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Tini a Tangaroa

Review of sustainability measures for scallop (SCA CS) for 2023/24

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Stock being reviewed

New Zealand Scallop (Coromandel Scallops SCA CS – Hauraki Gulf, Coromandel, & Western Bay of Plenty)

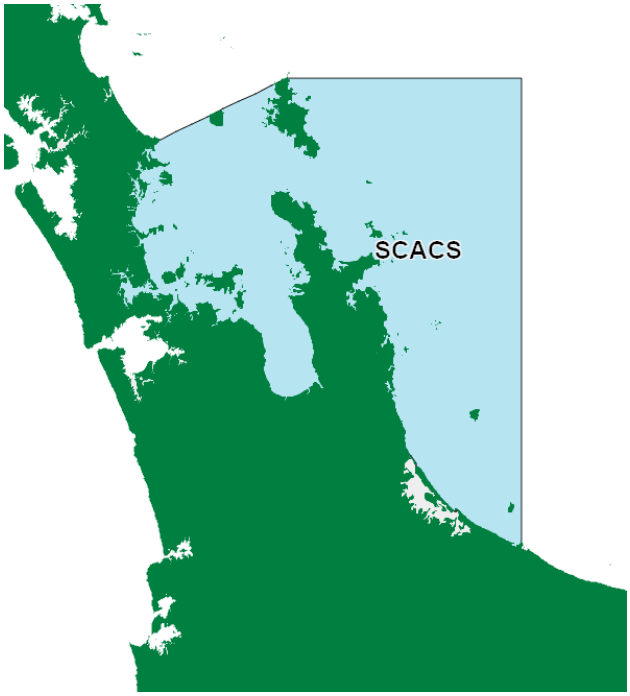

Figure 1: Quota Management Area (QMA) for SCA CS.

1 Purpose

1. Surveys carried out this year in the open areas of the Coromandel scallop fishery (SCA CS) at Te Hauturu-o-Toi (Hauturu)/Little Barrier Island (Little Barrier) and the Colville Channel (Figure 2) have shown serious declines in scallop abundance for both sites since 2021.

2. In response to these declines, the Minister for Oceans and Fisheries (the Minister) has decided to implement an emergency measure under section 16 of the Fisheries Act 1996 (the Act) to immediately close these areas to fishing. This measure has been implemented to protect the remaining scallop populations and habitat in these areas and to mitigate the risk of further impact from fishing activity over the upcoming summer period while longer-term measures are considered.

3. The purpose of this paper is to review management measures to support the recovery and future sustainability of scallops in SCA CS. Any decisions the Minister makes on these measures following consultation would come into effect for the upcoming fishing year and would remain in place after the emergency measure has lapsed.

2 Summary

4. There are currently no accepted target and limit reference points for the SCA CS stock and the biomass that will support the maximum sustainable yield (MSY) is not able to be estimated reliably using available information. Fishery-independent biomass surveys currently provide the best available information for reflecting the state of the scallop population within SCA CS.

5. In 2020, Fisheries New Zealand (FNZ) commissioned extensive dredge and dive surveys, which were carried out in 2021 to provide an estimate of biomass and density of scallops within a

number of scallop beds across the SCA CS quota management area. The surveys showed an overall decline in the abundance of scallops in the SCA CS stock, with substantial declines observed in many core scallop beds since the previous surveys undertaken in 2012.

6. As part of the April 2022 sustainability round and based on the best available information from the surveys at the time, the Minister considered that biomass and density of scallops in the majority of SCA CS was at a level that would not support sustainable fishing. The decision was made to close most of the SCA CS area to scallop harvest, and the catch limits and allowances for recreational fishing and other sources of mortality caused by fishing were significantly reduced from April 2022.[1]

7. Two defined areas were left open to commercial and recreational scallop harvest: one at Hauturu/Little Barrier and one in the Colville Channel (Figure 2).

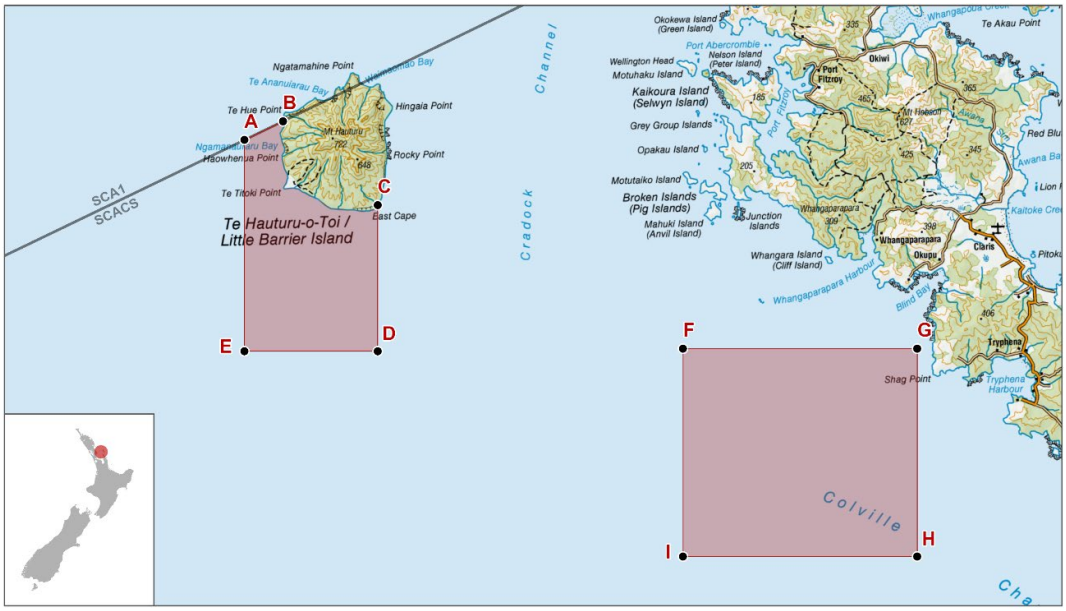

Figure 2: **Areas in the Coromandel (SCA CS) scallop fishery open to commercial and recreational scallop harvest: Te Hauturu-o-Toi/Little Barrier Island (A-E) and Colville Channel (F-I). A larger version of this map including coordinates is provided in Appendix One.**

8. Available biomass yield information from the 2021 survey results indicated that these two areas could sustain some level of ongoing utilisation. Following the decision to retain the two open areas, further research and monitoring was scheduled to provide good baseline data for future comparison and to support improved management and long-term sustainability.

9. The National Institute of Water and Atmospheric Research (NIWA) were commissioned to undertake pre-season camera surveys of the Hauturu/Little Barrier and Colville Channel areas. These surveys were carried out from June to August 2022 and the images were subsequently analysed to provide estimates of scallop density and biomass that could be compared to the 2021 dredge and dive-based survey results. The initial results of the surveys were presented in late October and indicated serious decline, which initiated consideration of emergency measures. The final survey results were presented to the Shellfish Assessment Working Group[2] in early December 2022.

[1] The Minister's decision letter and FNZ's decision paper for the April 2022/23 sustainability round are available at: https://www.mpi.govt.nz/consultations/review-of-sustainability-measures-2022-april-round/

[2] The Shellfish Assessment Working Group's purpose is to assess the status of shellfish stocks managed within the Quota Management System, as well as other important shellfish species of interest to New Zealand.

10. The results have confirmed a further decline in the density and biomass of scallops since the 2021 surveys at both sites, but particularly at Hauturu/Little Barrier. The estimated reductions in scallop biomass for both areas were far greater than reported commercial scallop harvest and the recreational allowance since the last survey, suggesting that fishing is unlikely to be the only factor that has contributed to these declines.

11. Until better information is available to estimate sustainable yields for scallops, which take into account both fishing and non-fishing related stressors in the area, FNZ considers that a cautious management approach is needed. FNZ also notes that no new information will become available to inform the status of scallops throughout the duration of the emergency measure.

12. Based on the estimated levels of decline at both Hauturu/Little Barrier and Colville Channel over the last year, FNZ considers that retaining the status quo or reducing recreational and/or commercial harvest at this time would not be adequate to address the risks of further decline or to ensure sustainability of the stock. FNZ is therefore proposing options to close these areas to fishing under section 11 of the Act, in line with the closure already in place across the rest of the quota management area. If implemented, the entire SCA CS area would be closed to recreational and commercial scallop harvest.

13. FNZ is proposing two options (Table 1). Both options would close all of SCA CS to commercial and recreational harvest under section 11 of the Act. It is proposed that this closure is implemented for an indefinite time period; but FNZ would seek new information on the abundance of scallops in SCA CS within three years (by 2025), and if new information indicates that the stock has recovered, FNZ will review whether the full closure is still required.

Table 1: Proposed management options for SCA CS. All figures are in tonnes of meatweight.

Option	Closure	TAC	TACC	Allowances		
				Customary Māori	Recreational	All other mortality caused by fishing
Current settings (Status quo)	Partial closure (s11)	19	5	10	3	1
Option 1	Full closure (s11)	19	5	10	3	1
Option 2	Full closure (s11)	11 ↓ (8 t)	0 ↓ (5 t)	10	0 ↓ (3 t)	1

14. Under Option 1, the Total Allowable Catch (TAC) and settings within would be retained, noting they could be reviewed based on new and better information before the fishery would re-open.

