Fisheries New Zealand
Tini a Tangaroa

Review of Sustainability Measures for Giant Spider Crab (GSC 3, 5 & 6A) for 2021/22

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1 Stocks being reviewed

Giant spider crab (GSC 3, 5 & 6A) – East Coast of the South Island, Chatham Rise, Southland and southern offshore islands

Jacquinotia edwardsii

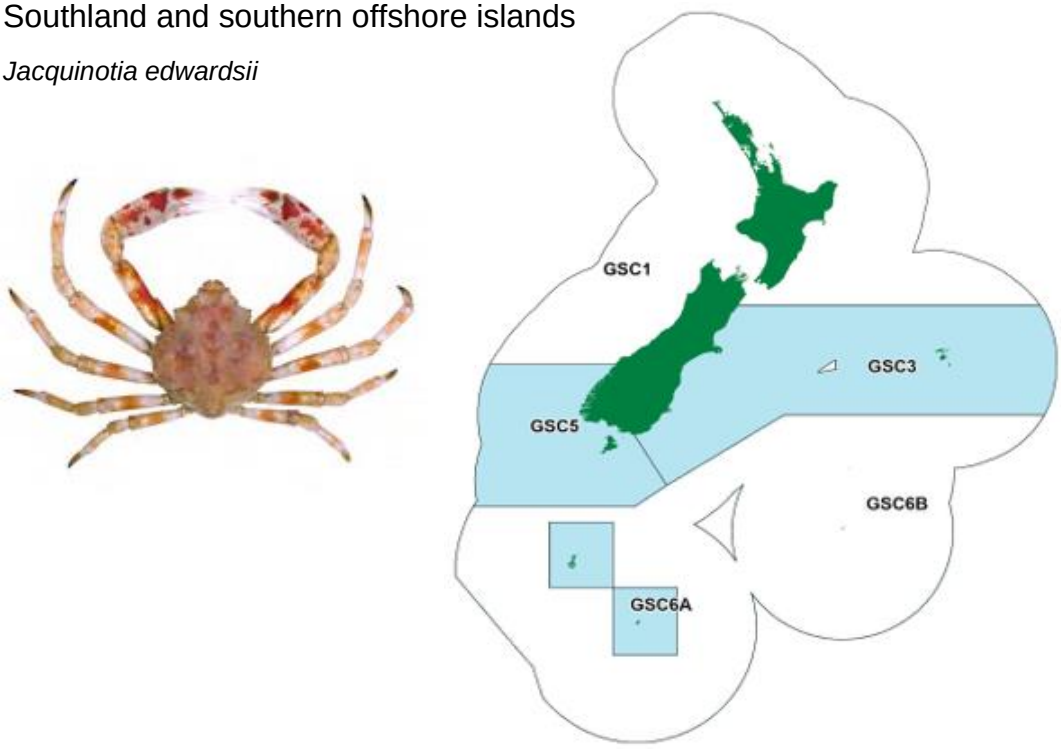

Figure 1: Quota Management Areas (QMAs) for giant spider crab with GSC 3, 5 & 6A highlighted.

2 Summary

1. Fisheries New Zealand is reviewing the sustainability measures for giant spider crab in Quota Management Areas (QMAs) GSC 3, 5 & 6A for the 1 April 2021 fishing year (Figure 1).
2. Giant spider crab in GSC 3, 5 & 6A are entirely taken as non-target catch (bycatch), mostly by large trawl vessels targeting squid. Since introduction to the Quota Management System (QMS) in 2004, catch rates of giant spider crab in the squid trawl fishery have increased.
3. As increased catch rates suggest an increase in abundance, Fisheries New Zealand is proposing to increase the Total Allowable Catch (TAC), Total Allowable Commercial Catch (TACC) and allowance for other sources of mortality caused by fishing of GSC 3, 5 & 6A.
4. A single option for change is proposed for each stock (Table 1). The proposed options would set the TAC of each stock slightly above current catch levels so as to provide for current catch and anticipated future catch given the trend of increasing catch rates.

Table 1: Summary of proposed catch settings for GSC 3, 5 & 6A from 1 April 2021. All figures in tonnes. Figures in parentheses indicate the change from current settings.

Stock	TAC	TACC	Allowances		
			Customary Māori	Recreational	All other mortality caused by fishing
GSC 3	21 ↑ (6 t)	19 ↑ (5 t)	0	0	2 ↑ (1 t)
GSC 5	96 ↑ (76 t)	86 ↑ (67 t)	0	0	10 ↑ (9 t)
GSC 6A	187 ↑ (22 t)	170 ↑ (22 t)	0	0	17

5. Fisheries New Zealand is seeking feedback and submissions on the proposed option for each stock.

3 About the stocks

6. From the intertidal to depths of over 500 m, giant spider crabs are found around the south & southeast coast of New Zealand and in sub-Antarctic waters. Giant spider crab is thought to be most abundant southeast of the Snares Islands, on the Pukaki Rise and around the Auckland Islands.

