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Submission: Review of sustainability measures for spiny rock lobsters in CRA 1, for 2023/24

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Recommendations

1. **The Minister applies in full** the findings of the High Court and sets the environmental bottom line for recruited biomass at B50, to ensure sustainability of the CRA 1 stock.
2. **The Minister makes the following precautionary decisions** for CRA 1. The Minister:
 - a. Sets a precautionary Total Allowable Catch (**TAC**) of 101 tonnes.
 - b. Sets aside an allowance for Māori customary fishing interests of 20 tonnes.
 - c. Sets aside an allowance for recreational fishing interests of 19 tonnes.
 - d. Sets aside an allowance for other fishing related mortality of 10 tonnes.
 - e. Sets a precautionary Total Allowable Commercial Catch (**TACC**) of 52 tonnes.

If the TAC is set as above, the following controls to apply to assist with rebuilding CRA 1:

- a. A recreational daily bag limit of 2 per person, per day, within the combined limit of 6 for spiny and packhorse lobsters; and
 - b. Consult on the introduction of a maximum size (tail width) for commercial landings and a recreational daily bag limit that includes a maximum of one spiny rock lobster with a tail width at or above the maximum size; and
 - c. No more than 10 t of the TACC to be taken from the area south of North Cape.
3. **The Minister splits the CRA 1 management area** at North Cape to create a minimum of two smaller Quota Management Areas.
4. **The Minister notes the mandatory obligation when making decisions** to take account of the cumulative effects of fishing, and the need to act in a precautionary manner by setting conservative TACs when information is uncertain, incomplete or unavailable.
5. **Fisheries New Zealand provides to the Minister** advice on the effects of the loss of abundance and the effects of truncating the age structure of the stock in general, and of each option being proposed as a possible TAC.

Executive summary

A challenge to earlier Ministerial decisions for the future management of Northland crayfish, CRA 1, resulted in a ground-breaking decision by the High Court in November 2022. The judgment exposes weaknesses in current fisheries management processes and has clarified the Minister must incorporate wider ecosystem effects into decision-making, and act more cautiously when information is uncertain, unreliable, or inadequate. All the information available for managing crayfish stocks falls into these categories.

The consultation document released on 10 January 2023 is a wholly inadequate response to the findings of Justice Churchman. Offering three possible Total Allowable Catch (TAC) reductions is not what the Court was looking for; rather a more fulsome approach that gathered together all information available and responded to not just crayfish but the rocky reef ecosystem where the species is embedded, including the consequences of truncating the age structure of the population by excessive exploitation rates.

Fisheries New Zealand (FNZ) has long relied on implausible science for single species assessments. Stable population descriptions rely on deceptive Catch Per Unit of Effort (CPUE) analysis while observation describes a steady loss of abundance and size of cray in Northland. These single species assessments have been ruled inadequate by the High Court yet FNZ persists with the smallest possible change to the status quo, which may provide fertile grounds for further review.

The National Rock Lobster Management Group (NRLMG) has proved again to be an unsuitable vehicle for supplying advice to government. The group is, and always has been, captured by commercial interests. The NRLMG needs to be urgently retired and FNZ reclaim full management control in the public interest. CRA 2, now CRA 1, next is CRA 3, are all subject to shifting baselines as continued depletion ignores past abundance. Governance is in crisis.

Only very low catches can be permitted in the medium term while the age structure of rock lobster in CRA 1 is restored to a more natural state. We recommend the Minister complies with the High Court ruling by setting the environmental bottom line for recruited biomass¹ at B50, to ensure a rebuild and ongoing sustainability of the CRA 1 stock.

This submission acknowledges there is no single source of best available information. In the absence of any meaningful data the results of January large-scale survey of 518 Northland crayfishers must be considered part of the best available information on recreational fishers' perspectives on the state of CRA 1.

Until now stock assessment models have been developed that portray a level of stability when none exists. These estimates of abundance are implausible when compared to historical reports and accounts by experienced observers of the CRA 1 fishery. The Northland Crayfishers Survey found that overall, 57% of respondents said there was a major change in crayfish abundance. For those respondents who had been cray fishing for over 20 years, 63% said the availability of crayfish is 40% or less of what it used to be when they first started fishing in Northland waters.

Despite the evidence from coastal hapū and recreational fishers, there has been a refusal to accept observed reality. By 2018 there was clear evidence of a steady decline in abundance in CRA 1 and CRA 2 and a consequent truncated age structure of the crayfish population. This resulted in significant ecosystem service loss that triggered a trophic cascade. Kina barrens were debated extensively in the High Court.

¹ Recruited biomass is legally harvestable adult male and female rock lobsters, excluding berried females.

Kina barrens are easily seen and obvious, but the other less obvious effects of depletion on associated or dependent species are certain to occur yet have been rarely, if ever, mentioned in Management Group advice.

Moreover, it is concerning that there is no advice in the proposal paper indicating what the deficit of large rock lobster is on the shallow reefs of Northland. Nor is there any indication of the time it would take to achieve a number that would restore ecosystem services of rock lobster for each of the options presented in the proposal paper. The High Court decision for CRA 1 exposes the overall management deficits.

We propose our own precautionary TAC of 101 tonnes, down from 193 t, as an interim step to rebuild abundance within a reasonable timeframe. That's because the Minister cannot defend the environmental bottom line while not knowing if the ecosystem will recover in 5 or 50 years, or not at all, under the various FNZ options proposed.

Ideally, catches would be limited to between 50 and 80 t per year and not include any individuals over 1.5 Kg weight. Future monitoring of age structure will inform as to whether this level of catch is allowing the ecosystem to recover, or the fishery needs further catch reductions.

To make a lawful decision for CRA 1 the Minister must now consider the quality of information and take into account any past, present and cumulative effects of fishing on crayfish and all species within the marine ecosystem.

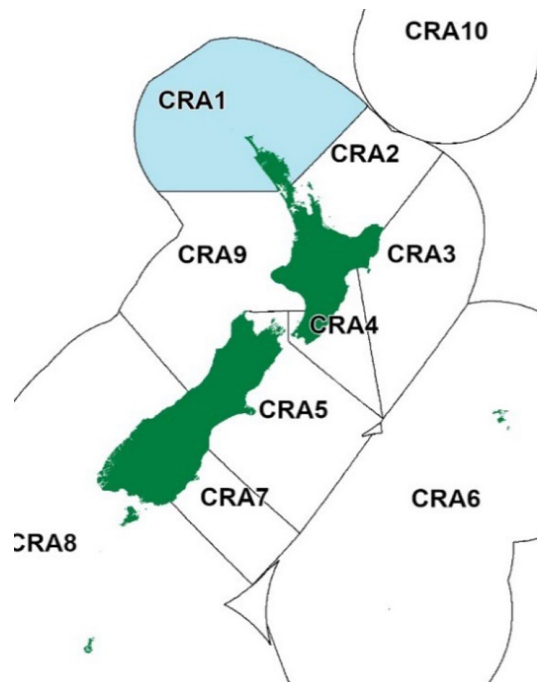
The stock assessment being used posits the stock at close to historical low abundance yet fails to capture the true extent of depletion from its unfished state. The assessment process is fatally flawed and needs replacing with a fisheries independent methodology.

Effort limits need to be applied, including pot limits for commercial fishing. Leaving uncontrolled fishing effort to prosecute an easily targeted shallow water species is certain to destroy the stock, despite any attempts at using catch to control effort. Moreover, the National Rock Lobster Management Group needs to be dismantled in the wake of current and historic management failures.

The most immediate need is to apply policy that values abundance and ecosystem function over the immediate grab for maximum catches. That is the only correct response to the High Court decision.

The submitters

7. The New Zealand Sport Fishing Council (**NZSFC**) appreciates the opportunity to submit on the proposals to review the sustainability measures for rock lobster (*Jasus edwardsii*) in Quota Management Areas CRA 1, Northland. The Fisheries NZ Discussion Paper No: 2023/01 was received on 10 January 2023 with submissions due by 8 February, 2023.
8. The NZ Sport Fishing Council is a recognised national sports organisation of 53 affiliated clubs with over 36,000 members nationwide. The Council has initiated LegaSea to generate widespread awareness and support for the need to restore abundance in our inshore marine environment. Also, to broaden NZSFC involvement in marine management advocacy, research, education and alignment on behalf of our members and LegaSea supporters. legasea.co.nz.
9. The New Zealand Angling and Casting Association (**NZACA**) is the representative body for its 24 member clubs throughout the country. The Association promotes recreational fishing and the camaraderie of enjoying the activity with fellow fishers. The NZACA is committed to protecting fish stocks and representing its members' right to fish.
10. The New Zealand Underwater Association comprises three distinct user groups including Spearfishing NZ, affiliated scuba clubs throughout the country and Underwater Hockey NZ. Through our membership we are acutely aware that the depletion of inshore fish stocks has impacted on the marine environment and the wellbeing of many of our members.
11. Collectively we are '*the submitters*'. The joint submitters are committed to ensuring that sustainability measures and environmental management controls are designed and implemented to achieve the Purpose and Principles of the Fisheries Act 1996, including "maintaining the potential of fisheries resources to meet the reasonably foreseeable needs of future generations..." [s8(2)(a) Fisheries Act 1996].
12. Our representatives 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.



Background

13. CRA 1 is fished on the east and west coast of Northland. Since 1999 a large proportion of the commercial catch (30% to 50% per year) has come from the Three Kings area, a group of 13 islands about 55 kilometres northwest of Cape Reinga. The Three Kings area represents just 1 of the 5 fisheries management statistical areas in CRA 1.
14. Rock lobster is an important species and fishery for all sectors in Aotearoa New Zealand. 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 rock lobster fishing has occurred since the 1930s. An updated but uncertain estimate of recreational harvest from the 2017–18 National Panel Survey in CRA 1 was 15.9 tonnes (+/-14.7 t). The 2019 stock assessment model input of CRA 1 recreational catch was 31.5 t for 2018. For the 2021/22 fishing year the recreational catch estimate assumed for the rapid update model was 28.3 t.
15. In 2015 the Total Allowable Catch (**TAC**) was set for the first time in CRA 1, at 273.1 t with a Total Allowable Commercial Catch (**TACC**) of 131.1 t, an allowance for recreational fishing of 50 t, and an allowance for Māori customary fishing of 20 t. In 2020 the Minister reduced the TAC by 70 t (26%) with the aim of maintaining the stock at the current level. This was comprised of reductions to the TACC of 21 t (16%), a cut to the recreational allowance by 18t (36%), and the allowance of other sources of fishing mortality was revised in line with the estimate used in the stock assessment, down 31 t (43%).
16. Following the 2021 rapid update, the TAC was further reduced from 1 April 2022 to increase the certainty that the CRA 1 stock continues to increase in biomass above the reference level. The TAC was reduced from 203 tonnes to 193 tonnes (5%), the recreational allowance was reduced from 32 tonnes to 27 tonnes (16%), and the TACC was reduced from 110 tonnes to 105 tonnes (5%).
17. The 2022 rapid update for CRA 1 added three years of additional data to the 2019 stock assessment model. FNZ note that the November 2022 Plenary accepted estimates of current stock status, but rejected stock projections beyond 2022 from the rapid updates due to uncertainty around recent recruitment.
18. The 2022 rapid update shows that the estimated CRA 1 vulnerable biomass, males of legal size at the start of the fishing year, to be 14.4% (462 t) of the unfished biomass. Down from 15.5% in 2019 and 14.6% in 2021. The point estimates have a range of uncertainty of 25% to 30% around them. The spawning stock biomass (mature females) is estimated to be 36.8% (543 t) of unfished levels, but the majority of mature females are below the minimum legal size of 60 mm tail width.
19. The NZSFC was one of three intervenor parties to the judicial review proceedings challenging the Minister's 2021/22 and later 2022/23 decisions for the future management of CRA 1. In November 2022 Justice Churchman (**Churchman J**) of the High Court upheld the challenge and directed the Minister to reconsider the 2022/23 decision for CRA 1 using best available information and in accordance with the judgment.