15. Under Option 2, the TAC would be reduced from 19 to 11 tonnes, and within this, the recreational allowance and Total Allowable Commercial Catch (TACC) would be reduced to zero tonnes to reflect that no fishing by those sectors would occur while the closure is in effect. A nominal allowance for other sources of mortality would be retained at 1 tonne to account for any mortality associated with factors such as illegal fishing/poaching and incidental effects from other commercial fishing methods.

16. Like for the current partial SCA CS closure, customary fishing would not be prohibited and customary utilisation would be managed by tangata whenua/ tangata kaitiaki in the region. Iwi have indicated that in order to support a recovery of the local scallop populations in their respective rohe moana, customary authorisations for scallop take have declined or ceased and cultural rāhui are in place for scallops over much of the SCA CS area. FNZ would continue to work in partnership with Iwi on management of customary fisheries and the recovery of the SCA CS stock.

17. FNZ welcomes feedback and submissions on the options proposed, or any alternatives.

3 About the stock

3.1 Fishery characteristics

18. Scallops are an iconic New Zealand shellfish species, and they are an important part of the coastal marine ecosystem. They are highly valued by tangata whenua and recreational fishers as kaimoana, and historically they supported localised commercial fishing, processing, and retail industries. They are also valued by the public, many of whom enjoy them at restaurants, fish shops, and events or festivals around the country.

19. Historically, scallops have been regularly taken under customary authorisations and within the SCA CS region are identified as a taonga species by the Mai i ngā Kuri a Whārei ki Tihirau Iwi Fisheries Forum.

20. Scallop populations are highly variable, with "boom and bust" cycles occurring in all main fisheries based on environmental conditions.

21. SCA CS was impacted by the arrival of "black gill" and *Chaetopterus* tubeworm in the late 1990s and early 2000s. After a period of reduced fishing, the stock recovered well in most areas with peaks in recruitment occurring in the years following. The scientific surveys in 2021 revealed that many scallop beds in SCA CS had returned to low levels of biomass and density, similar to when black gill and *Chaetopterus* were present.

22. Scallop fisheries are highly regulated with catch limits, minimum legal size (MLS) limits, and seasonal and method restrictions in place. Table 2 below provides a summary of these controls that apply to recreational and commercial fishing in SCA CS. There are also a number of customary fisheries management tools currently in place within SCA CS (see *Kaitiakitanga* section below).

Table 2: Existing controls under the Act that apply to recreational and commercial fishing in SCA CS.

Recreational
• The recreational fishing season runs from 1 September – 31 March. • A minimum legal size of 100 millimetres in shell length. • The daily bag limit is 20 scallops per person. • Divers operating from a vessel can take scallops for up to two nominated safety people on board the vessel, in addition to daily catch limits for the divers. • Scallops must be brought ashore in a measurable state (i.e., not shucked). An exception applies for scallops consumed immediately on board a vessel.
Commercial
• The commercial fishing season in SCA CS runs from 15 July – 21 December with commercial fishers operating on weekdays only during the season. • There are significant spatial restrictions for commercial scallop fishers (see Appendix Two for relevant map) • No commercial fisher is permitted to dredge for scallops from the SCA CS fishery between sunset and sunrise. • No commercial fisher shall take any scallops from the Coromandel scallop fishery during the period commencing 1 hour after sunset on any Thursday and ending 1 hour before sunrise on the following Sunday. • The regulated commercial minimum legal size of scallops in SCA CS is 90 millimetres in shell length. Scallops must remain unshelled until they are delivered either to the first point of sale after being taken or to a processing factory. • No commercial fisher fishing for scallops is permitted to use more than 1 dredge with a bar or bit that is more than 2.5 m long *or* more than 2 dredges, either of which has a bar or bit that is more than 1.4 m long.

23. There are also large spatial restrictions in place under a current section 11 closure: the Minister closed 98% of the SCA CS area to scallop fishing in 2022, so currently harvesting of scallops commercially and recreationally in SCA CS is restricted to the beds within the Hauturu/Little Barrier and Colville Channel areas. The regulated measures above still apply in these two open areas.

24. Scallops in SCA CS are amongst the top three shellfish species harvested by recreational fishers. The most common method for recreational harvest is diving/hand gathering, but there is also recreational dredging in SCA CS, which can be concentrated in popular and easily accessible beds/areas. While the open area at Colville Channel is largely inaccessible to the recreational sector due to its depth and remote location, some recreational dredging may have occurred this area. The Hauturu/Little Barrier bed, known to be a popular recreational harvest area, is also somewhat remote, lying 16 nautical miles from the north Auckland coastline.

25. The commercial scallop fishery supplies scallops to the domestic market and historically has been responsible for most of the overall scallop catch in SCA CS. All commercially caught scallops are taken by dredge. All northern commercial scallops are caught using 'Victorian box dredges.' Commercial fishers report that this dredge design suits the northern fishery conditions, which includes corrugated seabed environments.

26. Dredge fishing is known to have negative impacts on scallop populations (including impacts on growth and incidental mortality) and the habitat that supports them.[3] Sedimentation and land use impacts have also been identified as having significant impacts on scallop populations, particularly in enclosed coastal areas. The range of impacts are discussed further in the 'Environmental interactions' section (Heading 7) below.

3.2 Biology

27. Endemic to New Zealand, scallops (*P. novaezelandiae*), or kuakua/tipa, are suspension-feeding bivalves found in a variety of coastal habitats across New Zealand – particularly in semi-enclosed areas where circulating currents are thought to retain larvae.

28. Scallops are functional hermaphrodites, meaning they possess both male and female reproductive organs and can produce the associated eggs and sperm.[4] They generally reach sexual maturity at approximately 70 mm shell length and usually mature by the end of their first year. However, scallops contribute little to the spawning pool until the end of their second year and their contribution increases more in subsequent years. Year 1 scallops contain around 500,000 eggs each while year 4 and 5 scallops can contain over 40 million eggs each.[5]

29. Scallops may spawn sporadically from August to February, but spawn prolifically over the summer months.[4]

30. Like other broadcast spawners, high density beds and close proximity (to other scallops) are vital for successful fertilisation of the eggs that are released and the subsequent ongoing recruitment.[6]

31. Fertilisation is followed by a planktonic larval stage lasting about three weeks before attachment to substrate. Spat detach and begin the free-living stage of their life cycle when they reach around 5 mm.[5] Scallop larval settlement requires the presence of fine filamentous emergent epifauna on the seabed, such as tubeworms, hydroids, and filamentous algae. Survival of juveniles has been shown to vary with habitat complexity, being greater in more complex habitats (with more emergent epifauna) than in more homogeneous areas.[7]

32. Scallop populations are highly variable from one year to the next due to the variability in annual recruitment. This is a result of their high fecundity, variability in larval and adult mortality, as well as growth rates in adults. This variability in populations is more noticeable in areas of high fishing mortality and where fisheries are supported by one or two-year classes.[3]

[3] FNZ (2022) - Fisheries Assessment Plenary - November 2022 accessible at: https://www.mpi.govt.nz/science/fisheries-research-and-science/about-our-fisheries-research/

[4] Williams & Babcock (2005)

[5] Bull (1976)

[6] Williams (2005)

[7] Talman et al (2004)

33. Scallop populations fluctuate naturally and are susceptible to environmental degradation. Potential stressors to scallops, other than fishing, include:

- stressors resulting from human activity, such as nutrient enrichment and sediment loading [8, 9]
- environmental stressors, such as changes in salinity, water flow, turbidity and temperature; [8] and
- biological stressors, such as harmful algal blooms and disease/parasite events.[10]

3.3 Management background

34. The SCA CS fishery extends south from Leigh to Maketu on the north east coast of the North Island and encompasses the Hauraki Gulf and the Western Bay of Plenty.

35. SCA CS was introduced into the Quota Management System (QMS) in 2002 and an initial TAC of 48 tonnes was set.[11]

36. Catch limits and allowances have fluctuated over time based on available information and historically the SCA CS stock supported significant customary, recreational and commercial fisheries. However, recently there have been significant declines in abundance and the stock was last reviewed for the April 2022 (the current) fishing year, in response to new survey information.

37. For the April 2022 review the Minister decided to close most of the SCA CS area to fishing, while leaving open two discrete areas; one at Hauturu/Little Barrier and one in the Colville Channel. The Minister's decision to leave these areas open was based in part on an expectation that the wider closure would improve resilience of the open areas by protecting adjacent scallop beds and habitat.

38. The Minister set the TAC at 19 tonnes, TACC at 5 tonnes, allowances for recreational catch at 3 tonnes, for Māori customary catch at 10 tonnes, and 1 tonne for all other mortality from fishing. The TAC, TACC, and allowances were based on the estimates of sustainable yield from the 2021 survey and reflected the large-scale closure that had been put in place.

39. Catch limits, allowances and reported catches are described using meatweight, which is the calculated weight of the scallop after the shell, gut, and gill are removed. To determine meatweight, the unprocessed weight (greenweight) is divided by 8.0, the Gazetted conversion factor.

40. Prior to the review as part of the April 2022 sustainability round, the Coromandel Scallop Fishers Association (CSFA) in SCA CS managed the commercial fishery at fine scale with a voluntary Catch Per Unit Effort (CPUE) approach. This additional management approach operated within the limits of the TACC and had rules intended to protect individual scallop beds within the wider QMA from overfishing. While this fine scale voluntary management approach likely distributed fishing activity across the available beds and prevented concentration of fishing in certain areas, it is not known if the rules were effective at maintaining sustainable stock levels.

