Fisheries New Zealand
Tini a Tangaroa

Review of sustainability measures for spiny rock lobster (CRA 1) for 2023/24

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Contents

Stock being reviewed

Red or Spiny rock lobster[1] (CRA 1) – Northland

Kōura, crayfish – *Jasus edwardsii*

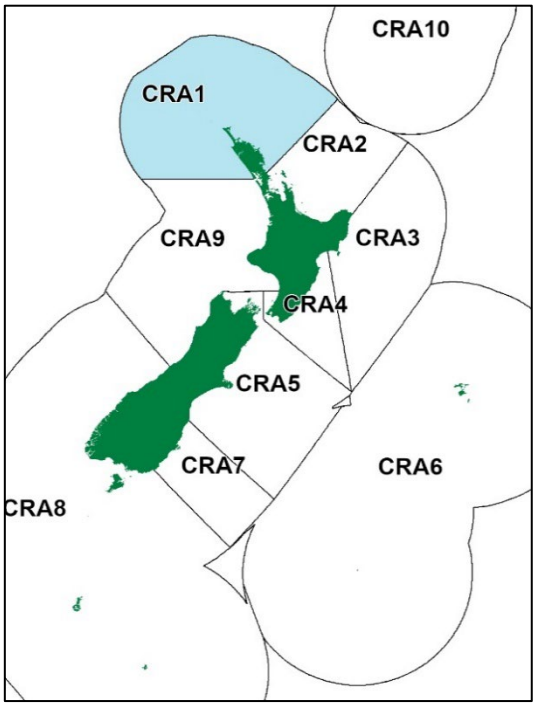

Figure 1: Quota Management Areas (QMAs) for spiny rock lobster, with CRA 1 highlighted.

Table 1: Proposed management options (in tonnes) for CRA 1 from 1 April 2023.

Option	TAC	TACC	Allowances		
			Customary Māori	Recreational	All other mortality caused by fishing
Option 1 *(current settings)*	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 *(current settings)*	6	6
Option B *(proposed for Options 2 and 3 above)*	6	3 ↓ (3)
Option C *(proposed for Option 4 above)*	6	2 ↓ (4)

[1] Hereafter referred to as spiny rock lobster

[2] Combined daily limit of spiny and packhorse rock lobster

1 Summary

1. Fisheries New Zealand (**FNZ**) with input from the National Rock Lobster Management Group (**NRLMG**)[3] are consulting on new sustainability measures for spiny rock lobster in Quota Management Area (**QMA**) CRA 1 (Northland) for the 1 April 2023 fishing year (Figure 1).

2. The primary objective of this consultation is to improve the sustainable utilisation of the CRA 1 stock through proposed reductions to the Total Allowable Catch (**TAC**), Total Allowable Commercial Catch (**TACC**), recreational allowance, and the recreational daily limit.

3. Spiny rock lobster supports important shared fisheries. Spiny rock lobsters are a taonga for tangata whenua, a popular species for recreational fishers to catch, and support valuable export markets, regionally important industries, and employment.

4. Spiny rock lobsters are also ecologically important predators in New Zealand's rocky reef ecosystems, feeding on a wide range of prey. There is evidence to suggest that predators, including spiny rock lobsters, can have a significant role in mitigating sea urchin (kina) barrens, but in the Northland area the evidence indicates they are not at a level that enables them to control kina populations.

5. This paper has been developed in response to the findings contained in a recent High Court judgment[4] and proposes four options for consideration as outlined in Table 1. The proposed options are a reconsideration of the Minister for Oceans and Fisheries (the **Minister**) decision for 2022/23 and will take effect from 1 April 2023.

6. In addition, three options are proposed to amend the recreational daily limit in CRA 1, as outlined in Table 2. The proposed reductions to the daily limit give effect to the Minister's 2022 decision to review the recreational regulations, and align with the proposed reductions to the recreational allowance.

7. The proposed catch setting options are based on results from a fully quantitative stock assessment conducted in 2019 (that was projected to 2023) and subsequent rapid updates conducted annually with the most recent update in November 2022. These assessments reflect best available information on the abundance of the CRA 1 stock and are expected to result in an increase in spiny rock lobster biomass leading to an increase in predation of kina.

8. Addressing the proliferation of kina barrens is likely to require a combination of management interventions on multiple species (other than simple reductions to catch settings). FNZ welcomes feedback and submissions on other management controls for spiny rock lobster outlined in section 9. FNZ has also contracted a research project to focus on kina barrens, with a multi-stakeholder workshop to be held in early 2023. The outcomes from this project will inform further decision-making on kina barrens.

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

2 Background information

2.1 High Court Judgment

10. In November 2021, The Environmental Law Initiative (**ELI**), and Te Uri o Hikihiki Hapū filed proceedings seeking a judicial review of the Minister's 2021/22 decision for CRA 1. This was amended in April 2022 to include the 2022/23 decision.

[3] The NRLMG is a national-level, multi-stakeholder group comprising representatives of customary, recreational and commercial fishing sectors, environmental organisations, fisheries compliance, and FNZ. For more information about the NRLMG, visit www.fisheries.govt.nz/nrlmg

[4] The Environmental Law Initiative v Minister for Oceans and Fisheries [2022] NZHC 2969 [11 November 2022]

11. In November 2022, the High Court found in favour of the applicants on four of the five grounds for review and directed the Minister to reconsider the 2022/23 decision in accordance with the findings in the judgment.

12. The High Court was satisfied that the evidence before the Court showed that[5]:

    (a) rock lobsters have an important ecological role in coastal ecosystems;

    (b) their primary ecological role is as a predator in shallow water areas;

    (c) in New Zealand, rock lobsters prey upon sea urchins/kina;

    (d) kina are an important herbivore on rocky reefs in north-eastern New Zealand because they can consume entire kelp forests and other seaweeds;

    (e) generally, the ecological role of rock lobsters as a predator influences the ecological role of the species they prey on;

    (f) where there are fewer rock lobsters, there is an increased population of kina, thereby increasing the grazing activity of kina, and resulting in the loss of strands of seaweed, particularly kelp forests, in coastal areas, described as a "trophic cascade";

    (g) trophic cascade has been reported in New Zealand, and areas affected by it are described as 'kina barrens', which take decades to reverse;

    (h) loss of kelp forests is ecologically damaging for surrounding coastal systems, in fisheries production, biodiversity, and ocean carbon sequestration.

13. The key finding of the Court was that the advice provided to the Minister about the effects of rock lobster fishing on the aquatic environment, particularly with regard to the formation of kina barrens, was not consistent with the best available information.

2.2 Management approach

14. Within New Zealand, spiny rock lobsters are managed using a range of both output controls (catch limits) and input controls (regulations including area and gear restrictions and daily limits). The fishing year for spiny rock lobster runs from 1 April to 31 March. For more information about the Quota Management System (QMS) go to: www.mpi.govt.nz/law-and-policy/legal-overviews/fisheries/quota-management-system/.

15. The overall management approach for spiny rock lobster fisheries is to monitor and manage them to provide for use while ensuring sustainability. The use of regular scientific assessments and reviews of spiny rock lobster TACs is consistent with this approach. Being able to adapt and respond quickly to changes observed in spiny rock lobster abundance is important because their populations can fluctuate rapidly in response to changes in the environment which can affect recruitment, abundance, and availability (Nursey-Bray et al 2012, McLeay et al 2019).

16. Since 1992, the NRLMG has provided advice on catch limits, regulatory and other management actions that apply specifically to spiny rock lobster fisheries. The NRLMG is a national-level, multi-stakeholder group comprising representatives of tangata whenua, recreational, and commercial fishing sectors, environmental organisations, and FNZ.

17. 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."

18. Additional detail about other management issues that relate to spiny rock lobsters is given in Appendix One.

[5] The Environmental Law Initiative v Minister for Oceans and Fisheries [2022] NZHC 2969 [11 November 2022] **para [69]**.

2.3 Stock assessment and monitoring information

19. Full scientific stock assessments of all spiny rock lobster stocks except CRA 9 (Westland/Taranaki)[6] are carried out every four to five years. These assessments estimate the status of the stock relative to requirements of the Fisheries Act 1996 (**the Act**) and show how the stock has responded to previous management controls.

20. Electronic reporting of catch and effort information was implemented in New Zealand's commercial fisheries during 2019. In 2020, the Rock Lobster Working Group (a Science Working Group convened by FNZ) reviewed the data from the first year of electronic reporting (1 April 2019 to 31 March 2020), by comparing the data with that generated from the previous paper reporting system. The Science Working Group concluded that catch-per-unit-effort (**CPUE**) estimated under the new electronic reporting system was likely to differ from CPUE estimated under the paper form system and is not comparable. The reasons for this appear to include data being collected on a different spatial and temporal scale, new reporting codes, and some issues with operators incorrectly interpreting the new reporting requirements.

21. Up until April 2020, management procedures were used in most spiny rock lobster stocks (including CRA 1) between full stock assessment years. Management procedures set out pre-agreed management actions that would be taken in response to changes in CPUE, an indicator of relative spiny rock lobster abundance.

22. The disruption to the time series of CPUE data means that previously used management procedures can no longer be operated as they rely on a consistent time series of CPUE. Rapid updates are being undertaken as an interim alternative to management procedures. In 2022, a rapid update was conducted for CRA 1. These rapid updates use new information (such as updated commercial catch information, recreational harvest estimates, length frequency and growth information) to update the most recent full stock assessment model. Results from these rapid updates provide updated estimates of stock status to guide management settings in between full stock assessment years.

23. There is potential to use the rapid update estimates of vulnerable biomass[7] as the basis for development of a new type of management procedure that could guide decisions on future TAC settings.

2.4 Estimation of B_{MSY} reference levels

24. For spiny rock lobster, research to determine B_{MSY}[8] has been undertaken for FNZ from 2019 to 2022. These B_{MSY} reference levels are tailored to the biological and fishery characteristics of each spiny rock lobster stock. They are constructed to be consistent with the requirements of the Act to maintain stocks at or above a level that can produce maximum sustainable yield (***MSY***)[9], while meeting the risk constraints in the Harvest Strategy Standard for New Zealand Fisheries. B_{MSY} reference levels represent an interim management target.

25. B_{MSY} reference levels for CRA 1 were accepted by the Science Working Group process in 2021. These reference levels provide a trade-off between maximum fixed catch (higher stability of catch levels between years, lower average annual yield) and maximum fixed fishing mortality (higher average annual yield, lower stability of catch levels between years).

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

6 The small number of fishers in CRA 9 and low fishing pressure means that there is no currently accepted stock assessment for CRA 9. The stock is monitored using commercial catch and biological information from the fishery. The CRA 9 TAC and TACC are the smallest of the nine fished spiny rock lobster stocks.

7 Vulnerable biomass refers to that portion of a stock's biomass that is available to fisheries, i.e., legally harvestable adult rock lobsters. Also called exploitable biomass or recruited biomass. For rock lobsters this is limited to male and female fish above the Minimum Legal Size at the beginning of the autumn-winter season, excluding berried females.

8 The average stock biomass that results from taking an average catch of *MSY* under various types of harvest strategies.

9 Maximum sustainable yield is the largest long-term average catch or yield that can be taken from a stock under prevailing ecological and environmental conditions, and the current selectivity patterns exhibited by fisheries.

27. 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 toward these new targets or maintain the stock at or above any targets, would also need to be agreed by the Minister.

28. In 2022, the NRLMG formed a sub-group to explore management targets and identified areas where further work is needed, including:

    (a) Sourcing science that might inform the levels of biomass that might better achieve the Act's environmental obligations;

    (b) Improving the mechanisms that would allow estimation of recreational take with sufficient precision to inform management and obtaining information to calibrate recreational controls;

    (c) The way and rate of change to achieve the new selected target;

    (d) How allocation decisions would be made in the process of building and maintaining stocks at new management targets.

29. Progressing this work will be a priority for FNZ and the NRLMG in 2023.

3 Status of the CRA 1 stock and previous TAC changes

30. The CRA 1 fishery extends from the Kaipara Harbour on the west coast of the North Island around North Cape and then south to Te Arai Point, south of Whangarei on the east coast (Figure 1).

3.1 Summary of 2019 stock assessment results

31. The 2019 stock assessment results suggested that vulnerable biomass had fluctuated around the reference level since 2000. In 2019, vulnerable biomass was estimated to be 15.5% (above the 14.1% reference level estimated by the 2019 assessment) and total biomass was 25.6% of the unfished level. Spawning biomass[10] in 2019 was 37% of the unfished level, well above the soft limit of 20% where it is FNZ policy to implement a formal, time-constrained rebuilding plan. The projections to 2023, based on 2019 catch levels and recent recruitment, suggested that vulnerable and total biomass would both decline, while spawning biomass was projected to remain constant.

32. Following the 2019 assessment results, the CRA 1 TAC was reduced from 1 April 2020. The TAC was reduced from 273 tonnes to 203 tonnes (16%), the recreational allowance was reduced from 50 tonnes to 32 tonnes (36%) with a continued daily limit of 6 rock lobsters, the allowance for other sources of mortality caused by fishing was reduced from 72 tonnes to 41 tonnes (43%), and the TACC was reduced from 131 tonnes to 110 tonnes (15%).

3.2 Summary of the 2021 rapid update

33. The results of the 2021 rapid update were that CRA 1 vulnerable biomass was 14.6% of the unfished level. With 2021 catch levels and recent recruitment, CRA 1 vulnerable biomass was projected to increase, with a 65% probability, to 15.8% of the unfished level over the following four years.

34. The rapid update results showed that CRA 1 spawning biomass was 36.3% of unfished levels. Spawning biomass was expected to stay constant relative to 2021 levels and remain well above the soft limit of 20% where a formal, time constrained rebuilding plan is required.

[10] The total weight of sexually mature female fish in the stock at the beginning of the autumn-winter season. This quantity depends on the abundance of year classes, the exploitation pattern, the rate of growth, both fishing and natural mortality rates, the onset of sexual maturity, and environmental conditions. Same as mature biomass.

35. 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%) with a continued daily limit of 6 rock lobsters (with the expectation that a subsequent review of the recreational measures be undertaken in 2022), and the TACC was reduced from 110 tonnes to 105 tonnes (5%).

3.3 Summary of the 2022 rapid update

36. The 2022 rapid update for CRA 1 added three years of additional data relative to the original stock assessment done in 2019.

37. The November 2022 Plenary accepted estimates of current stock status, but rejected stock projections beyond 2022 from the rapid updates.[11] This was due to uncertainty in estimates of recent recruitment, and concerns that these may be an artefact of the model rather than supported by data. While these recruiting year classes do not influence the vulnerable biomass in the final year of the assessment, they are influential in the projections. As a result, the Plenary decided to remove all rapid update projections from the final analysis.

38. The results of the 2022 rapid update show that the CRA 1 vulnerable biomass is 14.4% (462 tonnes) of the unfished level (3226 tonnes). See Figure 2 and Table 3 below.

