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Sustainability Review 2018
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Joint recreational submission on the review of rock lobster sustainability measures for 1 April 2018

Contents

Note: This v_2 submission (10 February 2018) includes minor grammatical corrections and some clarifications not included in the original submission sent to MPI on 9 February 2018.

A. Overview

1. The New Zealand Sport Fishing Council, our public outreach team LegaSea, the New Zealand Angling and Casting Association (NZACA), and other non-commercial representative groups (the submitters) appreciate the opportunity to submit feedback on the Discussion Document No: 2018/02 Review Sustainability Measures for Rock Lobster (CRA 2, 4, 7 & 8) for 2018/19. The Ministry for Primary Industries (MPI) released their proposals on 12 January 2018, with submissions due by 9 February 2018.

2. The submitters object to the Ministry's tight consultation timetable giving only 18 working days to respond to the complex sustainability measures for selected crayfish stocks. It is unreasonable to expect non-commercial entities to respond with adequate information to inform the Minister's decision, as required by ss 12 and 13 of the Fisheries Act 1996 (the Act).

3. The submitters have been highly critical of aspects of rock lobster management and advice given to Ministers in previous submissions. In frustration that we have been largely ignored, the submitters has gone direct to the public with some of our concerns to gather their views.

4. The reliability of commercial Catch Per Unit of Effort (CPUE) as an index of abundance is a major concern as there have been significant changes in fishing gear, technology and market demands since 1980, but there has been no consistent way that these changes are recorded or taken into account. The assumption that a potlift in 1980 is equivalent to a potlift in 2017 has had a major impact on the stock assessment models and the Management Procedures that underpin management advice.

5. The disconnect between the science and management advice and what most fishers are experiencing on the water has been evident for some time now. Commercial fishers have shelved part of their annual catch or opted for more conservative Total Allowable Catches (TACs) in CRA 4, CRA 7 and CRA 8. Clearly the 2014 CRA 2 Management Procedure has failed to maintain or increase abundance, even with significant voluntary shelving by commercial fishers over the last three years. The latest CRA 2 stock assessment and review was bought forward a year because of widespread concern about the continued decline in this fishery.

6. NZSFC have engaged more fully in this review including the working group meetings, the stakeholder meetings and some of the National Rock Lobster Management Group meetings over the last year. While some improvements have been made, the process of developing management advice needs improving. Stakeholders are passionate about representing the interests of their sector, but more independent input is needed. The work of the National Rock Lobster Management Group lacks adequate reporting and transparency.

7. Representatives for the submitters are available to discuss this submission in more detail if required. We look forward to positive outcomes from this review and would like to be kept informed of future developments. Our contact is Helen Pastor, secretary@nzsportfishing.org.nz.

B. Options supported

8. CRA 2 – Closure is an option available to the Minister and must be considered given the low state of the stock. The hard limit has been breached in relation to the reference biomass (Bref) and recent recruitment is at an all-time low adding considerable uncertainty around the rebuild rates. There was significant public support for closure in our online survey. The only other option available to the Minister is to select option 4, with a 191.5t TAC, which is potentially a significant catch against a Vulnerable Biomass estimated at 203 t in 2017. The submitters have

their doubts about the effectiveness of this option but recognise that the Minister must weigh the economic, social, and cultural costs of his decision. The choice is left to the Minister. On the basis that there will be a significant reduction in the TAC to allow CRA 2 stock to be rebuilt as soon as possible, the submitters support a 50 t allowance for recreational fishers. This coincides with the upper bound of the most defensible recreational harvest survey estimate.

9. CRA 4 – The submitters oppose the increase in TACC and support the status quo. There is doubt about the validity of the CRA 4 Management Procedure and the submitters urge the Minister to take a precautionary approach.

10. CRA 7 – The submitters support the 15.5 t decrease in TACC.

11. CRA 8 – The submitters oppose the 108.7 t increase in TACC and support the status quo.

C. Executive Summary

12. The submitters are committed to ensuring that sustainability measures and management decisions are made to achieve the purpose and principles of the Act. A precautionary approach needs to be taken in CRA 2 which is highly valued by customary, commercial and recreational fishers. An urgent rebuild of the CRA 2 stock is required to maintain its potential to meet the reasonably foreseeable needs of future generations.

13. Rock lobster play a vital role in maintaining a healthy balanced inshore ecosystem and the Minister has a statutory duty to avoid, remedy or mitigate any adverse effects of fishing on the aquatic environment.

14. The Minister ought to be concerned that the submitters and others nationwide are becoming disillusioned with the ongoing mismanagement and subsequent depletion of our taonga [treasure], our crayfish. There are major concerns about the failure of the 2014 CRA 2 Management Procedure, which is based on a Catch Per Unit Effort (CPUE) index that is not a reliable index of abundance, and the advice from the National Rock Lobster Management Group at the time. The result of these failures mean that the opportunity to start to rebuild CRA 2 in 2014 was missed and we are all suffering the consequences of depletion now.

15. The 2017 CRA 2 stock assessment is based on more plausible CPUE and shows a significant decline in stock biomass over the last 37 years to a new historic low -

    a. 2016 Spawning Stock Biomass (SSB) was 328 tonnes, just 18% of unfished levels and below the soft limit.

    b. 2017 Vulnerable Stock Biomass was 21% of the reference biomass, below the hard limit of 25% of the reference biomass.

    c. 2017 Vulnerable Stock Biomass was 203 tonnes, just 5% of unfished levels.

16. The CRA 2 stock has consistently been over-exploited since before reliable catch reporting was established and has reach a point where it has no resilience to cope with the current period of poor recruitment.

17. The Harvest Strategy Standard outlines the Ministry's approach to relevant sections of the Fisheries Act 1996 and, as such, must form a core input to the Ministry's advice to the Minister of Fisheries. The current low biomass level in CRA 2 means a time constrained rebuild plan is required, and the probability of rebuild should be increased where multiple sectors have significant interests in the fishery.

18. The submitters have committed substantial resources into developing and distributing an online survey to gauge public support for various CRA 2 management options available to the Minister. The 3,594 responses to the survey show strong support for a precautionary approach including closure to all commercial and recreational fishing, followed by support for Option 4 with a 191.5 t TAC, which may rebuild the stock to double the low current biomass in 4 years.

19. There is some resistance to the proposed large cut to the recreational allowance in CRA 2, from 140 t to 50 t, but at this time a 50 t allowance based on the upper-bound of the most defensible recreational harvest survey estimate is reasonable.

D. Rock Lobster Management

NRLMG advice

20. In 1992 the National Rock Lobster Management Group (NRLMG) was established as a statutory body to provide advice to the Minister on managing the rock lobster fisheries. It is advertised as a multi-stakeholder group comprising representatives of customary, recreational and commercial fishing interests, and the Ministry for Primary Industries (MPI).

21. In 2001 it was agreed by the Minister and the NRLMG that the group would "*provide well informed, credible, and consistent research and management information and advice to sector groups, Government agencies, and Ministers*[1]". The Minister must hold the NRLMG accountable to all stakeholders for achieving this unfulfilled commitment.

22. In our view it is time for the Minister to review the NRLMG membership and process. A number of members have been there a long time and developed entrenched positions. It is not clear to us who the recreational participants are representing as there is no transparency or engagement with the fishing public.

CPUE as a proxy for abundance

23. The often-stated assumption that commercial Catch Per Unit Effort (CPUE) is a reliable index of abundance needs to be tested. Until now there has been no allowance for changes in fishing operations, discard rates and market demands, and there is no consistent way of recording these types of changes. This year is the first time that improvements in fishing efficiency have been factored into the CPUE used in a rock lobster stock assessment model and the outcome is dramatic. The science is now a closer reflection of what people are experiencing on the water – depletion in CRA 2.

24. The use of holding pots also complicates the recording of retained catch, which has to be estimated by the fisher each day. At the peak of the season some fishers work a lot of pots or work further afield. Is the fishing effort of a pot lifted every day the same as a pot lifted every 2 days?