7. Giant spider crabs are known to exhibit mounding behaviour in which large number of crabs form clumps. This behaviour is particularly evident during spring and autumn and can result in large catches of giant spider crabs by trawl vessels.

8. There is little or no information available on age, growth and natural mortality of giant spider crabs and larval duration, survival, behaviour and settlement are poorly known.

4 Quota Management System

9. Giant spider crab was introduced to the QMS in 2004 and is managed under a fishing year running 1 April – 31 March. For management purposes, stock boundaries were set based on Fisheries Management Areas (FMAs) as there was no biological or fishery information which could be used to identify stock boundaries.

10. No estimates of biomass were available to inform the initial TAC settings of giant spider crab stocks. However, as minimal amounts of targeted fishing occurred prior to 2004, giant spider crabs were thought to be at or near virgin stock size upon introduction to the QMS.

11. In the absence of stock assessment information, the TACs for GSC 3, 5 & 6A were set based upon pre-2004 catch trends. However, pre-2004 catch information on giant spider crabs was uncertain due to historical under-reporting of giant spider crab catches and the substantial use of generic crab reporting codes.

12. The initial TACs of GSC 3 & 5 were intended to allow for both giant spider crabs taken as bycatch and modest amounts of exploratory target fishing. The TAC of GSC 6A was intended to account for unavoidable giant spider crab bycatch only and not additional catch for fishery development purposes.

13. The TACs of GSC 3, 5 & 6A have remained unchanged since 2004.

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

5 Legal basis for managing fisheries in New Zealand

15. 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/43030 for more information.

6 Treaty of Waitangi obligations

6.1 Input and participation of tangata whenua

16. Input and participation into the sustainability decision-making process is provided through Iwi Fisheries Forums, which have been established for that purpose. Iwi Fisheries Forums ideally 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[1]. Particular regard will be given to kaitiakitanga when making sustainability decisions.

17. Iwi Fisheries Forums may also be used as entities to consult iwi with an interest in fisheries.

[1] Not all Iwi Fisheries Forums have developed plans at this stage, though work in this area is ongoing.

18. In November 2020, a two-page document with information on the proposal to review the TACs of GSC 3, 5 & 6A was provided to Iwi Fisheries Forums, and input sought.

19. While no specific feedback was received relating to GSC 3, 5 or 6A prior to consultation, the Mid-North forum has stated they do not support increases to any TACCs in their rohe moana.

6.2 Kaitiakitanga

20. The GSC 3, 5 & 6A stocks overlap with the rohe moana of Te Waka a Māui Iwi Fisheries Forum and the Chatham Islands Fisheries Forum.

21. Although giant spider crab is not named specifically as a taonga species, all species are considered taonga in Te Waipounamu Iwi Forum Fisheries Plan. Fisheries New Zealand considers the proposals for GSC 3, 5 & 6A to align with the management objectives of Te Waipounamu Iwi Forum Fisheries Plan. The management objectives which are particularly relevant to the management options proposed for GSC 3, 5 & 6A are:

    - **Management Objective 3**: to develop environmentally responsible, productive, sustainable, and culturally appropriate commercial fisheries that create long-term commercial benefits and economic development opportunities for South Island iwi.
    - **Management Objective 5**: to restore, maintain and enhance the mauri and wairua of fisheries throughout the South Island.

22. Whilst the Chatham Island Fisheries Forum is currently in recess, Fisheries New Zealand considers the proposed options for GSC 3, 5 & 6A are consistent with the management objectives of the Chatham Islands Forum Fisheries Plan (CIFF@44°).

23. There are no customary fisheries management tools such as mātaitai, taiāpure or Section 186B temporary closures relevant to this review.

7 Relevant plans, strategies, and fish plans

7.1 National Deepwater Plan

24. Giant spider crab in GSC 3, 5 & 6A are managed as a Tier 2 species within the National Fisheries Plan for Deepwater and Middle-depth Fisheries 2019 – Part 1A (National Deepwater Plan). The National Deepwater Plan sets out a series of Management Objectives for deepwater fisheries, the most relevant to GSC 3, 5 & 6A being:

    - **Management Objective 1**: Ensure the deepwater and middle-depth fisheries resources are managed so as to provide for the needs of future generations.
    - **Management Objective 11**: Ensure New Zealand's deepwater and middle-depth fisheries are transparently managed.

25. The National Deepwater Plan has been formally approved under section 11A of the Act which means the Minster must take it into account when making sustainability decisions.

8 Recent catch levels and trends

8.1 Commercial catches

26. Although profitable deepwater crab fisheries exist elsewhere, targeted giant spider crab potting fisheries have not become established in New Zealand despite multiple attempts since the 1960s. In recent years, all giant spider crabs in GSC 3, 5 & 6A have been taken as non-target catch (bycatch), principally by large trawl vessels targeting squid.[2] When targeting squid, giant spider crabs occur in large quantities (up to 10 tonnes per fishing event).