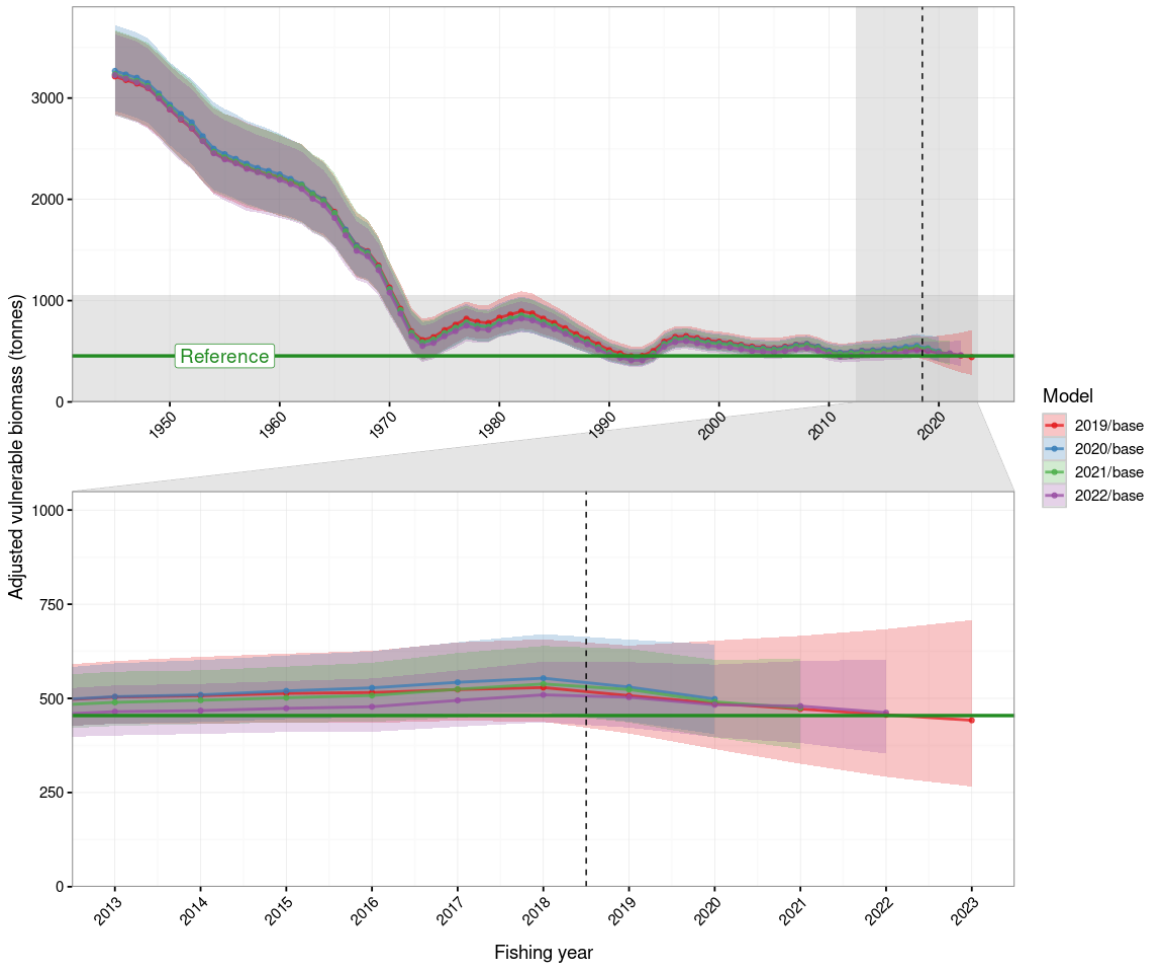

Figure 2: CRA 1 posterior distribution of adjusted vulnerable biomass (tonnes) showing the base case median (line and points) and 90% credible interval (shaded region) for the 2019 stock assessment and 5-year projections, and the 2020, 2021, and 2022 rapid updates. The top panel shows the adjusted vulnerable biomass for all model years, and the lower panel shows adjusted vulnerable biomass for the last ten years. The interim target (BR) is shown as green solid line in both panels.

[11] The November 2022 Plenary is available here: https://www.mpi.govt.nz/dmsdocument/54550-Fisheries-Assessment-Plenary-November-2022-Stock-Assessments-and-Stock-Status-Introductory-Section-to-Yellowfin-Tuna.

39. The rapid update results suggest that CRA 1 spawning biomass is 36.8% (543 tonnes) of unfished levels (1480 tonnes), (Figure 3). There is 100% probability that 2022 spawning biomass is higher than the soft limit of 20% where a formal, time constrained rebuilding plan is required (Table 3).

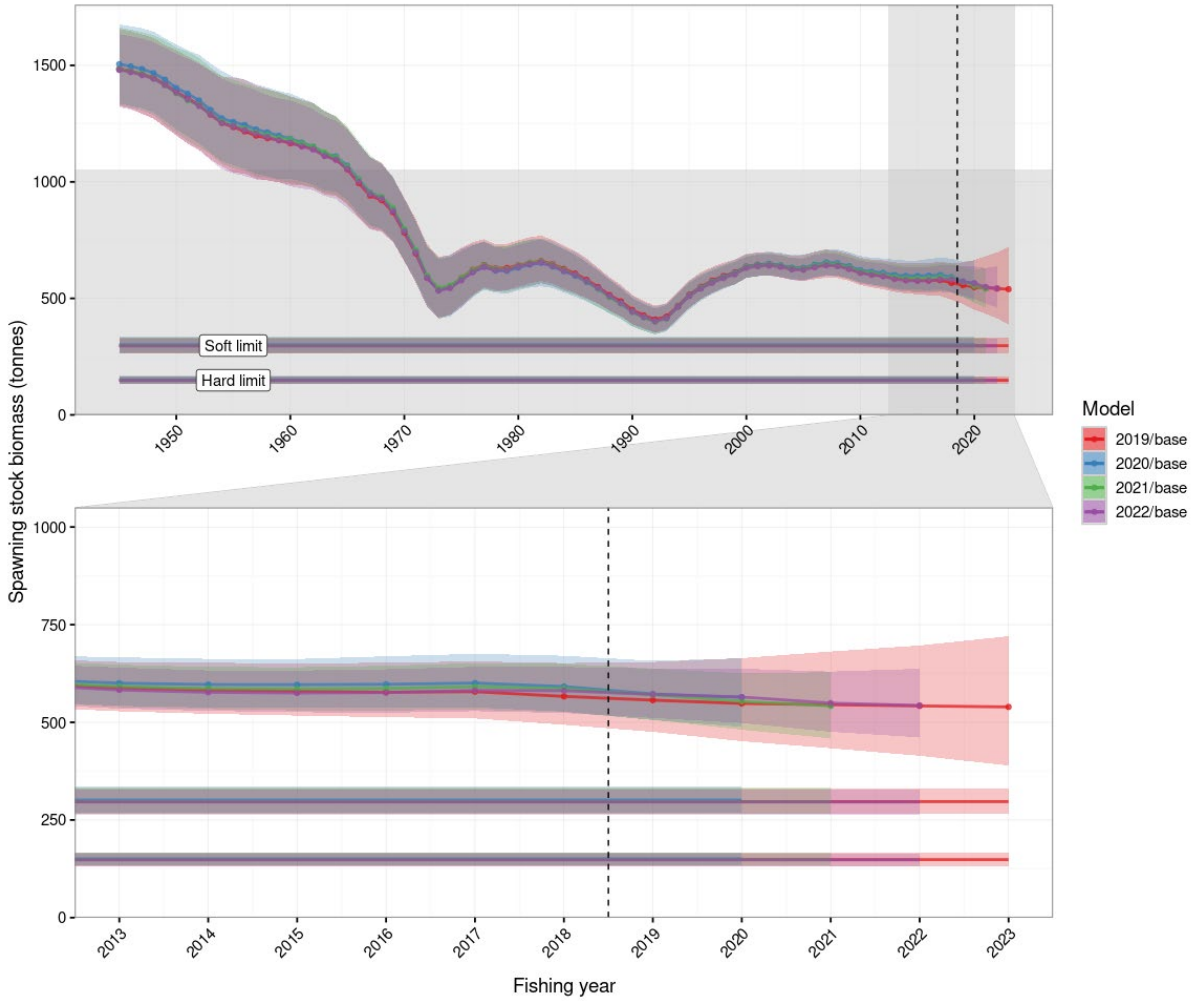

Figure 3: CRA 1 posterior distribution of spawning stock biomass (tonnes) showing the base case median (line and points) and 90% credible interval (shaded region) for the 2019 stock assessment and 5-year projections, and the 2020, 2021, and 2022 rapid updates. The top panel shows the spawning stock biomass for all model years, and the lower panel shows spawning stock biomass for the last ten years. The median (line) and 90% credible interval (shaded region) for the soft (20% SSB0) and hard (10% SSB0) limits are also shown.

40. Table 3 provides further results of the 2022 rapid update in terms of vulnerable, total, and spawning stock biomass, with the uncertainties in the results also shown.

Table 3: Median results from the 2022 CRA 1 base case sensitivity runs and combined model Markov Chain Monte Carlo outputs, reporting the 5th, 50th (median), and 95th quantiles of the posterior distributions[12].

Performance indicators	5% quantile	Median	95% quantile	Interpretation of the median results
Vulnerable biomass (B)				
B_{2022} / B_0	0.107	0.144	0.194	Vulnerable biomass in 2022 was 14% of unfished levels
Spawning stock biomass (SSB)				
SSB_{2022} / SSB_0	0.309	0.368	0.433	Spawning biomass in 2022 was 37% of unfished levels
Probabilities				
P(SSB_{2022}>10%SSB_0)		1		100% probability that 2022 spawning biomass is greater than 10% of unfished levels (hard limit)
P(SSB_{2022}>20%SSB_0)		1		100% probability that 2022 spawning biomass is greater than 20% of unfished levels (soft limit)

41. An estimated B_{MSY} reference level provides some guidance for this review of the CRA 1 stock, while noting further work is required to determine a management target. The B_{MSY} reference level was calculated based on the 2019 CRA 1 stock assessment as a vulnerable biomass level of 454 tonnes (14.4% of the unfished level). The results, given in Figure 2 above and Table 4 below, suggest that the median estimate of vulnerable biomass is above (102%) the B_{MSY} reference level in 2022 (with 55% probability).

42. Table 4 provides further results of the 2022 B_{MSY} reference level calculation in terms of vulnerable biomass, with the uncertainties in the results also shown. For example, vulnerable biomass in 2022 is estimated to be at 462 tonnes (median result), with a range of 354 tonnes and 603 tonnes (5% and 95% quantiles).

Table 4: B_{MSY} reference level results for CRA 1 and estimated vulnerable biomass level in 2022 (B_{2022}) from the 2022 rapid update. 5% and 95% quantiles are provided to show the uncertainty of the biomass estimates.

Vulnerable biomass (tonnes)	5% quantile	Mean	95% quantile	Interpretation of the mean results
B_R, reference level (tonnes)		454		The vulnerable biomass that can produce *MSY* is 454 tonnes
Vulnerable biomass (tonnes)	**5% quantile**	**Median**	**95% quantile**	**Interpretation of the median results**
Probability B_{2022} greater than B_R		0.545		55% probability that vulnerable biomass in 2022 was greater than the B_{MSY} reference level
B_{2022}	354	462	603	Vulnerable biomass in 2022 was 462 tonnes
B_{2022} / B_R	0.778	1.017	1.327	Vulnerable biomass in 2022 was 1.02 times (102%) the reference level

3.4 Post 2022 Plenary CRA 1 stock projections

43. Following the November 2022 Plenary, in order to assess the effect any adjustment to the TAC will have on the stock for this review an update was made to the five-year base projections using the 2022 rapid update and average recruitment estimated for 2009-2018. This avoided the most recent recruitment estimate for 2019 which was rejected by the Plenary (see paragraph 37 above).

44. The new projections modelled changes in TACC (with no change to the allowances) and demonstrated a reduction in tonnes that may achieve a desired outcome. Potential reductions of 10, 20, and 40 percent of commercial catch were calculated. Each percent reduction was then

[12] The median is the midpoint of a distribution of possible values, such that there is an equal probability of falling above or below it. The 5% and 95% quantiles represent the lower 5% and upper 5% of a distribution of values.

converted to a required decrease in tonnes (11, 21, and 42 tonnes respectively), which was applied to the TAC.

45. Under each scenario, CRA 1 vulnerable biomass and spawning biomass is expected to increase from current levels with 2021 catch levels and recent recruitment (Table 5).

Table 5: Median results from the post 2022 Plenary projections, reporting the 5th, 50th (median), and 95th quantiles of the posterior distributions.

Proposed reduction	Performance indicators	5% quantile	Median	95% quantile	Interpretation of the median results
Vulnerable biomass (B) projection					
Status quo	B_{2026} / B_{2022}	0.835	1.224	1.743	Vulnerable biomass in 2026 is 1.22 times (122%) of 2022 levels
10%		0.921	1.315	1.837	Vulnerable biomass in 2026 is 1.32 times (132%) of 2022 levels
20%		1.012	1.405	1.938	Vulnerable biomass in 2026 is 1.41 times (141%) of 2022 levels
40%		1.200	1.585	2.135	Vulnerable biomass in 2026 is 1.59 times (159%) of 2022 levels
Vulnerable biomass (B) projection in relation to unfished levels					
Status quo	B_{2026} / B_0	0.101	0.179	0.288	Vulnerable biomass in 2026 is 18% of unfished levels
10%		0.113	0.192	0.301	Vulnerable biomass in 2026 is 19% of unfished levels
20%		0.126	0.205	0.315	Vulnerable biomass in 2026 is 21% of unfished levels
40%		0.150	0.232	0.343	Vulnerable biomass in 2026 is 23% of unfished levels
Spawning stock biomass (SSB) projection in relation to unfished levels, SSB_0					
Status quo	SSB_{2026} / SSB_0	0.299	0.403	0.525	Spawning stock biomass in 2026 is 40% of unfished levels
10%		0.308	0.412	0.533	Spawning stock biomass in 2026 is 41% of unfished levels
20%		0.317	0.420	0.540	Spawning stock biomass in 2026 is 42% of unfished levels
40%		0.333	0.428	0.554	Spawning stock biomass in 2026 is 43% of unfished levels

46. These results were not considered by the November 2022 Plenary given time constraints, but have been peer-reviewed by FNZ Science and the rock lobster stock assessment team. These projections are considered an adequate representation of possible outcomes and useful for guiding the formulation of options outlined in this paper. There is however uncertainty associated with these projections, and they are intended as a guide only.

47. A rapid update will be conducted for CRA 1 later in 2023 and will provide a further opportunity to consider a review of the catch settings for April 2024. In 2023, the Rock Lobster Working Group will also look into how recruitment during the final model years is informed by the data in spiny rock lobster rapid updates.