25. The rock lobster population is fished at different rates across its range. Areas close to home are often the first to be depleted. As catch rates diminish pots are moved to grounds holding a less heavily fished population, where abundance is greater. When that area is exhausted another move is made, allowing stocks to be serially depleted without any apparent decline in CPUE to highlight changes in stock size.

[1] NRLMG 2003 Annual Report.

Application of Management Procedures

26. Management Procedures (MPs) are a mechanism used to guide catch limit decisions in most rock lobster fisheries. The Management Procedures, which the National Rock Lobster Management Group have staunchly defended and relied on, seem to be unravelling.

27. Setting and altering the Total Allowable Commercial Catches based on self-reported catch by individual commercial fishers, including legal crayfish returned to the sea requires a good deal of faith that the data will not be biased in some way.

28. We have raised concerns about problems associated with CPUE-based Management Procedures in previous submissions and these latest proposals just reinforce our concerns regarding the continued application of this strategy.

MLS and size concessions

29. Concessions enabling commercial fishers to take rock lobster below the Minimum Legal Size (MLS), at 52mm and 53mm, apply in CRA 3 (Gisborne), CRA 7 (Otago) and CRA 8 (Southland). Tracking changes in the age/size composition of commercial harvest is essential if the effects of a concession are to be understood.

30. Since 2013 we have requested the following information. In five years we have not received any response. This is ridiculous, we are not dealing in state secrets. The Minister must be made aware that public demand for this data will increase as long as this information is withheld. We again request the following –

    a. What percentage of fish below the national MLS are landed, per stock?
    b. Where and when fish below the national MLS are being harvested, per stock?
    c. What proportion of legal rock lobster catch is returned to the sea?
    d. What is the trend in high grading over time in each rock lobster fishery?

31. We submit it must be made mandatory for fish processors to record the number and weight of crayfish of concession size.

32. Management without this supporting information means there is no ability to cross-check the changes observed in CPUE. Validation of such important information enables transparent and credible management. It is submitted that is not a reasonable approach to consult with fishers if the Discussion Paper is based on information that has been withheld without any adequate response by MPI or other reasonable excuse.

33. In a fishery of such high social, economic and cultural value it is important for the Minister to insist he receives full and balanced advice, and MPI must provide the Minister with the best information – not just an all-powerful point estimate of standardised average CPUE.

E. Rock Lobster Proposals

Crayfish 2 (CRA 2) Te Arai Point to East Cape

Recommendation

34. CRA 2 - Closure is an option available to the Minister and must be considered given the low state of the stock. The hard limit has been breached in relation to the reference biomass (Bref) and recent recruitment is at an all-time low, adding considerable uncertainty around the rebuild rates. There was significant public support for closure in our online survey. The only other option available to the Minister is to select option 4, with a 191.5t TAC, which is potentially a significant catch against a Vulnerable Biomass estimated at 203 t in 2017. The submitters have their doubts about the effectiveness of this option but recognise that the Minister must weigh the economic, social, and cultural costs of his decision. The choice is left to the Minister. On the basis that there will be a significant reduction in the TAC to allow CRA 2 stock to be rebuilt as soon as possible, the submitters support a 50 t allowance for recreational fishers. This coincides with the upper bound of the most defensible recreational harvest survey estimate.

Background

35. The discussion paper, while acknowledging a consistent decline in stock abundance, takes a very short timeframe and does not fully identify the extent of the depletion that has occurred over time.

36. The CRA 2 area encompasses extensive areas of rocky coastline and reef around the islands of the Hauraki Gulf, Coromandel Peninsula and the Eastern Bay of Plenty out to East Cape. In the past rock lobster were abundant and played a significant role in coastal ecosystems. Large catches were taken out of some ports in the 1920s for canning and export to Europe. Widespread commercial cray fishing has occurred since 1945.

37. Crayfish became a quota species in 1990. The Total Allowable Commercial Catch (TACC) in CRA 2 was set at 250 tonnes (t) and reduced soon after. It increased to 236 t in 1997 when catch rates were improving and was not reviewed for the next 17 years.

38. The stock assessment conducted in 2013 estimated a reasonably stable fishery with no sustainability issues, it was however below the chosen reference level -

    a. 2012 Spawning Stock Biomass (SSB) was at 37% of unfished levels

    b. 2012 biomass was 79% of the chosen reference period, 1979-81.

39. The 2014 NZSFC submission stated that the stock assessment estimates of biomass in CRA 2 were simply not credible to anyone with experience in this fishery. The number of potlifts was well over 500,000 per year and still the TACC was not caught every year. This outcome is not good for commercial fishers and it is placing increasing pressure on an already depleted fishery. This level of effort and harvest also reduces ecosystem productivity and the availability of crayfish to recreational and customary fishers.

40. In addition, the 2014 NZSFC submission highlighted major concerns about the reliability of commercial Catch Per Unit of Effort (CPUE) as an index of abundance used in the stock assessment as there have been significant changes in fishing gear, technology and market demands since 1980, but there has been no consistent way that these changes are recorded or taken into account.

41. Commercial fishers who worked through the 1970s, 80s and 90s tell us of expansion, using better boats, mechanical haulers and better pots, enabling the exploitation of new grounds. The major fishing strategy back then was breaking in new territory. Now there are no new grounds to exploit and existing grounds are being heavily harvested to depletion levels.

42. When the Quota Management System fails to sustainably manage fish stocks the support for more marine protected areas or fisheries closures gets louder. In preference, the submitters support fisheries management that is transparent, precautionary, and provides for the interests of all New Zealanders.

43. An opportunity was lost in 2014 to take decisive action in CRA 2 and start the rebuild of rock lobster in this area. As a consequence, any rebuild of this stock will be starting from a lower baseline, so decisive action is required. Now is the time for an aggressive intervention that provides a lasting solution to restore abundance and diversity in the CRA 2 marine environment.

44. The submitters have committed substantial resources into developing and distributing an online survey to gauge public for various management options available to the Minister. Many of the respondents support regulation changes that will ensure that recreational fishers also contribute to the rebuild.

45. However, the implications around future regulation changes ought to have been signalled and identified for consultation in the current Discussion Paper. Doing this would be consistent with good practice consultation and ensure that the Minister is properly informed of the implications of his decision-making, with the likely implications to the daily bag limits for individual fishers being identified at the time of decision-making in relation to the TAC, TACC and non-commercial allowances.

Stock assessment 2017

46. Rock lobster stock assessments are complex and squeezed into a 6-week period. In 2017 the Rock Lobster Working Group met five times. A new base stock assessment model has been developed, and changes were made to the way CPUE is standardised. Data from an old reporting system were split from the Quota Management System reporting system, and the turnover in vessels helped to account for changes in potting efficiency over time.

47. **The new model shows a significant decline in stock biomass over the last 37 years to a new historic low.** The spawning stock biomass is now below the soft limit, which means that management action is required to rebuild the stock within a specified time (Figure 1) -

    a. 2016 Spawning Stock Biomass (SSB) was 328 tonnes, just 18% of unfished levels.

    b. 2017 Vulnerable Stock Biomass was 21% of the chosen reference period, 1979-81.

    c. 2017 Vulnerable Stock Biomass was 203 tonnes, just 5% of unfished levels.

48. The Total Allowable Catch for the last four years has been 416.5 tonnes per year. This was the level determined by the approved Management Procedure that would move the stock toward the management target.