[2] Between the 2004/05 and 2019/20 (April) fishing years, 95% of estimated giant spider crab catches in GSC 3, 5 & 6A were taken by >28 m trawl vessels targeting squid.

27. Although a potential high-value species, trawl vessels are not equipped to appropriately store, handle or process giant spider crabs. In addition, trawl caught giant spider crabs are often damaged. As large catches can disrupt factory processing, giant spider crabs form an unwanted portion of the catch. As such, fishers are incentivised to avoid catching giant spider crabs with the majority of crabs caught returned to the sea under the authorisation of an on-board observer. Such returns are required to be recorded and balanced with Annual Catch Entitlement (ACE).

28. Catches of giant spider crab in GSC 3, 5 & 6A have increased since introduction to the QMS, particularly in GSC 5 where catches regularly exceed the available ACE (information on catch against ACE can be found in the Fisheries Assessment Plenary). During this time, trawl effort targeting squid, whilst variable between years has decreased from 9,750 tows during 2004/05 to just over 5,000 tows during 2019/20.[3]

29. The location of giant spider crab catches mirrors that of squid trawl effort, with the majority of the catch taken along the Stewart Snares shelf or around the Auckland Islands. Almost all (96%) catches from GSC 3 are taken from tows conducted south of the Otago Peninsula (statistical areas 026 & 027), which is just north of the border between GSC 3 and GSC 5 (Figure 2). Given the spatial distribution of catches, it is likely that giant spider crabs caught off the Otago Coast and those caught further south along the Stewart Snares shelf (GSC 5) comprise the same biological stock.

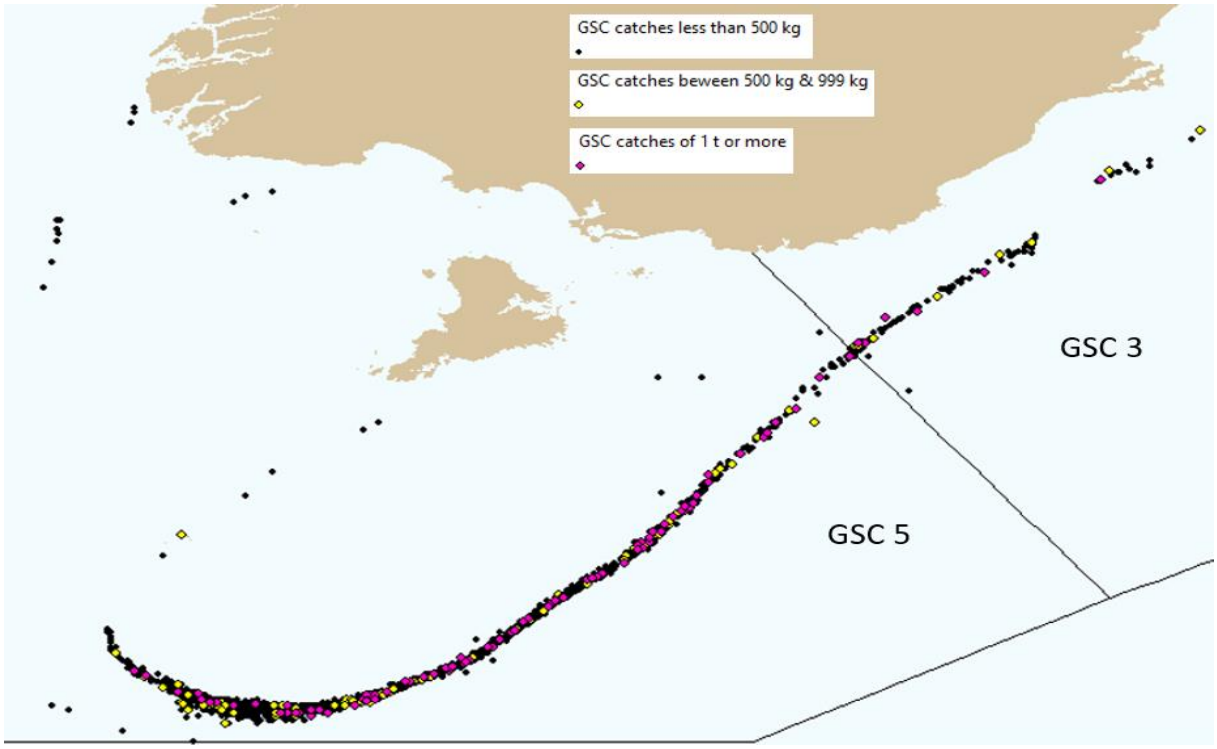

Figure 2: Start of fishing event position for all reported giant spider crab catches on the Stewart Snares shelf since introduction to the QMS in April 2004.