20. To inform this submission a survey was undertaken to better understand Northland fishers' perceptions of the state of the crayfish stock and marine environment around Northland. Also, to measure support for future management controls to enable a rebuild of CRA 1. The majority of the 518 respondents support conservative catch limits and a reduced recreational daily bag limit for the next five years, to contribute to a significant rebuild of the CRA 1 stock.

Management proposals

21. Fisheries New Zealand (**FNZ**), with input from the National Rock Lobster Management Group (**NRLMG**), is proposing new sustainability measures for managing spiny (red) rock lobster around Northland (CRA 1) for the 1 April 2023 fishing year.

Table 1: FNZ proposed reductions to the CRA 1 Total Allowable Catch (TAC), Total Allowable Commercial Catch (TACC) and the allowances (in tonnes) and the recreational daily bag limit.

Option	TAC	TACC	Allowances		
			Customary Māori	Recreational	All other mortality caused by fishing
Option 1 (<i>current settings</i>)	193	105	20	27	41
Option 2	182 ↓ (11 t)	99 ↓ (6 t)	20	22 ↓ (5 t)	41
Option 3	172 ↓ (21 t)	89 ↓ (16 t)	20	22 ↓ (5 t)	41
Option 4	151 ↓ (42 t)	71 ↓ (34 t)	20	19 ↓ (8 t)	41

Table 2: Proposed recreational daily limit options for CRA 1 from 1 April 2023.

	Combined daily limit ²	Max spiny rock lobster daily limit
Option A (<i>current settings</i>)	6	6
Option B (<i>proposed for Options 2 and 3 above</i>)	6	3 ↓ (3)
Option C (<i>proposed for Option 4 above</i>)	6	2 ↓ (4)

22. The Minister must first set a Total Allowable Catch (**TAC**) taking into account the purpose and principles of the Fisheries Act (1996) and international treaty obligations. Current stock assessment results show that CRA 1 vulnerable biomass has declined under current settings and future projections need to be treated with caution/precaution.

The current TAC is 193 t:

- Option 2 would reduce the TAC by 5.7%
- Option 3 would reduce the TAC by 10.9% and
- Option 4 would reduce the TAC by 21.8%.

Our recommendations - proposed TAC and settings

23. We make the following recommendations so the CRA 1 fish stock can rebuild to a more natural level assisted by contributions from all sectors. We recommend the Minister complies with the High Court ruling by setting the environmental bottom line for recruited biomass at B50, to ensure a rebuild and ongoing sustainability of the CRA 1 stock. The resulting exploitation rate of 17% would lower the risk of breaching the environmental bottom line and increase the probability of restoring a more natural age structure to the rock lobster population.

24. Recommended package of settings for CRA 1 from 1 April 2023 include the following TAC reduction and other management controls -

Table 2: Our proposed reductions to the CRA 1 Total Allowable Catch (TAC), Total Allowable Commercial Catch (TACC) and allowances, in tonnes.

Option	TAC	TACC	Allowances		
			Māori customary	Recreational	Fishing related mortality
Option 5	101	52	20	19	10

In conjunction with the reduction in the TAC and allowances the following controls to apply, as a package, to assist with rebuilding CRA 1:

- a. Set a management target for CRA 1 recruited biomass at B50, half the estimated unfished stock size;
- b. A recreational daily bag limit of 2 per person, per day within the combined limit of 6 for spiny and packhorse lobsters;
- c. Consult on the introduction of a maximum size (tail width) for commercial landings and a recreational daily bag limit that includes a maximum of one spiny rock lobster with a tail width at or above the maximum size; and
- d. No more than 10 t of the TACC to be taken from the area south of North Cape.

Existing CRA 1 management

25. The commercial fishing year applying to rock lobster is 1 April to 30 March the following year. The minimum legal size for harvesting male rock lobsters is 54mm tail width and a minimum of 60mm applies to female rock lobster. These apply to commercial and recreational harvest.
26. Recreational fishers have a maximum daily bag limit of 6 rock lobsters, these can be a combination of spiny and packhorse crayfish.
27. Commercial and recreational fishers must return to the sea rock lobsters that are undersize, in berry, soft shelled or unmeasurable.
28. No pot limits apply to commercial fishers. Recreational fishers are limited to 3 pots per person, and up to 6 pots for 2 or more people fishing from a boat.
29. Reviews of rock lobster stocks and management, including catch levels, are conducted regularly. Before the Minister decides on TAC settings he receives advice from the NRLMG, feedback from the public and Iwi Fisheries Forums.

No commercial effort limit – a fatal gap in policy

30. Non-commercial cray fishers are limited in the amount of fishing effort able to be lawfully deployed – the use of a maximum of 3 pots per person. Commercial fishers have no effort limit – they may lawfully deploy as many pots as they wish. The effect of not limiting commercial effort was clearly displayed as a primary cause in the collapse of CRA 2.

31. Limiting total catch is raw and unsophisticated policy. The High Court has identified several factors that need to be fully considered and taken into account when setting catch limits. These factors attempt to refine a little more how the high level catch limit can be set and clearly identifies the limitation of just setting single species catch limits.
32. A catch limit becomes completely ineffective if fishing effort is able to increase and maintain catches when fish stocks are declining. Relying on Catch Per Unit of Effort (**CPUE**) to identify such a trend is a delusion, and is perfectly reflected in the collapse of CRA 2. Policy must progress beyond reliance on catch limits.
33. Despite such an obvious policy gap, the discussion document remains silent on matters of commercial fishing effort.
34. In the view of the submitters, the lack of effort limits reduces the effectiveness of catch limits; both are required for stocks with moderate productivity and variable recruitment. A broad age structured population cannot be maintained by catch limits alone, and this policy gap needs urgent reform.
35. Each vessel must be limited in the number of pots able to be lawfully deployed. If there is insufficient catch from this level of effort the option of increasing pot numbers is unavailable. The signal of depletion will become very clear.
36. Given the Minister's statutory responsibilities as clarified by the High Court, to create an environmental 'bottom line' of sustainability, this policy gap must be addressed immediately. An effort limit must be applied firstly in CRA 1, and ultimately in other fish stocks.

The NRLMG

37. For a number of years the NRLMG acted as a primary advisor to the Minister on catch settings for rock lobster fisheries. We have previously submitted against parts of their advice that failed to adequately inform the Minister of uncertainties and completeness of information so the Minister could apply the precautionary principle in decision making, when appropriate. After all, the Minister cannot be expected to take account of matters not included in official advice.
38. Following the High Court decision, Fisheries NZ has taken a more active role in shaping the latest CRA 1 proposal paper and potential management options, on advice from Crown Law.
39. The real question is how well this process has functioned since first used in 1992. By 2018 the advice from the NRLMG has led to a steady decline in abundance in CRA 1 & 2 and truncated the age structure, resulting in significant ecosystem service loss that triggered a trophic cascade. Kina barrens are easily seen and obvious, but other less obvious effects of depletion on associated or dependent species are certain to occur yet were rarely, if ever, mentioned in historical NRLMG or FNZ advice. This meant there was no meaningful response to ongoing depletion, even though it was obvious to Northland fishers, divers and environmental interests.
40. The NRLMG's failure to recognise and address ecological effects of depleted crayfish stocks (and

other reef species) triggered environmental interests to seek restoration of indigenous biodiversity via the Resource Management Act. This has led to area closures in the Bay of Plenty and pending closures in Northland waters.

41. Rock Lobster Industry Council contractors run stock assessment models, with input from the Rock Lobster Fisheries Assessment Working Group, estimate exploitation rates and the trends in stock abundance. The models rely heavily on the assumption that changes in standardised CPUE from selected commercial vessels are a reliable measure of changes in stock abundance. We have repeatedly voiced our objection to this type of fisheries dependent assessment and the risks inherent in CPUE based assumptions. It appears to be faith based, relying on an indicator that lacks validity, as despite the known collapse of rock lobster stocks not predicted by the model, the NRLMG refuse to move from their faith in their CPUE stock assessment methodology.
42. The NRLMG has been dominated by commercial interests and FNZ show all the symptoms of being captured by failing to modify the advice to the Minister to reflect the uncertainties and gaps in the information, as required to comply with the purpose and principles of the Act. There has been an over reliance on stock assessments and CPUE management procedures by the Rock Lobster Industry Council and FNZ, to the exclusion of other information sources. It is unsurprising the matter ends up before the Courts, and the recent CRA 1 High Court decision exposes the management deficits.

Management approach

43. The management approach is determined by the NRLMG, who state;

The NRLMG's management goal is for all spiny rock lobster fisheries "to be managed and maintained at or above the assessed and agreed reference levels, using a comprehensive approach that recognises a range of customary Māori, recreational, commercial, and environmental concerns and values."
44. The NRLMG goal is incoherent and lacks legal foundation. Assessed and agreed reference levels is unavailable as a stock target. Furthermore, the Court has clarified that the TAC setting process locks in a suite of environmental and information principles, these clearly overtake any perceived values of user groups. Relying on stock assessment models for single species assessments with all their uncertainty and ability to be manipulated is no longer acceptable.
45. The 2019 CRA 1 stock assessment and management approach relies heavily on a model to fit CPUE data and some catch sampling by observers. The ability or usefulness of this approach is highly questionable. It is this flawed management approach that has brought us to this low point of abundance and diversity, and to rely on it to restore ecosystem function is delusional.
46. The proposition that the outputs of this model represents the best information serves commercial interests as its outputs routinely seek to justify the highest short-term catch, regardless of long-term costs. In our view, the NRLMG remains focused on a single purpose strategy of maximising current catch.