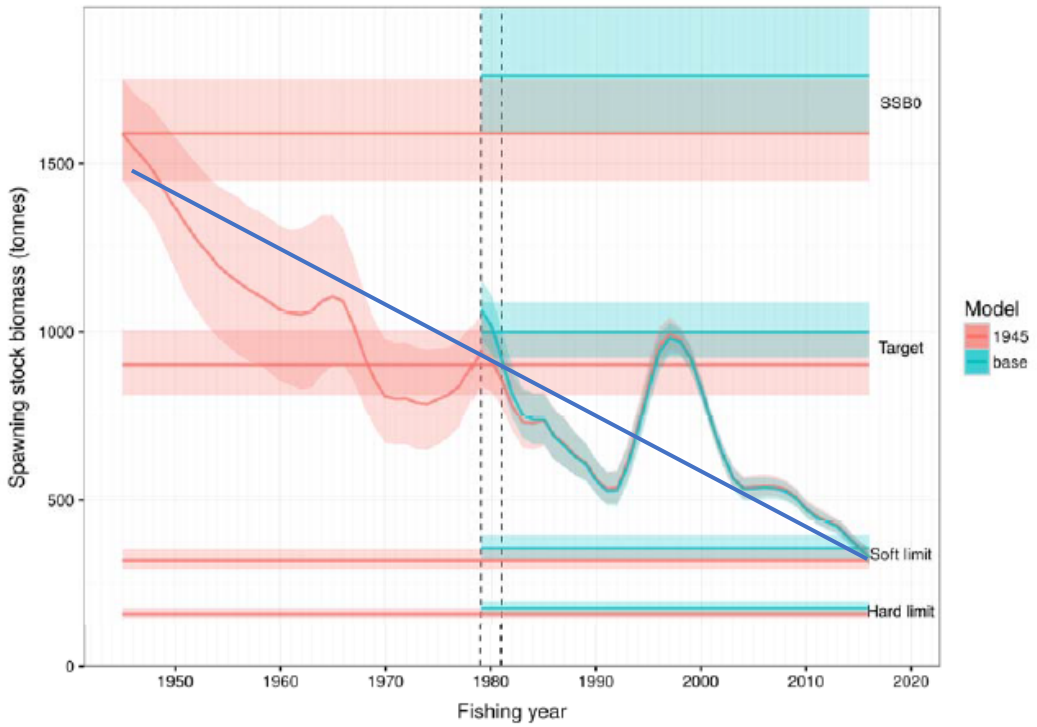


Figure 1: Results of the 2017 stock assessment showing Spawning Stock Biomass by fishing year for two CRA 2 model runs. One that starts in 1945, using highly uncertain catch history (Pink), and the base case from 1979-80 (Green) which estimates the initial unfished Spawning Stock Biomass (SSB0) using average recruitment. The overall trend since the 1940s has been consistent despite a few years of increased CPUE in the 1990s (blue line).

49. The submitters are concerned that fishing mortality in CRA 2 is exceptionally high. This is the proportion of the biomass that is harvested. Information presented at the November Plenary Meeting shows a consistent increase in fishing intensity since 1980, with a peak in 2014 at over 80% during the spring and summer period when all legal size males and females can be harvested.

50. Another indicator of high fishing mortality is the small average size of rock lobster (about 58 mm tail width) which means 50% of the catch is consists of males from 54 mm to 58 mm. There is little chance of recovery when rock lobster are fished so hard as soon as they reach legal size.

51. We do not believe the claims by some commercial interests that rock lobster in CRA 2 have always been less productive that stocks in other areas. These claims are based on historic reported catch. That reporting was never a true record of actual catch. Firstly, fishers in the 1960s were able to make a living hand hauling pots from small boats without travelling far because the fishery was abundant and accessible. There was a full range of sizes caught and catch rates were high. Catch reporting was infrequent, monitoring was poor, and cray were sold for cash.

52. In the period 1974 to 1980 discrepancies were discovered between national reported catch totals and total exported weight. These ranged from about 460 t in 1974 to 1159 t in 1978. The size of the discrepancy used in the stock assessment model for CRA 2 is an additional 17% of illegal catch on top of reported catch. No estimate is made of the unreported catch that ended up in the domestic market. In 1979 stricter reporting requirements were introduced, but by then the number of reported potlifts were over 600,000 per year.

53. It seems obvious to the submitters that the CRA 2 stock has consistently been over-exploited since before reliable catch reporting was established and this is the reason for low yields since the 1980s, not inherent low productivity.

54. The submitters are concerned that the CRA 2 stock has now reached a level where it has no resilience to cope with the current period of poor recruitment or an unpredictable natural event.

Crayfish 2 management proposals

55. The MPI Discussion Document proposes four options for the future management of CRA 2. The status quo and closure of the fishery are added for comparison. The Final Advice Paper needs to present the Minister with all six options identified in the table below.

Table 1: The Total Allowable Commercial Catch and allowances for the current fishing year (Status quo) and the four MPI proposed options in tonnes. Also, the estimated time to reach an intermediate target of double the current stock size for each option. The time taken to reach a target in the absence of fishing (Closure) is an important bench mark for rebuild times.

Option	Total Allowable Commercial Catch (TACC)	Allowances			Estimated time to double current stock size
		Customary Maori	Recreational	Other mortality	
Status quo	**200**	**16.5**	**140**	**65**	**N/A**
Option 1	140	16.5	50	45	**9 years**
Option 2	120				**7 years**
Option 3	100				**5 years**
Option 4	80				**4 years**
Closure	**0**	**0**	**0**	**0**	**2 years**

56. There are a number of uncertainties about how low the CRA 2 stock is and how long it will take to reach the intermediate target and final rebuild target. These are described in Appendix 1.

57. There is no doubt the Minister has an important decision to make. As part of this decision-making process he must weigh up:

    a. The risks to the stock.

    b. The importance of rock lobster in the ecosystem, including the effects of exploitation on associated species and the environment.

    c. The impacts of a sharp decline in catch to promote a rapid rebuild or a slow and very uncertain rebuild of CRA 2 on:

        i. Commercial fishing interests.

        ii. Recreational business interests, including dive shops, suppliers and charter vessel operations.

58. Fortunately, MPI has a Harvest Strategy Standard policy signed off by the Government in 2008 for exactly this situation.

Harvest Strategy Standard

59. "The Harvest Strategy Standard outlines the Ministry's approach to relevant sections of the Fisheries Act 1996 ("the Act"), and, as such, will form a core input to the Ministry's advice to the Minister of Fisheries ("the Minister") on the management of fisheries, particularly the setting of TACs under sections 13 and 14."

60. Currently the CRA 2 stock is below a couple of important reference points used in the HSS (see below).

61. The Final Advice Paper to the Minister must include a time constrained rebuild plan that complies with the Ministry's policy on rebuilding stocks. The Minister must then give full consideration to that plan when making a decision for the future management of CRA 2.

62. The HSS states:

> "Stocks that have fallen below the soft limit should be rebuilt back to at least the target level in a time frame between T_{min} and 2 * T_{min} with an acceptable probability."

And:

> "T_{min} is the number of years required to rebuild a stock in the absence of fishing and is a function of three primary factors: the biology of the species, the extent of stock depletion below the target, and the prevailing environmental conditions."

63. The current **management target** for CRA 2 is a reference biomass (B_{ref}) of 965 tonnes.

64. T_{min} to reach the intermediate target in CRA 2 has been calculated to be 2 years. Therefore, any rebuild plan must aim to reach the intermediate target in 2-4 years. MPI's Option 4 is the only one to reach the intermediate target in 4 years (with 50% probability), assuming recruitment quickly returns to the 10-year average rate.

65. Also, it is the only option to reach the current **management target** (B_{ref}) in less than 20 years. With minimal increase in recreational catch, Option 4 will see biomass reach B_{ref} in 13 years which is about twice the minimum time.

66. The HSS also states:

> "T_{min} reflects the extent to which a stock has fallen below the target, the biological characteristics of the stock that limit the rate of rebuild, and the prevailing environmental conditions that also limit the rate of rebuilding. Allowing a rebuilding period up to twice T_{min} allows for some element of socio-economic considerations when complete closure of a fishery could create undue hardships for various fishing sectors and/or when the stock is an unavoidable bycatch of another fishery. The probability of rebuild should be increased where the information is highly uncertain or where multiple sectors have significant interests in the fishery."