8.2 Non-commercial fisheries

30. There are no known records of recreational or customary catches of giant spider crab.

9 Current state of the stocks

31. In the absence of a species-specific harvest strategy, the default management target of 40% B_0 and associated reference points (as set out in the Harvest Strategy Standard) are applied to

[3] Incudes all squid target tows by trawl vessels greater than 28 m in length within FMAs 3,4, 5 & 6. Data split by October fishing year (1 October – 30 September).

giant spider crab stocks. However, giant spider crab stocks are low knowledge, and the status of giant spider crabs in relation to the default management target and associated reference points has never been known.

32. The best available information on the abundance of giant spider crabs in GSC 3, 5 and 6A comes from observed catch rates in the squid trawl fishery (in which the majority of the giant spider crab catch is taken). This fishery is highly observed with annual coverage rates averaging 26% between 2004/05 and 2011/12 and 88% between 2012/13 and 2019/20.

33. Modelled estimates using observer data from the squid trawl fishery show a statistically significant increase in the amount of giant spider crab taken as bycatch since introduction to the QMS (Figure 3).

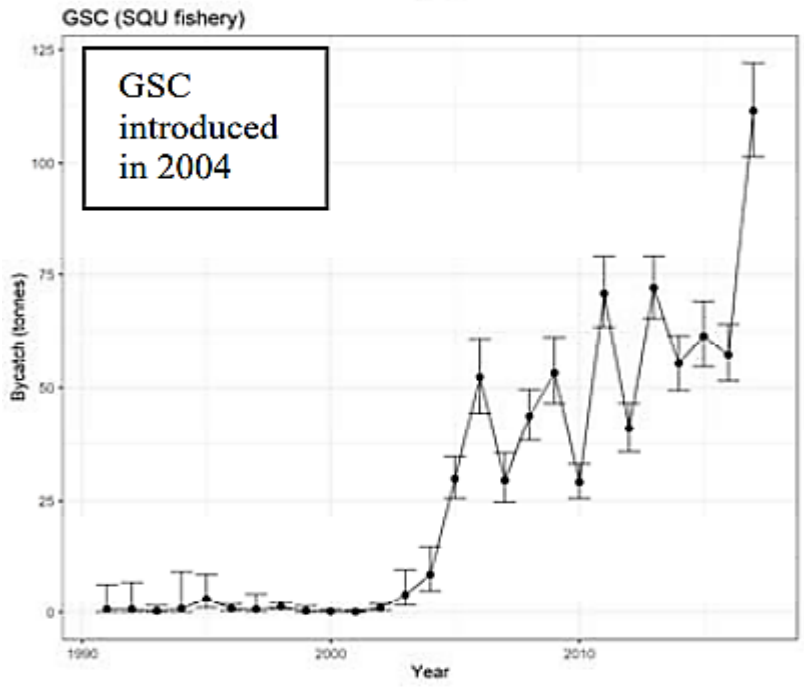

Figure 3: Modelled estimates of giant spider crab catches (all QMAs combined) from the squid trawl fishery between 1990/91 and 2016/17 (taken from Finucci et al, 2019).

34. Unstandardised catch per unit effort (CPUE) indices using observer derived information are strongly suggestive of an increase in giant spider crab catch rates in GSC 5 & 6A since introduction to the QMS (Figures 4 & 5). There have been no significant spatial or temporal changes in the squid trawl fishery during this time with almost all effort conducted by large vessels along the Stewart Snares shelf or around the Auckland Islands between the months of December and June.