Regulatory capture

47. An effective regulatory regime is necessary for fisheries to be managed and operated efficiently and equitably. It is inevitable that the regulator will become captured, but the degree of capture will vary across agencies from low to high. Strong capture violates the public interest to such an extent that the public would be better served by either (a) no regulation of the activity in question – because the benefits of regulation are outweighed by the costs of capture, or (b) comprehensive replacement of the policy and agency in question (Carpenter and Moss 2014: 11).
48. Fisheries in general, and rock lobster in particular, suffer from strong regulatory capture. In CRA 1 the stock assessment outputs have been generated in concert by an industry lobby and government agency. The harvest strategies devised by this process are preoccupied with maximising commercial catch, often using contrived models to support the strategy. The steady declines of age structure and abundance in CRA 1 and CRA 2 over time contradict the harvest strategies.
49. Neither CRA 1 or CRA 2 will survive to rebuild to functional levels while this process continues. The regulatory environment has become heavily captured and the popular quote attributed to Albert Einstein seems appropriate: ‘No problem can be solved from the same level of consciousness that created it’. Over time it has become more obvious that the problem of overexploitation will not be solved with current actors and processes. We must immediately apply policy that values abundance and ecosystem function over a short-term desire for maximum catches. That is the only correct response to the High Court decision.

Need for transparent advice by FNZ

50. From the evidence before the High Court it was readily apparent that subsequent (i.e. post decision-making) scientific advice to the Minister (and disclosed by the Minister in his affidavit to the High Court) was substantially more candid than the advice provided to the Minister by FNZ officials, as contained in the relevant proposal and final advice paper, and the subject of consultation with stakeholders.
51. It is not self-evident from the current FNZ discussion paper (2023/01) the identity of the officials providing advice in the paper, their qualifications or experience, in particular their qualifications and experience for making statements in relation to marine ecology, and whether the advice and options in the discussion paper are supported by the senior scientific witnesses who provided affidavit evidence to the High Court.
52. In the context here it is suggested that it is entirely appropriate for FNZ to disclose who are the authors of the discussion paper, their qualifications and experience, whether officials have expertise in marine ecology, and whether or not the options contained in the discussion paper are supported by the senior scientific advisors who gave affidavit evidence to the High Court. Conversely if such senior scientific advisors have not been consulted, then why not (?). Such disclosure, including disclosure of any further advice received from senior scientific advisors, is submitted to be appropriate given the history of court proceedings, the Minister's obligations to consult, and the duty of candour generally.

Stock assessment and monitoring

Stock assessments fail to describe reality

53. The FNZ proposal paper includes a plot showing historical levels of estimated biomass. (Figure 1). The 2022 rapid update for CRA 1 added three years of additional data relative to the original stock assessment done in 2019.

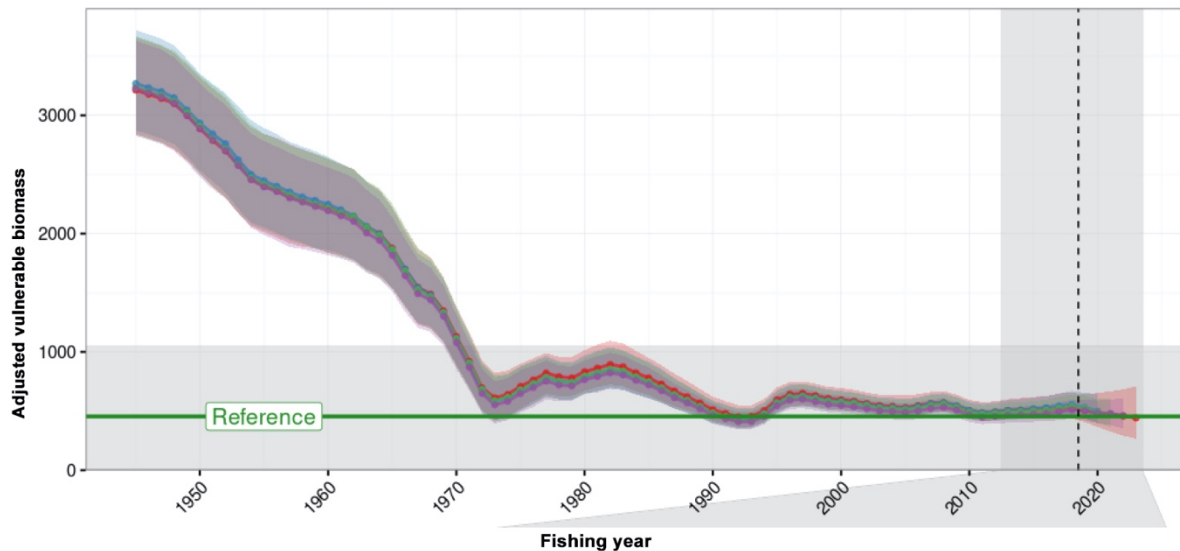


Figure 1: Results of the 2022 rapid update showing the CRA 1 vulnerable biomass is 14.4% (462 tonnes) of the unfished level of 3226 tonnes. **Source:** Fisheries NZ.

54. This model is implausible given the experience of the public. The observed continual decline in abundance and size over the last 50 years is simply ignored as if it doesn't exist. The model projects stability while none exists.
55. We are concerned this assessment portrays near stability and thereby projects a view that small adjustments are all that's required to rebuild age structure and abundance in CRA 1. The same model was used to estimate the biomass that would support maximum sustainable catch over time. This Reference Level takes no account of broader outcomes such as ecosystem functions and the spread of kina barrens, the size structure of the population, environmental changes that are affecting productivity, the carbon footprint of fishing with low catch rates, or the needs and expectations of hapū and the broader public.
56. The public survey captured experienced fishers' observations from the northeast coast that describe steady depletion of rock lobster abundance and smaller size crays. Figure 1 relies on the rock lobster fishery shifting effort into other areas of CRA 1 to maintain catch rates and profitability. The reality is the opposite – a steadily declining population comprising younger rock lobster.
57. There is no plausible estimate of unfished biomass used in the stock assessment model. Management has relied on comparing current biomass with model based estimates of unfished biomass. These estimates of abundance are implausible when compared to historical reports of abundance enabling catches from wading in shallow waters or using a sheep's head in a stocking to catch crayfish from the rocks.

58. The Fisheries New Zealand November Plenary Report also lists other major uncertainties with the CRA 1 stock assessment as:
- a. Levels of illegal catch and recreational catches in years without surveys.
 - b. Length frequency samples may not be representative of the fishery throughout all areas (particular issue).
 - c. Growth rate (limited tag data).
 - d. Model unable to predict sex ratios during spring-summer.
 - e. Spatial heterogeneity of the observations throughout statistical areas may not be representative of the population.
59. Comparing the FNZ model with peoples' lived experiences exposes the flaws and reiterates our concerns that this approach wildly underestimates the degree of depletion. In CRA 2 the reliance on such models led to its collapse. We cannot make the same mistakes for CRA 1, which ultimately impacts on hapū and the public of Northland.

Northland crayfish survey

60. FNZ issued its discussion paper on 10 January. On 11 January the submitters launched the Northland Crayfish Survey to gather peoples' feedback on the state of the spiny (red) rock lobster fishery around Northland, in CRA 1. Respondents were advised their feedback would be aggregated with all responders' surveys and used to inform the CRA 1 submission. The Survey closed on 19 January 2023.
61. There was a total of 548 responses to the survey. Not all respondents answered every question. 518 respondents indicated that their most common fishing area is in Northland (CRA 1). The remainder mainly fished in other areas between Canterbury and the Hauraki Gulf.
62. Of the 518 respondents who mostly fished in CRA 1, 95% were recreational fishers, around 2% identified themselves as Māori customary fishers, and less than 1% identified as a commercial fisher. The majority, 66%, had over 20 years' experience fishing for rock lobster.
63. The 508 CRA 1 fishers described the change in the availability of crayfish in their most commonly fished area compared to when they first started fishing. Around 14% of respondents advised that there were no or very few crayfish left. Another 22% advised there were around 20% of historic crayfish numbers. And, 23% of respondents said there were around 40% of historic numbers available in their most commonly fished area. **Overall, this represents 59% of Northland respondents independently saying there is a major change in the abundance of rock lobsters in the CRA 1 management area.** Northland respondents who had have been cray fishing for over 20 years were more likely to have experienced a decline in crayfish abundance, with 63% saying that availability of crayfish is 40% or less of what it was when they started fishing.
64. We are not aware of any similar large-scale survey of rock lobster fishers in CRA 1 and submit that these 2023 survey results need to be presented to the Minister as part of current available information on stakeholder views and the availability of rock lobster to fishers in CRA 1 (See Appendix 1).

The inevitable cost of relying on CPUE to assess abundance

65. Despite being one of the most common pieces of information used in assessing the status of fish stocks, relative abundance indices based on CPUE data are notoriously problematic. Raw CPUE is seldom proportional to abundance over a whole exploitation history and an entire geographic range, because numerous factors affect catch rates. One of the most commonly applied fisheries analyses is standardisation of CPUE data to remove some of the factors that that may affect annual CPUE as an index of abundance.
66. Even if CPUE is standardised appropriately, the resulting index of relative abundance, in isolation, provides limited information for management advice or about the effect of fishing. In addition, CPUE data generally cannot provide information needed to assess and manage communities or ecosystems. We discuss some of the problems associated with the use of CPUE data and some methods to assess and provide management advice about fish populations that can help overcome these problems, including integrated stock assessment models, management strategy evaluation, and adaptive management. We also discuss the inappropriateness of using CPUE data to evaluate the status of communities. We use tuna stocks in the Pacific Ocean as examples.
67. Several specific questions arise when considering management of ecosystems. For example, what would be the impact on the ecosystem if all commercially valuable stocks were fished at their single-species MSY levels? Do apex predators in the pelagic system play a role that is greater than their absolute abundance? Is it possible that declines in abundance of large predators have increased the survival of juveniles, which sustain the large catches at (apparently) low levels of abundance? Such questions cannot be answered by single-species approaches. Analyses using multispecies (e.g. [Stefansson and Palsson, 1998](#); [Hollowed et al., 2000](#); [Stefansson, 2003](#)) and ecosystem (e.g. [Polovina, 1984](#); [Walters et al., 1997, 1999](#); [Christensen and Walters, 2000](#); [Olson and Watters, 2003](#)) models have been used to address some of these questions ([May et al., 1979](#); [Pauly et al., 2000](#); [Watters et al., 2003](#)). For example, using Ecosim models, [Walters et al. \(2005\)](#) showed that widespread application of single-species MSY-based policies would, in general, cause severe deterioration in ecosystem structure, in particular, the loss of top predator species. Their result supports the practice of protecting some forage species specifically for their value in supporting larger piscivores ([Walters et al., 2005](#)).
68. CRA 1 falls victim to the same malady as destroyed CRA 2. Attempts at maximising catch using recent CPUE to drive management procedures become trapped by McNamara's fallacy:

McNamara fallacy (also known as the quantitative fallacy), named for Robert McNamara, the US Secretary of Defense from 1961 to 1968, involves **making a decision based solely on quantitative observations (or metrics) and ignoring all others**. The reason given is often that these other observations cannot be proven.