4 Catch information and current settings within the CRA 1 TAC

48. Spiny rock lobsters support important shared fisheries. As noted above, spiny rock lobsters are ecologically important, a taonga for tangata whenua, a popular species for recreational fishers to catch, and support valuable export markets, regionally important industries, and employment.

4.1 Commercial

49. Commercial fishing in CRA 1 occurs on both sides of the Northland Peninsula, as well as at the Three Kings Islands.

50. CRA 1 commercial landings have remained at or near the TACC from the early 1990s to 2019/20 (Figure 4). The TACC was approximately 131 tonnes from 1 April 1993 until 1 April 2020, when it was reduced to 110 tonnes. The COVID-19 outbreak, particularly the effective closure of the Chinese export market for a period coupled with low prices for exports, contributed to a slight under-catch of the TACC in 2019/20. Between 2015 and 2019 a CRA 1 management procedure was used to annually review the TACC.

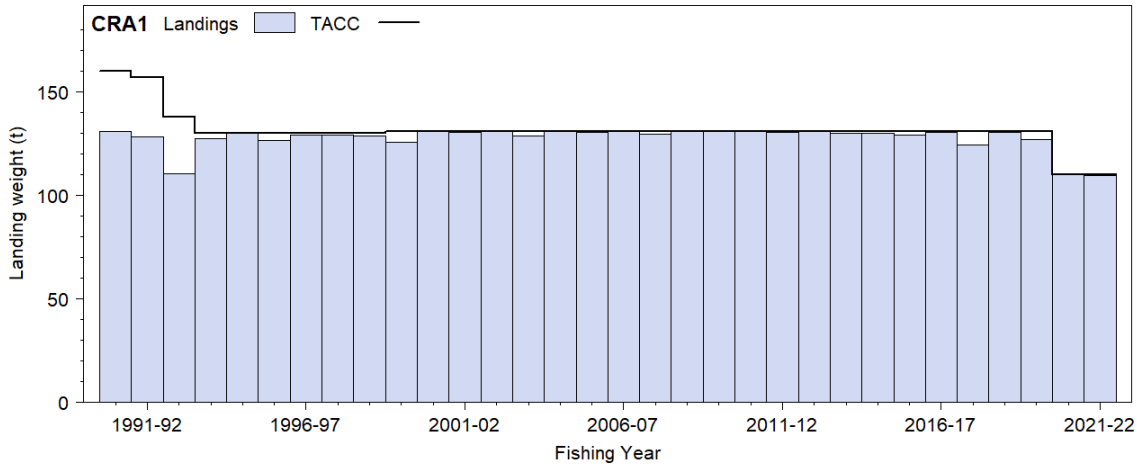

Figure 4: CRA 1 commercial landings and the TACCs from 1990 to 2021.

4.2 Customary Māori

51. CRA 1 customary catch is provided for by the Fisheries (Kaimoana Customary Fishing) Regulations 1998, and regulation 50 of the Fisheries (Amateur Fishing) Regulations 2013 (Amateur Regulations). In the last five years, 652 unspecified units[13] of spiny rock lobster were reported as customary harvest from CRA 1 on average each year. This information is considered incomplete, because customary take that occurs under the Amateur Regulations for the purposes of hui and tangi is not required to be reported.

52. An estimate of 10 tonnes was used in the 2019 CRA 1 stock assessment model and the 2020, 2021, and 2022 rapid updates to represent customary catches. The current customary allowance is 20 tonnes.

53. FNZ welcomes input from tangata whenua to inform advice on this allowance.

4.3 Recreational

54. Relevant sources of information for estimating recreational catch include the results of National Panel Surveys and creel surveys[14], the model estimate from the most recent stock assessment, and estimates from the more recent rapid update.

55. For the 2019 CRA 1 stock assessment, recreational catch estimates from the 1994 and 1996 Otago University surveys, the 2011/12 and 2017/18 National Panel Surveys (NPS), and the 2013/14 Blue Water Marine Research (Holdsworth) survey were used to construct a recreational catch trajectory. It was assumed that recreational catch has been proportional to CRA 1 commercial CPUE in statistical areas 903 and 904[15] during spring/summer (i.e., the east coast of Northland where the majority of recreational fishing takes place in CRA 1) (Figure 5).

56. The 2019 stock assessment model input of CRA 1 recreational catch was 31.5 tonnes for 2018. The 2017/18 NPS estimate of CRA 1 recreational catch, while uncertain, was 15.9 tonnes (±14.7 tonnes). For the 2021/22 fishing year, the recreational catch estimate assumed for the rapid update model was 28.3 tonnes.

[13] Customary harvest of rock lobster is usually reported as kilograms or number of individuals. However, in some cases (such as in CRA 1) the unit used is not specified.

[14] Creel surveys involve interviewing fishers, asking how many fish were caught, and measuring any fish caught.

[15] https://hub.arcgis.com/datasets/MPI::rock-lobster-statistical-areas/explore?location=-35.717536%2C173.569738%2C7.89

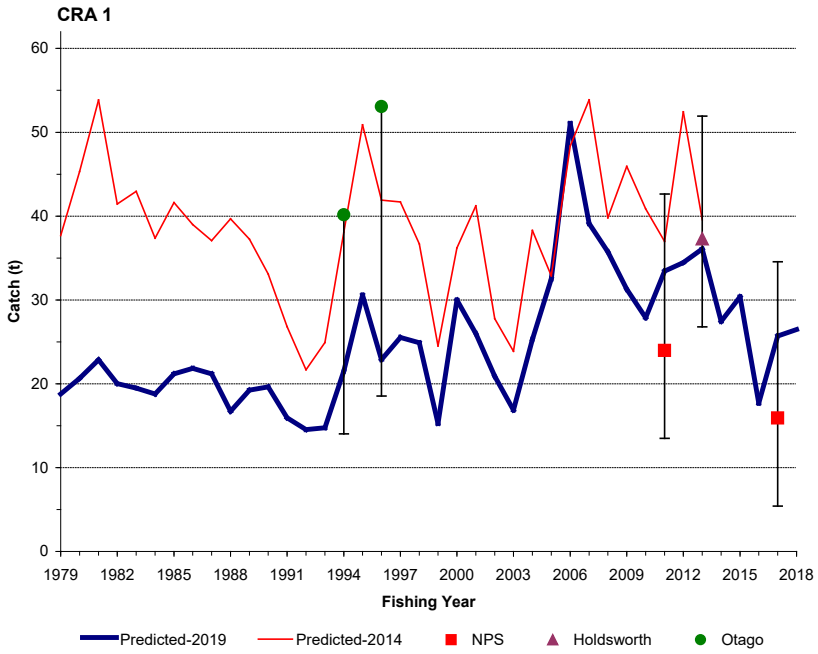

Figure 5: CRA 1 recreational catch trajectory (tonnes) based on the unstandardised (geometric mean) SS seasonal CPUE series for statistical areas 903 and 904 fitted to five recreational catch surveys. Error bars are ±2 SE, assuming a lognormal distribution, with the upper error bars for the two surveys undertaken by Otago University suppressed. Also shown is the equivalent recreational catch series used in the 2014 CRA 1 stock assessment.

57. During the 1 April 2022 sustainability review of CRA 1, it was noted that while there is uncertainty in the CRA 1 recreational harvest information, it was likely that recreational harvest could exceed the proposed new 27 tonne recreational allowance.[16] As recreational catch is likely to increase as stock abundance increases, a review of the recreational regulations, such as the recreational daily limit, was requested by the Minister in March 2022 to manage recreational catch on average to the new allowance of 27 tonnes.

58. To give effect to the Ministers March 2022 decision, FNZ undertook analysis on reductions to daily limits during 2022 (see section 8 for further discussion on the daily limit). The estimated reduction in recreational catch (from current levels) associated with different daily limits are the basis for the options proposed for recreational allowance outlined in this paper.

4.4 Section 111 commercial landings

59. Commercial fishers are allowed to take home spiny rock lobsters for personal use under section 111 of the Act. These lobsters must be declared on landing forms using the destination code 'F'. The maximum allowed for these landings in stock assessments in CRA 1 is 5.02 tonnes (Table 6).

[16] The 2022 rapid update used a model input of 28.3 tonnes for CRA 1 recreational catch.

Table 6: CRA 1 Section 111 commercial landings of spiny rock lobster (in tonnes, summed from landing destination code 'F') by fishing year. Note: this table was not updated for 2019, or subsequent years, because of uncertainty in the reporting of the section 11.

Fishing Year	CRA 1
2001	0.11
2002	0.49
2003	2.22
2004	3.55
2005	3.08
2006	5.02
2007	3.83
2008	3.63
2009	4.01
2010	3.67
2011	4.16
2012	4.21
2013	3.94
2014	3.58
2015	3.34
2016	3.01
2017	2.85
2018	2.05
Maximum	**5.02**

4.5 Other sources of mortality caused by fishing

60. Other sources of fishing related mortality for the CRA 1 fishery includes illegal catch (discussed below), handling mortality caused by the return of under-sized lobsters, berried female lobsters, and high-grading[17], as well as predation on lobsters by octopus and other predators within pots.

61. The 2019 CRA 1 stock assessment assumed that handling mortality was 10% of returned lobsters until the introduction of the Quota Management System in 1990, and 5% thereafter. The model estimate of handling mortality was 2.4 tonnes for 2018, and 1.98 tonnes in 2021 based on the new rapid update.

4.6 Illegal catch

62. In the 2019 CRA 1 stock assessment, the Rock Lobster Working Group agreed that illegal catch would be assumed to be a fixed percentage of the total commercial catch from 1981 to 2018 set at 20% of the commercial catch. The Rock Lobster Working Group also agreed to scale the resulting 38 year catch total proportionately to the annual standardised CPUE index over the same period. This acknowledged that illegal take was likely to be influenced by available abundance (Figure 6). Before 1980, export discrepancies (the difference between reported catch totals and total exported weight) were used to estimate illegal catch. For the 2021/22 fishing year, the illegal catch estimate assumed for the rapid update model was 35.3 tonnes.

63. The two annual illegal catch trajectories used in the 2019 CRA 1 stock assessment are plotted in Figure 6. When these annual catch estimates were used in the stock assessment model as seasonal catches, it was assumed that they were distributed between seasons in the same proportion as the commercial catch for each year.

[17] Schedule 6 of the Act allows for the return of rock lobster to the waters from which it was taken if a) that rock lobster is likely to survive on return; and (b) the return takes place as soon as practicable after the rock lobster is taken.

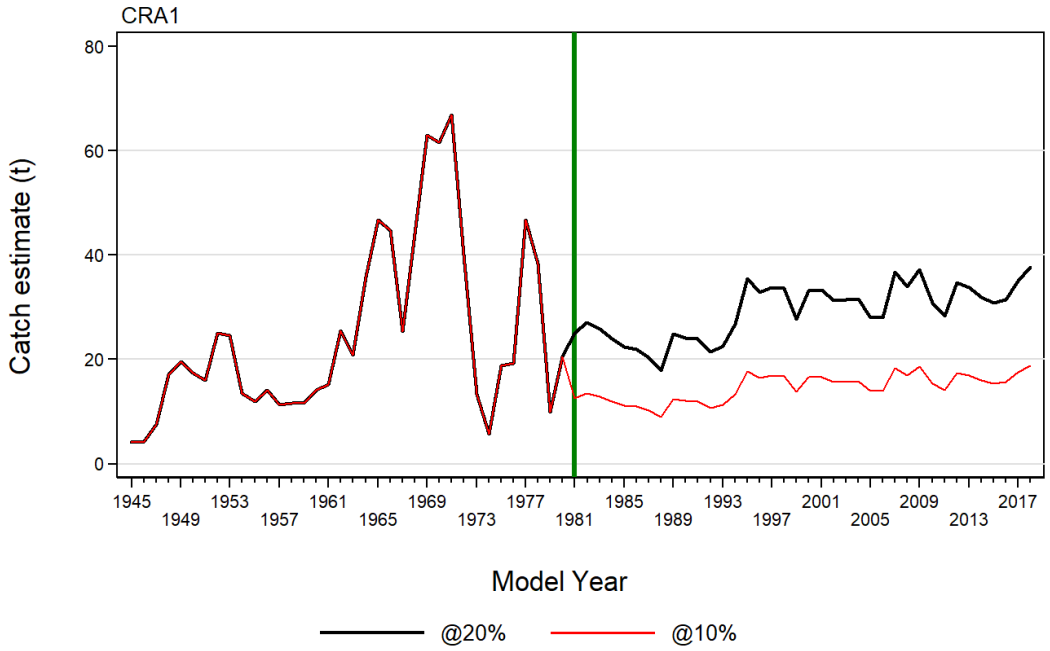

Figure 6: CRA 1 illegal catch trajectories for the 2019 stock assessment. The 10% and 20% labels refer to the percentage of the summed commercial catch from 1981 to 2018 that comprise the illegal catch over the same period. The vertical green line indicates 1981.

5 Treaty of Waitangi obligations

64. Section 5(b) of the Fisheries Act 1996 requires that the Act be interpreted and people making decisions under the Act to do so in a manner that is consistent with the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992 (**the Settlement Act**). Section 10 of the Settlement Act provides that non-commercial customary fishing rights continue to be subject to the Principles of the Treaty of Waitangi and give rise to Treaty obligations on the Crown.

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

5.1 Input and participation of tangata whenua

66. Section 12 (1)(b) of the Act requires that before undertaking any sustainability process the Minister shall provide for the input and participation of tangata whenua who have a non-commercial interest in the stock or an interest in the effects of fishing on the aquatic environment in the area concerned. In considering the views of tangata whenua, the Minister is required to have particular regard to Kaitiakitanga.[18]

67. Input and participation of tangata whenua into the sustainability decision-making process is provided mainly through Iwi Fisheries Forums, which have been established for that purpose. Each Iwi Fisheries Forum can develop an Iwi Fisheries Forum Plan that describes how the iwi in the Forum exercise kaitiakitanga over the fisheries of importance to them, and their objectives

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

for the management of their interest in fisheries. Iwi Fisheries Forums may also be used as entities to engage iwi with an interest in fisheries[19].

68. The CRA 1 management area is relevant to the rohe of the Te Hiku o Te Ika and the Mid-North Iwi Fisheries Forums.

69. Fisheries New Zealand acknowledges that the condensed timeframe involved in undertaking this review has impacted the time available to allow for input and participation. However, during the 2022 sustainability review input and participation on the proposed review of these stocks was sought and the views of these forums at that time are outlined in Table 7 below.

Table 7: Iwi Fisheries Forum input received on the CRA 1 review 2022.

