua fishing may include habitat contact by divers during pāua removal, primarily in the area of pāua foot attachment and the surrounding benthic area. Fishers who dive from vessels may impact the benthic environment if an anchor is used during fishing, although damage is likely minimal in rocky reef environments where pāua are found.[21]

85. The options propose to either maintain or reduce current fishing effort, so biological diversity of the aquatic environment should be maintained, and adverse impacts may even be reduced with a lower recreational daily bag limit for pāua, resulting in less time spent in contact with the benthic environment.

7.3 Habitats of particular significance for fisheries management

86. FNZ considers that habitats of particular significance for fisheries management are areas of particular significance in supporting the productivity of fisheries resources. In considering potential threats faced by the habitat and the need for protection, consideration will be given to the sensitivity of the habitat areas to the threat and the exposure of the habitat to the threat. This information will inform an assessment of the risk of adverse effects to the habitat.

87. Pāua inhabit reefs within intertidal and shallow subtidal coastal habitats, distributed along the majority of the PAU 2 coastline. Specific habitats of particular significance for PAU 2 have not been identified, however certain features of intertidal and shallow subtidal habitats are important in supporting various life stages of pāua and are discussed in Table 5.

[21] Fisheries New Zealand (2022). Fisheries Assessment Plenary, May 2022: stock assessments and stock status. Compiled by the Fisheries Science and Information Group, Fisheries New Zealand, Wellington, New Zealand.

Table 5: Summary of information on potential habitats of significance for PAU 2.

Fish stock	PAU 2
Habitat	No specific habitat of particular significance has been identified for PAU 2 **Information available:** **Juvenile:** Newly settled juveniles favour crustose coralline algal habitat. **Adults:** Pāua move into deeper waters with the onset of maturity, favouring rocky crevices and boulders. **Spawning:** Spawning areas are widespread throughout much of PAU 2 along intertidal and shallow subtidal rocky reefs.
Attributes of habitat	• Pāua are found in intertidal and shallow subtidal rocky reefs in coastal waters generally less than 10m. • Intertidal and subtidal rocky reefs typically consist of rocks and boulders, interspersed with cobble substrate and rock pools. Alongside these substrates, reefs typically include a wide range of seaweeds. • Crustose coralline algae attach to hard surfaces on intertidal and subtidal rocky reefs. This habitat that is favoured by newly settled juveniles, is a cue for settlement and also provides a food source for adults and juveniles. • Rocky crevices and boulders provide a cryptic habitat in the form of shade and cover for pāua. Cryptic habitats are favoured by adult pāua, particularly in deeper waters.
Reasons for particular significance	• Growth and recruitment success can be influenced by food availability. Pāua are herbivores and rocky reef communities offer a food source in the form of coralline algae and seaweeds. • Rocky reefs also provide shelter and shade which are important for supporting the survival of pāua. • As pāua are broadcast spawners, fertilization success depends on proximity and density of mature adults. Rocky crevices, boulders and seaweeds provide substrate for adults to aggregate and support localised recruitment.
Risks/Threats	• Land based impacts, particularly sediment deposition on habitats with benthic structure, are a threat to intertidal and subtidal rocky reefs. Sedimentation smothers coralline algae and seaweeds that provide adult and juvenile habitat. • Water temperature is an important determinate of growth in pāua, with growth generally faster in areas with lower mean monthly sea surface temperatures (Naylor et al. 2006). Ocean warming due to climate change contributes to higher sea surface temperatures and may pose a threat to the productivity of pāua. • Ocean acidification may influence the survival of crustose coralline algae and New Zealand crustose coralline algae have been found to exhibit a reduction in growth rates under lower pH (Cornwall et al. 2014). Reduced availability of crustose coralline algae could threaten an important habitat for settlement and a source of food for juveniles.
Existing protection measures	• Pāua fishing has negligible effects on pāua habitat due to the selective method used for harvest and there are no existing protection measures in place for intertidal and subtidal rocky reefs, specifically for spawning, juvenile and adult pāua life stages .

88. None of the options proposed would increase fishing pressure on PAU 2. Any changes would likely decrease fishing effort and would not contribute to increased adverse effects on habitats used by pāua in PAU 2.

89. In addition, FNZ considers adverse effects from fishing on habitats used by pāua in PAU 2 are low because:

- pāua spawning habitat is widespread through intertidal and subtidal rocky reefs;
- habitat that supports juvenile development is unlikely to be impacted by fishing in PAU 2 due to the fishing method being hand gathering; and
- the greatest threats to pāua recruitment are likely to be from climate change, particularly changes in water temperature and water circulation.

8 Relevant plans, strategies, statements and context

90. The following plans and strategies are relevant for PAU 2.

8.1 Regional plans

91. There are six regional councils/unitary authorities that have coastline within PAU 2 boundaries.[22] These regions have multiple plans to manage the coastal and freshwater environments, including terrestrial and coastal linkages, ecosystems, and habitats.