Logical Form:

Measure whatever can be easily measured.

Disregard that which cannot be measured easily.

Presume that which cannot be measured easily is not important. Presume that which cannot be measured easily does not exist.

69. This weakness is bolstered by the Burns effect "*when you can't measure the things that are important, you make the things you can measure important.*" Ken Burns states in the documentary series 'The Vietnam War'.
70. The first step is to measure whatever can be easily measured. This is okay as far as it goes. The second step is to disregard that which can't be easily measured or to give it an arbitrary quantitative value. This is artificial and misleading. The third step is to presume that which can't be measured easily is unimportant. This is blindness. The fourth is to say what can't be measured easily really doesn't exist. This is suicide.
71. The relevance to the CRA 1 stock assessment is obvious. We know the efficiency of a craypot set now is vastly improved over one set 40 years ago. However, we don't know to what extent the improving efficiency sustains catch over time and what relationship CPUE has to abundance. So we make it up, using statistics to make a case that CPUE can be used as a proxy for abundance and this assumption underpins the entire stock assessment.
72. Rock lobster are not suited to this style of stock assessment. They are not evenly dispersed, preferring to live in carefully selected habitat that gives shelter from predators. Living on rocky reef structure makes their habitat easily identifiable with modern, high strength echo sounders and seabed mapping. CPUE is maintained by moving effort along rocky reefs leaving depleted areas in search of pockets of abundance. This style of fishing renders CPUE unreliable as an indicator or proxy of abundance.
73. To put the final nail in the coffin a point estimate of biomass and yield is the focus for management decisions for a single species while ignoring every other part of the ecosystem the species is embedded within, as if doesn't exist. This is simply delusional and it's no wonder we struggle to maintain an age structured rock lobster population in CRA 1.
74. CPUE cannot measure the size of the stock, it is only a relative index assumed to show trends over time. Changes in stock abundance in an area will affect CPUE, however, this is only one variable that determines CPUE. CPUE measures the number of crayfish that enter and remain in the pot until it is hauled. The success of pots to attract and retain catch is predominantly determined by light (stage of the moon and cloud cover), swell (NE swell on the northeast coast increases CPUE), and bait (fresh bait has a higher CPUE than frozen heads). No attempt is made to incorporate these variables leaving CPUE as a flawed proxy for abundance.
75. It doesn't matter how well the model fits CPUE data as there is limited correlation with actual abundance and there is no absolute measure of stock size. This model cannot be corroborated from other data sources and has serious limitations and therefore needs to be given less weight.

Trophic cascade

76. Trophic cascades are the signature of indirect effects of changes in the abundance of individuals in one trophic level on other trophic levels (Pace et al. 1999). Trophic cascades can occur when the abundance of a top predator is decreased, releasing the trophic level below from predation. The released trophic level reacts by an increase in abundance, which imposes an increased

predation pressure on the next lower trophic level, etc. In the case of marine systems the outside perturbation typically stems from fishing, which can easily exceed the 'natural' predation mortality. Trophic cascades had not been thought to occur in marine systems (Steele 1998), but recently trophic cascades have been demonstrated in several large marine systems: the Black Sea (Daskalov et al. 2007), the Baltic Sea (Casini et al. 2008; Möllmann et al. 2008) and parts of the Northwest Atlantic (Frank et al. 2005, 2006; Myers et al. 2007). These trophic cascades cover up to four trophic levels and reach all the way down to primary production.²

77. MSY driven single species stock assessments are blind to any trophic cascades that result from prescribed catch levels. Such risks are not usually included in Ministerial advice that is uninterested in examining the existence of any trophic cascade. When one is encountered, say exploding urchin populations devouring kelp forests, it barely rates a mention in Ministerial advice that remains silent on any strategy to reverse the resulting ecosystem disruption.

78. From the Fisheries New Zealand November 2022 Plenary Report:

Fishery independent relative biomass surveys in the Hauraki Gulf Marine Park
Researchers at the University of Auckland and their collaborators have conducted a range of diver and potting surveys for rock lobsters at selected sites within CRA 2 (northern part of statistical area 905 and eastern Coromandel (eastern statistical area 906)) for many years. Data from these surveys have not, to date, been evaluated as to their utility in stock assessment modelling.

Rock lobster abundance has been monitored inside and outside the marine reserves at Cape Rodney and Tāwharanui since the 1970s and Hahei since the mid 1990s (MacDiarmid 1991, Kelly et al. 2000, LaScala-Gruenwald et al. 2021). Divers search 50 × 10 m transects on shallow reefs (< 20 m depth) in late autumn or early winter, visually recording carapace length and sex for all animals located. All reserves show similar patterns of an initial increase, followed by a decline since about 2008; all three populations within the reserves broadly follow the trends in the fishery up to 2019.

Potting surveys inside and outside Cape Rodney and Tāwharanui marine reserves in 2018 and 2019 (Hanns 2021) were used to assess the value of using lightly fished populations inside marine reserves to assess stock status empirically (Hanns & Shears in press). Potting inside and outside the reserves was conducted in collaboration with a commercial fisher in autumn and spring each year, and parallel dive surveys were conducted in autumn or early winter each year. Estimates of relative abundance for the total, vulnerable, and spawning populations in the fished areas were lower than in the marine reserves (in the range 2–18%). The surveys also generated length frequency distributions for populations in the marine reserves. The dive surveys after 2019 do not show large increases in abundance relative to previous surveys.

A broader survey of rock lobster densities throughout the Hauraki Gulf Marine Park was conducted in 2021 and 2022 (Hayley Nessia, Waiheke Marine Project, and Noises Marine Protection and Restoration Group pers. comm.). Surveys were conducted by divers at 11 locations (3 marine reserves and 8 fished areas) during autumn and winter using 50 × 10 m transects on shallow reefs. Estimated biomass has increased at the sites monitored in statistical area 905 since 2017, but not the sites monitored in statistical area 906. The increases in abundance suggested by the increasing CPUE and estimated by the 2022 CRA 2 stock assessment model are not reflected in the shallow (generally < 20 m) reef populations studied within the Hauraki Gulf Marine Park. Only low numbers of juveniles were observed by divers in these surveys, suggesting future recruitment may not be strong.

The extent to which some or all of these survey results can be used in stock assessment modelling or as external checks on stock assessment results has not yet been determined and needs further analysis.

² Andersen, Ken & Pedersen, Michael. (2009). Damped trophic cascades driven by fishing in marine ecosystems. *Proceedings. Biological sciences / The Royal Society.* 277. 795-802. 10.1098/rspb.2009.1512.

79. In the current proposal, FNZ advise that all four options aim to increase rock lobster abundance and assume “that this will lead to increased predation on kina”³, while also acknowledging that “the level at which spiny rock lobster biomass are able to control kina populations is unknown”⁴. The uncertainty around rock lobster management and highlighted in these two statements alone reinforces the need for the Minister to comply with the High Court directions. The Minister must set a precautionary TAC by taking an ecosystem approach that will ensure sustainability of the rock lobster population and associated and dependent species in the aquatic environment.

Estimation of B_{MSY} reference levels

80. The estimation of B_{MSY} reference level as a proportion of the unfished level remains elusive largely due to the unknown size and age structure of the virgin biomass. Our concern is that it’s not that current abundance is 15, 30, or 40% of the unfished size, it’s that in most places all indications point to a stock size of 2, 3, or 5%.

81. In CRA 1, 2 and 3 rock lobster are a major rocky reef ecosystem service provider. The original biomass in all three areas is not being recognised in modelling, because if the real degree of depletion was taken into account these stocks would be below the hard limit which would require the Minister to reduce catches to almost zero. Consequently, we are presented with implausible models that don’t match our reality, but clearly serve to maintain commercial catches.

82. From the consultation document:

The estimated B_{MSY} reference level for CRA 1 (454 tonnes) provides guidance for this review of sustainability measures. Further works needs to occur, including stakeholder engagement, to recommend management targets for all spiny rock lobster stocks to the Minister.

Management targets could be at or above the B_{MSY} reference level, depending on social, cultural, ecological, and economic factors, as well as stakeholder aspirations for each spiny rock lobster fishery. In setting targets, the role of spiny rock lobster in maintaining biodiversity in a healthy marine environment will need to be considered. Management targets should take into account fishery implications such as yield and catch rate. Additional approaches that could be used to move stocks towards these new targets or maintain the stock at above any targets, would also need to be agreed by the Minister.⁵

83. The NRLMG and FNZ appear to promote the notion that a B_{MSY} reference level can be chosen to suit sector aspirations. A B_{MSY} reference level, or B_{REF} as used by the NRLMG, uses s13(2) of the Act as there is no reliable biomass for the current level of stock or the level that would provide MSY. The use of s13(2) is in itself an acknowledgement that information is unreliable, uncertain and inadequate. In such circumstances, the Minister must be cautious and apply the precautionary principle.