Reference points

67. The 2017 rock lobster plenary report states that the CRA 2 stock is "Likely (> 60%) that B_{2017} is below the Soft Limit" which is defined as 20% of the unfished spawning stock biomass. However, there is uncertainty in estimating the unfished biomass and in many rock lobster stocks a Reference Biomass (B_{ref}) is used as the **management target** using provisions in s13(2A) of the Fisheries Act 1996. The current B_{ref} for CRA 2 is the average Vulnerable Biomass estimated in the stock assessment from 1979 to 1981.

68. Current science shows that the Vulnerable Biomass available to fishers is about 5% of the unfished biomass and the Minister must ensure that the stock can be rebuilt beyond the intermediate target of two times where it is now.

69. There is however, confusion about which of the different biomass estimates to use to determine the status of rock lobster stocks (See Appendix 1).

70. Neither Spawning Stock Biomass (SSB) nor Vulnerable Biomass (VB) provide a clear picture of stock status for the public or managers.

71. The submitters propose that in future stock assessment model outputs include Recruited Biomass. Recruited Biomass refers to all male and female rock lobster at or above the minimum legal size at the start of the fishing year. This is consistent with the way other stocks are assessed. The Recruited Biomass in CRA2 would be about half way between Vulnerable Biomass and Spawning Stock Biomass.

72. If there is an assumption that a proportion of stock is not available during autumn/winter then that can be stated as a percentage of Recruited Biomass. Using Spawning Stock Biomass alone to determine status of a rock lobster stock against limit reference points for heavily fished stocks like CRA 2 can be misleading.

Why a closure must be considered

73. The submitters understand that the latest stock assessment increased the relative value of B_{ref} but for now the current reference biomass is unchanged, and there is no case made against the use of the current B_{ref}.

74. The Harvest Strategy Standard default limits regarding Maximum Sustainable Yield (MSY) compatible targets, such as the B_{ref} target used in CRA 2, are set at a soft limit of 50% and a hard limit of 25%. Although an intermediate target to double CPUE has been agreed by the Working Group, any decision made still must be moving the stock beyond the intermediate target and towards B_{ref}.

Option	Estimated time to reach Bref (years)
Option - 1	20+
Option - 2	20+
Option - 3	20+
Option - 4	16
Closure	7

75. The Vulnerable Biomass in 2017 was 21% of B_{ref}, so under these criteria **CRA 2 has breached the hard limit and a closure must be considered.**

Surveys to measure public opinion

76. In 2017 the NZSFC and LegaSea conducted an online survey using email databases to measure people's perceptions of the state of the rock lobster fishery in CRA 2. Around 850 responses were received, with many respondents having dived or potted for crayfish for more than 20 years in this area. Of 841 respondents 78% rated the rock lobster fishery as very poor or worse and many backed up that view with details of their experiences.

77. There was support from recreational fishers for additional management measures to help rebuild abundance in CRA 2. Most fishers were prepared to contribute in some way, even if that meant a seasonal or temporary closure for all fishers.

78. In February 2018 the submitters conducted a follow-up survey on rock lobster in CRA 2. As awareness has grown various fishing and diving communities on social media have distributed the survey. In just seven days 3,594 surveys have been completed.

79. This time only people who said that they had caught crayfish in the CRA 2 area were asked the same question as before "*How would you rate the size and availability of crayfish in your most commonly fished area of CRA2?"*. The response was very similar to 2017, with 88% rating the stock as poor or worse.

80. All respondents were shown a table of TACCs and allowances that included the status quo, the four options in the MPI Discussion Paper with rebuild times to the intermediate target, and another option (Closure) showing the rebuild time if the fishery was closed (T_{min}). T_{min} is reference point to help assess the relative rebuild times for all options, and a benchmark for the Harvest Strategy Standard recommended rebuild rate of two times $T_{min,}$ which must be considered. The same table is used in this submission (Table 1, page 9).

81. **There was most support from respondents for a closure of CRA 2 to all fishing**. This shows that for many people none of the Ministry options provided an adequate response to the current poor state of the CRA 2 fishery. Closure was supported by 42% of all respondents, and 37% of people who had caught rock lobster in CRA 2. There was also support for Option 4 with an 80 tonne TACC, a TAC of 191.5 t, reaching the intermediate target in four years. 38% of all responses, and 42% of people who had caught rock lobster in CRA 2 supported this Option.

	Option 1	Option 2	Option 3	Option 4	Closure	**Total**
Have never fished in CRA 2	18	35	233	483	702	**1471**
Have Fished in CRA 2	28	51	339	876	776	**2070**
Total	**46**	**86**	**572**	**1359**	**1478**	**3541**

82. Respondents were asked for their interest in the fishery: recreational; commercial; environmental or other. They were able to select more than one answer, but the pattern of preferred management options was similar (See Appendix 2).

	Recreational fisher/diver	Commercial fisher/diver	Concerned about the environment	Supportive of restoring marine abundance	Others	**Total Responses**
Closure	91%	1%	69%	74%	1%	**1478**
Option 1	93%	11%	61%	70%	0%	**46**
Option 2	95%	2%	66%	72%	2%	**86**
Option 3	94%	2%	66%	74%	1%	**572**
Option 4	95%	1%	65%	71%	0%	**1359**
Total	**93%**	**1%**	**67%**	**73%**	**1%**	**3541**

Statutory Considerations

83. In general, the Minister has wide discretion in setting TAC, TACC, and Allowances under the Fisheries Act 1996 (the Act). Rock lobster must be abundant to enable all people to provide for their social, economic and cultural wellbeing, and be sustainable to meet the reasonably foreseeable needs of future generations, as per section 8(2)(a & b) of the Act.

84. There are several obligations under Part 1 and Part 3 of the Act that deal with Principles, consultation, and economic, social, and cultural effects of decisions. Providing these are adhered to, the Minister may set catch levels to achieve a stock target of anywhere between one that will produce the maximum sustainable yield and an unfished stock.

85. The submitters emphasise the need for the Minister to comply with the provisions of the Hauraki Gulf Marine Park Act when choosing an option. There is a clear obligation to rebuild this fishery to abundant levels to improve marine diversity and to enable all people, not just export-driven fishers, to provide for their social, economic and cultural wellbeing.

Recreational Harvest

86. Prior to 2010 there was concern about the accuracy of recreational harvest estimates for important species like rock lobster and paua. The major problem was recruiting enough fishers in these specialist potting and diving fisheries during national diary or panel surveys to get a representative sample. There have been changes and improvements over time. The 2011-12 National Panel Survey undertaken by NRB provides the most defensible harvest estimates yet, especially for areas with a large number of fishers such as the Hauraki Gulf and Bay of Plenty.

87. In addition, there were two years of intensive recreational fishing surveys at boat ramps and marinas from Port Charles to Maketu in 2010-11 and 2011-12 focused on rock lobster and scallop harvest. The corroboration between these surveys show that the National Panel Survey harvest estimate of 41 tonnes (± 23%) is the best available information on recreational harvest in CRA 2.

88. The submitters support the proposed allowance for recreational fishing interest of 50 t (which is 41 t plus 23%).

89. Commercial interests have suggested MPI use the model estimate for 2017 of 34 t as the new recreational allowance, but this is not a survey estimate. The 34 tonnes is based on a simple assumption that provides an approximation of what catch might be. It must be disregarded because there are no confidence intervals associated with this figure. If there were confidence intervals they would probably be about twice the NRB survey levels (as per discussion at the NRLMG), which would give an upper-bound of recreational harvest in 2017 of 50 t (which is 34 t plus 46%).

90. This time next year an updated recreational harvest estimate for 2017-18 will be available from the National Panel Survey that is underway now. The survey will provide a benchmark for current harvest.

Economic impact

91. Recreational harvest surveys show that most rock lobster in CRA 2 are taken by divers (85%) and potting (13%). SCUBA diving has the highest catch rates, but it is expensive to maintain and replace the equipment needed. The decline in recreational catch rates of rock lobster has prompted many experienced divers to hang up their wetsuits, according to comments received in our online surveys. This has had an impact on expenditure with dive shops and dive charter businesses. These days many new entrants to the sport prefer free diving and dive shops have changed product lines to cater for this.