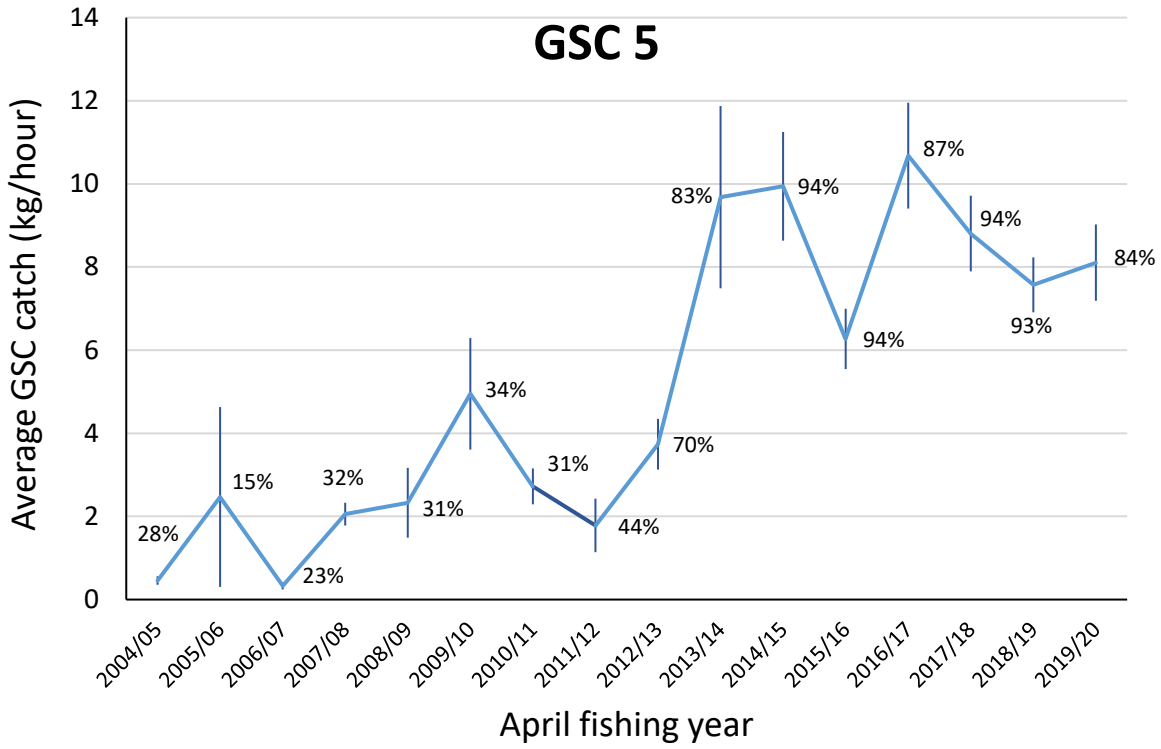

Figure 4: Observer reported giant spider crab catch (kg) per hour of towing for squid in target tows that started within QMA GSC 5. Data labels refer to percent observer coverage whilst error bars represent standard error.

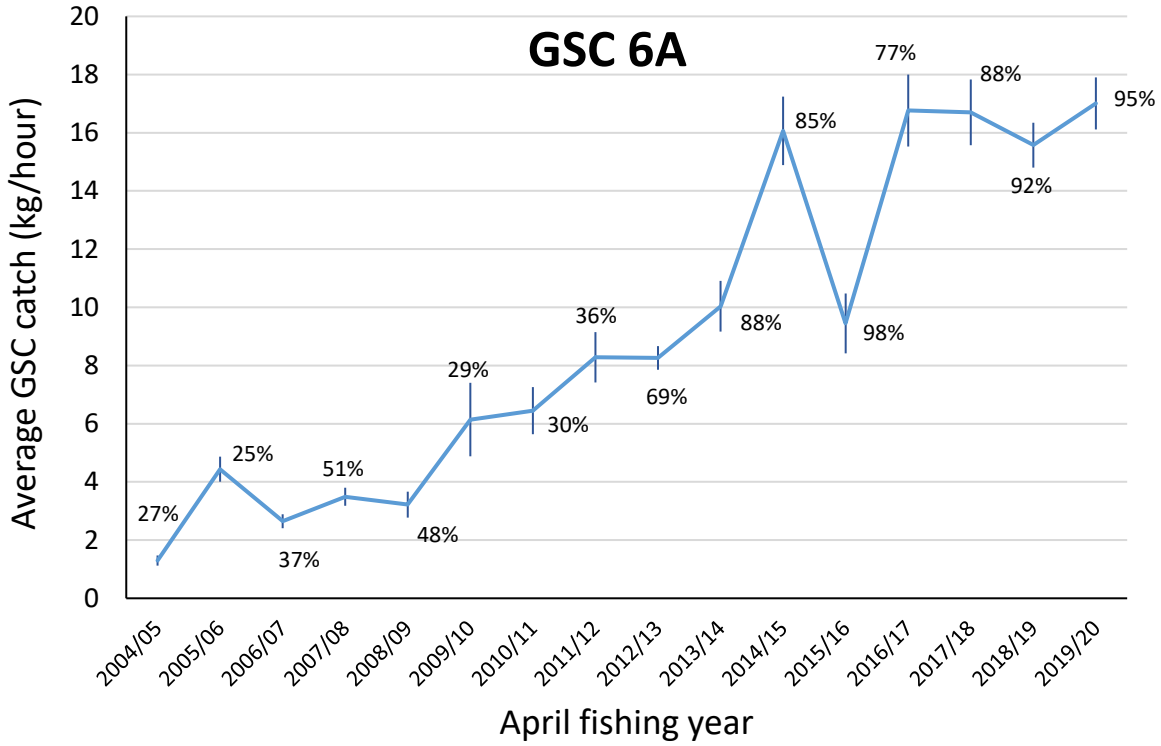

Figure 5: Observer reported giant spider crab catch (kg) per hour of towing for squid in target tows that started within QMA GSC 6A. Data labels refer to percent observer coverage whilst error bars represent standard error.

35. Information on giant spider crabs in GSC 3 is less certain due to lower amounts of squid trawl effort in those parts of statistical areas 026 & 027 which fall within GSC 3 and historically lower levels of observer coverage in this area.[4] However, data between 2013/14 and 2019/20 is suggestive of an increase in the catch rates of GSC 3 (Figure 6).