Iwi Fisheries Forum	Stock	Input received
Te Hiku o Te Ika	CRA 1	The Forum supported taking an ecosystem-based approach to the management of spiny rock lobster. They also raised concerns around localised depletion issues and that the scale of the QMA didn't support localised aspirations The Forum broadly supported a more precautionary approach.
Mid-North	CRA 1	The Mid-North forum stressed the importance of local area management for northern crayfish stocks. Concern was expressed that the large scale of the CRA 1 QMA does not support addressing localised concerns. It was recognised there are a wide range of different local environments and pressures exist within CRA 1 and the QMA scale does not support local area management to respond to localised depletion.

70. Additional engagement with tangata whenua is provided through the NRLMG. A Te Waka a Māui me Ōna Toka Iwi Forum representative is a member of the NRLMG, who directly inputs into decision-making on South Island stocks behalf of South Island tangata whenua. A representative of Te Ohu Kaimoana is also a member of the NRLMG and supports North Island and Chatham Island Mandated Iwi Organisations to provide feedback on spiny rock lobster proposals each year.

5.2 Kaitiakitanga

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

72. Spiny rock lobster is listed as a taonga species in the fisheries plan of the Te Hiku o Te Ika Iwi Forum.

73. FNZ considers that the options proposed are generally consistent with the management objectives of the Iwi Fisheries Forum plans. The options proposed align with the following objectives:

    (a) In relation to CRA 1, Te Hiku o te Ika Fisheries Forum Fisheries Management Plan:

        i. To ensure fish stocks are healthy and support the social, cultural and economic prosperity of Te Hiku iwi and hapū.

74. Customary tools utilised under the Fisheries (Kaimoana Customary Fishing) Regulations 1998, and the Act, provide for tangata whenua to manage local fisheries in ways that best fit local customary practices in the form of mātaitai reserves, taiāpure and temporary closures.

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

75. There are several mātaitai reserves, taiāpure, and section 186A area closures that fall within CRA 1, which are set out in Table 8. It is not anticipated that the options proposed would negatively impact the availability of spiny rock lobsters in these areas in CRA 1, however any positive impacts are unknown. While these impacts are unknown, they will likely be positive, given under all options the CRA 1 biomass is projected to increase overall.

Table 8: Customary fisheries management areas in CRA 1.

Quota Management Area	Customary Area	Management type
CRA 1 -Northland	Te Puna	**Mātaitai reserve** *Commercial fishing is not permitted within mātaitai reserves unless regulations state otherwise.*
	Maunganui Bay[20]	**Temporary closures** *These areas are temporarily closed to all fishing or certain fishing methods, for everyone. These closures are issued under sections 186A of the Fisheries Act and apply for up to 2 years, but can be renewed.*
	Marsden Bank and Mair Bank[21]	
	Waikare Inlet	**Taiāpure** *All types of fishing are permitted within a Taiāpure. The management committee can recommend regulations to manage commercial, recreational, and customary fishing.*

76. Through this public consultation, FNZ is seeking input from tangata whenua on how the proposed options for CRA 1 may or may not assist tangata whenua to provide kaitiakitanga, and how tangata whenua consider the proposal may affect their rights and interests in this stock.

6 Proposed TAC and settings within the TAC

77. The TAC options proposed for CRA 1 have been guided by the results of the 2022 rapid update and biomass projections based on the 2022 rapid update but with recruitment drawn from a different period due to concerns raised by the November 2022 Plenary (see section 3).

78. All of the options proposed aim to increase the certainty that the CRA 1 stock will remain at or above the B_{MSY} reference level. CRA 1 vulnerable biomass is currently near the B_{MSY} reference level that produces maximum sustainable yield and is expected to increase over the next four years under each of the proposed options. Spawning biomass is also projected to increase over this time from current levels.

79. With rock lobster biomass expected to increase, it is reasonable to assume that this will lead to increased predation on kina. However, addressing the proliferation of kina barrens likely requires a combination of management interventions across multiple species (such as those outlined in section 9). The options proposed below provide different levels of precaution and are intended as an interim approach while further work is undertaken to determine the objective with regard to kina barrens, the corresponding management target for rock lobster and the steps necessary to achieve it.

80. Overall, the options recognise that the level at which spiny rock lobster biomass are able to control kina populations is unknown. A range of adjustments are proposed with increasing precaution and greater levels of biomass increase from Options 1 through to 4.

81. Option 1 takes into account the previous TAC reductions and allows for more utilisation, while Options 2, 3 and 4 give greater emphasis to mitigating ecosystem effects (such as trophic cascades and kina barrens) and have greater impacts on utilisation opportunities for the rock lobster industry and non-commercial fishers. Ecosystems effects are discussed further under section 7 and the socio-economic impacts are discussed further in section 6.5. While all options

[20] Applies to all species of fish, aquatic life or seaweed, except kina.

[21] Applies to all shellfish (including rock lobster and kina).

are expected to increase spiny rock lobster biomass, options with larger reductions to the TAC give greater certainty that spiny rock lobster biomass will increase at a faster rate.

82. Under Options 2, 3 and 4, it is proposed that the recreational daily limit is reduced to give effect to the Minister's 2022/23 decision on a review of recreational regulations and to ensure recreational catch is managed on average to the recreational allowance. See section 8 for further information on the proposed recreational daily limit reductions.

83. For each of the four options, no change is proposed to the 20 tonne CRA 1 customary Māori allowance. While noting the incompleteness and uncertainty in the CRA 1 customary harvest information, the available information indicates that current harvest is within the 20 tonne allowance for customary Māori interests at this time. Under each option it is also proposed that the current 41 tonne allowance for other mortality caused by fishing is retained. This allowance includes mortality associated from fisher handling, and an estimate of illegal take. While noting the uncertainty in the CRA 1 information, the available information indicates that current illegal harvest and handling mortality is within the 41 tonne allowance.

84. Fisheries New Zealand welcomes feedback and submissions on other management controls for spiny rock lobster outlined in section 9. FNZ has also contracted a research project to focus on kina barrens, with a multi-stakeholder workshop to be held in early 2023. The outcomes from this project will inform further decision-making on kina barrens across multiple relevant stocks.

6.1 Option 1 – Current settings

TAC: 193 t	**TACC:** 105 t	**Customary**: 20 t	**Recreational**: 27 t	**Other mortality**: 41 t

85. Option 1 proposes to retain the current TAC of 193 tonnes. This option acknowledges that the TAC has recently been decreased (2020 and 2022) and that these decreases have assisted in maintaining CRA 1 at or above the B_{MSY} reference level (at 102% in 2022).

86. Under this option, assuming average recruitment, it is expected that vulnerable biomass may increase to 18% of the unfished level over the next four years. Spawning biomass is expected to increase to 40% of the unfished level over the next four years (well above the soft limit).

87. Under this option no change would be made to the 27 tonne recreational allowance for CRA 1, noting that the recreational allowance was reduced from 32 to 27 tonnes for 1 April 2022, and a separate review of recreational regulations would occur.

88. This option also proposes to retain the current CRA 1 TACC of 105 tonnes, recognising that CRA 1 is at or above the B_{MSY} reference level, and assuming average recruitment, vulnerable biomass is expected to increase over the next four years.

89. This option would maintain current utilisation opportunities (both commercial and non-commercial) and takes into account the 2019 stock assessment that overfishing is very unlikely to be occurring (<10%) at the current B_{MSY} reference level.

90. Option 1 has lower levels of expected biomass increase in comparison to the options below, but avoids additional socio-economic impacts that would occur from a further TAC reduction. This option recognises that current settings have only been in place for less than a year, and any changes associated with the previous changes are yet to be known.

91. The biomass increases expected under this option are expected to be less than the other options below and over a longer unknown timeframe. This option provides the lowest amount of certainty that spiny rock lobster biomass will increase to a level that in combination with other measures, will allow them to play their part in controlling kina populations.

6.2 Option 2

TAC: 182 t (↓11 t) **TACC:** 99 t (↓ 6 t)	**Customary**: 20 t	**Recreational**: 22 t (↓ 5 t)	**Other mortality**: 41 t

92. Option 2 proposes reducing the TAC to 182 tonnes (a decrease of 11 tonnes, refer to para 44).

93. Under this option, assuming average recruitment, it is expected that vulnerable biomass may increase to 19% of the unfished level over the next four years. Spawning biomass is expected to increase to 41% of the unfished level over the next four years (well above the soft limit).

94. Under this option, it is proposed to reduce the recreational allowance from 27 to 22 tonnes, which equates to a roughly 15% reduction in estimated recreational take. To align the allowance with the estimated reduction in recreational take, a daily limit reduction from six to three spiny rock lobsters per person is recommended, which will ensure recreational catch remains within the allowance proposed.

95. This option proposes to decrease the TACC to 99 tonnes, a reduction of 6 tonnes (5.7%).

96. There are low to moderate socio-economic impacts expected under this option. The negative economic impacts to the rock lobster industry (including loss of annual revenue, reduced availability of Annual Catch Entitlement (**ACE**), unknown impacts to associated businesses and communities), are expected to be greater than Option 1 (see section 6.5 below). A reduction of the recreational daily limit to three spiny rock lobsters per person proposed in this option is expected to have moderate impacts to the recreational sector.

97. The biomass increases expected under this option are expected to be greater and within a shorter timeframe than Option 1. This option provides a greater amount of certainty than Option 1 that spiny rock lobster biomass will increase to an as yet unknown level that in combination with other measures, will allow them to play their part in controlling kina populations.

6.3 Option 3

TAC: 172 t (↓ 21 t) **TACC:** 89 t (↓16 t)	**Customary**: 20 t	**Recreational**: 22 t (↓ 5 t)	**Other mortality**: 41 t

98. Option 3 proposes reducing the TAC to 172 tonnes (a decrease of 21 tonnes, refer to para 44).

99. Under this option, assuming average recruitment, it is expected that vulnerable biomass may increase to 21% of the unfished level over the next four years. Spawning biomass is expected to increase to 42% of the unfished level over the next four years (well above the soft limit).

100. Under this option, the proposed recreational allowance and daily limit proposals are consistent with Option 2.

101. This option proposes to decrease the TACC to 89 tonnes, a reduction of 16 tonnes (15.2%).

102. There are moderate socio-economic impacts expected under this option. The negative economic impacts to the rock lobster industry (including loss of annual revenue, reduced availability of ACE, unknown impacts to associated businesses and communities), are expected to be greater than Options 1 and 2 (see section 6.5 below). A reduction of the daily limit to three spiny rock lobsters per person proposed in this option is expected to have moderate impacts to the recreational sector.

103. The biomass increases expected under this option are expected to be greater and within a shorter timeframe than Options 1 and 2. Option 3 provides a greater amount of certainty than Options 1 and 2 that spiny rock lobster biomass will increase to an as yet unknown level that in combination with other measures, will allow them to play their part in controlling kina populations.

6.4 Option 4

TAC: 151 t (↓ 42 t)	**TACC:** 71 t (↓ 34 t)	**Customary**: 20 t	**Recreational**: 19 t (↓ 8 t)	**Other mortality**: 41 t

104. Option 4 proposes reducing the TAC to 151 tonnes (a decrease of 42 tonnes, refer to para 44).

105. Under this option, assuming average recruitment, it is expected that vulnerable biomass may increase to 23% of the unfished level over the next four years. Spawning biomass is expected to increase to 43% of the unfished level over the next four years (well above the soft limit).

106. This option proposes to reduce the recreational allowance from 27 to 19 tonnes, which equates to a roughly 29% reduction in estimated recreational take. To align the allowance with the estimated reduction in recreational take, a daily limit reduction from six to two spiny rock lobsters per person is recommended, this will ensure recreational catch remains within the allowance proposed.

107. This option proposes to decrease the TACC to 71 tonnes, a reduction of 34 tonnes (32.4%).

108. There are significant socio-economic impacts under this option. The negative economic impacts, (including loss of annual revenue, reduced availability of ACE, unknown impacts to associated businesses and communities) are expected to be greater than the other options proposed (see section 6.5 below). A reduction of the daily limit to two spiny rock lobsters per person proposed in this option is expected to have significant impacts to the recreational sector.

109. The biomass increases expected under this option are expected to be the greatest compared to the other options. Of the options, Option 4 provides the most certainty that spiny rock lobster biomass will increase to an as yet unknown level that in combination with other measures, will allow them to play their part in controlling kina populations in the shortest but unknown timeframe.

6.5 Socio-economic considerations

6.5.1 Commercial

110. Spiny rock lobster is New Zealand's most valuable wild caught fishery, generating more than $300 million annually in export revenue. Spiny rock lobster fishing supports a range of businesses and regional and coastal communities. The majority of New Zealand's spiny rock lobsters (more than 90%) are exported live, with China being the primary market. Spiny rock lobster exports typically target periods of higher market price, including the lunar New Year.

111. The estimated value of CRA 1 quota based on the current TACC and the average quota share price for the 2017/18 fishing year[22] is over $107 million. The average price of CRA 1 ACE (the earnings quota owners receive when selling their ACE) for the 2017/18 and the 2021/22 fishing year were $40,576.41 and $34,090.80 per tonne respectively.

112. More detail on CRA 1 ACE and quota prices over the last six years can be found in Table 9. Due to the small number of official trades, there is considerable uncertainty in the assessment of impacts on CRA 1 ACE and quota.

[22] 2017/18 is the most recent fishing year with sufficient quota trades to calculate an average price for CRA 1.

Table 9: Number of transfers and average prices of ACE and quota for CRA 1[23].

April Fishing Year	Annual Catch Entitlement (ACE)		Quota	
	Number of transfers	Average price (per tonne)	Number of transfers	Average price (per tonne)
2016/17	120	$40,799.32	1	
2017/18	127	$40,576.41	10	$1,026,119.05
2018/19	106	$42,322.79	0	
2019/20	108	$43,525.05	1	
2020/21	103	$29,484.64	1	
2021/22	110	$34,090.80	0	

113. The current value of CRA 1 to the catching sector estimated from the current TACC (105 tonnes) is approximately $9.94 million based on the 2022/23 fishing year port price. The potential short-term loss of annual revenue to the catching sector, due to further reductions of the TACC proposed in this paper are outlined in Table 10 below.

Table 10: Estimated loss of revenue to the CRA 1 catching sector.

Option	2021/22 fishing year port price	TACC reduction (tonnes)	Estimated loss in revenue
1	$94.7022	0	$0
2		6	$568,213
3		16	$1,515,235
4		34	$3,219,874

114. It should also be noted that the reduced availability of ACE and revenue loss may lead to vessels becoming unviable, the extent of which is expected to increase with greater levels of TACC reduction.

115. Downstream impacts to associated businesses and communities are also anticipated, though these impacts are difficult to estimate. However, there will be long term economic benefits for fishers who rely on CRA 1, of increased abundance (i.e., rock lobster being easier to catch and therefore less overall running costs).

6.5.2 Recreational

116. There is no estimate of recreational or customary asset value of the fishery or non-market values of spiny rock lobster, but the social and cultural values are recognised.