92. The submitters acknowledge that all the options in the MPI Discussion Document will have a significant economic impact on CRA 2 commercial fishers who were operating 33 vessels in 2015-16. Assuming a port price of about $70 per kg the fishery would have been earning about $14 million per year with a fully caught 200 t TACC. Based on average ACE price at the time, this would have been shared about half and half between the quota owner and the vessel

operator. However, the majority of the expenses fall on the vessel operator having to build and deploy pots, pay the crew, then bait and lift 10 pots to make $100 in 2015-16 ($35 times 0.28 kg per pot lift times 10 lifts). Clearly there are areas in CRA 2 that have not been economic for some time, especially for vessel operators who don't own CRA 2 quota. Any of the proposed options will affect some operations and could reduce vessel numbers.

93. There have been significant reductions in the number of inshore fishing vessels and surface longliners in New Zealand over the last 15 years, even when TACCs have remained the same or increased.

94. The submitters support rapid rebuilding the CRA 2 stock and increasing catch rates so that the remaining fishers can run profitable businesses sooner rather than later. Getting a good return for a reasonable fishing effort has to be the goal. CRA 2 is well behind all other rock lobster stock in New Zealand in this regard.

Social and Cultural Impact

95. There is compelling anecdotal evidence, now backed up by the stock assessment, that the CRA 2 stock has been over-fished for a long time reducing the actual and potential social and cultural wellbeing for non-commercial fishers.

96. What comprises Customary and Recreational interests is not defined in the Act however, the Supreme Court had this to say:

> **SC [54] The notion of people providing for their wellbeing, and in particular their social wellbeing, is an important element of recreational interests[2].**
>
> **SC [59] The terms of the definition of utilisation, including the wellbeing concept, are contextually relevant to what is meant by recreational interests[10] and in that sense are relevant considerations in decisions under s 21.**

97. Providing for the cultural and social wellbeing of the public are key relevant factors when the Minster determines allowances. How this 'important element' of people providing for their wellbeing is to be 'allowed for' was subsequently refined, if a little clumsily;

> **SC [56] Although what the Minister allows for is an estimate of what recreational interests will catch, it is an estimate of a catch which the Minister is able to control. The Minister is, for example, able to impose bag and fish length limits. The allowance accordingly represents what the Minister considers recreational interests should be able to catch but also all that they will be able to catch. The Act envisages that the relevant powers will be exercised as necessary to achieve that goal. The allowance is an estimate and an allocation of part of the total allowable catch in that way.**

98. In areas where there has been a substantial decline in abundance rock lobster over time, as apparent in CRA 2, then current estimates of recreational harvest will inevitably reflect the (depleted) state of the stock; and logically ought not to be construed as a reference for what "should be" allowed for by the Minister; in the sense that what "should be" able to be caught by the recreational interests, as intended by the Supreme Court (above) ought to reflect a beneficial, or desirable state for the recreational interests.

99. The Discussion Paper identifies that MPI will begin consultation on possible regulation changes, including possible changes to recreational bag limits later in 2018. If it is possible to estimate likely management changes including bag limit reductions under the different management

options considered in the Discussion Paper, then the implications around these future changes ought to have been signalled and identified for consultation in the current Discussion Paper. Doing this would be consistent with good practice consultation and ensure that the Minister is properly informed of the implications of his decision-making, with the likely implications to the daily bag limits for individual fishers being identified at the time of decision-making in relation to the TAC, TACC and non-commercial allowances.

Crayfish 4 (CRA 4) Hawke Bay to Wellington

Recommendation

100. The submitters support CRA4_01: Status quo.

Introduction

101. CRA 4 covers a significant area from southern Hawke's Bay around to the Kapiti Coast, including the Wairarapa and Wellington coastlines.

102. Much of this area is important to recreational fishers and divers with crayfish often being a main target and important to the local communities.

103. The current Management Procedure was first applied to CRA 4 in 2017. At that time the Management Procedure recommended a 70 tonne decrease to the TACC.

104. CRA 4 CPUE has been rapidly declining since 2012, anecdotal reports from fishers in the region have not shown any noticeable increase in abundance, just a shift in fishing effort.

105. It is notable that anecdotal reports credit the effectiveness of Moremore Mataitai reserve for providing a reasonable daily catch of crayfish when compared to the poor catch rates in some other parts of CRA 4. The Moremore Mataitai reserve was established by the people of Ngai Te Ruruku o Te Rangi in 2005.

CRA 4 Management Proposals

106. The Management Procedure has recommended an increase of 29.8t to the TACC, and no changes are proposed to the allowances.

Option	TAC	TACC	Allowances		
			Customary Māori	Recreational	Other mortality
CRA4_01: *Status quo*	484	289	35	85	75
CRA4_02: Based on the operation of the current CRA 4 management procedure	513.8 ↑	318.8 ↑			

CRA 4 Model needs caution

107. The submitters urge caution when the Minister considers catch limits for CRA 4. We note that the latest CRA 2 stock assessment was nowhere near as optimistic as the previous assessment using the same CPUE standardisation as the CRA4 assessment. This is primarily due to the use of a vessel effect parameter which accounts for some of the increases in fishing efficiency since 1990. It is likely that a similar parameter will be added to the CRA 4 model during the next stock assessment (2022), which would be expected to have a significant effect on the overall model.

108. **The Minister must be advised that the CRA 4 CPUE analysis is unreliable**. MPI must advise the Minister of the likely impact of using the new standardisation for CRA 4. The submitters believe that the Management Procedure would no longer be recommending this increase if the new CPUE index was used.

109. It would be irresponsible of the Minister to act upon the recommendations of a Management Procedure using what is now known to be an inaccurate CPUE series. Increasing the TACC based on this flawed data would be irresponsible and in the submitters opinion, conflict with the Minister's duty to consider the best available information and act in a precautionary manner.

110. **The submitters urge the Minister to take a precautionary approach in CRA 4** as it is a fishery that has been in steep decline. Being cautious now will allow the fishery to retain some resilience and eventually rebuild to a more abundant level, allowing higher levels of harvest in the future with less risk.

Crayfish 7 (CRA 7) Otago

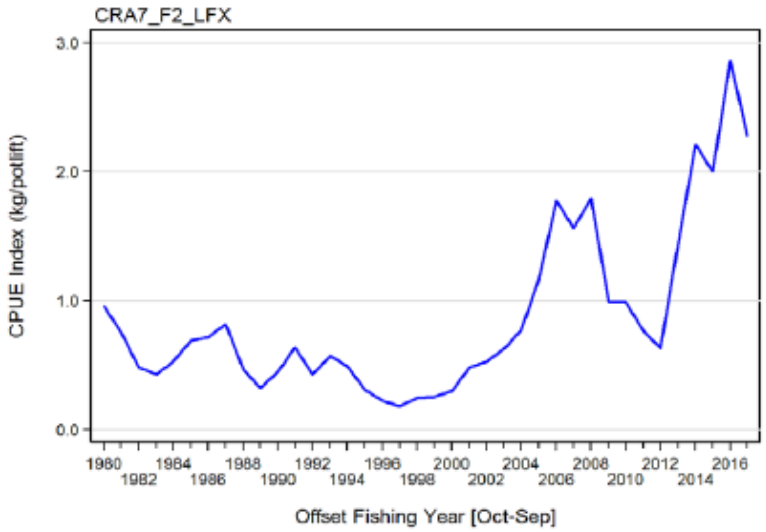
Recommendation

111. The submitters support option CRA7_02: TAC and TACC reduction.

Introduction

112. CRA 7 Catch Per Unit of Effort (CPUE) was at an all-time high in 2016 prompting the Management Procedure to recommend a 14.8t increase to the TACC.

113. CRA 7 also received TACC increases in 2014 and 2015 from an all-time low of 44 t in 2013.



CRA 7 Management Proposals

114. The current Management Procedure has recommended a 15.5t TACC decrease, back to levels similar to 2016 when CPUE was increasing.