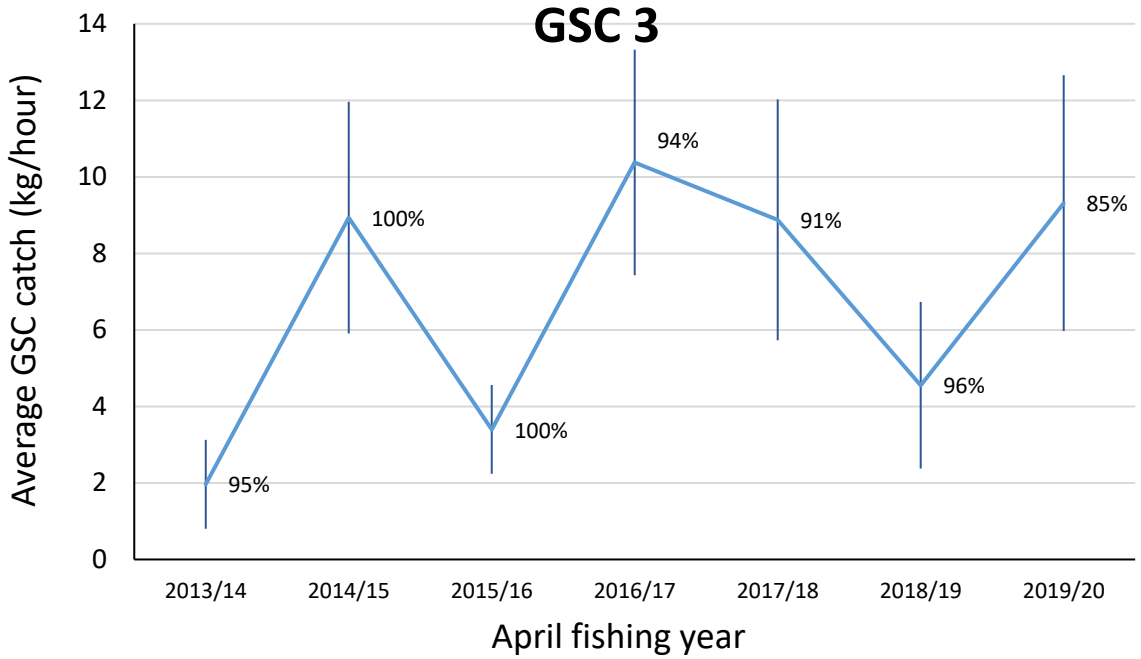

Figure 6: Observer reported giant spider crab catch (kg) per hour of towing for squid in target tows that started within those parts of statistical areas 026 & 027 within GSC 3. Data labels refer to percent observer coverage whilst error bars represent standard error.

10 Current and proposed TAC, TACC and allowance settings

36. A single option for change is proposed for the TAC, TACC and allowances of each stock (Table 2).

Table 2: Summary of current and proposed catch settings for GSC 3, 5 & 6A from 1 April 2021. All figures in tonnes. Figures in parentheses indicate the change from current settings.

Stock	Option	TAC	TACC	Allowances		
				Customary Māori	Recreational	All other mortality caused by fishing
GSC 3	**Option 1** *(Status quo)*	15	14	0	0	1
	Option 2	21 ↑ (6 t)	19 ↑ (5 t)	0	0	2 ↑ (1 t)
GSC 5	**Option 1** *(Status quo)*	20	19	0	0	1
	Option 2	96 ↑ (76 t)	86 ↑ (67 t)	0	0	10 ↑ (9 t)
GSC 6A	**Option 1** *(Status quo)*	165	148	0	0	17
	Option 2	187 ↑ (22 t)	170 ↑ (22 t)	0	0	17

37. Fisheries New Zealand invites views on these proposed options.

10.1 GSC 3

38. Although variable between years, the catch rates of GSC 3 in the squid trawl fishery have increased over recent years. As this represents the best available information on the abundance of giant spider crab in GSC 3, Fisheries New Zealand considers there is an opportunity to increase the TAC of this stock.

39. Option 2 would increase the TAC of GSC 3 by six tonnes so that it is set at 21 tonnes. Given the increase in observed catch rate over recent years, Fisheries New Zealand considers that the

[4] Observer coverage of squid target tows starting within those parts of statistical areas 026 & 027 that are within the GSC 3 QMA, averaged 12% per annum between the 2004/05 and 2012/13 (April) fishing years.

proposed six tonne increase is not inconsistent with the objective of maintaining the stock at or above, or moving the stock towards or above, a level that can produce the maximum sustainable yield.

40. Within the TAC, the TACC of GSC 3 would be increased by five tonnes so that it is set at 19 tonnes. This is above current or historical catches of GSC 3. The proposed change would result in increasing the availability of ACE with which commercial fishers could balance against increased giant spider crab bycatch, should the trend of increasing catch rates continue.

41. As there is no information suggesting any customary or recreational harvest of giant spider crab in GSC 3, no changes are proposed to the customary Māori or recreational allowance of GSC 3. However, information is sought from tangata whenua and stakeholders regarding any customary or recreational take of giant spider crab in GSC 3 so as to inform final advice to the Minister.