[8] FNZ (2022) - Fisheries Assessment Plenary - November 2022

[9] Stevens (1987), Nicholls et al. (2003)

[10] Rolton et al. (2022)

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

Emergency measure

41. Section 16 of the Fisheries Act allows the Minister to impose emergency measures if they are satisfied that there is or has been a serious decline in the abundance or reproductive potential of one or more stocks or species; or significant adverse change in the aquatic environment.[12] An emergency measure may be in force for a period not exceeding 3 months, and after consultation with representative interests may be renewed once, and only for a further period not exceeding 9 months.

42. The Minister has decided to implement an emergency measure to immediately close the areas at Hauturu/Little Barrier and Colville Channel to scallop fishing. This emergency measure will come into effect on 16 December 2022. It will be in place for three months and includes commercial, recreational, and customary fishing. The Minister's decision to utilise the emergency measure followed engagement and consultation, to the extent practicable, with those holding interests in the fishery.

43. The Minister's announcement of the emergency measure can be viewed at: https://www.beehive.govt.nz/release/serious-scallop-decline-prompts-emergency-closure-coromandel-fishery.

4 Status of the stock

44. Because there are currently no accepted target and limit reference points for the SCA CS stock, the biomass that will support the maximum sustainable yield (MSY) is not able to be estimated reliably using available information.

45. Section 13(2A) of the Act specifies requirements for setting a TAC where, as is the case for SCA CS, the current level of the stock or the level of the stock that can produce the maximum sustainable yield (MSY) is not able to be estimated reliably using the best available information. In such cases, the Minister must set a TAC using the best available information, and 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.

46. Research surveys currently provide the best available information for reflecting the state of the scallop population within SCA CS. The surveys provide fishery-independent population estimates including biomass, size structure, and spatial distribution.

4.1 2021 dredge and dive-based scallop surveys in SCA CS

47. In 2020 FNZ commissioned extensive dredge and dive surveys, which were carried out by NIWA in 2021 to provide an estimate of biomass and density of scallops within a number of scallop beds across the SCA CS quota management area[13]. The results of the survey were reported to FNZ's Shellfish Working Group in late 2021.

48. The 2021 survey results showed that in many areas the biomass was substantially lower than the previous surveys carried out in 2012 and that, overall, the biomass had declined to levels close to lowest recorded levels. The specific reasons for the observed decline across the different sites were not known and were likely a combination of both fishing and non-fishing related stressors. The surveys showed the Hauturu/Little Barrier and Colville Channel areas had some biomass of scallops at high density levels, which was predicted would support some level of ongoing utilisation. Accordingly, these areas were kept open, with significantly reduced catch limits and allowances.

49. The catch limits set for 2022 were derived from the survey results and based on conservative estimates of the yield considered to be sustainable. The viable commercial yield for each area was calculated using estimates of critical scallop density in those areas. In the absence of

[12] Section 16 of the Fisheries Act, Accessible at: https://www.legislation.govt.nz/act/public/1996/0088/latest/DLM395525.html

[13] FNZ (2022) - Fisheries Assessment Plenary - November 2022

biological reference levels, a cautious approach was used to estimate exploitable biomass, with a high critical density threshold of 0.1 scallops/m^2 and a conservative harvest rate between 10% and 15%.[14]

50. The 2021 survey results remain the best available information on the status of scallop populations throughout the closed area of SCA CS (those areas have not been surveyed in 2022).

4.2 2022 camera-based surveys in Hauturu/Little Barrier and Colville Channel areas

51. Following the Minister's April 2022 decision to close the majority of SCA CS and retain two open areas, FNZ commissioned NIWA to undertake a further camera-based survey to provide comparable estimates of scallop biomass and density within the Hauturu/Little Barrier and Colville areas.

52. The surveys of the open areas were carried out from June to August 2022, prior to the commencement of both the recreational and commercial fishing seasons[15].

53. These surveys were carried out using camera technology, whereas the 2021 surveys used diving and dredge methodology. A camera-based approach was adopted to avoid the impacts of dredge-based surveys on the seafloor and to provide good baseline records of the benthic habitat for future comparison.

54. The survey design was reviewed by the Shellfish Assessment Working Group prior to the survey being undertaken. The imagery from 53 transects across the two areas was examined by NIWA technicians and the review data has been used to develop estimates of scallop density, abundance and biomass. Whilst the survey technology and approach are new and differed to previous surveys, the sampling design was conventional and comparable with previous dredge-based surveys.

55. Being a new approach, there were some additional uncertainties identified by the Shellfish Assessment Working Group, which if addressed in future, may help to improve the precision and reliability of estimates derived from the camera-based survey method. However, it was considered unlikely that addressing these uncertainties would change the biomass estimates or affect the perception of stock status. Overall the 2022 survey results are considered to provide biomass and density estimates that can be effectively compared to previous surveys.

56. A series of locations within the open areas were surveyed. Each of the 53 locations were sampled by a 500 m transect to capture digital still photos of the seafloor (see Figure 3). The images were then reviewed to identify the presence and size of live scallops and the data used to estimate overall biomass and density across the open areas.[16]

[14] Further details of the methodology used to estimate yield can be found in the SCA CS decision document for April 2022 at: https://www.mpi.govt.nz/dmsdocument/50530-Review-of-Sustainability-Measures-for-the-2022-April-round-Fisheries-New-Zealand-Decision-Paper

[15] Note the commercial scallop season opens on 15 July, however no commercial fishing took place prior to the completion of the surveys in August.

[16] The review of images also included an auditing process involving an independent comparer to ensure that readings and categorisation of scallop life status was consistent.

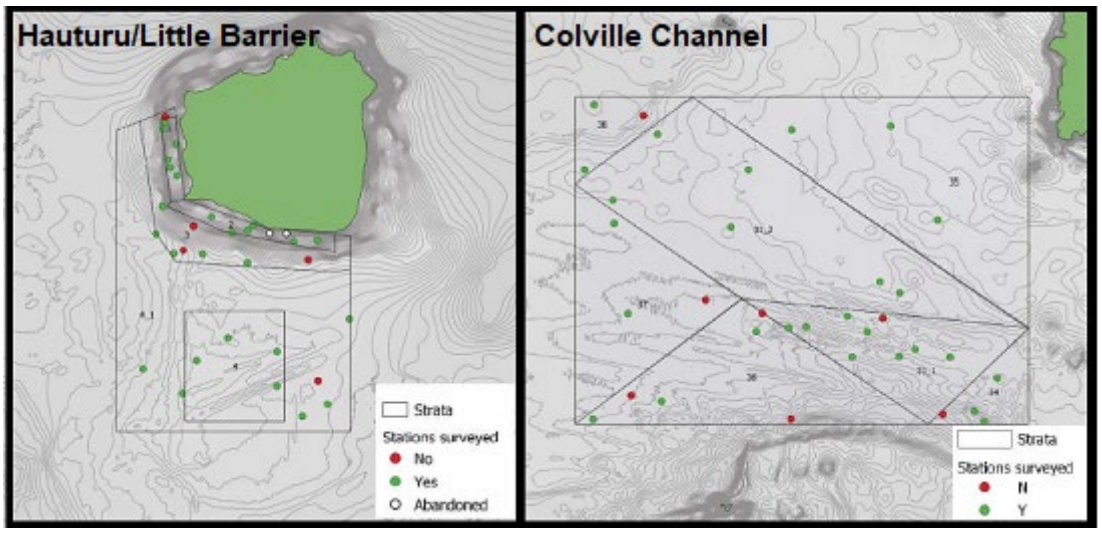

Figure 3: Camera survey sites in the open areas at Te Hauturu-o-Toi/Little Barrier Island (left) and Colville Channel (right).

57. For comparability, the 2022 surveys included the same strata surveyed in Hauturu/Little Barrier and Colville Channel in 2021. The 2022 surveys also included new strata which were not surveyed in 2021 so that biomass and density could be assessed more widely within each area.

58. Table 3 below shows the 2022 surveyed biomass and density of scallops within the different strata as presented to the Shellfish Assessment Working Group on 9 December 2022. For Hauturu/Little Barrier strata 1-4 are comparable (were also surveyed in 2021), but stratum 41 is new (surveyed 2022 only). For Colville Channel survey stratum 31 is comparable (was also surveyed in 2021), and all other strata were surveyed only in 2022.

Table 3: 2022 Survey biomass estimates (meatweight tonnes) and densities of recruited (>90 mm) scallops for all surveyed areas of Te Hauturu-o-Toi/Little Barrier Island and Colville Channel.