92. FNZ considers that the proposed management options presented are in keeping with the objectives of relevant regional plans, which generally relate to the maintenance of healthy and sustainable ecosystems to provide for the needs of current and future generations. The provisions of these various documents are, for the most part, of a general nature and focus mostly on land-based stressors on the marine environment. Some regional plans have objectives to ensure adverse effects on ecological systems such as shellfish areas are avoided.

93. FNZ has reviewed these documents and the provisions that might be considered relevant can be found in a separate document titled *Regional plan provisions and policy statements,* accessible at https://www.mpi.govt.nz/dmsdocument/54625. FNZ considers that the proposed options in this paper are consistent with the objectives of the relevant regional plans.

94. FNZ engages with the Resource Management Act (RMA) coastal planning processes (including regional authorities) to support marine management decisions to manage not only the fishing effects on the coastal environment but also land-based impacts on fisheries.

8.2 Te Mana o te Taiao (Aotearoa New Zealand Biodiversity Strategy)

95. Te Mana o te Taiao – the Aotearoa New Zealand Biodiversity Strategy sets a strategic direction for the protection, restoration and sustainable use of biodiversity, particularly indigenous biodiversity, in Aotearoa New Zealand. The Strategy sets a number of objectives across three timeframes. The most relevant to setting sustainability measures for PAU 2 are objectives 10 and 12:

    Objective 10: Ecosystems and species are protected, restored, resilient and connected from mountain tops to ocean depths.

    Objective 12: Natural resources are managed sustainably.

96. FNZ is working with the Department of Conservation and other agencies on implementation plans for the strategy. As part of those plans, we will identify areas of focus for FNZ in delivering Government biodiversity objectives including progression to a more integrated ecosystem-based approach to managing fisheries. In that context, this advice contains information on

[22] Regional councils/unitary authorities are Waikato, Taranaki, Manawatū-Whanganui, Greater Wellington, Hawke's Bay and Gisborne.

biodiversity impacts, ecosystem function and habitat protection associated with adjustments to catch limits, consistent with your legislative obligations and the intent of Te Mana o te Taiao.

9 Economic considerations

97. Provided recent catch trends continue, all options will provide for existing levels of commercial utilisation and do not propose changes to the TACC. Potential reductions in daily recreational take of pāua could have economic impacts for recreational fishers who harvest within PAU 2 as subsistence fishers.[23] However, the proposed reductions will still provide for those fishers, and there will be an economic benefit long term for people who rely on pāua if the stock is sustainable.

10 Deemed values

98. Deemed values are the price paid by fishers for each kilogram of unprocessed fish landed in excess of a fisher's Annual Catch Entitlement (ACE) holdings. The purpose of the deemed values regime is to provide incentives for individual fishers to acquire or maintain sufficient ACE to cover catch taken over the course of the year, while allowing flexibility in the timing of balancing, promoting efficiency, and encouraging accurate catch reporting.

99. The Deemed Value Guidelines set out the operational policy FNZ uses to inform the development of advice to the Minister on the setting of deemed values.

100. The deemed value rates for PAU 2 are shown in Table 6.

Table 6: Standard deemed value rates ($/kg) for PAU 2.

	Interim Rate ($/kg)	Annual Differential Rates ($/kg) for excess catch (% of ACE)					
		100-120%	120-140%	140-160%	160-180%	180-200%	200%+
PAU 2 status quo	59.40	66.00	79.20	92.40	105.60	118.80	132.00

101. The average price paid by fishers during the 2021/22 fishing year for one kilogram of PAU 2 ACE was $21.30. The 2022/23 port price for PAU 2 is $24.02/kg. The annual deemed value is set appropriately above the average ACE price, which is consistent with the objective to incentivise fishers to balance catch against ACE rather than pay a deemed value of catch landed in excess of ACE (Table 6).

102. FNZ is satisfied that the current deemed values are consistent with section 75(2)(a) of the Fisheries Act 1996 in that they provide sufficient incentive for fishers to balance their catch with ACE. FNZ is therefore not recommending any changes to deemed value rates for PAU 2 at this time.

11 Questions for submitters

- Which option do you support for setting the TAC and allowances? Why?
- If you do not support any of the options listed, what alternative(s) should be considered? Why?
- Are the proposed allowances for customary Māori, recreational, and other sources of mortality appropriate? Why?
- Do you think these options adequately provide for social, economic, and cultural wellbeing?
- Do you have any concerns about potential impacts of the proposed options on the aquatic environment?

103. Feedback is welcome on these proposals and any alternative ideas you may have. Please provide detailed information and sources to support your views where possible.

[23] Subsistence fishers are those who fish primarily to feed family and relatives, relying on the resource as a primary food source.

12 How to get more information and have your say

104. Fisheries New Zealand invites you to make a submission on the proposals set out in this discussion document. Consultation closes at 5pm on 24 March 2023.