84. The B_{MSY} reference level is used as an interim target and settles on a vulnerable biomass target of 454 t (14.4% of the unfished biomass level) with an annual exploitation rate weighted across

³ Review of sustainability measures for spiny rock lobster (CRA 1) for 2023/24. Fisheries Discussion Paper No: 2023/01. [79]

⁴ [At 80]

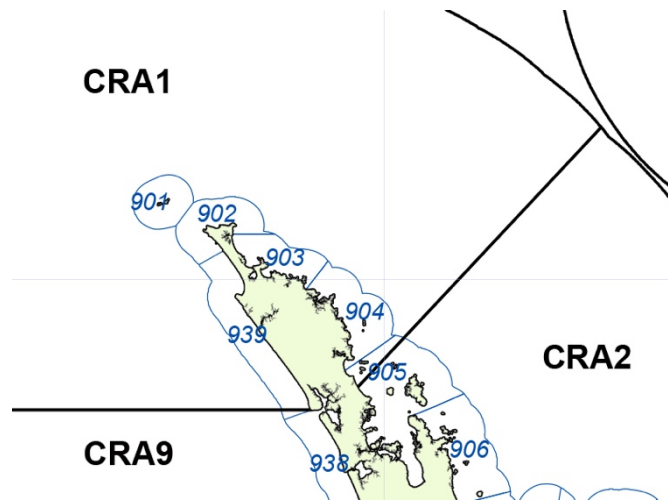
⁵ [At 26-27]

seasons of 29.8%. This is an unacceptably low target and high exploitation rate given the low and uncertain recruitment in CRA 1, and the need to re-establish older age classes in the population. The uncertain nature of the estimated B_{REF} and a natural mortality rate around 10.8% dictate an exploitation rate around 10%. **A TAC of between 40 and 80 tonnes is not unreasonable after applying the precautionary principle.**

Catch information and current settings

Commercial

85. The CRA 1 area extends from the Kaipara Harbour on the west coast, around Cape Reinga and south to Te Arai Point. Within this area there are 5 Statistical Areas for commercial use. Those reporting areas are 939, 901-904 and part of 905.
86. CRA 1 has a range of environments from rugged, exposed coastline to the west, to the Three Kings area with upwellings and strong currents, and East Northland with extensive rocky coastline warmer waters and sheltered bays.
87. Since the late 1990s there has been a significant increase in the proportion of catch taken from the reporting areas for the Three Kings area (901) and the west coast (939) where catch rates are higher. Less commercial catch has been taken from East Northland (903 and 904) where catch rates are lower. While area is taken into account in the analysis of rock lobster catch rates, much of the data that drives the stock assessment results comes from the north-western area. The submitters continue to advocate for this extensive CRA 1 management area to be split at North Cape to create (at a minimum) two smaller Quota Management Areas.
88. The assumption that growth rates and recruitment are the same for the north-western area and East Northland is probably wrong, but the Rock Lobster Science Working Group concluded that there was insufficient data collected from the East Northland commercial fishery to include it as a separate area in the CRA 1 stock assessment model. While we are told that fishing effort in East Northland has declined over the last few years, data from the rock lobster catch and effort report (Starr 2021) shows that a significant proportion of CRA 1 fishing effort and catch has come from East Northland.
89. The critical data missing from East Northland is commercial logbook data or observer coverage used to help estimate trends recruitment. If commercial fishers had self-reported the size of rock lobster caught, or if observer coverage had been evenly spread across all statistical areas then a separate status of the stocks and management approach for East Northland would be available. Instead, observer coverage was focused on areas where the majority of fishing occurs because catch rates are higher and estimates of recruitment are probably not representative of all of CRA 1.



Section 111 landings

90. Commercial fishers are permitted to take spiny rock lobsters for personal use under s111 of the Act. These fish must be reported to FNZ using code 'F' but are considered as recreational catch. FNZ advise the maximum allowed for these landings in stock assessments in CRA 1 is 5.02 tonnes. However, there is no limit to the total, actual annual removals that can be taken by commercial fishers using s111.
91. FNZ note that the data on s111 takings for 2019 and subsequent years is not included in the proposal document "because of uncertainty in the reporting of the section 11 (sic)"⁶. This uncertainty will require a precautionary TAC decision when the Minister decides how many tonnes to set aside to 'allow for' the mortality caused by recreational fishing given that s111 catches are considered as part of the recreational allowance.
92. We object to rock lobster taken under s111 being classified and included in the recreational harvest estimates on the grounds that –
- a. They are taken using commercial methods and techniques (recreational fishers are limited to 3 pots per person and 6 pots per vessel);
 - b. There is no limit to the annual removals;
 - c. There are no means of validating the reported 'F' code catches;
 - d. These fish are included as recreational catch which reduces the availability of rock lobster to amateur fishers when the overall allowance and individual bag limits are reduced.
93. FNZ propose four options for the future management of CRA 1. Option 1 is the status quo, which is not viable. If options 2, 3 or 4 are applied and s111 takings are included in the recreational allowance this biases the Minister's decision towards protecting commercial harvest to the detriment of recreational interests.
94. For example, in 2021 commercial interests were granted access to 56.7% of the TAC by way of the TACC and s111s. With the reduction in 2022, commercial interests' access to the 193 t TAC increased to 57% while the recreational allowance reduced from 15.8% to 14% of the TAC.
95. If we consider the s111 removals at a maximum of 5.02 t, in 2021 that represented 15.7% of the recreational allowance. By 2022 s111 mortality represented 18.6% of the overall allowance. The current FNZ proposals mean that s111 mortality will be either 22.8% or 26.4% of the recreational allowance.

Legal obligations – Treaty of Waitangi

96. We agree with the High Court's interpretation of the international obligations applying to fisheries management in Aotearoa, as follows –

New Zealand is subject to the requirements of the United Nations Convention on the Law of the Sea (UNCLOS), from which certain aspects of the Act derive, as well as other international law instruments. Section 5 of the Act provides that:

⁶ [At 59]

This Act shall be interpreted, and all persons exercising or performing functions, duties, or powers conferred or imposed by or under it shall act, in a manner consistent with –

- (a) New Zealand's international obligations relating to fishing; and
- (b) The provisions of the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992.[14]

97. The Court went on to explain that there are two approaches to fisheries management that are identifiable at international law, being an 'ecosystem approach' and a 'precautionary approach'. [15] We are celebrating this clarity.

Legal obligations – Fisheries Act 1996

Mandatory obligations to ensure sustainability

98. Sections 8, 9 & 10 of the Fisheries Act 1996 (**the Act**) define the purpose and principles on which fisheries management is based. This purpose and accompanying principles ought to guide establishment of an environmental bottom line that will ensure sustainability – the overarching obligation. This bottom line applies to all species – none are exempt from the obligation to ensure sustainability. The key tool used to defend the bottom line is the setting of catch limits pursuant to s13; determining the TAC for each stock.

99. The biomass that will provide the maximum sustainable yield (B_{MSY}) of any species is only a starting point at determining the environmental bottom line. From this theoretical point the principles must be applied to describe and take into account any uncertainties, information fullness and reliability, the ecosystem and international obligations, while applying the precautionary principle. Properly taking these matters into account will inevitably lead to the requirement for a higher biomass than B_{MSY} . We recommend a target of B_{50} for recruited biomass in CRA 1.

100. Each TAC option must include assessments of each of the relevant factors identified in Part 2 of the Act, and describe how a Minister may take these into account; how to explicitly reflect each of the factors when making a determination. Without full advice from officials, a Minister will be unable to take the mandatory factors into account.

101. It is insufficient to gloss over these requirements with a light hand considering the recent decision by Churchman J. The High Court identified extensive gaps in the current B_{MSY} -centric process and directed a new review to incorporate the shortcomings detailed in the judgment. The FNZ proposal paper is a defiant dedication to the status quo, making as few concessions as may be lawful, and doesn't engage in the spirit and detail the High Court has directed.

102. The single species stock assessment process has been ruled insufficient, and the rapid assessments even less useful without the full application of the factors needed to ensure the bottom line is at least achieved; the bottom line doesn't form a coherent target or aspiration, it is a bottom line not to be breached.

103. In making his decision we expect the Minister to comply with the Court’s findings and the purpose and principles of the Act – to create an environmental bottom line of sustainability – therefore the Minister must set the CRA 1 TAC to achieve a stock size well above the single species B_{MSY} .

104. Additionally, the Court found that section 5 was not properly taken into account. Obligations to international treaties ratified by New Zealand include biodiversity and applying the precautionary principle. The Minister is directed to take these obligations into account and they must be reflected in decisions when exercising powers under the Fisheries Act 1996.

The importance of age structure on ecosystem services

105. The High Court highlighted the statutory duty on the Minister to take into account any effects of fishing on any stock and the aquatic environment as per s8 of the Act: ‘Effect’ means the direct or indirect effect of fishing, including any positive, adverse, temporary, permanent, past, present, future, and/or cumulative effect.⁷

106. The fundamental problem is that fishing, in addition to removing biomass, also truncates the age and size structure and reduces spatial heterogeneity of exploited populations because fisheries usually target large and therefore old individuals (Berkeley et al. 2004b).

107. It is the truncated age structure of rock lobster, the loss of large individuals, that results in the significant loss of kina predation. To adopt an ecosystem sensitive and precautionary approach to setting a TAC requires information that links the exploitation rate to the truncated age structure, and the effects this has on ecosystem function and resilience to environmental change.

108. Why would multiple reproductive age classes provide stability to a fish population? As pointed out by Murphy, multiple reproductive age classes helps increase the survival rate of larvae under harsh and variable environmental conditions. Such long-tailed age structures (a long tail of old individuals in the age distribution) certainly provide more reproductive output. In addition to this simple reason, there are other biological effects associated with a long-tailed age structure, including: (1) age-related differences in spawning locations and time, and (2) increased quantity and quality of eggs produced by older (experienced) or larger fish. These effects, known as bet-hedging strategies, can dampen environmental stochasticity and help stabilise fish populations. That is, fish allocate reproductive outputs across larger spatial and temporal extent to ensure reproductive success in unfavourable environmental conditions. The association between bet-hedging and age structures is often referred as maternal effects in fishes.⁸

109. The B_{MSY} -centric stock assessments used in CRA 1 ignore age structure and fail to advise a Minister of the uncertainties and incompleteness of the modelling, thereby preventing a reasonable application of the precautionary principle. For example, the current stock assessment is very uncertain and not well supported by observation. Biomass is plotted for

⁷ At [22]

⁸ Hsieh, Chih-hao & Yamauchi, Atsushi & Nakazawa, Takefumi & Wang, Wei-Fen. (2009). Fishing effects on age and spatial structures undermine population stability of fishes. *Aquatic Sciences*. 72. 165-178. 10.1007/s00027-009-0122-2.

many decades and shows a very stable population since 1970. The evidence of Te Uri O Hikihiki hapū records the steady decline of rock lobster since the 1970s. The recent Northland Crayfish Survey shows a similar decline. Clearly both conditions cannot be true – **real life observations must be given greater weight than a numerical model generating fish that have never been observed.**

110. There is no advice in the FNZ proposal paper indicating what the deficit of large rock lobster is on the shallow reefs of Northland, nor the time it would take to achieve a number that would restore ecosystem services of rock lobster for each TAC option tabled. A Minister cannot defend the bottom line while not knowing if the ecosystem will recover in 5 or 50 years, or not at all under the different TAC options.

111. Additionally, the reproduction deficit arising from the loss of large spawners isn't mentioned, although it is largely accepted and supported by research.