Location	Survey strata	Area (km^2)	No. survey stations	Biomass (absolute, in tonnes)			Density (scallops per m^2)		
				mean	median	95% CI	mean	median	95% CI
Hauturu/Little Barrier	1-4	25.5	20	4.83	4.70	1.26 - 9.66	0.016	0.016	0.004 – 0.031
	41 (new)	36.7	6	7.95	7.56	1.60 – 16.46	0.020	0.019	0.004 – 0.040
	Total	62.2	26	12.78	12.56	4.94 – 22.42	0.018	0.018	0.007 – 0.032
Colville Channel	31	52.7	14	36.17	35.98	21.28 – 53.71	0.065	0.065	0.039 – 0.093
	34 (new)	4.4	3	1.47	1.45	0.57 – 2.61	0.032	0.032	0.014 – 0.054
	35 (new)	35.7	3	13.75	13.89	3.82 – 23.52	0.032	0.032	0.012 – 0.000
	36 (new)	20.4	3	11.00	11.18	0 – 21.34	0.052	0.052	0.000 – 0.106
	37-38 (new)	23.0	4	0.00	0.00	0.00 – 0.00	0.000	0.000	0.000 – 0.000
	Total	136.2	27	62.39	62.04	41.77 – 84.93	0.042	0.042	0.028 - 0.057
Total open area	All strata	198.4	53	75.17	75.27	51.58 – 100.95	0.035	0.035	0.024 – 0.046

59. Average biomass and density of scallops was shown to be low in most of the surveyed areas. For the total Hauturu/Little Barrier area, scallop biomass was estimated to be 12.56 tonnes (median), and the median density of scallops was 0.018 scallops/m^2 (Table 3). For the total Colville Channel area, scallop biomass was estimated to be 62.04 tonnes, and the median density of scallops was 0.042 scallops/m^2 (Table 3).

60. Table 4 below shows a comparison of the biomass and density estimates for the survey strata sampled in both the 2021 and 2022 surveys.

Table 4: Comparison of 2021 and 2022 biomass estimates (meatweight tonnes) and densities of recruited (>90 mm) scallops for comparable survey strata at Te Hauturu-o-Toi/Little Barrier Island and Colville Channel.

Location	Metric	2021		2022		Biomass decline (% median)
		Median	95% Confidence interval	Median	95% Confidence interval	
Hauturu/Little Barrier	Biomass (t)	31.14	18.98 – 47.11	4.70	1.26 – 9.66	85%
(Strata 1-4)	Density (scallops per m^2)	0.120	0.074 – 0.178	0.016	0.004 – 0.031	87%
Colville Channel	Biomass (t)	57.15	21.78 – 105.63	35.98	21.28 – 53.71	37%
(Stratum 31)	Density (scallops per m^2)	0.112	0.045 – 0.194	0.065	0.039 – 0.093	42%

61. The 2022 survey results showed an approximate 85% decline in absolute biomass of recruited (>90 mm) scallops in comparable areas of Hauturu/Little Barrier from the 2021 biomass estimate (Table 4). Median density of scallops in the area showed an 87% decline from 2021.

62. For comparable areas of Colville Channel, the 2022 survey results showed an approximate 37% decline in absolute biomass of recruited scallops from 2021, and density of scallops showed a 42% decline (Table 4).

63. The biomass of scallops in each area was also estimated at a range of specified density levels (Table 5). The level of scallop biomass at higher density levels can be more informative than just absolute biomass levels given that high density scallop beds are disproportionately more important for the fertilisation success of scallops during spawning.[17]

Table 5: Biomass estimates for a range of specified critical density levels (0, 0.04, 0.07, 0.10 and 0.12 scallops/m^2) for Te Hauturu-o-Toi /Little Barrier Island and Colville open areas in SCA CS. B_{mean} represents mean biomass at the specified density level, and B_{cv} represents the CV (coefficient of variation) associated with the mean estimate. B_{median} represents the median scallop biomass at the specified density level.

Density level (scallops m^2)	Location	Biomass of recruited (>90 mm) scallops (tonnes, meatweight)		
		Bmean	Bcv	Bmedian
0	Hauturu/Little Barrier	12.78	± 4.60	12.56
	Colville Channel	62.39	± 13.10	62.04
	Combined	75.17	± 14.28	75.27
0.04	Hauturu/Little Barrier	2.67	± 1.82	2.58
	Colville Channel	23.82	± 8.10	22.89
	Combined	26.49	± 8.48	25.55
0.07	Hauturu/Little Barrier	0	-	0
	Colville Channel	12.40	± 5.33	11.79
	Combined	12.40	± 5.33	11.79
0.10	Hauturu/Little Barrier	0	-	0
	Colville Channel	6.19	± 2.79	5.87
	Combined	6.19	± 2.79	5.87
0.12	Hauturu/Little Barrier	0	-	0
	Colville Channel	2.54	± 1.24	2.41
	Combined	2.54	± 1.24	2.41

[17] Williams (2005)

64. As shown in Table 5, most of the scallop biomass at Hauturu/Little Barrier and Colville Channel was present in beds of lower density (< 0.1 scallops m^2), particularly at Hauturu/Little Barrier where no biomass was at or above a density level of 0.07 scallops/m^2.

65. For the 2022 fishing year, exploitable biomass for Hauturu/Little Barrier and Colville Channel was estimated using a critical density threshold of 0.1 scallops/m^2 and a conservative harvest rate between 10% and 15%. Using those parameters, the commercially exploitable biomass for 2022 was estimated to be 5 tonnes in total across both open areas. If the same approach was used based on the 2022 survey results, the estimated commercially exploitable biomass would be 0.6 – 0.9 tonnes, all of which would be from Colville Channel. However, based on the overall survey results and the observed declines in biomass (especially at higher density levels) within the last year, FNZ considers that this would not be an appropriate or sustainable method for estimating yield.

66. It is acknowledged that these survey results have not yet been formally published. The final survey outputs were reviewed by the Shellfish Assessment Working Group on 9 December 2022 and accepted as the best available information with which to make management decisions. The full results are expected to be published in 2023.

67. While MSY is not able to be estimated reliably using these survey results due to the lack of reference points for SCA CS in these areas, these declines in biomass have occurred over a short period of time and far exceed estimated fishing removals in the same period. Because of this, and the overall low density of scallops estimated in these areas, FNZ considers that the current management controls in place are very unlikely to maintain the stock at a level that can produce MSY.

5 Catch information and current settings within the TAC

5.1 Commercial

68. Commercial fishing in SCA CS operates to a restricted season, which runs from 15 July to 21 December each year with commercial fishers operating five days a week during the season. An MLS of 90 millimetres in shell length applies to commercial fishing in SCA CS[18] and is lower than the 100 millimetres for recreational catch. Further to the legislated requirements, commercial fishers in SCA CS operate as a collective and employ additional voluntary measures around scallop harvesting, such as the CPUE based management approach.

69. From 1992, up to and including the 2012 fishing year, the base SCA CS TACC was set at 22 tonnes, before being increased to 100 tonnes in 2013 based on the discovery of a significant scallop bed in 2012 (Hauraki bed) with an estimated 1 005 tonne meat weight biomass. This bed had largely disappeared by 2014, despite little fishing occurring, and in 2016 the TACC was reduced to 50 tonnes.

70. From 2017 to 2021, landings decreased with an estimated 12 tonnes (meatweight) landed in 2019-2020 and approximately 13 tonnes in 2020-21. There was an increase in catch over the last fishing season (2021-22), with 22 tonnes being taken. Most landings in this fishery have been reported to be from beds around Hauturu/Little Barrier and Mercury Islands. In the 2022-23 fishing year, yet to be completed, landings to date (as of December 2022) are 1.25 tonnes in total out of the 5 tonne commercial catch limit. Figure 4 displays the historical commercial landings and catch limits for the SCA CS fishery.

[18] In 1995 the MLS for SCA CS was changed from 100 mm to 90 mm as part of a management plan comprising a wide variety of effort controls including dredge size, fishing hours, or non-fishing days). The smaller MLS is intended to reduce the dredge tows required to catch the TACC and thereby reduce incidental mortality.

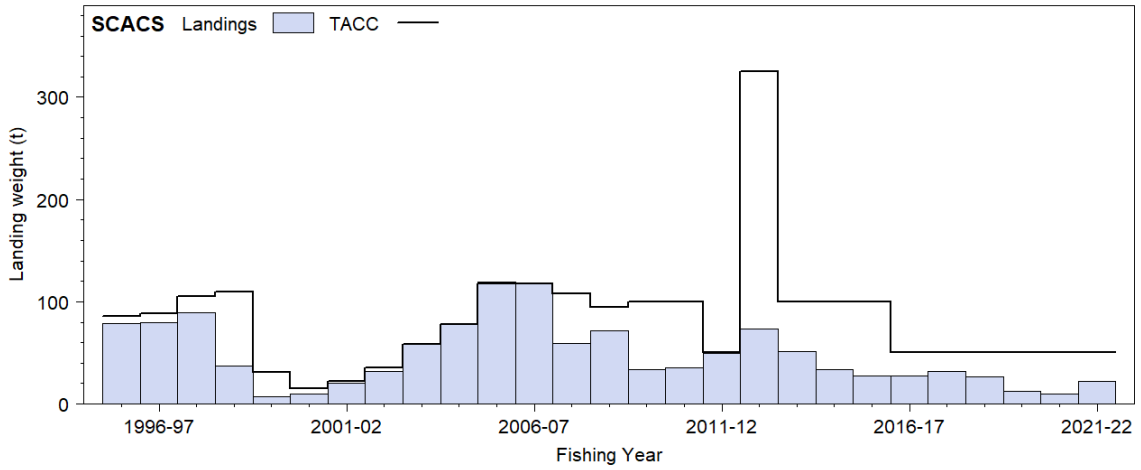

Figure 4: Landings and catch limits for SCA CS (Coromandel) from 1995–98 to 2021–22. TACC refers to catch limit (including in-year increases), and weight refers to meatweight.