105. Please see the Fisheries New Zealand sustainability consultation webpage (https://www.mpi.govt.nz/consultations/review-of-sustainability-measures-2023-april-round) for related information, a helpful submissions template, and information on how to submit your feedback. If you cannot access to the webpage or require hard copies of documents or any other information, please email FMSubmissions@mpi.govt.nz.

13 Legal basis for managing fisheries in New Zealand

106. 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* at https://www.mpi.govt.nz/dmsdocument/54622 for more information.

14 Referenced reports

Andrew, N; Naylor, R (2003). Paua. In: Andrew, N & Francis, M (Eds) The Living reef. The ecology of New Zealand's rocky reefs. Craig Potton Publishing, Nelson, New Zealand.

Carbines, G D; Beentjes, M P (2003). Relative abundance of blue cod in Dusky Sound in 2002. New Zealand Fisheries Assessment Report 2003/37. 25 p. Accessible at: https://fs.fish.govt.nz/Doc/17339/2003%20FARs/03_37_FAR.pdf.ashx

Cornwall, C E; Boyd, P W; McGraw, C M; Hepburn, C D; Pilditch, C A; Morris, J N; Smith, A B; Hurd, C L (2014). Diffusion boundary layers ameliorate the negative effects of ocean acidification on the temperate coralline macroalga Arthrocardia corymbosa. PloS one, 9(5), e97235. Accessible at: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0097235

Fisheries New Zealand (2011). Operational Guidelines for New Zealand's Harvest Strategy Standard. Accessible at: https://www.mpi.govt.nz/dmsdocument/19706-OPERATIONAL-GUIDELINES-FOR-NEW-ZEALANDS-HARVEST-STRATEGY-STANDARD

Fisheries New Zealand (2020). Guidelines for the review of deemed value rates for stocks managed under the Quota Management System. Accessible at: https://www.mpi.govt.nz/dmsdocument/40250/direct

Fisheries New Zealand (2022). Fisheries Assessment Plenary, May 2022: stock assessments and stock status. Compiled by the Fisheries Science and Information Group, Fisheries New Zealand, Wellington, New Zealand. Accessible at: https://www.mpi.govt.nz/science/fisheries-science-research/about-our-fisheries-research

Francis, M (2003). Snapper. In: Andrew, N & Francis, M (Eds), pp. 186–191, The Living reef. The ecology of New Zealand's rocky reefs. Craig Potton Publishing, Nelson, New Zealand.

Gerring, P K (2003). Incidental fishing mortality of pāua (Haliotis iris) in PAU 7. New Zealand Fisheries Assessment Report 2003/56. 13 p. Accessible at: https://docs.niwa.co.nz/library/public/FAR2003-56.pdf

Hooker, S H; Creese, R G; Jeffs, A G (1997). Growth and demography of pāua Haliotis iris (Mollusca: Gastropoda) in northeastern New Zealand, Molluscan Research, 18:2, 299-311. Accessible at: https://www.tandfonline.com/doi/abs/10.1080/13235818.1997.10673703

McCardle, I (1983). Young pāua in peril. Shellfisheries newsletter, 20, 18.

Naylor, J R; McShane, P E (2001). Mortality of post-settlement abalone Haliotis iris caused by conspecific adults and wave exposure, New Zealand Journal of Marine and Freshwater Research, 35:2, 363-369. Accessible at: https://www.tandfonline.com/doi/abs/10.1080/00288330.2001.9517006

Naylor, J R; Andrew, N L; Kim, S W (2006). Demographic variation in the New Zealand abalone Haliotis iris. Marine and Freshwater Research 57: 215–224. Accessible at: https://www.publish.csiro.au/mf/mf05150

Naylor, R; Fu, D (2016). Estimating growth in pāua. New Zealand Fisheries Assessment Report 2016/14. 76 p. Accessible at: https://docs.niwa.co.nz/library/public/FAR2016-14.pdf

New Zealand Government (2020). Te Mana o te Taiao - Aotearoa New Zealand Biodiversity Strategy 2020. Accessible at: https://www.doc.govt.nz/nature/biodiversity/aotearoa-new-zealand-biodiversity-strategy/

Wynne-Jones, J; Gray, A; Heinemann, A; Hill, L (2014). National Panel Survey of Marine Recreational Fishers 2011-2012: Harvest Estimates. New Zealand Fisheries Assessment Report 2014/67. 139p. Accessible at: https://www.mpi.govt.nz/dmsdocument/4719-FAR-201467-National-Panel-Survey-Of-Marine-Recreational-Fishers-201112-Harvest-Estimates

Wynne-Jones, J; Gray, A; Hill, L; Heinemann, A; Walton, L (2019). National Panel Survey of Marine Recreational Fishers 2017-2018. New Zealand Fisheries Assessment Report 2019/24. 104p. Accessible at: https://www.mpi.govt.nz/dmsdocument/36792-far-201924-national-panel-survey-of-marine-recreational-fishers-201718