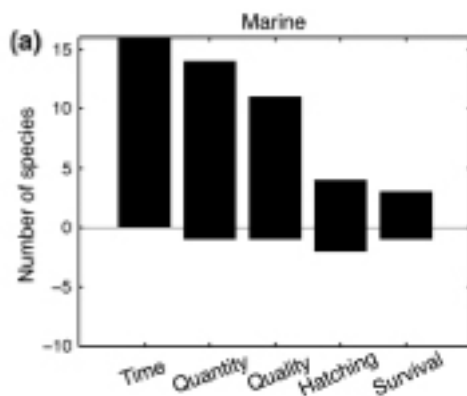


Figure 2: Frequency of maternal effects of fish early life history traits for a marine species. Timing of spawning (Time), egg quantity (Quantity), egg quality (Quality), egg development or hatching rate (Hatching), larval survival (Survival). Positive values indicate positive effects and negative values indicate negative or no effects. Overall, maternal effects are positive for fish early life history traits. [Hsieh, Yamauchi, Nakazawa, Wang. 2009]

112. The Minister must not be lured into a comfort zone with assurances that there is an abundance of small rock lobsters in the fishery. When CRA 2 was reviewed the then Minister seemed to rely on that advice as being a positive sign. Real time observations and expert advice to the High Court make it clear that even if there are a lot of small rock lobsters in the fishery, they are ineffective predators on established populations of adult kina.

113. The need to enable rock lobster to grow through to large adults in sufficient numbers to provide their kina population control services is required to comply with Churchman J. Lacking additional initiatives from the NRLMG, the Minister is left with reducing the exploitation rate as the primary means of controlling the age structure.

114. Another common issue raised during the survey of Northland rock lobster fishers is the increasing prevalence of long-spine black sea urchins. These non-native urchins seem to like occupying dark cracks and often block access to the cracks that spiny rock lobster prefer. Experienced observers have advised that many cracks that were historically inhabited by crayfish are now inhabited by these long-spine urchins, and have no surrounding kelp. Consequently, the spiny rock lobsters seem to have abandoned these traditional hideouts.

Sustainability measures

115. The High Court has identified the key lever in ensuring sustainability is through setting the TAC. This can be achieved by applying s13, 14 or 20 of the Act. However, section 11(3) of the Act provides for the Minister to apply a range of sustainability measures, including but not limited to setting a TAC.

116. Section 11(3) outlines sustainability measures related to the size, sex, biological state of fish and the environment, area controls, fishing methods and seasons. This broad range of measures reflects the gravity of the decision to be made and the information required to make a lawful Ministerial decision. It also highlights that s11 sustainability measures can be applied to stocks within and outside the QMS. Clearly there is scope for the Minister to make a management decision that does not solely rely on the TAC. There is scope for officials to recommend using particular regulations to compliment the TAC. Remaining silent on complementary regulations compels the Minister to be additionally cautious given the uncertain state of the stock assessments and cascading ecosystem losses from the status quo.

117. Under the matters outlined by the Court, the majority of exploited fish stocks in New Zealand waters (within and outside the QMS) have insufficient data to set a lawful TAC, therefore it makes sense that the Minister must give particular regard to the broader sustainability measures as described in s11(3) while applying the precautionary principle when making his next decision for CRA 1.

118. The latest proposal from FNZ does not identify nor discuss any other sustainability measure aside from setting the TAC and applying controls to reduce recreational catch. Given the scope of measures under s11(3) this advice is incomplete.

119. We submit the FNZ proposal for the future management of CRA 1 is insufficient for consultation purposes on the grounds that:

- e. the full scope of possibilities are not identified and offered for discussion;
- f. the absence of a range of possibilities naturally skews the potential feedback to –
 - i. only the 4 TAC options in Table 1 of the proposal; and
 - ii. the proposed recreational daily limit reductions in Table 2.

Statutory duty to provide for peoples' wellbeings

120. In the Act's purpose **ensuring sustainability** means –

- (a) Maintaining the potential of fisheries resources to meet the reasonably foreseeable needs of future generations; and
- (b) Avoiding, remedying or mitigating any adverse effects of fishing on the aquatic environment.

Utilisation means -

Conserving, using, enhancing, and developing fisheries resources to enable people to provide for their social, economic and cultural wellbeing.

121. We submit the CRA 1 stock is not being managed to meet the purpose and principles of the Act, nor is CRA 1 sufficiently abundant to enable people to provide for their social, economic and cultural wellbeings. The increasing number of hapū applications for temporary closures under

s186A of the Act and environmental groups appealing Regional Plans highlight the ecosystem effects of low rock lobster abundance, and the concern that mana whenua and the community have that depletion is affecting their wellbeings.

122. We submit that the CRA 1 stock needs to be rebuilt. The current size of the overall vulnerable biomass is close to its lowest historical level. While commercial fishing effort in East Northland is currently low, low stock abundance is severely limiting access to the fishery for recreational and Māori customary fishers.

123. Churchman J discusses the purpose of the Act in defining utilisation as including the statutory requirement for the Minister to provide for the cultural wellbeing of all people. This includes the obligations on Māori to exercise guardianship in accordance with tikanga Māori. The Minister also has a statutory duty to conserve and enhance fisheries resources to enable people to provide for their wellbeings. As the Supreme Court identified earlier, “people providing for their wellbeing, particularly their social wellbeing, is an important element of recreational interests”. Fishing for food is most often an opportunity to share time with the whānau, grandkids, friends or work colleagues. Relationships are built and strengthened through sharing time, stories and kaimoana. Crayfish stocks must be managed to a lawful level to enable all people, not just commercial interests, the opportunity to provide for their social, economic and cultural wellbeings.

124. Provision of wellbeings for non-commercial interests is enabled through the application of ss20 and 21 of the Act, after a TAC has been set to ensure sustainability. Churchman J confirmed earlier judgments that clearly set out the scheme of the Act and Ministerial obligations. The Supreme Court was clear in saying that –

It follows that the total allowable commercial catch is ultimately determined by a calculation. Starting with the figure for the total allowable catch, the Minister must decide what allowances to make for what will be taken by the specified non-commercial fishing interests, and all other mortality caused by fishing. The Minister deducts the sum of these allowances from the total allowable catch and the difference is the total allowable commercial catch.”⁹

TAC - Mortality allowances = TACC.

- a. First set the TAC, then
- b. Deduct the estimated mortality associated with non-commercial fishing and fishing related mortality; and
- c. The balance is the Total Allowable Commercial Catch (TACC).

125. The quality of information relating to the mortality associated with commercial and non-commercial fishing is variable. For crayfish harvesting there is assumed high illegal catch and generally the estimates for recreational harvest are limited. The greater the uncertainty, the greater need for a precautionary decision.

126. Taking a precautionary approach enables the Minister to fulfil his statutory obligation to set a TAC that encompasses all mortality in that fish stock. For CRA 1 the Minister must be advised to

⁹ At [53]

set aside sufficient tonnages to 'allow for' all mortality associated with incidental and unseen commercial and non-commercial fishing, illegal and undeclared catch.

127. Once the allowances have been set the Minister must turn his mind to the regulations. As above, we submit in support of a package of measures within the TAC including a reduced recreational daily bag limit, to assist the rebuild of CRA 1. The regulations must be set at a level that will maintain, on average, annual recreational harvest within the allowance, recognising that other factors such as weather and local availability affect catch rates. This process highlights the need for the Minister to set a precautionary allowance because it is the Minister's statutory obligation to account for all catch within the TAC.

Statutory duty to use best available information

128. The High Court has reinforced the statutory requirement for the Minister to use best available information as a basis for his future management decisions. Churchman J went so far as to say that, "the purposes of the Act appear to create what could be described as an 'environmental bottom-line', and are accordingly complemented by a scheme that favours precaution"¹⁰.

129. Given the uncertainty around recent and historic commercial catch and fishing effort information, which is assumed to be tracking changes in stock abundance in the CRA 1 stock assessment model, real life observations of changes from people who have spent hundreds of hours in the waters of CRA 1 must be taken into account. This is a necessary reality check.

130. On 11 January the submitters launched the 'Northland Crayfish Survey' to gather peoples' feedback on the state of spiny rock lobster numbers around Northland. Respondents were advised their feedback would be aggregated with all responders' surveys and used to inform this submission. (See Appendix 1)

131. The majority (66%) of the 518 survey respondents who mainly fished in Northland had over 20 years' experience fishing for spiny (red) rock lobsters. Around 14% of 508 of those respondents advised that in their most commonly fished area there were no or very few crayfish left. Another 22% advised there were around 20% of historic numbers, and 23% of respondents said there was around 40% of historic numbers remaining in their most commonly fished area. Altogether, this represents 59% of people independently saying they have witnessed a major change in the abundance of rock lobsters in the CRA 1 management area. We are not aware of any similar large-scale survey of rock lobster fishers in CRA 1.

132. There is no single source of best available information that excludes all other sources. The Minister must be advised that this survey forms part of the best available information on recreational fishers perspectives on the state of the CRA 1 fishery. From the High Court decision:

While I am of the view that this principle does not add much to the requirements of the Act that the Minister must make decisions in reliance on the best available information, it is clear in the authorities that "An improperly informed exercise of a discretion is not a proper exercise". As stated by McGechan J:

¹⁰ At [108]

Essentially, if a decision-maker ignores or acts in defiance of an incontrovertible fact or an established and recognised body of opinion, which is plainly relevant to the decision to be made – in a sense that Parliament must have intended it to be taken into account – the decision may be invalidated. Two points, however, require emphasis. First, the fact “must be an established one or an established and recognised opinion”; and “it cannot be said to be a mistake to adopt one of two different points of view of the facts, each of which may be reasonably held”. This is judicial review; and not a statutory appeal on [the] facts with [the] power to substitute a preferred view. Second, as Tipping J put it, the fact or opinion must have been “actually or constructively within the knowledge of the Minister or the Ministry”, constructive knowledge being in the sense that the Minister “should have been aware of the fact [or] opinion”; or as Cooke P put it (in the context of mandatory statutory considerations) facts “which were or ought to have been known to himself or the Ministry”. Third, the matter is to be looked at as at the date of the impugned decision. Facts which come to light subsequently, and which it cannot be said the Minister or Ministry should have known at the time, are excluded. Administration does not require clairvoyance. (citations omitted) ¹¹

133. The survey represents a substantial body of opinion by experienced fishers comprising thousands of hours of direct observation over many years. The results in Appendix 1 clearly show that most recreational crayfishers have seen cray abundance drop to 40% or less of what it was when they started fishing, which contradicts the results of the stock assessment that shows little change in CRA 1 abundance since 1990. This information has become available following the last Ministerial decision and needs to be included in advice to the Minister.