117. Potential reductions in daily recreational take of spiny rock lobster could have economic impacts for recreational fishers who harvest within CRA 1 as subsistence fishers.[24] However, the proposed reductions will still provide for those fishers, and there will be an economic benefit long term for people who rely on increased abundance in CRA 1.

7 Legal basis for managing fisheries in New Zealand

118. The Fisheries Act provides the legal basis for managing fisheries in New Zealand.

119. An overview of the Minister's central statutory considerations for setting and varying the CRA 1 TAC, allowances, and TACC under the Act are provided as follows. See the separate document Overview of legislative requirements and other considerations at https://www.mpi.govt.nz/dmsdocument/51712for more information.

[23] Quota and ACE trading prices registered with FishServe may include transactions between related commercial entities and the averages may understate true market/transfer price.

[24] Subsistence fishers refer to those who fish primarily to feed family and relatives, relying on the resource as a source of food.

7.1 Section 8 – Purpose of the Act

120. The purpose of the Act is to provide for the utilisation of fisheries resources while ensuring sustainability:

Ensuring sustainability is defined as ”maintaining the potential of fisheries resources to meet the reasonably foreseeable needs of future generations and avoiding, remedying or mitigating the adverse effects of fishing on the aquatic environment”.

Utilisation of fisheries resources is defined as “conserving, using, enhancing, and developing fisheries resources to enable people to provide for their social, economic, and cultural wellbeing.”

121. The Supreme Court has held that the purpose statement incorporates two competing social policies and noted that both are to be accommodated as far as is practicable in the administration of fisheries under the QMS, but that, ‘In the attribution of due weight to each policy that given to utilisation must not be such as to jeopardise sustainability.’[25]

7.2 Section 9 – Environmental principles

122. There are three environmental principles under section 9 of the Act that must be taken into account by the Minister when considering sustainability measures for the CRA 1 stock. These are:

a) Associated or dependent species should be maintained above a level that ensures their long-term viability;

b) Biological diversity of the aquatic environment should be maintained; and

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

7.2.1 Associated or dependent species

123. Associated or dependent species include marine mammals, seabirds, fish and invertebrate species caught as bycatch in the spiny rock lobster fishery, as well as any non-harvested species taken or otherwise affected by the taking of any harvested species.

Marine mammals

124. In New Zealand waters, marine mammal entanglements with pot fishing gear have been documented since 1980. A recent study on cetacean interactions with pot fisheries (Pierre et al., 2022) found that from 1980 to the present, 1-2 entanglement events of cetaceans per year were reported on average. However more recently, from 2010 – 2020, an average of 4-5 entanglement events per year have been recorded.

125. Nationally, the most recorded entanglements over time have involved humpback whales, followed by orca. In CRA 1 there have been two interactions reported in the last 10 years, however these could not be attributed to a specific sector.

126. Methods to reduce impacts on cetaceans from interactions and entanglements with pot and trap fishing gear include gear modifications, spatial/temporal management, and disentanglement interventions. Disentanglement interventions are the main documented response to addressing entanglements in New Zealand to date.

127. Guidance for commercial pot fishers has been distributed by the New Zealand Rock Lobster Industry Council (NZ RLIC). This guidance includes proactive approaches to reduce the risk of cetacean entanglements with fishing gear, providing information on whale identification, best practise approaches to mitigation and reporting requirements.

128. The Hector’s and Māui dolphin Threat Management Plan (TMP) guides management approaches for addressing both non-fishing and fishing-related impacts on Hector’s and Māui dolphins. To date, with regard to the spiny rock lobster fishery, there have been no reported

[25] *Recreational Fishing Council Inc v Sanford Limited and Ors* [2009] NZSC 54 at [39].

interactions with Hector's or Maui dolphins in CRA 1. The residual risk to the Hector's and Māui dolphin from potting in CRA 1 is considered low.

Seabirds

129. Management of seabird interactions with New Zealand's commercial fisheries is guided by the National Plan of Action – Seabirds 2020 (NPOA-Seabirds). The NPOA-Seabirds sets out the New Zealand government's commitment to reducing fishing-related captures and associated mortality of seabirds. The vision of the NPOA-Seabirds is that New Zealanders work towards zero fishing-related seabird mortalities.

130. Management actions and research under the NPOA-Seabirds are guided and prioritised based on the seabird risk assessment that breaks down the risks to seabird population by fishery groups. The most recent seabird risk assessment was published in 2020.[26]

131. There have been no reported interactions with seabirds in CRA 1 fishery in the last 10 years. This is likely due to the primary method being potting, with pots usually set too deep for seabirds to enter.

Fish bycatch

132. The most frequently reported incidental species caught via commercial spiny rock lobster potting, in decreasing order of catch across CRA 1 are: carpet shark, blue cod, tarakihi, snapper, red scorpion fish, northern bastard cod, and octopus. This is based on an analysis of estimated incidental catches for the period 2016 to 2021. Many of these species are released from pots alive.

7.2.2 Biological diversity

133. Any benthic impacts from fishing are an important consideration in relation to this principle, along with the critical role kelp plays in the coastal and marine environments.

Benthic impacts

134. Potting is the main method of targeting spiny rock lobster and is assumed to have very little direct effect on non-target species. FNZ is not aware of any information that exists regarding the benthic effects of potting in New Zealand.

135. A study on the effects of lobster pots was completed in a report on the South Australian rock lobster fisheries (Casement & Svane 1999). This fishery is likely to be the most comparable to New Zealand because the lobster species is the same (*Jasus edwardsii*) and many of the same species are present, although pots and how they are fished may differ. The report concluded that the mass of algae removed by pots probably has no ecological significance.

Biodiversity role of kelp

136. As outlined in the Aquatic Environment and Biodiversity Annual Review 2021 (AEBAR)[27], kelp provides a wide and diverse range of ecosystem services, including:

    a) Providing important settlement, nursery, shelter, and refuge habitats for a wide range of coastal and inshore shellfish and finfish species, including for spiny rock lobster;

    b) Providing food for invertebrates, shellfish, finfish, and seabird species, which in turn supports a variety of important commercial and non-commercial fisheries resources;

    c) Modifying wave and tidal action and influencing coastal physical processes such as erosion, sedimentation, and turbidity;

    d) Driving primary production and energy and nutrient recycling that contribute to other near-shore systems including sandy beaches and deepwater ecosystems;

[26] Assessment of the risk of commercial fisheries to New Zealand seabirds, 2006–07 to 2016–17 https://www.mpi.govt.nz/dmsdocument/39407/direct

[27] https://www.mpi.govt.nz/dmsdocument/51472-Aquatic-Environment-and-Biodiversity-Annual-Review-AEBAR-2021-A-summary-of-environmental-interactions-between-the-seafood-sector-and-the-aquatic-environment

137. The removal of predators (particularly large predators) through fishing, and the occurrence of kina barrens as a result, will have an impact on associated biodiversity (MacDiarmid et al. 2013). The full extent of this impact is unknown (including on associated and dependent species), but it is likely that a shift from productive kelp forests to kina barrens will result in reduced primary production and biodiversity.

7.2.3 Habitat of particular significance for fisheries management of spiny rock lobster

138. Specific habitat of particular significance for CRA 1 have not been identified, however certain features of rocky habitats important for spiny rock lobster are discussed in Table 11.

139. FNZ recently consulted on guidance for defining, identifying, and managing habitat of particular significance for fisheries management and for how FNZ takes into account that these habitats should be protected when preparing fisheries management advice.[28] Recent attention has been given to this part of the Act through the Prime Minister's Chief Science Advisor's report titled *The Future of Commercial Fishing in Aotearoa New Zealand (March 2021).*[29]

Table 11: Summary of information on habitat of particular significance for fisheries management for New Zealand spiny rock lobster.

Fish stock	Spiny rock lobster
Habitat	• No specific habitat of significance have been identified for CRA 1. <u>Juveniles:</u> • Spiny rock lobsters have high fecundity and an extensive pelagic larval stage of up to two years, which results in larval dispersal over wide areas by ocean currents. • During this pelagic phase, larvae are dispersed in the open ocean and carried by currents. The open ocean environment is important during this stage of spiny rock lobster development. • After the pelagic larval phase, larvae metamorphose into the post larval puerulus stage and settle on coastal shelf rocky reefs. Puerulus and juvenile spiny rock lobsters preferentially inhabit holes and crevices in hard substrates where light levels are low. <u>Adults:</u> • Adult spiny rock lobsters are found in reef habitats up to depths of 200 m, where they inhabit crevices, caves, and rocky overhangs. • Migrations related to moulting, reproduction and feeding are known to take place, resulting in seasonal changes in the depth distribution, sex ratios, size frequency and density. • Spiny rock lobsters are predators that forage on benthic invertebrates such as pāua, ophiuroids and kina. The presence of macroalgae (kelp) on reef habitats increases structural complexity and provides habitat and food for prey species, thus benefitting spiny rock lobsters. • Spiny rock lobsters are also known to forage for bivalves on sand flats surrounding reefs, usually nocturnally.
Attributes of habitat	• Complex rocky habitats provide critical habitats for spiny rock lobsters, including: - Settlement substrata for juveniles - Shelter and refuge from predation - Feeding opportunities
Reasons for particular significance	• Successful reproduction, development of juvenile stages, and growth to mature adult sizes is critical to supporting the productivity of spiny rock lobster stocks.
Risks/Threats	• Land-based practices can impact coastal reef habitats, including through sedimentation and eutrophication.

[28] The habitat of particular significance for fisheries management consultation material is available here: https://www.mpi.govt.nz/consultations/guidance-for-identifying-a-habitat-of-particular-significance-for-fisheries-management/

[29] Accessible at: https://www.pmcsa.ac.nz/topics/fish/

Fish stock	Spiny rock lobster
	• In the long-term oceanographic circulation patterns (currents, gyres, eddies) could be impacted by climate change, and changes in seawater temperature and predation may affect survival and settlement of spiny rock lobster larvae. • Seawater temperature change is known to affect larval energy, swimming, and presumed survival in packhorse rock lobster.[30] • Settlement processes for spiny rock lobster are complex, involving larval behaviour, biological and environmental factors, and oceanographic processes.[31] There is evidence from New Zealand and Australia that environmental conditions can lead to different settlement strengths in different areas of a stock, which means that there may be some stock-level resilience to climate change.[32]

140. As noted in Table 8 above, the open ocean is important for the survival of spiny rock lobster larvae, and structurally complex rocky reefs are important for the settlement and survival of juvenile and adult spiny rock lobster. The extent to which these areas are considered habitats of particular significance for fisheries management in relation to life cycle stages of spiny rock lobster in CRA 1 is unknown.

141. Urchin barrens, other species grazing on kelp (e.g., butterfish[33]), and other impacts on marine plants such as sedimentation and eutrophication, could potentially negatively impact the suitability of rocky reef habitat for juvenile and adult spiny rock lobsters as a refuge, as well as the availability of prey species.

142. Recent work undertaken by the rock lobster stock assessment team indicates a relationship between sea surface temperature and spiny rock lobster recruitment. This work is preliminary and requires further scrutiny, however, this could be a significant development, especially in CRA 1.

143. It is acknowledged that kelp habitats are likely to be important for a range of harvested and non-harvested species, and any reduction in such habitats is therefore likely to be adverse to spiny rock lobster and other species that rely on kelp (Dayton 1985).

7.3 Section 10 – Information principles

144. Section 10 relates to the information principles that: All persons exercising or performing functions, duties, or powers under the Act, in relation to the utilisation of fisheries resources or ensuring sustainability, shall take into account, these are:

(a) decisions should be based on the best available information:

(b) decision makers should consider any uncertainty in the information available in any case:

(c) decision makers should be cautious when information is uncertain, unreliable, or inadequate:

(d) the absence of, or any uncertainty in, any information should not be used as a reason for postponing or failing to take any measure to achieve the purpose of this Act.

145. Both scientific and anecdotal information need to be considered and weighed accordingly when making management decisions. The weighting assigned to particular information is subject to the certainty, reliability, and adequacy of that information. Less than full information suggests caution in decision-making, not deferral of a decision completely. As a general principle, information outlined in the FNZ Fishery Assessment Plenary Report is considered the best available information on stock status and should be given significant weighting. The information

[30] García-Echauri, L., Liggins, G., Cetina-Heredia, P., Roughan, M., Coleman, M. A. & Jeffs, A. 2020. Future ocean temperature impacting the survival prospects of post-larval spiny lobsters. *Marine Environment Research,* 156, 104918.
[31] Hinojosa, I. A., Gardner, C., Green, B. S., Jeffs, A., Leon, R. & Linnane, A. 2016. Differing environmental drivers of settlement across the range of southern rock lobster (*Jasus edwardsii*) suggest resilience of the fishery to climate change. *Fisheries Oceanography*, 26 (1): 49-64.
[32] See previous footnote.
[33] Taylor, D.I., Schiel, D.R. (2010). Algal populations controlled by fish herbivory across a wave exposure gradient on southern temperate shores. *Ecology*, 91, 201-211. https://doi.org/10.1890/08-1512.1

presented in the Plenary Report is subject to a robust process of scientific peer review and is assessed against the Research and Science Information Standard for New Zealand Fisheries.[34] Corroborated anecdotal information also has a useful role to play in the stock assessment process and in the management process.

146. Fisheries New Zealand considers that the best available information has been used as the basis for proposals in this paper. Where information is uncertain, unreliable or inadequate this has been noted. FNZ welcomes feedback on the information used throughout this document, including if any literature relating to CRA 1 has been overlooked.

7.4 Section 11 – Sustainability measures

147. Section 11 of the Act sets out various matters that the Minister must take into account or have regard to when setting of varying any sustainability measures[35]. This includes:

(a) any effects of fishing on any stock and the aquatic environment; and

(b) any existing controls under the Act that apply to the stock or area concerned; and

(c) the natural variability of the stock concerned; and

(d) any relevant planning instruments, strategies, or services. [36]

7.4.1 Effects of fishing on any stock and the aquatic environment

148. Refer sections 7.2 above and 7.5 below.

7.4.2 Existing controls that apply to CRA 1

149. A range of existing management controls apply to CRA 1, including:

(a) Gear restrictions: nationally, there is a prohibition on the use of spears for taking spiny rock lobsters by both recreational and commercial fishers.

(b) Number of pots (recreational only): there is a maximum number of pots that may be used, set, or possessed in New Zealand fisheries waters on any day for recreational purposes. Recreational fishers are restricted to three pots. Two or more recreational fishers on a vessel are restricted to a combined total of six pots.

(c) Escape apertures: a fisher must not use or possess on a vessel or vehicle a spiny rock lobster pot, unless the pot has at least two rectangular apertures (other than the mouth of the pot) through which undersize spiny rock lobsters are able to escape. This applies to both recreational and commercial fishers.

(d) Size restrictions: spiny rock lobsters have a minimum legal size of 60mm (tail width) for females and 54mm (tail width) for males. This applies to both recreational and commercial fishers.