5.2 Customary Māori

71. Scallops are an important traditional food for Māori and under the current s11 closure in SCA CS, the ability remains for scallops to be gathered under provisions for customary fishing.

72. While scallops are a common species for which customary authorisations are issued, there is limited quantitative information available on the level of customary take of scallops from SCA CS. It is likely that Māori customary fishers also utilise the provisions under recreational fishing regulations, noting the recent closures will have significantly reduced recreational access.

73. FNZ has been informed by tangata whenua throughout the SCA CS area that to protect local scallop populations, the issuing of customary authorisations has declined or in many cases ceased.

74. Customary fishing authorisations in some parts of SCA CS, if issued, would be under the Fisheries (Amateur Fishing) Regulations 2013, where there is no requirement to report on catch. As such, customary harvest records held by FNZ are likely to be incomplete.

75. FNZ welcomes input from tangata whenua to inform advice on setting an appropriate customary allowance under the proposed full closure of the SCA CS fishery.

5.3 Recreational

76. The recreational scallop fishing season opens on 1 September and runs through to 31 March each year.

77. Historically there was significant recreational interest in scallops in suitable areas throughout SCA CS, mostly in enclosed bays and harbours, which are set aside as non-commercial areas.[19] Harvesting of scallops was reported from larger boats/launches, off land and, most commonly, by trailer boats, from which an estimated 66% of scallops were taken nationally in 2017/18.

78. The best available information on current recreational catch is from the 2017/18 National Panel Survey of Marine Recreational Fishers (NPS), which provides a snapshot of the level of

[19] The areas closed to commercial scallop dredging are displayed in Appendix Two.

recreational take in that fishing year.[20] Scallops were reported to be harvested using dredging and/or by hand gathering from either the shore or while diving. The 2017/18 NPS estimated 468,843 scallops were harvested for that year across all scallop areas in New Zealand by hand gathering while diving, the popular method of choice.

79. A total estimated weight of 62 tonnes (green weight) of scallops was harvested for the 2017-2018 fishing year. Of the overall national scallop take, 93% came from within Fisheries Management Area 1 (FMA 1), which includes the main scallop beds in SCA 1 and SCA CS. Within FMA 1, approximately 60% of recreational scallop catch is taken from SCA CS. In both areas the predominant fishing method is hand-gathering. The NPS estimated 37 tonnes from SCA CS. Another NPS is currently underway and will run until the end of September 2023. Final results are not expected until early in 2024 and will be significantly affected by the current scallop closures that are in place.

80. Following the partial closures in SCA CS, recreational fishing for scallops has been permitted only in the open areas since 1 September 2022. While the level or recreational take is uncertain, it is anticipated to be relatively low due to the remote nature of the areas. There have not been any indications of increased or concentrated recreational fishing effort in these areas since the closures were put in place. However, there is some concern that the busy summer period may pose a risk to the areas, particularly in light of the observed decline in abundance. It is noted that recreational take can be self-limiting where abundance is low, as effort to achieve catch exceeds people's willingness to engage in the fishery.

5.4 Other sources of mortality caused by fishing

81. The Minister must set an allowance within the TAC for all other sources of mortality caused by fishing. This allowance is intended to provide for unrecorded mortality of fish associated with fishing activity, including incidental mortality from fishing methods, or illegal fishing.

82. Incidental damage to uncaught or undersize scallops can occur during commercial dredging.

83. The box dredges used in the SCA CS commercial fishery have been found to be more efficient in the sandy conditions prevalent in the northern region than the ring-bag dredges used elsewhere in New Zealand. However, scallops encountered by box dredges have shown modest reductions in growth rate compared with scallops collected by divers, and quite high levels of mortality (20–30% total mortality, and up to 50% mortality for scallops returned to the water).[21] Experiments and modelling suggest that dredging also reduces habitat diversity and increases juvenile mortality.

84. Other sources of mortality are also likely to occur from recreational dredging and the illegal take or 'poaching' of scallops. The proposed closure option in this document would restrict all commercial and recreational fishing effort and associated incidental mortality. However, there may still be some level of illegal take of scallops under a full closure.

6 Treaty of Waitangi obligations

85. 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.

86. 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 tangata

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

[21] FNZ (2022) - Fisheries Assessment Plenary - November 2022

whenua wish to exercise kaitiakitanga[22] 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.

6.1 Input and participation of tangata whenua

87. 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.

88. 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 Forum 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.[23]

89. To facilitate input and participation, Fisheries New Zealand engages with tangata whenua at Iwi Fisheries Forum hui. The review of the SCA CS fishery and proposed full closure of SCA CS was noted at the Mai i ngā Kuri a Whārei ki Tihirau forum hui held on 5 December.

90. The Mai i Ngā Kuri a Whārei ki Tihirau forum did not have specific feedback on the review of the two open areas at Hauturu/Little Barrier and Colville Channel.

91. FNZ welcomes input from other tangata whenua with an interest in the SCA CS fishery.

6.2 Kaitiakitanga

92. SCA CS covers northern parts of the rohe moana for the Mai i Ngā Kuri a Wharei ki Tihirau Iwi Fisheries Forum and scallops are identified as a taonga species within the Mai i Ngā Kuri a Whārei ki Tihirau Iwi Forum Fisheries Plan.

93. 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 tāngata whenua can exercise kaitiakitanga in respect of fish stocks.

94. FNZ considers that the proposed management options are in keeping with the objectives of the Iwi Fisheries Forum Plan for Mai i Ngā Kuri a Whārei ki Tihirau, which generally relates to active engagement with iwi and the maintenance of healthy and sustainable fisheries, but seeks further input from iwi to help inform final advice on this review of the Coromandel scallop stock.

95. There are six customary fisheries management areas within SCA CS. These include one taiāpure, one mātaitai reserve, and four temporary closures, implemented under section 186A of the Act (Table 6). The Eastern Coromandel and Waiheke Island section 186A closure areas specifically prohibit the take of scallops to support localised populations.

[22] 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.

[23] 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.

Table 6: Customary fisheries management areas in SCA CS.

Customary area	Management type
Maketu Taiāpure	**Taiāpure** All types of fishing are permitted within a Taiāpure. The management committee can recommend regulations for commercial, recreational, and customary fishing
Umupuia Beach	**S186A 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
Te Mata and Waipatukahu	
East Coromandel	
Waiheke Island	
Te Maunga o Mauoa Mātaitai	**Mātaitai Reserve** Commercial fishing is not permitted within mātaitai reserves unless regulations state otherwise.

96. FNZ notes that Ngati Manuhiri also has a cultural rāhui for scallops in place over a large area within SCA CS. The Iwi has also applied for a temporary closure under section 186A of the Fisheries Act, over the open fishing areas at both Hauturu/Little Barrier and Colville Channel. This application is currently being processed by FNZ in parallel to the proposed closure under section 11 of the Act.

97. FNZ is seeking input from tangata whenua on how the proposed closure options for SCA CS may or may not provide for kaitiakitanga as exercised by tangata whenua, and how tangata whenua consider the proposal may affect their rights and interests in this stock.

7 Environmental interactions

98. The key environmental principles, which must be taken into account when considering sustainability measures for SCA CS, 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.

99. The proposed options are unlikely to negatively impact overall environmental interactions in the SCA CS fishery as they do not propose to increase fishing effort. Overall, FNZ considers that any potential adverse effects of fishing on the aquatic environment are more likely to be avoided or mitigated by a closure and/or reduction to the TAC.

7.1 Associated or dependent species

Protected species interactions

100. Dredging and diving are considered to pose little to no risk to seabirds and there are no known captures of marine mammals, seabirds or protected fish species in New Zealand scallop fisheries.[24] [25] The proposed options are therefore unlikely to affect the long-term viability of any protected species.

[24] FNZ (2022) - Aquatic environment and biodiversity annual review (AEBAR) 2021 – accessible at https://www.mpi.govt.nz/science/fisheries-research-and-science/about-our-fisheries-research/aquatic-environment-and-biodiversity-annual-review-aebar/

[25] FNZ (2022) - Fisheries Assessment Plenary November 2022

Fish and invertebrate bycatch

101. In SCA CS, a photographic survey approach was used in 2006 to provisionally examine bycatch groups[26], and a more quantitative and comprehensive study was conducted using bycatch data collected in the 2009 dredge survey.[27]

102. Survey catches were quantified by volume of different component categories. Over the whole 2009 survey, scallops formed the largest live component of the total catch volume (26%), followed by assorted seaweed (11%), starfish (4%), other live bivalves (4%), coralline turfing algae (1%) plus other live components not exceeding 0.5%. Dead shells (identifiable and hash) formed the largest overall component (45%), and rock, sand, and gravel formed 8%. Categories considered sensitive to dredging were caught relatively rarely.

103. If fishing pressure is reduced as a result of a closure and/or changes to catch limits, any impacts on these bycatch species are likely to be positive.

7.2 Biological diversity

104. The effects of scallop dredging on the benthos are well-studied, with New Zealand studies showing that with increasing fishing intensity there are decreases in the density and diversity of benthic communities and, especially, the density of emergent epifauna that provide structured habitat for other fauna.[28]

105. A closure of the fishery and/or reduction in catch limits would remove any commercial or recreational dredging, which would be more likely to maintain biological diversity of the aquatic environment in those areas.