134. The survey results form a central part of the best available information; there is no substitute for the experience of those survey participants that is directly relevant to the matter in hand. Churchman J includes the statement on best available information from Miller J that included this comment regarding best available information¹²;

A TAC-setting decision should begin by identifying the best available information, being information that is available without unreasonable cost, effort, or time, and decisions may be based on such information although it is incomplete or inadequate or unreliable.

135. Section 10(b) of the Act is very clear. A decision maker must take account of the uncertainties in the available information. The uncertainty must be explicitly identified and effects of the uncertainty fully described. Section 10(c) directs decision makers to be cautious when information is uncertain, unreliable, or inadequate. The survey results demonstrate that the options being offered for future catch settings in CRA 1 are based on uncertain information that is inadequate. In response, the decision maker must apply the precautionary principle.

136. Taking account of the cumulative impacts of the effects of fishing is non-discretionary. A Minister must receive advice on the effects of the loss of abundance and the effects of truncating the age structure of the stock in general, and of each option being proposed as a possible TAC. To make a lawful decision, it is crucial when applying the precautionary principle that information and gaps in the knowledge of the effects of fishing are included in advice to the Minister.

¹¹ At [102]

¹² At [104]

Telson clipping

137. The submitters support compliance initiatives to stop illegal take by fishers across all sectors. However, we hold doubts about the effectiveness of telson clipping as a deterrent for large-scale poaching. Those responsible for large-scale poaching are intent on avoiding detection, and a whole tail does not prove that the rock lobster was legally landed by a commercial fisher for sale.
138. In reality, telson clipping does the opposite intended, by legitimising the illegitimate. It makes every crayfish that is not telson clipped available for sale.
139. Telson clipping applies in CRA 2 & 5, and has applied in the Kaikōura Marine Area since 2014. The submitters have previously asked officials, on multiple occasions, in submissions and meetings, for evidence to demonstrate that telson clipping has resulted in a measurable and significant reduction in the volume of crayfish being sold through the black market. No evidence has been provided.
140. We note in the following comment in the proposal document, “FNZ does not have a high level of confidence that regulations requiring telson clipping of recreational caught spiny rock lobsters is an effective measure to prevent illegal sales”¹³.
141. We share FNZ concerns. We do not support telson clipping as a means to address illegal harvest of rock lobster.

Deemed values

142. The submitters have made substantive submissions on the deemed value regime for more than a decade. Many of the issues raised previously still exist today.
143. Given the low abundance in CRA 1 every rock lobster deemed adds to the mortality in the fishery and represents a loss of potential and future productivity.
144. We continue to advocate that the deemed value regime is a failure as it has consistently failed to constrain commercial catch to the statutory limits set by previous Ministers.

¹³ At [235]

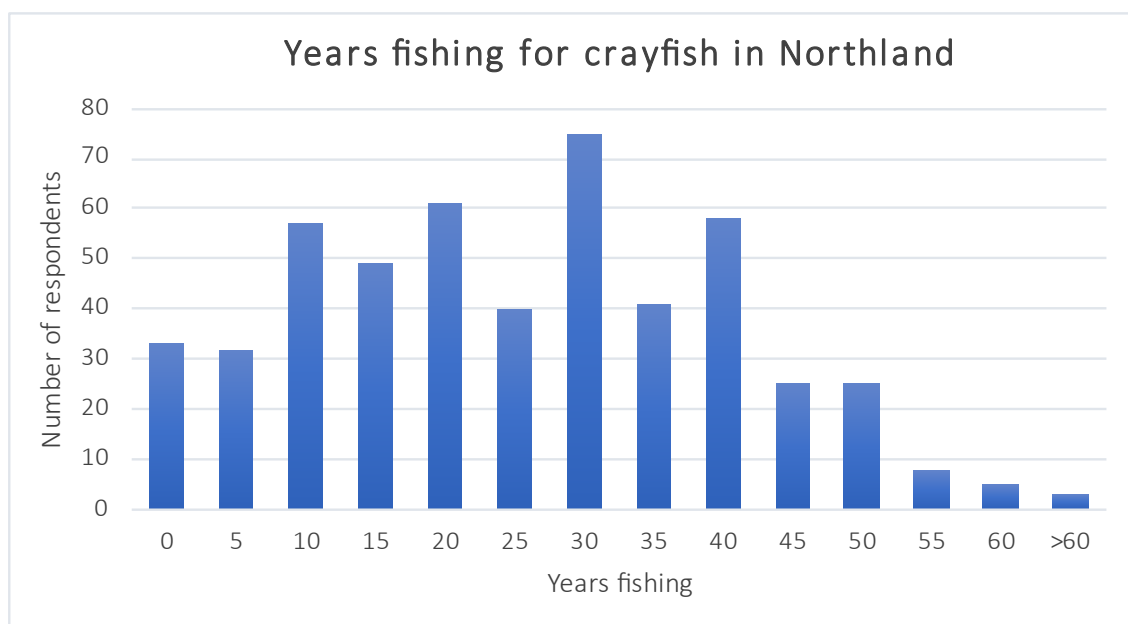
Appendix 1 – Survey of Northland Crayfishers

Introduction

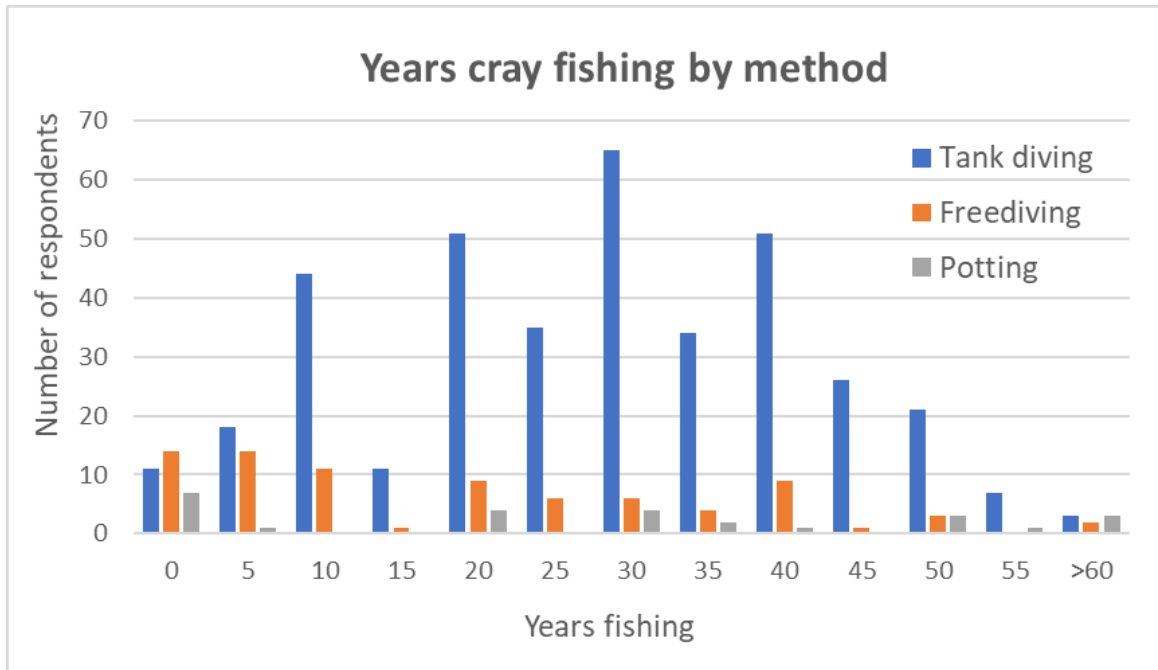
1. The Northland Crayfish Survey was conducted from 11 to 19 January 2023. The objective was to gather peoples’ feedback on the state of the spiny (red) rock lobster fishery around Northland, called CRA 1. Respondents were advised their feedback would be aggregated with all responders’ surveys and used in this submission to help communicate the public opinion on the state of the Northland rock lobster fishery.
2. There was a total of 548 responses. Not all respondents answered every question. 518 respondents indicated that their most common fishing area is in Northland (CRA 1). The remainder mainly fished other areas including Canterbury and the Hauraki Gulf. We are not aware of any similar large-scale survey of rock lobster fishers in CRA 1.
3. Total number of respondents: 548
Northland 518 : Other 30
Northland fishers - Recreational 492 (95%)
Māori customary 9
Commercial 3
Did not specify 14

Participants

4. Survey respondents had a broad range of experience. 66% of the 518 survey participants who most often fished for crayfish in Northland have over 20 years of experience fishing in the CRA 1 region. These are summarised by 5 year bins in the plot below e.g. 5 = 5 to 9 years.



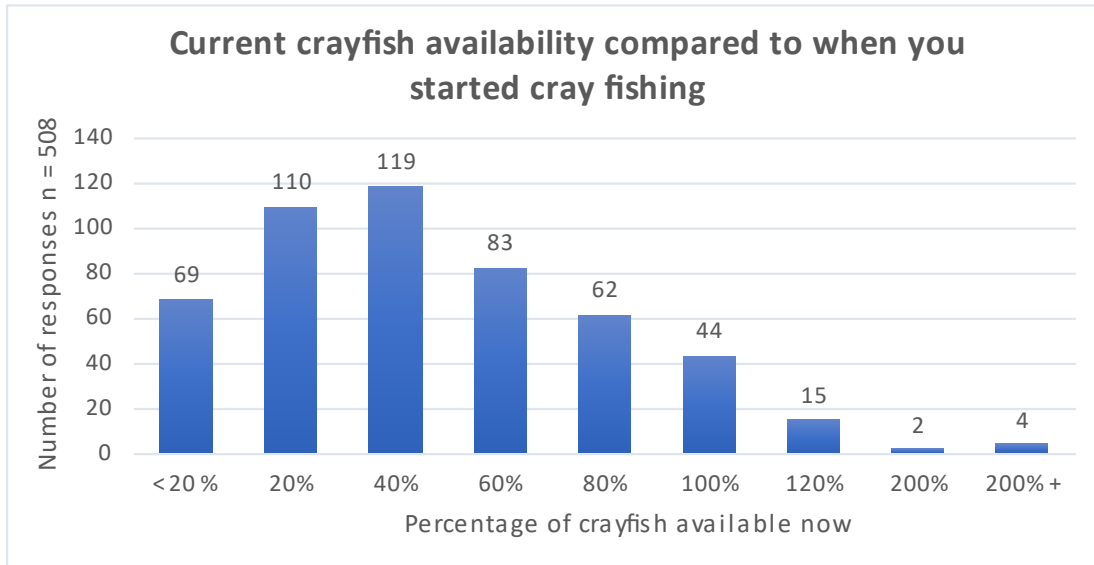
- The main method used by 78% of respondents was diving with tanks (SCUBA), while 16% were mainly free divers, and 6% used pots. A higher proportion of SCUBA use was by divers with 20 to 40 years' experience, while freediving was more popular for divers with less than 10 years' experience fishing for crayfish.