(e) Prohibited states: nationally, it is illegal to take or possess spiny rock lobsters carrying external eggs (in berry), or spiny rock lobsters in the soft-shell stage (post moulting). This applies to both recreationally and commercially caught fish.

(f) Area closures: area restrictions set under the Act, can apply to both recreational and commercial fishers. Area closures may be put in place to ensure sustainable utilisation or to protect habitats of particular significance for fisheries management. There are no general area closures currently in place for rock lobster in the CRA 1 fishery. There are however, several mātaitai reserves, taiāpure, and section 186A area closures that fall within CRA 1 (see section 5.2)

[34] A non-binding FNZ Policy Document.
[35] Such as setting the TAC, TACC and allowances.
[36] Sections 11 (2) and (2A).

(g) Daily limits: recreational fishing of spiny rock lobsters is managed through daily limits. In CRA 1 no person may take or possess more than six rock lobsters (both spiny and packhorse rock lobster combined) per day.

7.4.3 The natural variability of all spiny rock lobster stocks in New Zealand

150. A variety of environmental factors are thought to influence the productivity of spiny rock lobster populations, including water temperature, ocean currents, shelter availability, and food availability (Linnane et al 2010). Lobsters grow at different rates around New Zealand and female lobsters mature at different sizes (Annala 1983).

151. Spiny rock lobster larvae spend an extended time in the plankton, swimming and drifting in the ocean for up to 24 months. This means that larvae hatched in one area may be retained in that area by local eddy systems, carried to other areas by currents, or lost to New Zealand entirely. For most areas, larvae may originate a considerable distance from the settlement site. The number of 'puerulus', the final planktonic developmental phase of spiny rock lobster, that settle to the sea floor varies among areas and from year to year.

152. Puerulus settlement may be affected by environmental factors such as the amount of suitable habitat available, the persistence of storms, prevailing ocean currents, sea temperature, food availability, and predation. Large numbers of puerulus larvae also die before reaching suitable habitat, which is due in part to predation, but may also be a result of unfavourable environmental conditions.

153. Information on variability in growth, maturity, available abundance, mortality and recruitment is incorporated into the stock assessments that inform spiny rock lobster management. This information informed the development of options discussed in this paper.

Climate change

154. The oceans around New Zealand are, in some regions, warming at a rate well in excess of the global average (Sutton and Bowen, 2019). While the extent to how this will impact the wider ecosystem is largely unknown, it can be expected that there will be an impact on spiny rock lobster, including their spatial variability.

155. Spiny rock lobsters are likely to be affected by climate change and ocean acidification (Cornwall & Eddy 2015). Calcifying organisms, such as lobsters have been highlighted as particularly susceptible (e.g., Hepburn et al. 2011; Bell et al. 2013).

156. Changes to kina and spiny rock lobster productivity may have wider consequences in coastal ecosystems, because these species often have important ecosystem roles (Pinkerton et al. 2008; Cornwall & Eddy 2015).

157. Changes to ocean circulation patterns also have the potential to affect the recruitment of the spiny rock lobster, given the extended phyllosoma (larval) stage.

7.4.4 Relevant plans, strategies, or services

158. The following plans and strategies are relevant for CRA 1.

Regional Plans

159. There is one Regional Council that has coastline within the CRA 1 boundary. The Northland Regional Council has multiple plans to manage the coastal and freshwater environments, including terrestrial and coastal linkages, ecosystems, and habitats.[37]

160. Fisheries New Zealand considers that the proposed management options presented in this document, are in keeping with the objectives of relevant regional plans, which generally relate to the maintenance of healthy and sustainable ecosystems to provide for the needs of current and future generations. The provisions that might be considered relevant can be found in a separate document titled *Regional plan provisions and policy statements,* accessible at https://www.mpi.govt.nz/dmsdocument/54625-Regional-plan-provisions-and-policy-statements.

Northland Regional Plan

[37] Regional Coastal Plan, Regional Water and Soil Plan and the Regional Air Quality Plan.

161. The proposed Regional Plan for Northland is relevant to the CRA 1 proposals in this document. Resource Management Act (RMA) objectives, policies and rules have been sought as part of the proposed Northland Regional Plan to provide marine spatial protection measures, prevent damage to the seafloor and prohibit the temporary or permanent damage or destruction or removal of fish, aquatic life, or seaweed.

162. Early in November 2022, the Environment Court released its decision on marine protection measures under the proposed Northland Regional Plan. Of relevance to CRA 1, is the prohibition of all fishing, except for kina harvest, in Maunganui Bay to Oke Bay and Mimiwhangata under the proposed Plan to protect the biodiversity values identified. It is uncertain at this time when the prohibitions may come into effect or what effect they will have.

Conservation Management Strategies

163. The Northland Regional Council has a current Conservation Management Strategy in place. Conservation Management Strategies are required under the Conservation Act 1987 and are recognised under the Resource Management Act 1991.

164. The Conservation Management Strategies guide what the Department of Conservation intends to do, how it will set priorities about what has to be done and how it can respond to requests to use the natural and historic resources it manages. The strategies include objectives, outcome statements, and policies. While of general relevance, there is nothing in them specific to the fish stocks being reviewed.

7.4.5 Additional relevant strategies

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

165. Te Mana o te Taiao – the Aotearoa New Zealand Biodiversity Strategy sets a strategic direction for the protection, restoration and sustainable use of biodiversity, particularly indigenous biodiversity, in Aotearoa New Zealand. The Strategy sets a number of objectives across three timeframes. The most relevant to setting sustainability measures for CRA 1 are objectives 10 and 12:

Objective 10: Ecosystems and species are protected, restored, resilient and connected from mountain tops to ocean depths.
Objective 12: Natural resources are managed sustainably.

166. The Ministry for Primary Industries (MPI) is undertaking work to support this strategy, as well as the requirement under the Act to avoid, remedy or mitigate adverse effects on the aquatic environment. Information is discussed above and below in this section on relevant interactions with the wider aquatic environment for this stock.

7.5 Section 13 – Total Allowable Catch

167. The Minister must set a TAC for each quota management stock. The TAC set must:

(2)(a) maintain the stock at or above a level that can produce the maximum sustainable yield, having regard to the interdependence of stocks; or

(b) enable the level of any stock whose current level is below that which can produce the maximum sustainable yield to be altered—

(i) in a way and at a rate that will result in the stock being restored to or above a level that can produce the maximum sustainable yield, having regard to the interdependence of stocks; and

(ii) within a period appropriate to the stock, having regard to the biological characteristics of the stock and any environmental conditions affecting the stock; or

(c) enable the level of any stock whose current level is above that which can produce the maximum sustainable yield to be altered in a way and at a rate that will result in the stock moving towards or above a level that can produce the maximum sustainable yield, having regard to the interdependence of stocks

168. In the 2022 rapid update, a B_{MSY} reference level was calculated based on the 2019 CRA 1 stock assessment as a vulnerable biomass level of 454 tonnes (14.4% of the unfished level). The results suggest that the median estimate of vulnerable biomass is above (102%) the B_{MSY} reference level in 2022 (with 55% probability).

169. As an estimate of B_{MSY} is available, and the CRA 1 stock is estimated to be above B_{MSY} and remain above B_{MSY} for the next four years under current catch rates, section 13(2)(a) applies. However, section 13(2)(c) could also apply if a reference level above B_{MSY} is selected.

7.5.1 Interdependence of stocks

170. When setting the CRA 1 TAC under section 13, the Minister must have regard to the interdependence of stocks. The interdependence of stocks involves the consideration of the effects of fishing on associated stocks affected by fishing for the target stock (also discussed above in section 7.2).

Kina or urchin barrens

171. Much of the available information relating to kina barrens comes from CRA 2 and other areas (including CRA 4 (Wellington/Hawke's Bay), CRA 7 (Otago) and Australia). Due to the similarity of the habitat and the role of rock lobsters, as a predator that influences the ecological role of prey species, it is reasonable to assume that the findings from these areas are also broadly relevant to CRA 1.

172. The main evidence for decreased predation by rock lobster leading to increased kina abundance and barrens in northern eastern areas of New Zealand comes from trends observed in areas closed to fishing (Shears & Babcock 2002, Shears & Babcock 2003), and comparative studies between protected areas (Leigh and Tāwharanui within the CRA 2 fishery) and nearby unprotected areas (Shears et al. 2008, Salomon et al. 2008).

173. On northern eastern reefs, evidence from these studies suggests a high abundance of large predators (including spiny rock lobsters and finfish) mitigate the development of urchin barrens. The distribution of urchin barrens and the occurrence of trophic cascades more generally varies with environmental context, e.g., depth and wave exposure (Shears et al. 2008, Salomon et al. 2008, 2010). In areas of CRA 1, such as the Bay of Islands where kina barrens are common, their distribution varies in relation to environmental factors such as, changes in water temperature, increased sedimentation, and eutrophication[38] (Grace & Kerr 2005a, b; Froude 2016).

174. Several studies from northeast New Zealand have demonstrated consistent and large-scale patterns in the extent of urchin barrens (Choat & Schiel, 1982; Shears & Babcock, 2004; Cole, 1993; Grace, 1983). For example, at the top of the North Island around from Ahipara on the west coast to the entrance of the Hauraki Gulf on the east coast, 17% (5,528 hectares) of the available rocky reef ecosystem is covered in urchin barrens (Kerr & Grace 2017). However, in Maitai Bay on the Karikari Peninsula in the Far North it was calculated that the extent of kina barrens covers 40% of the estimated historic area of high productivity kelp forests (Kerr et al. 2020).

175. Spiny rock lobsters consume kina[39], with smaller spiny rock lobsters consuming smaller kina and larger spiny rock lobsters consuming kina of all sizes, though smaller kina are preferentially selected by all spiny rock lobsters regardless of size (Andrew and MacDiarmid 1991, Shears and Babcock 2002). Spiny rock lobsters are also known to influence kina behaviour (Andrew 1993).

176. There is evidence from two marine reserves in northern eastern New Zealand (largely within the CRA 2 area) that reducing fishing pressure on reef predators such as spiny rock lobsters, snapper and other fishes can increase predation of kina, resulting in reduced kina populations and a return to macroalgal dominated habitat (e.g., Babcock et al. 1999, Shears & Babcock

[38] Eutrophication is characterized by excessive plant and algal growth due to the increased availability of one or more limiting growth factors needed for photosynthesis (Schindler 2006), such as sunlight, carbon dioxide, and nutrient fertilizers.

[39] Sea urchins (*Evechinus chloroticus*) are endemic to New Zealand

2003). It is reasonable to assume that, due to the close proximity of CRA 2 to CRA 1, and the similarity in habitats, these finding are also broadly relevant to CRA 1.

177. While the majority of literature focus on trophic interactions involving predators, sea urchins and large brown algae, particularly trophic cascades, the occurrence of kina barrens in New Zealand may also be influenced by a range of other environmental factors, such as environmental and climatic influences, species' demographics, and catchment-derived sedimentation (Schiel 2013). It should be noted that multiple causality does not mean that effects that are manageable at this time should be ignored, i.e., the presence of other factors that may have a role to play, does not mean the impact of fishing can be disregarded.

178. Marine benthic community structures and trophic interactions are complex, with multiple factors at play. Effective restoration and management strategies require an understanding of the mechanisms and dynamics of ecosystem change. Shifts between kelp forest and urchin barren states can be discontinuous, demonstrating "hysteresis," or unequal thresholds to switch between states. In other words, reversing the system from urchin barrens back to kelp forest (should that be the objective) may require sea urchin densities to fall well below that which caused the initial shift to barrens (Miller 2022).

179. Fisheries New Zealand has contracted a research project to review and update evidence for fishing-induced trophic cascades in New Zealand with a focus on kina barrens. This project will include a literature review and a multi-stakeholder workshop to be held in early 2023. This project has been set up to enable an informed multiple-stakeholder discussion to take place on trophic cascades as it applies to New Zealand fisheries, the existing research and survey data (and what they indicate), and development of research priorities. The outcomes from this workshop will be used to inform further decision-making on kina barrens.

Other relevant kina predators in CRA 1

180. While spiny rock lobsters are considered one of the key predators for large kina, other species such as snapper and packhorse rock lobster are also known to consume kina. Packhorse rock lobsters are the biggest rock lobsters in the world and grow to a much larger size than spiny rock lobsters. The latest stock status information for snapper (SNA 1 and SNA 8) and packhorse rock lobster (PHC 1) are outlined in Table 12 below.

Table 12: Stock information for snapper (SNA 1 and SNA 8) and packhorse rock lobster (PHC 1).

Stock	Last assessment	Status in relation to			
		Target	Soft limit	Hard limit	Overfishing
SNA 1 (East Northland)	2022 (preliminary)	Very Unlikely to be at or above	Unknown	Very Unlikely to be below	Unknown
SNA 8 (West coast North Island)	2021	Likely to be at or above	Very Unlikely to be below	Exceptionally Unlikely to be below	Very Unlikely to be occurring
PHC (All of NZ)*	2020	Likely to be at or above	Very Unlikely to be below	Very Unlikely to be below	Unlikely to be occurring

*Although the PHC 1 stock unit covers all over New Zealand, this species mostly occurs in the north of the North Island.

181. The impact other species have on urchin barrens is important to note when considering the review of spiny rock lobster outlined in this paper. For example, the first successful stock assessment of packhorse rock lobster in 2020 suggested that increased recruitment or productivity of the stock in recent years has increased stock biomass to near historical highs. As the northern snapper stock (SNA 1) abundance rebuilds, a larger amount of snapper will become available to consume kina. Species such as snapper and packhorse rock lobster are also managed under the QMS, and consideration of urchin barrens will be given when these stocks are next reviewed.

Role of spiny rock lobsters in the ecosystem across New Zealand

182. In New Zealand, spiny rock lobsters are mainly nocturnal (Williams & Dean 1989). They consume a broad range of prey, including molluscs, crustaceans, annelid worms, macroalgae, echinoderms, sponges, bryozoans, fish, foraminifera and brachiopods (MacDiarmid et al. 2013). They prefer soft-sediment bivalves over rocky reef prey and make nocturnal foraging

movements away from the reef (Flood 2021). Their feeding rates shift seasonally in relation to moulting and reproductive cycles (Kelly et al. 1999).

183. Predation on spiny rock lobsters is known from a variety of fish species. Published scientific observations support predation upon spiny rock lobsters by octopus (Brock et al. 2003), rig (King & Clarke 1984), blue cod, groper, southern dogfish (Pike 1969), and seals (Yaldwyn 1958, cited by Kensler 1967) and other spiny rock lobsters. Predation on packhorse rock lobsters from octopus has also been observed.

184. At high biomass spiny rock lobsters are ecologically important predators in New Zealand's rocky reef ecosystems (Pinkerton et al. 2008, Pinkerton et al. 2015). Survey work and experimental work have shown that predation by spiny rock lobsters in marine reserves can influence the demography of surf clams of the genus Dosinia (Langlois et al. 2005, Langlois et al. 2006).