106. FNZ notes that while environmental factors, such as sedimentation and water quality, may also affect biological diversity in scallop habitat, it does not have a direct role in managing such environmental impacts. However, it will monitor existing work being done in this field and continue to engage with relevant local authorities in this regard.

7.3 Habitats of particular significance for fisheries management

107. Habitats of particular significance for fisheries management are not defined in the Act. FNZ recently consulted on draft guidelines for identification of habitats of particular significance for fisheries management and the operational proposals to support its application. Protect in this context means taking measures that would avoid, remedy, or mitigate the adverse effect of a decision that could undermine the function the habitat provides for the fisheries resource.

108. There are no specific habitats of particular significance identified for SCA CS at this time. What is known is discussed in Table 7. Irrespective of whether a habitat of particular significance for scallops has yet been identified, FNZ considers that a closure and/or reduction to catch limits would avoid adverse effects from fishing on any significant scallop habitats in SCA CS.

Table 7: Summary of information on potential habitats of particular significance for SCA CS.

Habitat	Specific habitats of particular significance for scallops in SCA CS have not been identified at this time. However, certain features of the habitats with which scallops are associated are known to influence scallop productivity by affecting the recruitment, growth, and mortality of scallops, and therefore may in the future be useful in terms of identifying habitats of significance.

[26] Tuck et al. (2006)

[27] Williams & Parkinson (2010)

[28] FNZ (2022) - Aquatic environment and biodiversity annual review (AEBAR) 2021

Attributes of habitat	• Scallops are found in a variety of coastal habitats, but particularly in semi-enclosed areas where circulating currents are thought to retain larvae. • Scallops inhabit waters of up to about 60 m deep but are more common in depths of 10 to 50 m on substrates of shell gravel, sand or, in some cases, silt. • Scallops are typically patchily distributed at a range of spatial scales. Some scallop beds are persistent, and others are short lived. The extent to which the various beds or populations are reproductively or functionally separate is not known. • Scallop larvae spend about three weeks in the plankton. They then attach to algae or some other filamentous material with fine byssus threads. This indicates that an important attribute of habitat is the presence of suitable settlement surfaces for larvae. When the spat reach about 5 mm they detach and take up the free-living habit of adults, usually lying-in depressions on the seabed and often covered by a layer of silt.
Reasons for particular significance	• Scallops grow relatively fast, have high mortality, and variable recruitment. The rates of these processes probably vary in relation to environmental conditions (e.g., temperature, water flow, turbidity, and salinity), ecological resources (e.g., food, oxygen, and habitat), and with intra- and inter-specific interactions (e.g., competition, predation, parasitism, and mutualism), and the combination of these factors determines the species distribution and abundance.[29] • Scallops are a key component of the inshore coastal ecosystem, acting both as consumers of primary producers (e.g., plankton) and as prey for many predators. Scallops themselves can also provide structural habitat for other epifauna (e.g., sponges, ascidians, and algae).
Risks/threats	*Fishing* • It is well known that fishing with mobile bottom contact gears such as dredges has impacts on benthic populations, communities, and their habitats.[30] The effects are not uniform but depend on at least: 'the specific features of the seafloor habitats, including the natural disturbance regime, the species present, the type of gear used, the methods and timing of deployment of the gear and the frequency with which a site is impacted by specific gears; and the history of human activities, especially past fishing, in the area of concern'.[31] • The effects of scallop dredging on the benthos are relatively well studied and include several New Zealand studies carried out in areas of the northern fisheries (SCA 1 and SCA CS)[32] and the Golden/Tasman Bays region of the southern fishery (SCA 7).[33] The results of these studies are that, generally, with increasing fishing intensity there are decreases in the density and diversity of benthic communities and, especially, the density of emergent epifauna that provide structured habitat for fauna. *Sedimentation* • Fine sediments introduced from runoff from land may have adverse effects on scallops and scallop habitat. Layers of fine sediment can decrease heterogeneity in scallop habitats[34], and the resulting decrease in habitat complexity is likely to negatively impact survival of juvenile scallops.[35] The suspension of fine sediments has been implicated in scallop population declines in other parts of New Zealand.[36] Suspended sediments can reduce rates of respiration in scallops and some studies have demonstrated that suspended sediments disrupt feeding, decrease growth and increase mortality in New Zealand scallops.[37] Suspended sediments can also reduce light levels near the seabed, which could impact food availability for scallops in the habitat.[38] The effects of fine sediments on scallop habitat may be exacerbated by the use of mobile bottom contact gears such as dredging and trawling[29] and by climatic changes in the frequency and severity of storm events which increase sedimentation rates and resuspension of seafloor sediments.[39] However, the specific impacts of sedimentation on habitats in SCA CS is unknown and requires further investigation.

[29] Begon et al. (1990)

[30] E.g. Kaiser et al. (2006), Rice (2006)

[31] Department of Fisheries and Oceans (2006)

[32] Thrush et al. (1995), Thrush et al. (1998), Cryer et al. (2000), Tuck & Hewitt (2013).

[33] Tuck et al. (2017)

[34] Gibbs & Hewitt (2004)

[35] Talman et al. (2004).

[36] NIWA (2012)

[37] Stevens (1987), Nicholls et al. (2003)

[38] Macdonald et al. (2006)

[39] Cummings et al. (2021)

Risks/threats (cont.)	*Climate impacts* • The oceans around the East Coast North Island of New Zealand are warming at a rate well in excess of the global average[40], and moderate to strong heatwaves have been recorded in recent years in the Hauraki Gulf.[41] Changes in the environmental conditions associated with marine heatwaves may have impacts on both the timing of spawning, and food availability for survival of larval scallops (which might impact the availability of suitable habitats for scallops).[42] However, the extent to which changes in climate and temperature may be affecting scallop habitat suitability in SCA CS is unknown.
Existing protection measures	While specific habitats of significance have not been identified, there are scallop populations in many estuaries and harbours in SCA CS, and these are protected from benthic effects of commercial dredging, trawling and Danish seining (refer Appendix Two for a map of fishery restrictions).

8 Sustainability measures (section 11 of the Act)

109. Section 11 of the Act sets out various matters that must be taken into account when setting or varying any sustainability measures.[43] These include any effects of fishing on the stock and the aquatic environment (see *Status of the stock* and *Environmental interactions* sections above), existing controls under the Act that apply to SCA CS (summarised above under *Fisheries characteristics* and *Kaitiakitanga* sections), the natural variability of the stock concerned (see *Biology* section), and any relevant fisheries plans (discussed below).

110. Section 11 (2A) requires the Minister to take into account: (a) any conservation services or fisheries services; and (b) any relevant fisheries plan approved under this Part; and (c) any decisions not to require conservation services or fisheries services. Services of relevance to the options in this paper include research used to monitor stock abundance, such as the biomass surveys undertaken for SCA CS (which have been used to inform the status of the stock), and the tools used to enforce compliance with management controls in the fishery.

111. FNZ notes that the SCA CS fishery does not have observer or on-board camera coverage, but Fisheries Compliance regularly monitors the SCA CS area to ensure that management controls are being adhered to.

9 Relevant plans, strategies, statements, and context

112. To date fisheries plans have been approved only for deepwater species, highly migratory species and pāua. There are no relevant approved fisheries plans for SCA CS and the management of the SCA CS fishery is guided by the non-binding policy guidance in MPI's Harvest Strategy Standard (see below).

9.1 Harvest Strategy Standard

113. The Harvest Strategy Standard for New Zealand Fisheries (HSS) is a policy statement of best practice in relation to the setting of fishery and stock targets and limits for fish stocks in New Zealand's QMS.[44] It is intended to provide guidance on how fisheries law will be applied in practice, by establishing a consistent and transparent framework for decision-making to achieve the objective of providing for utilisation of New Zealand's QMS species while ensuring sustainability.

[40] Sutton & Bowen (2019)

[41] https://www.moanaproject.org/recent-marine-heatwaves

[42] Williams (2005)

[43] An outline of the Minister's requirements under sections 11 and 11A of the Fisheries Act can be found in FNZ's separate legal overview document at https://www.mpi.govt.nz/dmsdocument/54622-Fisheries-New-Zealand-review-of-sustainability-measures

[44] FNZ (2008) - Harvest Strategy Standard. Accessible at: https://fs.fish.govt.nz/Doc/16543/harveststrategyfinal.pdf.ashx

114. The HSS outlines the Ministry's approach to relevant sections of the Act and forms a core input to the Ministry's advice to the Minister on the management of fisheries. The HSS defines a hard limit as a biomass limit below which fisheries should be considered for closure and a soft limit as a biomass limit below which the requirement for a formal time-constrained rebuilding plan is triggered.

9.2 Hauraki Gulf Marine Park Act 2000

115. SCA CS boundaries overlap within the Hauraki Gulf Marine Park (HGMP). Therefore, sections 7 (recognition of national significance of Hauraki Gulf) and 8 (management of Hauraki Gulf) of the Hauraki Gulf Marine Park Act 2000 (HGMPA) apply to the management of this fishery.[45]

116. FNZ considers that this review of SCA CS and the proposed options are consistent with obligations under sections 7 and 8 of the HGMPA in that the proposed options aim to address a sustainability risk with SCA CS, and addressing this risk should help to:

    a) Maintain the life-supporting capacity of the environment of the Gulf and its islands; and

    b) Protect natural and historic resources (i.e. scallops) in the Gulf; and,

    c) Mitigate risks to the future use of these resources by people and communities in Gulf.