42. An increase of one tonne is proposed to the allowance for all other mortality to the stock caused by fishing. This allowance accounts for unreported giant spider crab mortality (such as due to trawl damage) and would set the allowance for all other mortality to the stock caused by fishing at an amount that equals approximately 10% of the TACC. This is consistent with the approach taken for GSC 6A, the QMA with the highest levels of giant spider crab bycatch

43. As all giant spider crab in GSC 3 are taken as bycatch, Fisheries New Zealand does not expect catches of giant spider crab to increase above existing levels as a consequence of the proposed option. Therefore, Fisheries New Zealand considers it unlikely that the proposed option will impact upon the sustainability of the GSC 3 stock.

10.2 GSC 5

44. The three-year average GSC 5 catch prior to introduction to the QMS was 15 tonnes, with the most recent three-year average (17/18 – 19/20) being 81 tonnes. During this time, catch rates of giant spider crab in GSC 5 in the squid trawl fishery have increased considerably. As this represents the best available information on the abundance of giant spider crab in GSC 5, Fisheries New Zealand considers there is an opportunity to increase the TAC of this stock.

45. Option 2 would increase the TAC of GSC 5 by 76 tonnes so that it is set at 96 tonnes. Given the considerable increase in both catch and catch rate since introduction to the QMS, Fisheries New Zealand considers that the proposed increase is not inconsistent with the objective of maintaining the stock at or above, or moving the stock towards or above, a level that can produce the maximum sustainable yield.

46. Within the TAC, the TACC of GSC 5 would be increased by 67 tonnes so that it is set at 86 tonnes. The proposed increase uses the same approach as that taken upon introduction to the QMS (catch averaged over three years) with an additional five tonnes added to account for a continuation of the increasing trend in catch rates. The proposed change would also result in increasing the availability of ACE with which commercial fishers could balance against catch.

47. As there is no information suggesting any customary or recreational harvest of giant spider crab in GSC 5, no changes are proposed to the customary Māori or recreational allowance of GSC 5. However, information is sought from tangata whenua and stakeholders regarding any customary or recreational take of giant spider crab in GSC 5 so as to inform final advice to the Minister.

48. An increase of nine tonnes is proposed to the allowance for all other mortality to the stock caused by fishing. This allowance accounts for unreported giant spider crab mortality (such as due to trawl damage) and would set the allowance for all other mortality to the stock caused by fishing at an amount that equals approximately 10% of the TACC. This is consistent with the approach taken for GSC 6A, the QMA with the highest levels of giant spider crab bycatch.

49. As all giant spider crab in GSC 5 are taken as bycatch, Fisheries New Zealand does not expect catches of giant spider crab to increase above existing levels as a consequence of the proposed option. Therefore, Fisheries New Zealand considers it unlikely that the proposed option will impact upon the sustainability of the GSC 5 stock.

10.3 GSC 6A

50. Since introduction to the QMS, both catches and catch rates of GSC 6A in the squid trawl fishery have increased considerably. As this represents the best available information on the abundance of giant spider crab in GSC 6A, Fisheries New Zealand considers there is an opportunity to increase the TAC of this stock.

51. Option 2 would increase the TAC of GSC 6A by 22 tonnes so that it is set at 187 tonnes. Given the considerable increase in observed catch rate over recent years, Fisheries New Zealand considers that the proposed 22 tonne increase is not inconsistent with the objective of maintaining the stock at or above, or moving the stock towards or above, a level that can produce the maximum sustainable yield.

52. Within the TAC, the TACC of GSC 6A would be increased by 22 tonnes so that it is set at 170 tonnes. This is above current or historical catches of GSC 6A. The proposed change would result in increasing the availability of ACE with which commercial fishers could balance against increased giant spider crab bycatch, should the trend of increasing catch rates continue.

53. As there is no information suggesting any customary or recreational harvest of giant spider crab in GSC 6A, no changes are proposed to the customary Māori or recreational allowance of GSC 6A. However, information is sought from tangata whenua and stakeholders regarding any customary or recreational take of giant spider crab in GSC 6A so as to inform final advice to the Minister.

54. As the current 17 tonne allowance for all other mortality to GSC 6A caused by fishing equates to 10% of the proposed TACC, no changes to this allowance are proposed at this time.

55. As all giant spider crab in GSC 6A are taken as bycatch, Fisheries New Zealand does not expect catches of giant spider crab to increase above existing levels as a consequence of the proposed option. Therefore, Fisheries New Zealand considers it unlikely that the proposed option will impact upon the sustainability of the GSC 6A stock.

11 Uncertainties and risks

56. The biology of giant spider crabs is little known and the actual biomass that can support the maximum sustainable yield, and the current status of the stocks in relation to this target, is unknown. Given this uncertainty, and the propensity of deepwater crab fisheries elsewhere to show rapid declines in abundance, a cautious approach to the management of giant spider crab stocks is warranted.