Option	TAC	TACC	Allowances		
			Customary Māori	Recreational	Other mortality
CRA7_01: *Status quo*	132.52	112.52	10	5	5
CRA7_02: Based on the operation of the current CRA 7 management procedure	117 ↓	97 ↓			

115. The submitters are pleased to see a Management Procedure recommending precautionary action.

116. CRA 7 may also be affected by the addition of a vessel effect parameter in the standardisation of CPUE during the next stock assessment (2020). While the vessel effect parameter it is not expected to be as great as the effect in CRA 2 or 4, it still needs to be considered in this review.

117. The submitters recommend a precautionary approach is taken when making any decisions in crayfish fisheries until this parameter has been adopted.

Crayfish 8 (CRA 8) Southland

Recommendation

118. The submitters support option CRA8_01: Status quo.

Introduction

119. CRA 8 is the highest productivity crayfish stock in New Zealand, sustaining harvest far above other fisheries.

120. CPUE has reached an all-time high of over 3.5kg per potlift. This is around 14 times more, on average, per potlift than CRA 2, which has a CPUE of 0.253 kg per potlift.

121. CRA 8 biomass is estimated to be at 140% of the reference period target.

CRA 8 Management Proposals

122. The CRA 8 Management Procedure has recommended a 108.7 t increase to the Total Allowable Commercial Catch (TACC).

Option	TAC	TACC	Allowances		
			Customary Māori	Recreational	Other mortality
CRA8_01: *Status quo*	1,053	962	30	33	28
CRA8_02: Based on the operation of the current CRA 8 management procedure	1,161.7 ↑	1,070.7 ↑			

123. Although CRA 8 is a highly productive stock and at an all-time high, the submitters believe 108.7 t increase is excessive and recommend a more modest approach needs to be adopted.

124. In 2009 the CRA 8 TACC was increased to 1019 t, this lasted two seasons before there was a considerable drop in CPUE. The TACC was then reduced to 961.2 t and has fluctuated around this point since then.

125. To jump straight back to a higher TACC, which would be the highest level in recent years seems an unnecessary risk, the submitters recommend a more cautious, incremental approach is taken to protect this productive fishery.

F. Appendix One: Determining the status of rock lobster stocks

126. Part of the discussion about **management targets** used for rock lobster is the relevance of using Spawning Stock Biomass (SSB) or Vulnerable Biomass (VB) as a more logical and relevant measure of stock status.

127. SSB is used in many other fisheries as it is typically understood to be representative of the reproductive capability of the stock, due to SSB representing all the mature females in the population.

128. Crayfish are different to many other species monitored by this reference point in that a large portion of females are unavailable to the fishery during Autumn/Winter so the exploitation rate of females is lower than for males.

129. There is no stock-recruit relationship used in rock lobster assessments. In other words, the size of the spawning stock in an area like CRA 2 probably does not determine the number of individuals recruiting into the fishery. This assumption is made due to the long pelagic larval phase of 12 months, where they drift with the current and don't necessarily return to CRA 2.

130. Vulnerable Biomass is made up of all rock lobster that can be legally taken, which is directly reflected in commercial catch statistics and Catch Per Unit of Effort (CPUE) used in fisheries management. Even the weight of legal fish not suitable for market and returned to the sea are recorded by commercial fishers.

131. During the years in between the stock assessments the fishery is only tracked by catch and commercial CPUE, it would seem reasonable that VB be used to measure performance against the **management target**. Therefore, the status of the VB must also be taken into account in management advice to the Minister.

132. The Harvest Strategy Standard does not specify whether SSB, VB or Recruited Biomass (RB) be used, and SSB has simply been a convention due to its use in other, mainly finfish, fisheries.

133. The HSS describes a limit as:

"A limit represents a point at which further reductions in stock size (or proxies) are likely to ultimately lead to an unacceptably high risk of stock collapse and/or a point at which current and future utility values are diminished or compromised. Limits (both "soft" and "hard") should be set well above extinction thresholds – rather, they should act as upper bounds on the zone where depensation[11] may occur."

"[11] Depensation is a situation where depleted populations may start to decline at an accelerated rate due to factors such as an inability to find mates, impaired breeding success, competition and predation. In the ecological literature, these effects are commonly called Allee effects."

134. A stock that has a portion described as "functionally extinct", in our opinion, should not be considered above a limit.

135. The estimates of rebuild times in Table 1 (Page 9) are based on a number of key assumptions including:

- The strength of recruitment in the future.
- That standardised CPUE is proportional to abundance.
- Recreational harvest will increase and be double the current model estimate if the biomass doubles.
- That the interim target is reached at 50% probability of, rather than the recommended 70% probability.

136. MPI's Harvest Strategy Standard states -

"For both limits, the ultimate goal is to ensure full rebuilding of the stock to the biomass target with an acceptable probability (70%). The reason for requiring a probability level greater than 50% is that a stock that has been severely depleted is likely to have a distorted age structure (an over-reliance on juvenile fish, with relatively few large, highly fecund fish). In such instances it is necessary to rebuild both the biomass and the age composition."

G. Appendix 2: Summary of CRA 2 Survey Results

137. In 2017 the NZSFC and LegaSea conducted an online survey using email databases to measure people's perceptions of the state of the rock lobster fishery in CRA 2. Over 800 responses were received, with many respondents having dived or potted for crayfish for more than 20 years in this area. Of 841 respondents 78% rated the rock lobster fishery as very poor or worse and many backed up that view with details of their experience.

138. In February 2018 the submitters conducted a follow-up survey on rock lobster in CRA 2. As awareness has grown various fishing and diving communities on social media have distributed the survey. In just seven days 3,594 surveys have been completed.

139. All respondents were shown a table (below) of TACCs and allowances that included the status quo, the four options in the MPI Discussion Paper with rebuild times to the interim target, and another option (Closure) showing the rebuild time if the fishery was closed (T_{min}). T_{min} is reference point to help assess the relative rebuild times for all options and a benchmark for the Harvest Strategy Standard recommended rebuild rate of two times $T_{min,}$ which must be considered. The same table is used in this submission.

Table of rebuild times and options

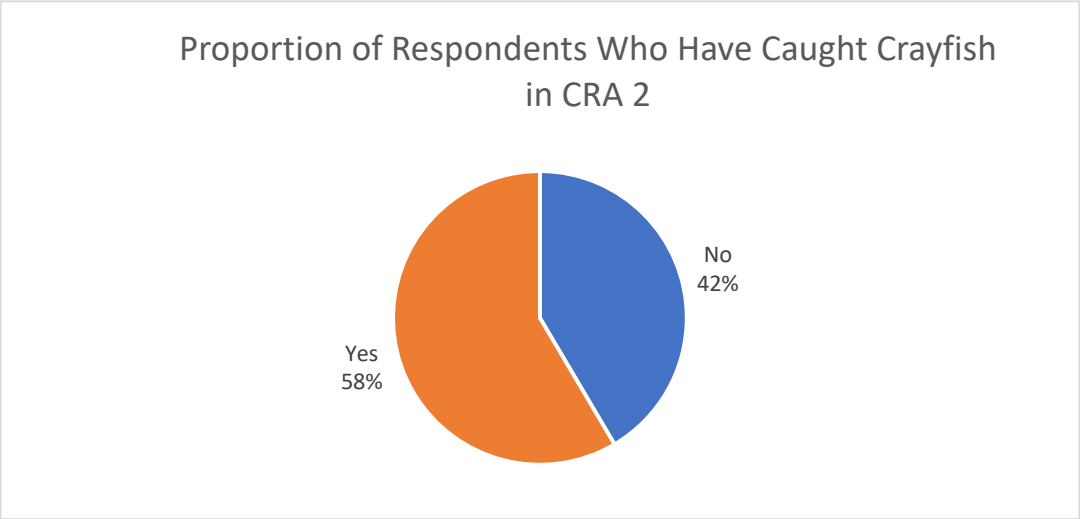
Option	Total Allowable Commercial Catch (TACC)	Allowances			Estimated time to double current stock size
		Customary Maori	Recreational	Other mortality	
Status quo	**200**	**16.5**	**140**	**65**	**N/A**
Option 1	140	16.5	50	45	**9 years**
Option 2	120				**7 years**
Option 3	100				**5 years**
Option 4	80				**4 years**
Closure	**0**	**0**	**0**	**0**	**2 years**

Table of options selected by respondents who had fished in CRA 2 and those that had not.