117. In addition to the HGMPA, the recently released *Revitalising the Gulf: Government action on the Sea Change Plan* is relevant to the future management of the portion of SCA CS that lies within the HGMP.[46] A key fisheries output from *Revitalising the Gulf* is the development of an area specific fisheries plan[47] under section 11A of the Fisheries Act. There are also new marine protection proposals for the HGMP which would overlap with scallop beds in SCA CS.

118. Under the draft Hauraki Gulf Fisheries Plan, specific management measures are proposed to support the sustainability and improved future management of scallops within the HGMP. If the proposed full closure were to be implemented, the specific actions within the Fisheries Plan would be considered as part of the ongoing and longer-term management approach.

9.3 Regional Plans

119. Three Regional Councils have coastlines within the boundaries of the wider SCA CS area: Auckland, Waikato, and Bay of Plenty, and the open scallop areas at Hauturu/Little Barrier and Colville Channel are within Auckland's coastline. Each of these regions have policy statements and plans to manage the coastal and freshwater environments, including terrestrial and coastal linkages, ecosystems and habitats.

120. 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. There are no provisions specific to scallops.

121. 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.

122. The FNZ Coastal Planning Team engages with the 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.

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[45] NZ Legislation (2000) - Hauraki Gulf Marine Park Act. Accessible at https://www.legislation.govt.nz/act/public/2000/0001/latest/DLM52558.html#DLM53130

[46] Details of the Revitalising the Gulf package can be found on FNZ's website at: https://www.mpi.govt.nz/fishing-aquaculture/sustainable-fisheries/strengthening-fisheries-management/revitalising-the-hauraki-gulf-government-action-on-the-sea-change-plan/

[47] The Hauraki Gulf Fisheries Plan is still in draft and not yet approved under section 11A of the Fisheries Act, which means the Minister is not required to take it into account.

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

123. 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.[48] The Strategy sets a number of objectives across three timeframes. The most relevant to setting sustainability measures for SCA CS 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.

124. 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 biodiversity and habitat impacts associated with a closure and adjustments to catch limits, consistent with the Minister's legislative obligations and the intent of Te Mana o te Taiao.

10 Economic considerations

125. The Coromandel scallop fishery supports a number of associated people and businesses. This includes but is not limited to:

    - Quota holders[49].
    - Commercial fishers.
    - Seafood processing facilities and licensed fish receivers.
    - Suppliers of fishing, boating and diving equipment and others in the marine industry.
    - Dive shops

126. Under the options proposed in this paper, the SCA CS fishery would be fully closed under s11 of the Act, prohibiting any commercial and recreational harvest. The closure would have socio-economic consequences, particularly at a regional scale, and is likely to reduce socio-cultural wellbeing in the short to medium term for those directly involved with the fishery.

127. It is noted that fishers and processors are not solely reliant on scallops and do or can catch/process other species, but a closure would remove all commercial revenue from scallops and fishers/vessel operators would likely consider moving into different fisheries. This would require some conversion of vessels to allow for alternative fishing gear to be used and purchase of that gear. The costs of conversion can be considerable, along with costs of obtaining quota or ACE for other species.

128. FNZ also notes that a full closure is proposed to provide an opportunity for scallops to recover, and if scallop numbers recover to higher levels that can sustain fishing, there would be longer-term socio-economic benefits for those associated with the fishery.

[48] Accessible at: https://www.doc.govt.nz/nature/biodiversity/aotearoa-new-zealand-biodiversity-strategy/

[49] This includes Māori who own Fisheries Settlement quota shares – Some iwi and mandated iwi organisations are therefore likely to be impacted by a closure of commercial take. However, FNZ does not have information to accurately quantify the potential loss in quota value or flow on impacts of this for iwi and their associated communities.

11 Current and proposed management options

129. There are a range of tools available under the Act to manage the impacts of fishing pressure on scallop abundance, including catch limits and method and/or spatial restrictions. FNZ welcomes views on how these different tools could be used as part of a package of measures to manage the SCA CS fishery in the future.

130. Given the immediate sustainability concerns for scallops at Hauturu/Little Barrier and the Colville Channel, FNZ is proposing to implement a full spatial closure for SCA CS, and an option to also review the TAC, allowances and TACC.

131. Based on the best available information from the recent camera surveys of scallop abundance at Hauturu/Little Barrier and Colville Channel, FNZ considers that changes to the TAC, allowances and TACC of SCA CS (without a spatial closure) would not provide an appropriate mechanism to protect remaining scallop beds and enable their recovery, as well as that of the wider stock. This is because:

- The survey results have indicated serious declines in biomass within the areas open to fishing at Hauturu/Little Barrier and the Colville Channel within a short period of time, and the estimated reductions in biomass have exceeded reported commercial scallop harvest and the recreational allowance. This indicates that factors outside of direct fishing impacts are contributing to the decline in scallops.

- Until better information is available to estimate sustainable yields for scallops, which take into account both fishing and non-fishing related stressors in the area, a cautious management approach is needed (as per the information principles of the Act).

- Reducing the allowance for recreational fishing would not constrain the overall level of take that may occur. While a number of management measures are in place to limit overall recreational harvest (such as seasonal closure, size limits and bag limits etc), the allowance is not legally constraining.

132. FNZ is proposing two options for SCA CS, both of which would fully close SCA CS to scallop fishing under a section 11 sustainability measure. These options differ in that one is proposing only a closure of the currently open areas (Option 1), while the other proposes a closure of the open areas combined with changes to the TAC, allowances and TACC of SCA CS (Option 2).

11.1 Current settings

Partial closure under a Section 11 Sustainability measure. Hauturu/Little Barrier and Colville Channel areas open to fishing.				
TAC: 19 t	**TACC:** 5 t	**Customary**: 10 t	**Recreational**: 3 t	**Other mortality**: 1 t

133. FNZ considers that retaining the status quo for SCA CS would not respond to the declines in scallop abundance observed at Hauturu/Little Barrier and Colville Channel, and noting the points raised in paragraph 131, would be inconsistent with the purpose of the Act to ensure sustainability of fisheries resources.

11.2 Option 1

Full closure under a Section 11 Sustainability measure, including the Hauturu/Little Barrier and Colville Channel areas				
TAC: 19 t	**TACC:** 5 t	**Customary**: 10 t	**Recreational**: 3 t	**Other mortality**: 1 t

134. Option 1 proposes a full closure to commercial and recreational harvest of scallops in SCA CS as a sustainability measure under section 11 of the Act. This option seeks to address the sustainability risk identified by the 2022 camera-based survey by protecting the scallop beds at Hauturu/Little Barrier and Colville Channel from further direct and indirect impacts of fishing

activity. FNZ notes that no new information will become available to inform the status of scallops throughout the proposed duration of the emergency measure, and this section 11 closure would remain in place to protect the scallop beds once the emergency measure has lapsed.

135. As noted above, it is likely that fishing is not the only factor that has contributed to declines in scallop abundance within these areas. However, there is a lack of information on those other factors or solutions to manage them. On the other hand, impacts of fishing can be controlled and removing direct and indirect effects of fishing is likely to improve chances of scallop recovery.

136. Spawning success of scallops is known to be density dependent and, based on recent declines in abundance, there is a concern that if fishing continues in the open areas scallop density may become too low for successful spawning. As well as having immediate implications for the overall spawning success of scallops in these areas, low density could also affect the contribution of spat to surrounding scallop beds. Though it should be noted that there is limited information on scallop population connectivity in the Coromandel fishery and while there are indications of spat transfer from these areas[50], their importance as sources of scallop eggs and spat for other scallop beds is currently unknown.

137. FNZ acknowledges that a full closure would further impact all fishers in SCA CS, as commercial and recreational utilisation would be completely prohibited. The most significant impact will be the complete exclusion of the commercial fishing and associated industries, which are currently built around the SCA CS fishery. However, it is also noted that a full closure is aimed at providing the best opportunity for scallops to recover, and if scallop numbers recover to higher levels that can sustain fishing, there would be longer-term socio-economic benefits for those associated with the fishery.

138. It is proposed that the closure is implemented for an indefinite time period; however, FNZ would commission new information on the abundance of scallops in SCA CS by 2025. If this indicates that the stock has recovered FNZ will review whether the full closure is still required and, if not, what management measures would be required to enable utilisation while ensuring sustainability.

139. The scallop fishing industry has signalled a desire to work collaboratively on innovation and improvement to scallop management in the future. FNZ notes that it is open to a collaborative management approach and would also welcome input from tangata whenua and feedback from sectors and interests on the future management of the fishery.

140. FNZ will also have the opportunity during the closure period to research other factors that may be affecting the scallop populations and to review appropriate reference points (management targets and limits) for the fishery. In line with this goal, FNZ has recently commissioned a review of reference points for scallop fisheries (including SCA CS), and the results for this project (SCA2022-01) are due to FNZ in September 2023. A key aim of the project will be to establish a framework for setting reference points that appropriately consider fishery effects (e.g., benthic habitat damage from dredging) as well as non-fishery effects (e.g., land-based sedimentation) that can influence scallop productivity.