Changes in availability of crayfish

- 508 survey participants who fished for crayfish in Northland provided their feedback on the following question –

For Northland fishers – As a percentage, how would you describe the change in the number of crayfish in your most commonly fished area since you began fishing?
 <20% No or very few; 20%, 40%, 60% or 80% of past numbers; 100% (no change); 120% (slight increase); higher; 200% (availability has doubled).
- Of the Northland fishers, 298 (59%) sit at or below the 40% availability bracket, while 4% of Northland fisher respondents indicated an increase in availability.
- Around 14% of respondents advised that in their most commonly fished area there were no or very few crayfish left. Another 21% advised there were around 20% of historic crayfish numbers. And, 23% of respondents said there were around 40% of historic numbers available in their most commonly fished area.
- Northland respondents who have been cray fishing for over 20 years were more likely to have experienced a decline in crayfish abundance, with 63% saying the availability of crayfish is 40% or less of the numbers compared to when they started fishing.

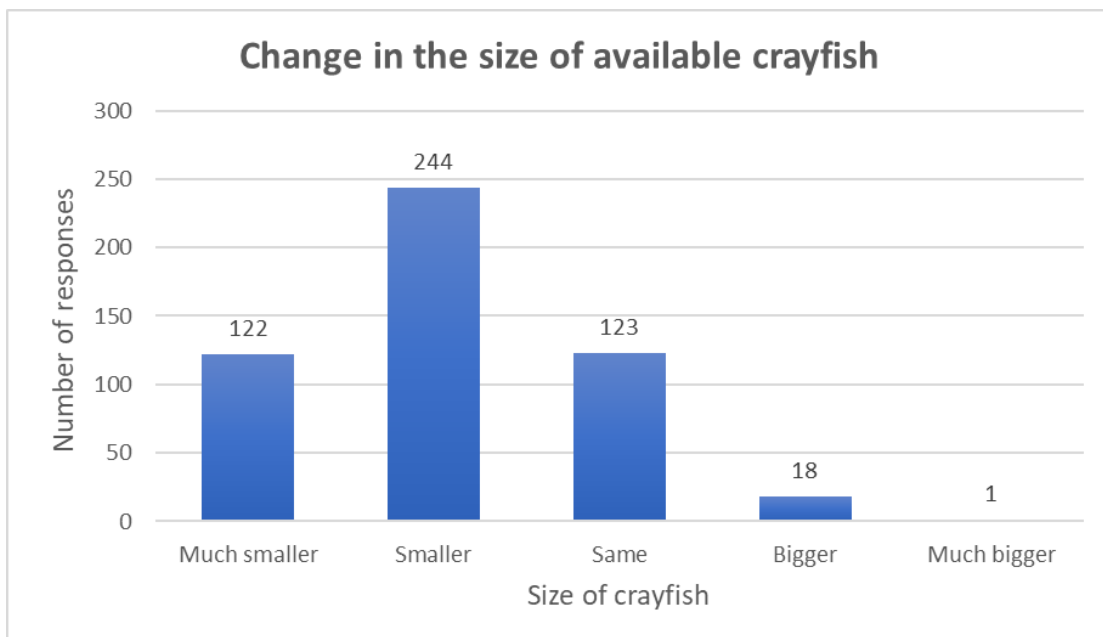


Changes in size of crayfish

10. 508 survey participants who fished for crayfish in Northland provided their feedback on the following question –

How would you rate the change in size of crayfish (red rock lobster not packhorse) in your most commonly fished area of Northland and other areas?

11. Of the 508 survey participants who answered this question, 72% indicated that crayfish were smaller in size now than when they first started fishing.



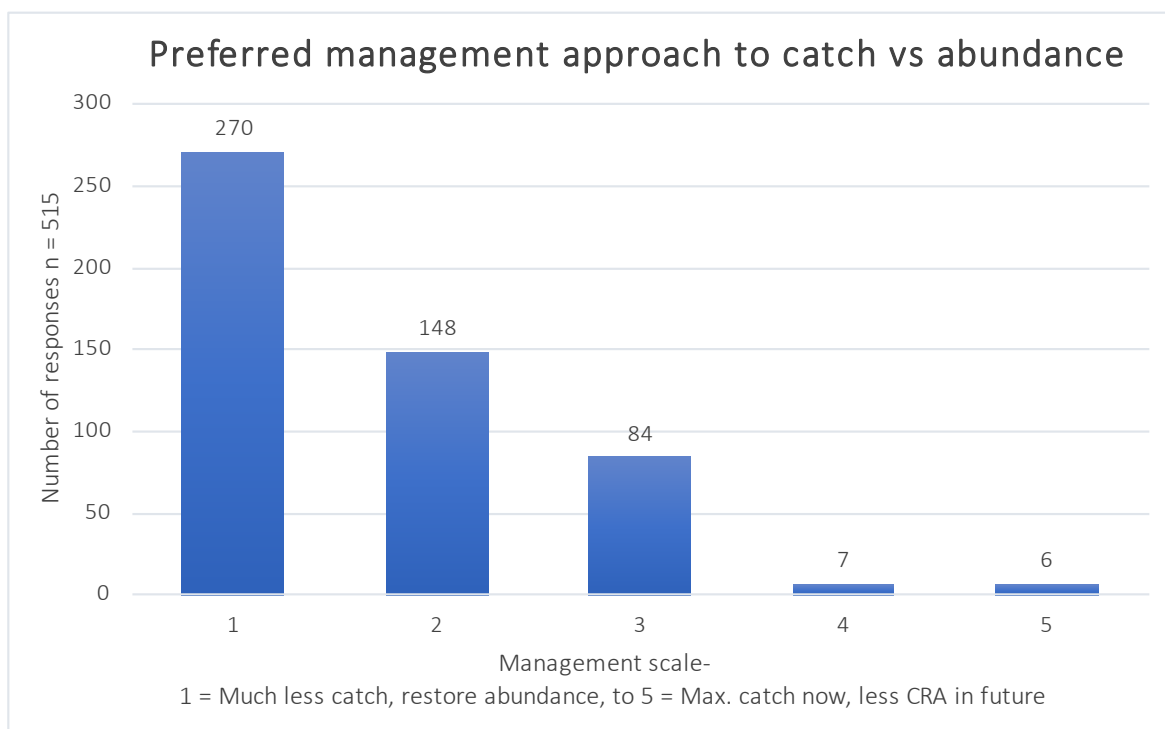
Management

12. Future management. 515 of the Northland respondents answered the question about which future management option for CRA 1 they would support. The question was:

“Based on your current perspective on the state of crayfish in your area, how do you think total commercial, recreational and Māori customary crayfish catch in Northland should be managed using the scale below –

Much less catch now more CRA in future 1 : 2 : 3 : 4 : 5 Max catch now less CRA in future.”

13. Responses. 52% of respondents chose option 1 – much less catch now for more crayfish in the future.



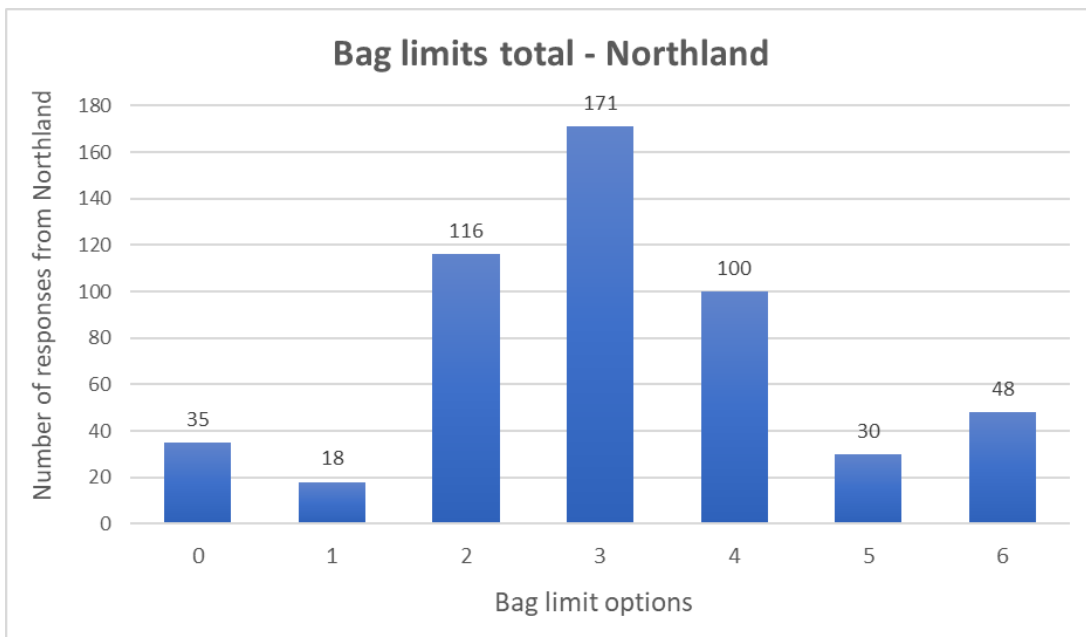
Recreational daily bag limits

14. Bag limit change. The question regarding a possible change to recreational daily bag limits was as follows –

When a fishery is depleted recreational fishers can contribute to the rebuild of crayfish numbers by reducing their daily catch. The Minister will be considering changes to the recreational daily bag limit for crayfish in Northland (CRA 1). The current bag limit is 6. What bag limit would you support in Northland for the next 5 years?

15. Bag limit responses. All 518 Northland fishers responded to the bag limit question. Of these respondents, 75% fell around the 2 to 4 daily bag limit option. And, 48 respondents (9%) opted to retain the status quo – a bag limit of 6 per person, per day.

16. There was a similar response to the question about a possible change to recreational daily bag limits from the 346 Northland fishers with 20+ years fishing experience. 74% fell within the 2 to 4 daily bag limit option, with 10% supporting retention of the status quo.



Changes in ecosystem - habitats and species

17. Participants were asked to reflect if they had recognised any changes in the abundance of species that are most commonly found within the same area as crayfish. Survey respondents were also given the option to select 'uncertain'. This option has been omitted from this graph. Cray fishers have generally observed that kina numbers have increased in many areas, while kelp and butterfish have decreased. Most fishers also consider that there are less packhorse crayfish than when they started diving or potting.