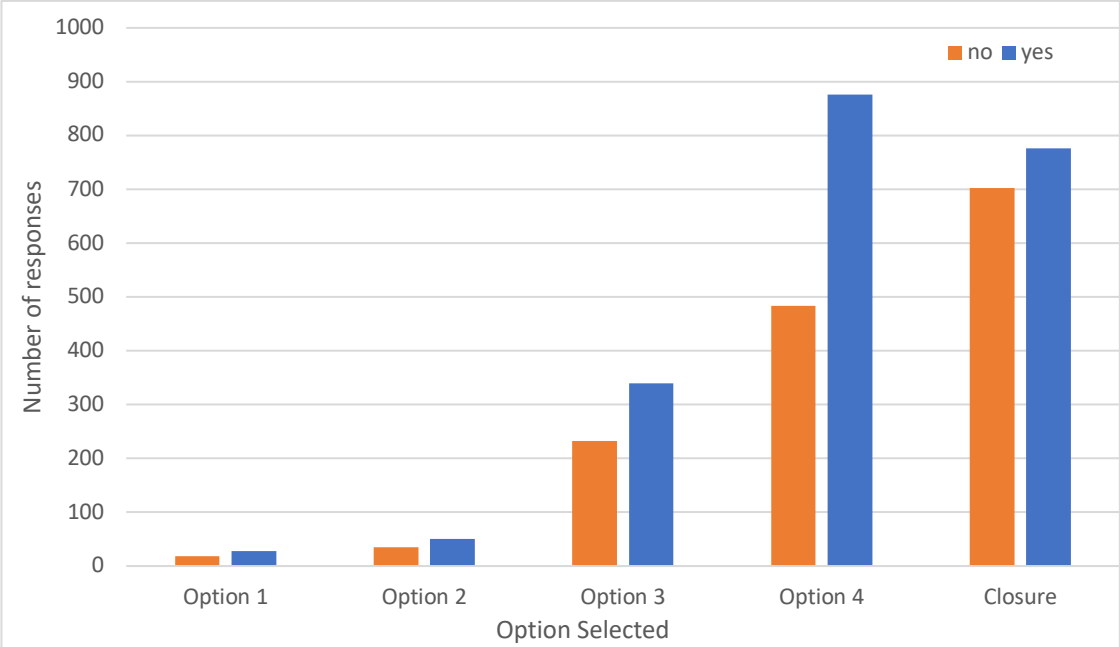
	Option 1	Option 2	Option 3	Option 4	Closure	**Total**
Have never fished in CRA 2	18	35	233	483	702	**1471**
Have Fished in CRA 2	28	51	339	876	776	**2070**
Total	**46**	**86**	**572**	**1359**	**1478**	**3541**

Table of options selected by respondents by stated interest.

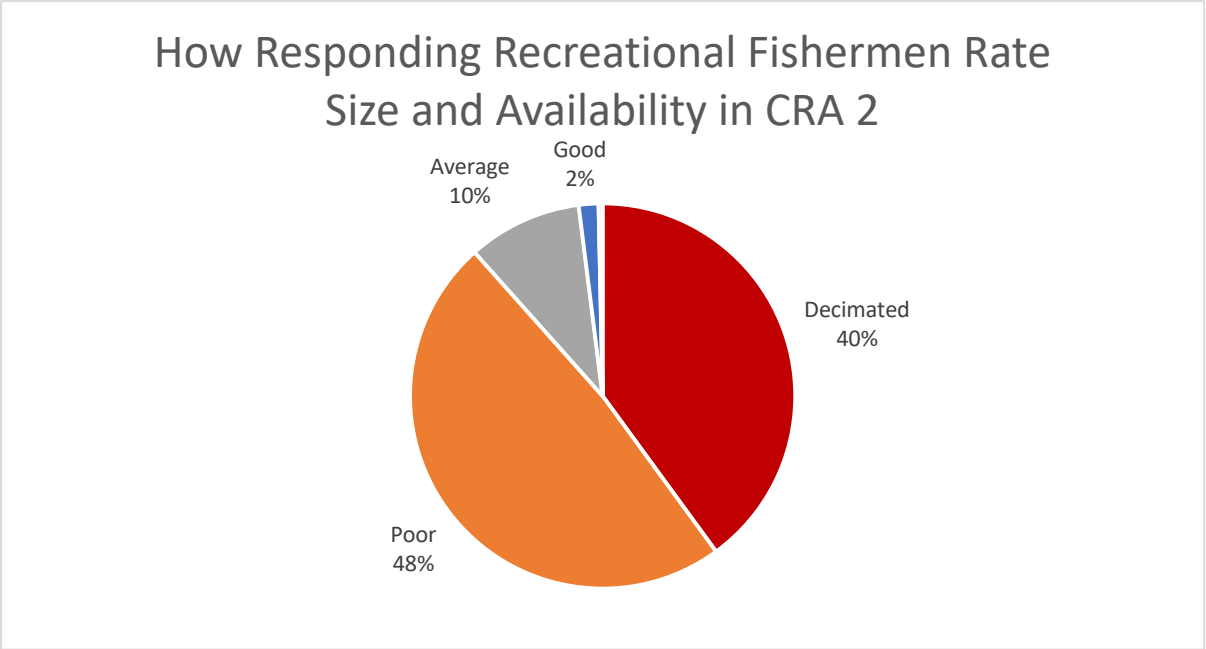
	Recreational fisher/diver	Commercial fisher/diver	Concerned about the environment	Supportive of restoring marine abundance	Others	**Total Responses**
Closure	91%	1%	69%	74%	1%	**1478**
Option 1	93%	11%	61%	70%	0%	**46**
Option 2	95%	2%	66%	72%	2%	**86**
Option 3	94%	2%	66%	74%	1%	**572**
Option 4	95%	1%	65%	71%	0%	**1359**
Total	**93%**	**1%**	**67%**	**73%**	**1%**	**3541**



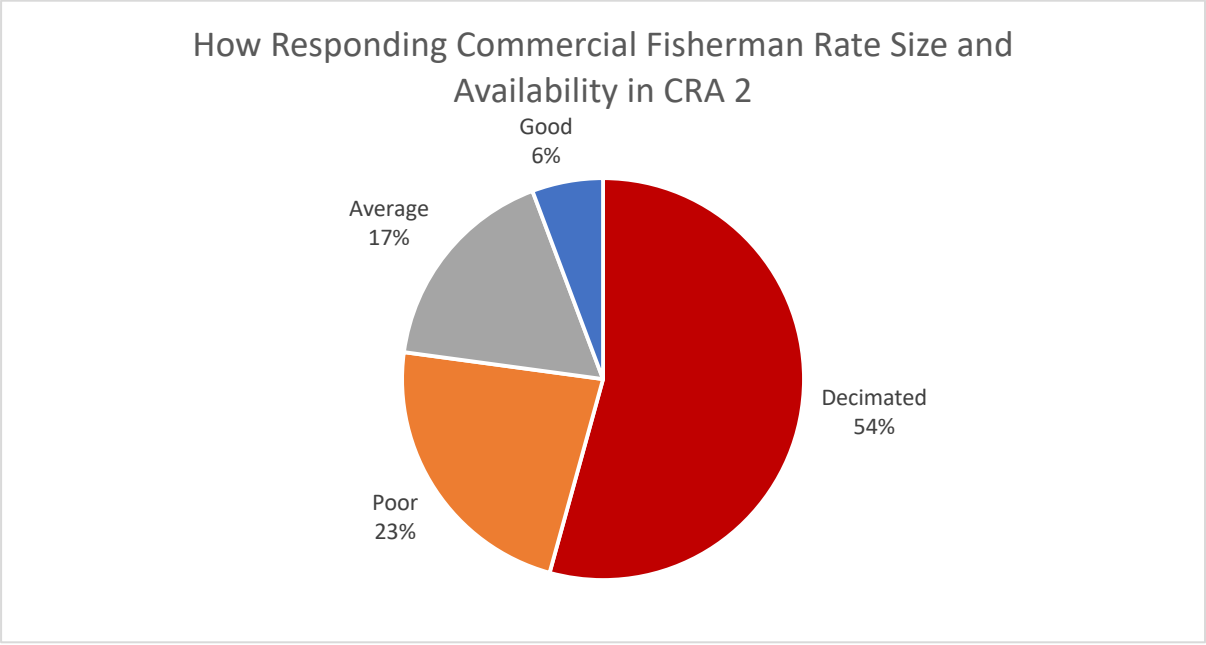
The majority of respondents have fished in CRA 2. Respondents were asked the general areas they usually fished which showed a reasonable spread throughout the whole area.