57. As the sustainability status of giant spider crab in GSC 3, 5 & 6A is not known, it is possible that current catch levels could result in a biomass decline over the long term. However, the risk of this is considered low given that catch rates have continued to increase alongside total catch. As such, Fisheries New Zealand considers it unlikely that the proposed options will result in a sustainability risk to the stocks.

58. The proposed options are not expected to result in the initiation of a giant spider crab target fishery, with Fisheries New Zealand anticipating that all giant spider crabs in GSC 3, 5 & 6A will continue to be taken as bycatch. Therefore, as catches of giant spider crab are not expected to increase as a consequence of this review, Fisheries New Zealand considers the proposed options represent a cautious approach to the management of giant spider crab stocks.

59. In addition, the catch-per-unit-effort analysis information underpinning this proposal has not been standardised or been through the Deepwater Working Group process. As such, it is possible that changes in areas fished or trawl gear used may be driving the increase in giant spider crab catch rates rather than changes in abundance. However, given the magnitude of the change in GSC 5 & 6A, the use of observer derived data , the high observer coverage rates and the relative consistency of the deepwater trawl fleet since 2012/13, Fisheries New Zealand is confident that the change in catch rates is at least partly explained by changes in giant spider crab abundance.

60. Likewise, due to the uncertainty in pre-QMS catches of giant spider crabs, it is possible that higher catches since 2004 reflect more accurate reporting by fishers rather than an actual increase in catches. However, this uncertainty is mitigated by the use of independent fisheries observer data which shows an increase in giant spider crab catch rates over the same period.

61. Under the Act there is a requirement to act on the best available information and not postpone or fail to take any measure due to the absence of, or uncertainty in, information. The best available information at this time suggests that the abundance of giant spider crab in GSC 3, 5 & 6A has increased since the stocks were introduced to the QMS. As such, Fisheries New Zealand considers it appropriate to increase the TACs to reflect this change.

62. Fisheries New Zealand will continue to monitor the state of giant spider crab stocks through total catch and observed catch rates from the squid trawl fishery. Further reviews of the TAC will be considered if supported by this information and additional management measures may be considered should a target fishery develop.

12 Environmental interactions

63. Fisheries New Zealand considers it highly unlikely that the options proposed in this paper will result in the initiation of a target fishery for giant spider crab. Likewise, the amount of trawl effort targeting squid or other deepwater species is not expected to increase as a consequence of the proposed options.

64. Therefore, the impact of the proposed options on associated or dependent species, the biological diversity of the aquatic environment and habitats of particular significance for fisheries management are considered negligible.

13 Deemed values

65. Deemed values are the price paid by fishers for each kilogram of unprocessed fish landed in excess of a fisher's 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. The Deemed Value Guidelines set out the operational policy Fisheries New Zealand uses to inform the development of advice to the Minister on the setting of deemed values.

66. The deemed value rates of GSC 3, 5 & 6A are shown in Table 3. The deemed value rates of GSC 3, 5 & 6A are unchanged since 2015.

Table 3: Current deemed value rates ($/kg) for GSC 3, 5 & 6A.

Stock	Interim	Annual 100-120%	Differential rates ($/kg) for excess catch (% of ACE)				
			120-140%	140-160%	160-180%	180-200%	>200%
GSC 3, 5 & 6A	0.09	0.10	0.12	0.14	0.16	0.18	0.20

67. The average price paid by fishers during the 2019/20 (April) fishing year for one kilogram of GSC 3, 5 & 6A ACE was $0.09, $0.10 and $0.10 respectively. The 2019/20 port price index of GSC 3, 5 & 6A was $0.20/kg. The port price of GSC 3, 5 & 6A has remained unchanged since 2014/15.

68. As the current deemed value rates of GSC 3, 5 & 6A are set at, or slightly above the average ACE price, no changes are proposed to the deemed value rates of GSC 3, 5 or 6A at this time.

14 Questions for submitters on options for varying TACs, TACCs and allowances

- Do you support the proposed options for varying the TAC? Why?
- If you do not support the proposed options, what alternative(s) should be considered? Why?
- Are the allowances for customary fishing appropriate? Why?
- Are the allowances for other sources of mortality to the stock caused by fishing appropriate? Why?

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

15 How to get more information and have your say

70. Fisheries New Zealand invites you to make a submission on the proposals set out in this discussion document. Consultation closes at 5pm on 5 February 2021.

71. Please see the Fisheries New Zealand sustainability consultation webpage (https://www.mpi.govt.nz/consultations/review-of-sustainability-measures-2021-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.

16 Referenced reports

Finucci, B; Edwards, C; Anderson, O & Ballara, S. (2019). Fish and invertebrate bycatch in New Zealand deepwater fisheries from 1990–91 until 2016–17. New Zealand Aquatic Environment and Biodiversity Report No. 210. 81 p. Accessible at: https://fs.fish.govt.nz/Doc/24680/AEBR-2019-210-Bycatch-in-deepwater-fisheries.pdf.ashx

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