141. A full closure under section 11 of the Act would not extend to customary fishing authorised under section 50 of the Fisheries (Amateur Fishing) Regulations 2013 (fish, aquatic life, or seaweed taken under authorisation for hui or tangi). It would also still allow for tangata kaitiaki/tiaki to authorise the taking of fisheries resources under regulation 11 of the Fisheries (Kaimoana Customary Fishing) Regulations 1998 (power to authorise the taking of fisheries resources for customary food gathering).

142. While not prohibited, customary utilisation would continue be managed by tangata whenua/ tangata kaitiaki in the region. Iwi have indicated that to support a recovery of the local scallop populations in their respective rohe moana, customary authorisations for scallop take have

[50] Nunes Soares Silva (2015).

declined or ceased and cultural rāhui have been put in place for scallops over much of the SCA CS area.

143. Under Option 1 it is proposed no change is made to the TAC, allowances or TACC, as access to the fishery would already be prohibited through the section 11 closure. Under this option FNZ would continue to monitor the fishery and, if new information indicated fishing could occur sustainably, the TAC and settings within the TAC would be reviewed prior to re-opening the fishery. Quota holders would be unable to harvest or sell scallops under this option but would continue to pay levies since the existing TACC would remain in place.

11.3 Option 2

Full closure under a Section 11 Sustainability measure, including the Hauturu/Little Barrier and Colville Channel areas				
TAC: 11 t ↓ (8 t)	**TACC:** 0 t ↓ (5 t)	**Customary**: 10 t	**Recreational**: 0 t ↓ (3 t)	**Other mortality**: 1 t

144. As with Option 1, Option 2 proposes a full closure to the commercial and recreational harvest of scallops in SCA CS as a sustainability measure under section 11 of the Act. The benefits and impacts of the closure are discussed above under Option 1.

145. In contrast to Option 1, Option 2 proposes to also change the TAC of SCA CS and settings within the TAC.

146. Under Option 2 the TAC would be decreased from 19 to 11 tonnes.

147. FNZ considers that a TAC of 11 tonnes 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 given that it entails a reduction to utilisation that would help to move scallops toward a higher biomass that is more likely to produce MSY. However, FNZ also acknowledges that the proposed closure under section 11 of the Act would be the mechanism achieving this reduction; the TAC reduction would not in itself change utilisation after the closure is already in place, but it would better reflect the status of the fishery under the closure.

148. The customary allowance would be retained at 10 tonnes under this option. However, FNZ welcomes input from tangata whenua to inform whether this is an appropriate setting for the customary allowance under the proposed full closure of the SCA CS fishery. FNZ recognises that a lower allowance might better reflect levels of customary take given that customary authorisations for scallop take have declined or ceased and cultural rāhui are in place for scallops over much of the SCA CS area.

149. The allowance for other sources of mortality would be maintained at 1 tonne to account for possible illegal take of scallops during the closure and incidental fishing mortality from other non-target methods.

150. The recreational allowance would be set at zero tonnes, as would the TACC. Notably, if the recreational allowance and TACC are set at zero it would not actually impact take by those sectors, which would already be prohibited under the section 11 closure. However, as with the proposed TAC change, the changes to these settings would better reflect the status of the fishery under the closure, and the level of harvest considered sustainable.

12 Deemed values

151. 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.

152. It should be noted that the SCA CS fishery is a target fishery and deemed values should not be a consideration under a full closure as proposed by the options of this paper, since unavoidable bycatch is unlikely. FNZ is therefore not proposing adjustments to the deemed value rates for SCA CS.

153. The current deemed value rates for SCA CS are provided in Table 8 for reference.

Table 8: Deemed value rates for SCA CS.

Stock	Interim Rate ($/kg)	Annual Differential Rates ($/kg) for excess catch (% of ACE)					
		100-120%	120-140%	140-160%	160-180%	180-200%	200%+
SCA CS	33.30	37.00	44.40	51.80	59.20	66.60	74.00

13 Questions for submitters

- Do you support options to close the SCA CS fishery? Why?
- Which option do you support for the TAC and allowances? Why?
- If you do not support any of the options listed, what alternative(s) should be considered? Why?
- Are there any other measures for managing the SCA CS fishery that you support?
- 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?

154. We welcome your views on these proposals. Please provide detailed information and sources to support your views where possible.

14 How to get more information and have your say

155. Fisheries New Zealand invites you to make a submission on the proposals set out in this discussion document. Consultation closes at 5pm on 8 February 2022.

156. 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.

15 Legal basis for managing fisheries in New Zealand

157. 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.

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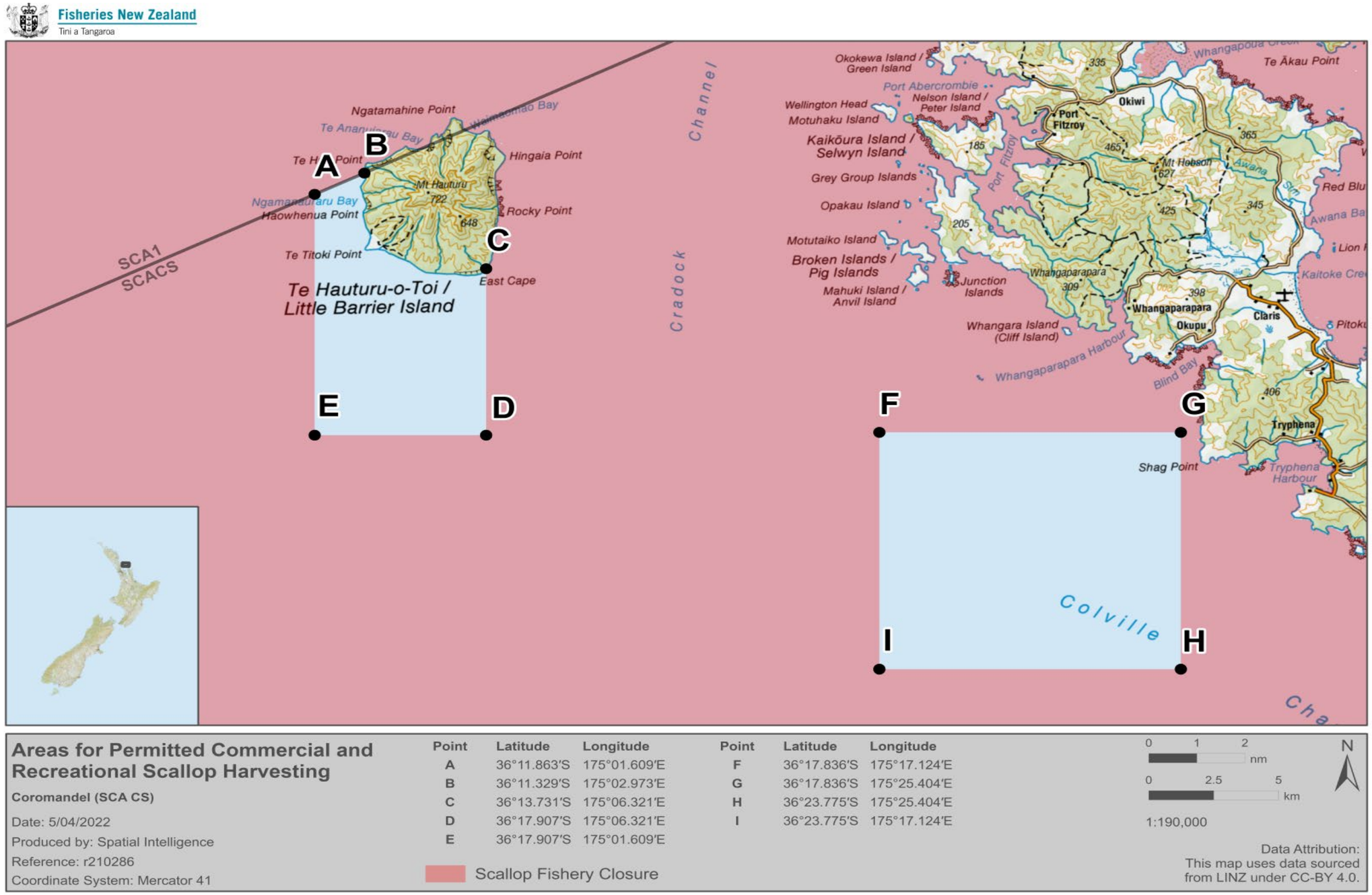
17 Appendix One: Map of areas open to scallop fishing at Hauturu/Little Barrier and Colville Channel



Areas for Permitted Commercial and Recreational Scallop Harvesting

Coromandel (SCA CS)

Date: 5/04/2022

Produced by: Spatial Intelligence

Reference: r210286

Coordinate System: Mercator 41

Point	Latitude	Longitude	Point	Latitude	Longitude
A	36°11.863'S	175°01.609'E	F	36°17.836'S	175°17.124'E
B	36°11.329'S	175°02.973'E	G	36°17.836'S	175°25.404'E
C	36°13.731'S	175°06.321'E	H	36°23.775'S	175°25.404'E
D	36°17.907'S	175°06.321'E	I	36°23.775'S	175°17.124'E
E	36°17.907'S	175°01.609'E			

Scallop Fishery Closure

Data Attribution:
This map uses data sourced from LINZ under CC-BY 4.0.

18 Appendix Two: Map of Fishing restrictions in the Coromandel (SCA CS) scallop fishery