185. Ecosystem modelling has been used to explore trade-offs between catches of invertebrate species with ecosystem function on the Wellington coast (Eddy et al. 2015). The authors concluded that the level of lobster exploitation had the greatest effect on the modelled ecosystem function, followed by pāua and kina. While this work suggests that high rock lobster exploitation rates can have a significant impact on the organisation and function of temperate reef ecosystems, more research is required to determine the extent to which this has occurred in CRA 1. The presence of other northern keystone species such as snapper will also have an influence on community and habitat composition.

8 Recreational controls to support the TAC proposals

8.1 Summary

186. During the 2022/23 sustainability review of the CRA 1 fishery, it was noted that while there was uncertainty in the CRA 1 recreational harvest information, it was likely that recreational catch could exceed the proposed new 27 tonne recreational allowance.[40]

187. A review of the recreational regulations was requested by the Minister in March 2022 to manage recreational catch (on average) to the new allowance. As CRA 1 stock biomass increases, it is likely that recreational catch will increase, particularly when current daily limits are not being fully utilised by the sector (i.e., most recreational fishers do not take the maximum daily limit). This has the potential to compromise any realised benefits from the other sustainability measures proposed for the CRA 1 stock.

188. To give effect to the Minister's March 2022 decision, FNZ undertook analysis on reductions to daily limits during 2022. FNZ considers that a reduction to the daily limit for spiny rock lobsters would be the most effective measure to manage recreational harvest to the new allowance.

189. The Minister has recently issued a Fisheries (Recreational Management Controls) Notice[41] that contains the specifications of recreational fishing management controls for daily limits, weights, and minimum legal sizes. Changes to these controls can now be implemented at the same time as adjustments to the TAC, allowances and TACC so that management measures across sectors can be coordinated and responsive.

190. Other regulatory and non-regulatory measures will be considered if the controls for CRA 1 fishery do not manage recreational catch to the allowance. These could include a maximum legal size, and seasonal or area closures (which could apply to both recreational and commercial fishers) (refer to section 9).

[40] The 2022 rapid update used a model input of 28.3 tonnes for CRA 1 recreational catch.

[41] https://www.mpi.govt.nz/dmsdocument/53743-FisheriesRecreational-Management-Controls-Notice-2022-with-corresponding-New-Zealand-Gazette-Notice

8.2 Current recreational settings

191. Recreational catch is managed within the allowance set, primarily through a combination of a daily limit and a minimum legal size. Table 13 provides a summary of the recreational regulations that are currently in place to manage spiny rock lobster fishing in CRA 1.

Table 13: Summary of the key Fisheries (Amateur Fishing) Regulations 2013 that currently apply in CRA 1.

Daily limit of six lobsters per person (regulation 13)	No person may take or possess more than 6 rock lobsters (spiny and packhorse rock lobsters combined) on any one day.
Minimum size limit for spiny lobster (regulation 30)	54 mm tail width for males; 60 mm tail width for females.
Protected spiny lobsters that cannot be taken and must be returned to the sea (regulation 31)	Undersize lobsters below the minimum size limit; 'berried' females carrying external eggs; soft-shelled lobsters (both sexes); and unmeasurable lobsters (both sexes).
Pot limits (spiny and packhorse) (regulation 43)	3 pots for one person, up to 6 pots for 2 or more persons from a vessel.
Pot escape gap requirements for spiny and packhorse lobster (regulation 45)	Pots must have at least two escape gaps 54 mm x 200 mm to allow undersized rock lobsters to escape.
The buoy or floats attached to the pot must be marked with the fisher's name (regulation 44)	
Spear guns, spring-loaded loops, and spring-loaded lassos may not be used to harvest rock lobster. Hand drawn loops may be used (regulation 46)	

8.3 Proposed CRA 1 daily limits

192. To complement the catch setting reductions outlined earlier in this paper, it is proposed that the spiny rock lobster daily limit is reduced. FNZ considers a reduction to the daily limit is the most effective measure to manage recreational harvest as the fishery rebuilds.

193. FNZ welcomes feedback on proposed changes to the CRA 1 recreational daily limit to ensure the long-term sustainable utilisation of this important shared fishery is not compromised (Table 14).

Table 14: Daily limit proposals for CRA 1.

Option	Description
A	**Current settings** Retain the current daily limit of six rock lobsters (spiny and packhorse combined) per recreational fisher in CRA 1.
B	**Reduce the daily limit for spiny rock lobster to three** Within the daily limit of six rock lobsters (spiny and packhorse combined), amend the Amateur Regulations so that a recreational fisher must not take or possess more than three spiny rock lobsters from CRA 1.
C	**Reduce the daily limit for spiny rock lobster to two** Within the daily limit of six rock lobsters (spiny and packhorse combined), amend the Amateur Regulations so that a recreational fisher must not take or possess more than two spiny rock lobsters from CRA 1.

194. The options outlined would apply to all recreational fishers in CRA 1. A "recreational fisher" is a person fishing under the Amateur Regulations and includes those fishing on an amateur fishing charter vessel and commercial fishers taking fish for non-commercial purposes under section 111 of the Act.

195. No new offences would be introduced as a consequence of the daily limit proposals. The following infringement fees would continue to apply:

(a) A $250 infringement fee for taking or possessing more than the daily limit for spiny rock lobster, but not more than 2 times that daily limit;

(b) A $500 infringement fee for fee for taking or possessing more than the daily limit for spiny rock lobster, but not more than 3 times that daily limit.

196. This would not change the packhorse daily limit because up to six packhorse lobsters could still be harvested if no spiny lobsters are taken at the same time.

8.4 Reported daily limit frequencies

197. FNZ Science has undertaken analysis of daily limit reductions. Individually reported daily frequencies for the 2011-12, 2013-14 and 2017-18 National Panel Surveys was used to explore the potential implications of smaller daily limits on spiny rock lobster harvest in CRA 1 (Figure 7). This analysis suggests that very few (<10%) of recreational fishers in CRA 1 take more than three spiny rock lobsters in a day.

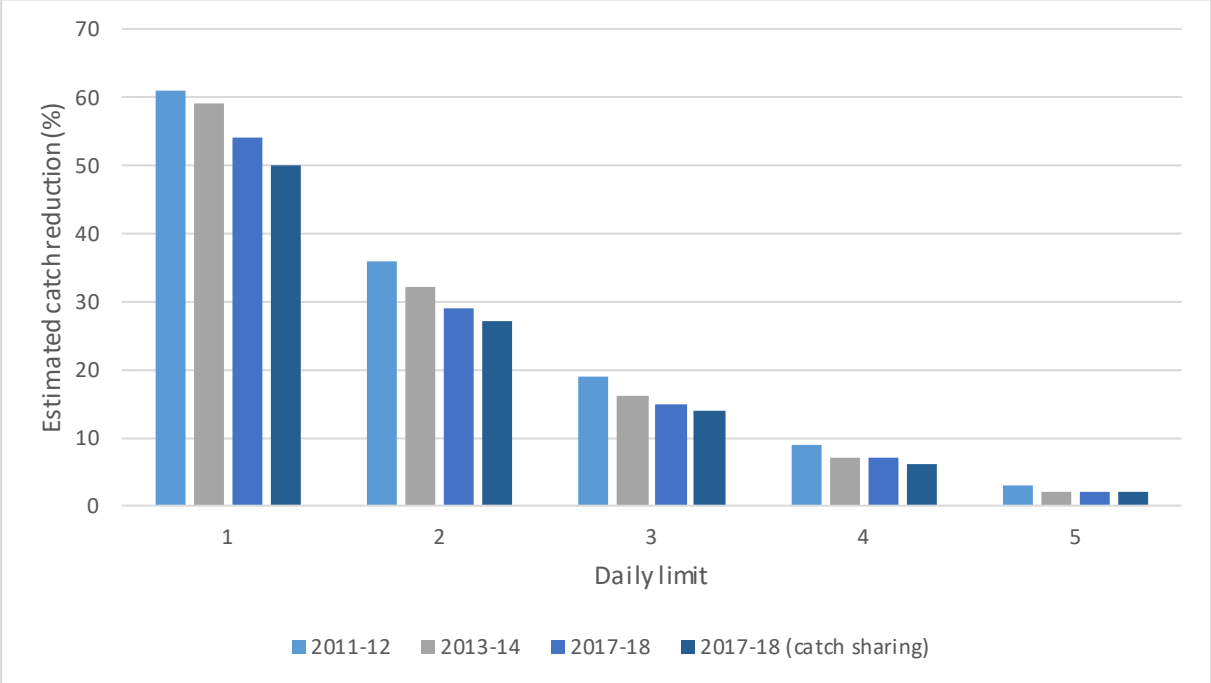

Figure 7: Effect on harvest (median) of reducing daily limit from 6, on the basis of assumed daily limit frequencies from different survey datasets.

198. Catch sharing within a group of fishers is likely to take place, particularly as daily limit sizes are reduced. Catch sharing slightly reduces the impact of reducing daily limits on harvest (Figure 7, dark blue bars). For example, if a one fish daily limit had been in place in 2017-18, then with catch sharing the reduction in catch would have been 50% (compared to 54% without sharing), with differences reducing as the daily limit increased.

199. It cannot be predicted what recreational fishers will do in the future in relation to daily limit changes, but the analysis estimated what would have been harvested from the observed fishing trips, had smaller daily limits been in force at the time.

200. The overall effects on recreational harvest from small changes to the daily limit were very limited (e.g., 2-3% reduction with daily limit of 5, 7-9% reduction with daily limit of 4). More significant reductions would be needed to effectively manage recreational catch to the allowances proposed in this paper (e.g., a daily limit of three would reduce harvest by 15-19% and a daily limit of one would reduce the harvest by 54-61%).

201. Assessing the effectiveness of the recreational daily limit will likely require more frequent monitoring of the recreational harvest (over and above periodic National Panel Surveys) such as creel surveys.[42]

8.5 Analysis of options

8.5.1 Option A – retain the current daily limit of six spiny rock lobsters

202. Under Option A (no change to the current spiny rock lobster daily limit), the utilisation opportunities for recreational fishers in the CRA 1 fishery would remain unchanged. However, as CRA 1 spiny rock lobster abundance increases there is the potential for recreational fishers to receive the benefits of additional catch as the stock builds. If this goes unchecked, the aim of building the fishery could be compromised and the overall objective of increasing CRA 1 abundance will be put at risk.

203. As the stock continues to increase, it is unlikely that the current daily limit will manage recreational catch to the 27 tonne allowance over the next few years. However, there is considerable uncertainty in the analyses, because a range of factors can drive what daily limit is taken (including fisher behaviour).

8.5.2 Options B and C – reduce the daily limit of spiny rock lobsters

204. The proposed daily limit reductions (Options 2 and 3) are unlikely to impact greatly on most recreational use at this time given the relatively low abundance, but will support increasing the abundance of spiny rock lobsters in CRA 1 and ensuring recreational catch does not undermine this, as more spiny rock lobsters become available to recreational fishers.

205. Reducing the spiny lobster daily limit from six to three or two is intended to manage recreational catch to the proposed new allowances (22 or 19 tonnes) while the CRA 1 biomass increases. The daily limit would be reviewed again with a view to an increase when the stock biomass has increased.

Changing fisher behaviour

206. The impact of a daily limit reduction on overall recreational harvest depends on the frequency at which the spiny rock lobster daily limit is fully caught by recreational fishers.

207. Since recreational catch is strongly influenced by abundance (generally lower when abundance is low, and higher when abundance is higher), it is intuitive that recreational harvest will have been restrained by the current relatively low levels of abundance.

208. The 2017/18 National Panel Survey results suggested that daily limits of three or less lobsters made up 74.6% of the take for CRA 1. Anecdotal information also suggests that recreational fishers are finding it challenging to find legal-sized spiny rock lobsters in parts of the CRA 1 fishery due to low levels of abundance.

209. Recent work carried out by FNZ Science suggests that at current stock levels, reducing the recreational daily limits to three (Option B) or two (Option C) per person per day, would result in approximately a 17.5% and 29% reduction in harvest respectively

210. There is a risk under any proposal to reduce a daily limit that fishers could be incentivised to go fishing to take their daily limit more often. More frequent collection of a daily limit will minimise the overall reduction in harvest that is intended by lowering the daily limit.

211. Overall, the risk of fishers fishing more often for CRA 1 spiny rock lobsters is considered to be low. Reducing the daily limit could change fisher behaviour, however recreational fishing effort is influenced by a range of factors, including weather, accessibility and the availability of spiny rock lobsters. Also, there is widespread acknowledgement that the recreational fishing sector needs to contribute to ensuring the success of the fishery. Pre-engagement on the proposal suggests recreational fishers are supportive of a reduction to the daily limit in CRA 1.

[42] Boat ramp surveys and interviews.

212. Feedback from pre-engagement suggests there is a high level of support for the proposed daily limit reduction. Te Hiku o Te Maui (the Iwi Fisheries Forum for upper Northland) also endorse reducing the daily limit from six to three spiny rock lobster, however, the forum also suggests combining this with packhorse rock lobster (a combined limit of three spiny and/or packhorse lobster).

Combined daily limit – what this means for packhorse rock lobster

213. There is no proposal to adjust the combined daily limit. A fisher would still be able to take up to six packhorse rock lobster per day, if no spiny lobsters are taken at the same time.

214. Packhorse rock lobster are taken mainly in the north of the North Island, including the Bay of Plenty. Packhorse rock lobsters are the biggest rock lobsters in the world and grow to a much larger size than spiny rock lobsters.

215. The best available information suggests PHC 1 stock biomass is well above both B_{MSY} and the soft limit (20% of unfished biomass, B_0).

216. The 2020 packhorse rock lobster stock assessment showed, with 2019 catch levels (40.3 tonne TACC and 10 tonnes recreational catch) and recent recruitment, vulnerable biomass of packhorse rock lobster is projected to stay at 79% of the unfished level. Over the next four years, with catch levels of 47 to 67 tonnes, vulnerable biomass is projected to decrease from 79% to 66-76% of the unfished level but remain well above B_{MSY} with very high probability.

217. FNZ is not planning to review the daily limits for packhorse rock lobster at this time, but welcomes your views on retaining the combined daily limit of six rock lobster (spiny and packhorse).

Different daily limits between management areas

218. The proposed spiny rock lobster daily limit reduction in CRA 1 will create different daily limits to most other areas of New Zealand, which could create some confusion for some fishers. However, a recreational daily limit of three spiny rock lobsters per person has been in place in the Hauraki Gulf and Bay of Plenty (CRA 2) for five years. This daily limit has been generally accepted and recent analysis (Hartill et al. 2022) suggests that the reduced daily limit has been effective at limiting overall catch increases. Option B would align the CRA 1 daily limit with CRA 2.