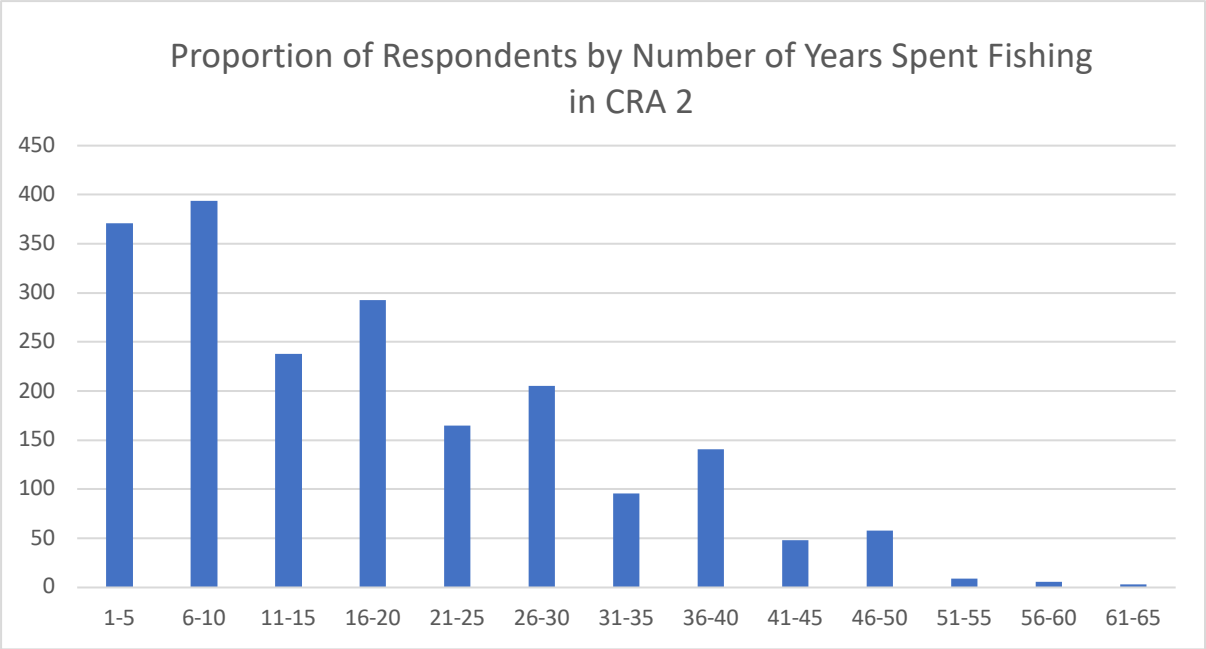
Respondents who had caught rock lobster in CRA 2 were more supportive of Option 4 that a complete closure than those who did not fish for rock lobster in CRA 2. The overall trend showed favour of the more precautionary measures.



The majority of recreational fishermen who caught rock lobster in CRA 2 (88%) rated the size and availability of Crayfish in CRA 2 as poor or decimated.



A higher proportion of respondents identifying as commercial fishermen rated the availability of crayfish in CRA 2 as average or good than the recreational fishers, but also more rated the fishery as decimated.



There was a wide range of experience for respondents who had caught rock lobster in CRA 2.

Comments from fishers in the online survey February 2018

Eastern Coromandel

Diver 3564: The decline in the crayfish population in the last 36 years has been slowly getting more and more noticeable. I am mainly a free diver and the decline is more pronounced when you are checking holes and habitat than if you are potting. It is in a sorry state. So much so that I seldom target them these days and spearfish for finfish in preference.
Something needs to be done. the option 4 will see all parties cut by round 60 % approx, the customary should also be cut as well by 60 odd %. Four years is a small price to pay (for all parties) to restore our fishery.

Diver 3480: The decline i have noticed is worse every year. Cant believe the pots out there now. Even when diving u don't see many young cray like you used to see. Very concerning and would like to see something done about this before its too late.

Hauraki Gulf

Diver 3478: You need to be brave and good at the game along with the ability to travel long distances to get a bag these days, in the 60's I could walk from Martins Bay with a snorkel and do well.

Gt Barrier Eastern Coromandel

Diver 3423: Only comment is that something has to change. My experience is that what was prime habitat for crayfish is now empty. Commercial pots are absolutely everywhere and the effort they go to catch an ever decreasing amount can't be good for the industry.

Eastern Coromandel

Diver 3113: The state of the crayfish fishery in CRA 2 is dismal and has been in serious decline over the last decade, prior to this it was in a moderate state of decline. The significant reduction in the total

number of crayfish and the size of crayfish within the Mercury Bay and Mercury Island region of CRA 2 is apparent to scuba divers like myself who regularly dive within this region. The significant plunge in total crayfish numbers over the last decade is directly matched by the proliferation of the number of commercial crayfish pots that have been deployed in the region. During the commercial harvest periods the density of deployed commercial crayfish pots is both appalling and dispiriting to observe. These pots are placed every 50m along the nearshore coastal zone and around the outlying Mercury Islands. It is no surprise that it has become very difficult to find good sized crayfish within the region and the crayfish that are of legal size are mostly only 1-2mm oversize, or barely legal. It is galling as a responsible recreational cray fisher to know that when I decide to leave these just legal sized crayfish alone to grow and breed there is a high probability they will end up in a baited commercial crayfish pot and on someone's plate in Asia.

The significant decline in total crayfish numbers and the average size of crayfish in the Mercury Island/Mercury Bay region is not the result of recreational cray fishing. The operators of dive shops in the region will confirm total scuba diver numbers have been consistently decreasing over the last last two decades as evidenced by the continuing decrease in the number of scuba tank fills each year. Almost all of the deployed cray fish pots I see deployed in this region have commercial fisher identifications and cray pots deployed by recreational cray fishers are relatively uncommon.

The management of the CRA 2 area has been woeful. When the commercial cray fisherman were unable to maintain their TACC a few years ago the Ministry responded to lobbying by the commercial fishing industry and increased the TACC in the Mercury Island/Bay region. This is nonsensical and flies in the face of the foremost principal of the fisheries act and quota management system that states customary and recreational fishing rights take precedence over the TACC.

The evidence is clear that commercial over fishing is the cause of the near collapse of crayfish stocks in CRA 2. As a result the estimated percentage customary and recreational take of the estimated biomass appears to now be significant. However, if the total biomass of crayfish in CRA 2 had not been pillaged by commercial interests and instead was sustainably managed by the Ministry and commercial fishing industry as it has been allowed to, the total biomass would much higher and the percentage customary and recreational take would be much lower.

Because commercial fishing has been responsible for the significant decline of crayfish numbers within CRA 2 I do not support a reduction in the customary and recreational take, and instead support a significant reduction in the TACC. The sector that has caused this deplorable situation must be held accountable to the people of New Zealand.