219. If a recreational fisher takes rock lobsters from outside of the CRA 1 fishery, the combined daily limit of six spiny and packhorse lobsters would still apply (i.e., fishers could take up to six spiny lobsters). Therefore, if this catch is brought into the CRA 1 fishery and the catch is inspected by FNZ Compliance, it will be up to the recreational fisher to provide evidence that the lobsters were harvested outside of CRA 1.

Concerns that the daily limit will remain at three for spiny lobster

220. Some recreational fishers may have concerns that the proposed spiny lobster daily limit reduction might be set at three and not reviewed in the future even if the stock rebuilds.

221. It is proposed that the daily limit, along with the catch settings, are reconsidered at the time of the next CRA 1 sustainability review. This will provide an opportunity to address any concerns that may arise regarding the efficacy of the proposed daily limit. However, if the 2022/23 National Panel Survey results or other information suggest management action is required sooner than 2025, a review of recreational controls can be considered earlier.

9 Consideration of additional management controls

222. FNZ are open to exploring a range of additional management controls (such as section 11 sustainability measures) that may be implemented in CRA 1, or in all or some QMAs for spiny rock lobster.

223. FNZ welcomes feedback and submissions on whether any of the measures outlined below are fit for purpose and worth future consideration and consultation.

9.1 Maximum legal size for spiny rock lobster

224. FNZ welcomes feedback on the potential of a Maximum Legal Size for spiny rock lobster.

225. Larger spiny rock lobsters are important in preying upon larger kina (Andrew & MacDairmid 1991, Ling et al 2009), and a maximum legal size would protect larger lobsters, leading to a broader size structure in the population. Greater abundance of larger spiny rock lobsters would be expected to increase predation on larger kina.

226. A maximum legal size could be applied nationally to the recreational or commercial (or both) fisheries but may have a particular benefit in areas where there is evidence of kina barrens, such as CRA 1.

9.2 Area and seasonal closures

227. Area and seasonal restrictions set under the Fisheries Act, can apply to both recreational and commercial fishers. Area and seasonal closures may be put in place to ensure sustainable utilisation.

228. There are no area closures currently in place for spiny rock lobster in the CRA 1 fishery. There are however, several mātaitai reserves, taiāpure, and section 186A temporary closures that fall within CRA 1 (see section 5.2).

9.3 Recreational accumulation limits

229. For most Quota Management Areas (other than CRA 5 (Canterbury/Marlborough) where an accumulation limit of 3 daily limits applies), at present there is no effective limit on the amount of spiny rock lobster people can have in their possession at any one time, provided the daily limit was not exceeded on any one day while fishing. The availability of the defence provision in regulation 29(3) of the Amateur Regulations (where a person can be in possession of many times the daily limit if they can satisfy the court that the fish were taken over a number of fishing days) is currently exploited by illegal operators.

230. Some NRLMG members suggest an accumulation limit and the associated ‘bag and tag’ conditions that limit the ability to store and transport large quantities of spiny rock lobster should be applied in all Quota Management Areas. This would assist in addressing circumstances where people deliberately exceed the daily limit or where the daily limit is consistently taken for sale or barter. This measure would complement the other measures in place to address illegal take.

231. FNZ considers that accumulation limits are an effective compliance tool. FNZ will continue to monitor and assess the effectiveness of accumulation limits in CRA 5 and may consider proposing reviewing accumulation limit requirements as necessary.

9.4 Recreational telson clipping

232. Telson clipping is cutting off the bottom third of the telson (the central part of the tail fan) so that it is noticeably shorter than the other sections of the tail fan. This marks a lobster as having been recreationally caught and therefore not able to be sold, bartered or traded.

233. Telson clipping was introduced in the CRA 2 fishery and the remainder of CRA 5 (outside Kaikoura) in July 2020 and applies to all recreational (including section 111) catch. The measure was thought to help address the potential for illegally taken lobsters to end up being sold and displacing legally taken product in the restaurants, retail, and hospitality trade.

234. Telson clipping of recreational caught spiny rock lobsters does not impede illegal sales that occur through social media channels, which is the primary platform for illegal sales. 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.

235. FNZ will continue to monitor and assess the effectiveness of the telson clipping measure in CRA 2 and CRA 5, and will consider reviewing telson clipping requirements if necessary.

9.5 Recreational charter vessel reporting

236. The NRLMG supports better management of amateur charter-fishing vessel (ACV) fishing overall, and improvements to the reporting regime. ACVs have been required to report their catch since 2010, however there are some concerns with the completeness, credibility, and quality of these data from some vessels. There is also a need to confirm that catch from these vessels is incorporated into the overall recreational allowance.

237. In 2023, FNZ will continue to monitor and assess the situation including how to better manage the recreational ACV sector. The FNZ and the NRLMG will discuss any potential solutions to ensure they are fit for purpose before engaging with ACV operators.

10 Deemed values

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

239. The Deemed Value Guidelines set out the operational policy Fisheries New Zealand uses to inform the development of advice to the Minister on the setting of deemed values.

240. FNZ notes that the interim deemed value rate is 90% of the annual deemed value rate for all spiny rock lobster stocks, which is consistent with the Deemed Value Guidelines. The Deemed Value Guidelines set out the operational policy FNZ uses to inform the development of advice to the Minister on the setting of deemed values. The deemed values for CRA 1 are set at the same rate (see Table 15 below) and FNZ has found them to be operating in accordance with the Guideline. Therefore, there are no changes proposed to the deemed value rates of the spiny rock lobster stocks under review for 1 April 2023.

Table 15: Standard deemed value rates ($/kg) for all spiny rock lobster stocks.

Interim	Annual 100-120%	Differential rates ($/kg) for excess catch (% of ACE)				
		120-140%	140-160%	160-180%	180-200%	>200%
99.00	110.00	132.00	154.00	176.00	198.00	220.00

241. FNZ welcomes feedback on these deemed value settings.

11 Questions for submitters

- Which option do you support for the TAC, TACC and allowances? Why?
- If you do not support any of the options listed, what alternative(s) should be considered? Why?
- Are the allowances for customary Māori, recreational and other sources of mortality appropriate? Why?
- Do you think these options adequately provide for social, economic, and cultural wellbeing?
- Do you think the proposed options appropriately consider the environmental obligations under the Act?
- Which of the proposed daily limits of spiny rock lobsters do you support? Why?
- Are there any other benefits and impacts of the proposed daily limit reduction in addition to those discussed here?
- Do you have any ideas or alternative approaches to the recreational management for CRA 1, apart from a reduction to the recreational daily limit?
- Is there any literature or research that is relevant and has been omitted in this paper?
- What are your thoughts on the ecological importance of spiny rock lobster in CRA 1?
- Do you have any feedback on the current deemed values settings?

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

12 How to get more information and have your say

243. FNZ invites you to make a submission on the proposals set out in this discussion document. Consultation closes at 5pm on Wednesday 8 February 2023.

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

13 Referenced reports

Data for the 2019 stock assessment of red rock lobsters (Jasus edwardsii) in CRA 1
https://www.mpi.govt.nz/dmsdocument/43732-FAR-202044-Data-for-the-2019-stock-assessment-of-red-rock-lobsters-Jasus-edwardsii-in-CRA-1

Guidelines for the review of deemed value rates for stocks managed under the Quota Management System: https://www.mpi.govt.nz/dmsdocument/40250/direct

Harvest Strategy Standard for New Zealand Fisheries. (2008). Compiled by the Ministry of Fisheries, Wellington, New Zealand: https://fs.fish.govt.nz/Doc/16543/harveststrategyfinal.pdf.ashx.

Hector's and Māui Dolphin Threat Management Plan 2020
https://www.doc.govt.nz/globalassets/documents/conservation/native-animals/marine-mammals/maui-tmp/hectors-and-maui-dolphin-threat-management-plan-2020.pdf

November 2022 Fisheries Assessment Plenary Report: https://www.mpi.govt.nz/dmsdocument/49036

National Panel Survey of Marine Recreational Fishers 2017/18: https://fs.fish.govt.nz/Doc/24728/FAR-2019-24-National-Panel-Survey-Marine-Recreational-Fishers.pdf.ashx.

National Panel Survey of Marine Recreational Fishers 2011/12:
https://fs.fish.govt.nz/Doc/23718/FAR_2014_67_2847_MAF2010-01.pdf.ashx.

National Plan of Action – Seabirds 2020
https://www.mpi.govt.nz/dmsdocument/40652-National-Plan-Of-Action-Seabirds-2020-Report

Rapid updates for New Zealand rock lobster (Jasus edwardsii) stocks in 2020:
https://www.mpi.govt.nz/dmsdocument/48013-FAR-202161-Rapid-updates-for-New-Zealand-rock-lobster-Jasus-edwardsii-stocks-in-2020

Rock lobster catch and effort data: summaries and CPUE standardisations, 1979/80 to 2018/19:
https://www.mpi.govt.nz/dmsdocument/42439/direct.

The 2019 stock assessment of rock lobsters (Jasus edwardsii) in CRA 1
https://fs.fish.govt.nz/Page.aspx?pk=113&dk=24851

Recent reviews of rock lobster stocks:

CRA 1 Sustainability Round Review April 2022:
https://www.mpi.govt.nz/consultations/review-of-sustainability-measures-2022-april-round/

CRA 1 Sustainability Round Review April 2021:https://www.fisheries.govt.nz/consultations/review-of-sustainability-measures-2021-april-round/

CRA 1, 3, 4, 7 and 8 Sustainability Round Review April 2020: https://www.fisheries.govt.nz/news-and-resources/consultations/review-of-sustainability-measures-for-1-april-2020/

CRA 3, 4 and 8 Sustainability Round Review April 2019:
https://www.mpi.govt.nz/dmsdocument/33523-review-of-rock-lobster-sustainability-measures-for-1-april-2019

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14 Appendix One: Other relevant matters

14.1 Commercial electronic reporting

245. Electronic reporting (ER) of catch and effort information was implemented in New Zealand's commercial fisheries during 2019. In 2020, the Rock Lobster Working Group reviewed the data from the first year of electronic reporting (1 April 2019 to 31 March 2020), by comparing these data with those generated from the previous paper reporting system. The Working Group concluded that CPUE estimated under the new electronic reporting system was likely to differ from CPUE estimated under the paper form system and is not comparable. The reasons for this include data being collected on a different spatial and temporal scale, new reporting codes and some issues with operators incorrectly interpreting the new reporting requirements.

246. The NZ RLIC convened a series of workshops in collaboration with Ministry for Primary Industries (MPI) and the three electronic logbook platform providers between March and June 2021 to address these reporting issues. These workshops were educational in nature, aimed at upskilling fishers to the required level of reporting.

247. The disruption to the time series of CPUE data means that previously used management procedures can no longer be operated as they rely on a consistent time series of CPUE. Rapid updates are being undertaken as an interim alternative to management procedures.

248. The lack of CPUE from ER data going forwards is problematic, as this data is used in stock assessments as an index of abundance and is vital to assessing spiny rock lobster stocks. Without accurate data the effects of future removals from the stock will be largely unknown. FNZ is investigating potential solutions to the issues arising from electronic reporting errors.

14.2 Fisheries Amendment Bill and on-board cameras

249. The Fisheries Amendment Bill[43], recently come into force, is part of the wider fisheries reform programme. Its goal is to encourage better fishing practices. It aims to update and strengthen New Zealand's fisheries management system. The Bill proposes to change the current rules and policies by:

    a) tightening commercial fishing rules for landings and discards;

    b) creating new rules and regulations for offences and penalties;

    c) introducing new mechanisms for recreational management decision-making;

    d) enabling the further use of on-board cameras on vessels; and

    e) creating a new defence to help save marine mammals and protected sharks and rays.

250. It is expected that the wider Fisheries Amendment Bill will enhance the CRA 1 stock by providing for better verified information to underpin fisheries management decisions and encourage better fishing practices.

251. The Minister recently announced key details of the nationwide rollout of cameras on commercial fishing vessels[44]. It is expected that the independent information they will provide will support the reputation of New Zealand's fishing industry, the sustainability of New Zealand's fisheries and provide for more confident management decisions.

252. As part of decisions regarding the wider rollout of on-board cameras, Cabinet signalled that a trial should be conducted to assess the feasibility of using on-board cameras as a monitoring tool in spiny rock lobster fisheries. Decisions on the monitoring objectives for this proposed trial,

[43] Fisheries Amendment Bill. Ministry for Primary Industries

[44] Rollout of cameras on fishing vessels to begin. Honourable David Parker, Minister for Oceans and Fisheries.

the areas where it would take place and timing are yet to be made and will be determined following engagement with tangata whenua, fishers and other stakeholders. However, given the need to ensure that vessels subject to the Electronic Monitoring regulations are prioritised for camera installations, it is unlikely that any trial would take place before 2024.

14.3 Recreational catch estimation

253. Spiny rock lobster is a popular recreational species to catch throughout the country. Recreational fishers are not required to report the quantities of spiny rock lobsters they catch, other than reporting requirements for recreational charter-fishing operators.

254. Recreational fishers generally co-operate with surveys to estimate harvest, including periodic National Panel Surveys (NPS) and creel survey approaches, but NRLMG sector members consider that that these estimates are too infrequent (five or six years apart) and not precise enough to track changes in harvest for use in management decisions.

255. The information available to inform adjustments to recreational management controls to maintain catch within the allowances on average is also limited and uncertain. Approaches including surveys at access points could be used to collect information for these purposes.

256. The most recent NPS surveys provide good harvest estimates for large fisheries, but for fisheries like spiny rock lobster with few participants and relatively low catch, the estimates had large error bounds. Regular surveys at main access points (boat ramps) have been used to estimate relative changes in recreational harvest in CRA 2, but these on their own do not estimate total catch.

257. The existing tools for estimating recreational catch are being reviewed by the Marine Amateur Fisheries Working Group (MAFWG). Revised approaches and alternative methods, including more frequent surveys (NPS and creel), will be evaluated for their cost and utility for spiny rock lobster fisheries. A sub-group of the MAFWG is targeting the completion of a report by 1 May 2023.

14.4 Illegal catch estimation

258. Current illegal take estimates are highly uncertain, but for some stocks they are large compared to the catch by legitimate sectors. Illegal take estimates for some stocks can introduce considerable uncertainty and risk into stock assessments, directly reduce the harvest that can be taken by legitimate users and the benefits they can attain from sustainable use of spiny rock lobster fisheries and can compromise stock rebuilds.

259. Estimating illegal take is challenging because of the nature of the activity. The NRLMG consider that improved estimates of illegal take are vital to inform management and compliance responses.

260. In 2022 the NRLMG and FNZ Compliance explored improvements of illegal take estimates. This included potentially incorporating information collected during compliance activities, and compliance findings from 2020/21 and 2021/22.

261. FNZ Compliance has provided regular reports to the NRLMG with compiled information on inspections and the issues identified, and the nature and extent of offences relating to spiny rock lobster. FNZ Compliance will continue to engage with FNZ and the NRLMG to continue to improve illegal take estimates in all spiny rock lobster fisheries.