NATIONAL ROCK LOBSTER MANAGEMENT GROUP

Review of Rock Lobster Sustainability Measures for 2022/23

Final Advice Paper

Prepared by Fisheries New Zealand with input from the National Rock Lobster Management Group

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Tini a Tangaroa

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Red or spiny rock lobster[1]
(CRA 1, CRA 7, CRA 8)
Jasus edwardsii, kōura, crayfish

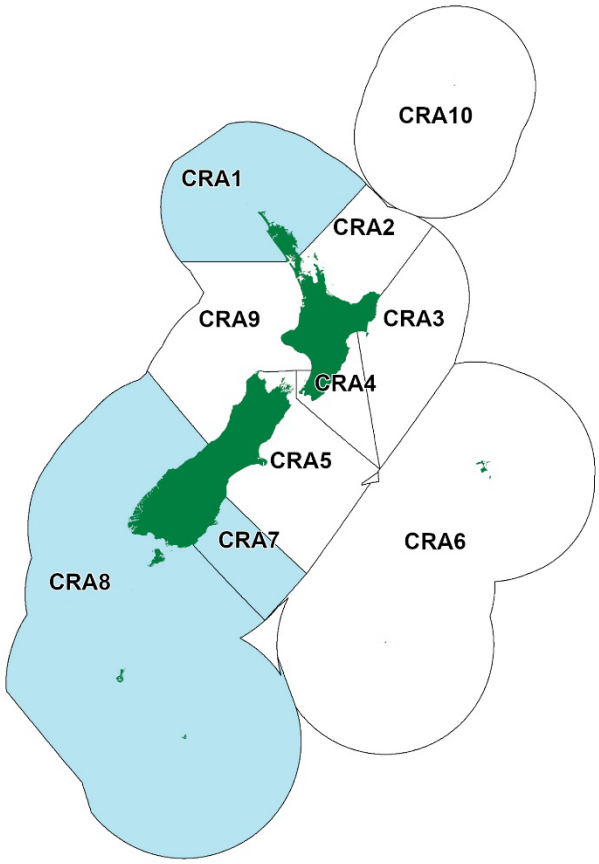

Figure 1: Map of rock lobster Quota Management Areas, showing stocks under review in blue.

2 Summary

1. Fisheries New Zealand (FNZ), with input from the National Rock Lobster Management Group (NRLMG), asks you to make decisions on sustainability measures for three red rock lobster stocks from 1 April 2022: CRA 1 (Northland), CRA 7 (Otago), and CRA 8 (Southern) (Figure 1).

2. Rock lobster stocks support important shared fisheries. Rock lobsters are ecologically important, taonga for tangata whenua, popular species for recreational fishers to catch, and also support valuable export markets, regionally important industries, and employment. New Zealand's rock lobster stocks are regularly reviewed to provide for ongoing sustainable use, reflecting a responsive management approach.

3. The proposals presented in this paper are based on results from new stock assessments, or rapid assessment updates[2], from 2021. These assessments reflect best available information on the CRA 1, CRA 7 and CRA 8 stocks. Based on these assessments, stock biomass for all three stocks is predicted to increase over the next four years under current catch settings.

4. You are being asked to make decisions under s 13(2)(a) of the Fisheries Act 1996 (the Act). There is no agreed management target for rock lobster, but there is an agreed B_{MSY} (the

[1] Hereafter referred to as rock lobster.
[2] Rapid assessment 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. Rapid assessment updates are run annually between full stock assessments, which are conducted approximately every five years.

biomass, or weight of fish, which produces the maximum sustainable yield (MSY)[3]) reference level for these stocks, which enables these rock lobster stocks to be managed at or above B_{MSY}. CRA 7 and CRA 8 are projected to increase by a moderate degree and stay well above the B_{MSY} reference level, while CRA 1 is projected to increase slightly and remain just above the B_{MSY} reference level. All three rock lobster stocks are expected to remain well above the level where a formal rebuild plan is required.

5. Table 1 provides a summary of the options proposed for rock lobster. Any changes you decide on as a result of this review will come into effect on 1 April 2022. In summary, the NRLMG suggests that you:

   - **CRA 1** – either maintain or reduce catch settings[4] based on the results of a new rapid assessment update;
   - **CRA 7** – either maintain or increase catch settings based on the results of a new stock assessment;
   - **CRA 8** – either maintain or increase catch settings based on the results of a new stock assessment; and
   - Make no change to the Māori customary non-commercial allowance for any of the above options.

6. Rapid assessment update results have also been carried out for the CRA 3 (Gisborne), CRA 4 (Wellington/Hawke's Bay), and CRA 5 (Canterbury/Marlborough) rock lobster fisheries. These results suggest that no changes to catch settings are needed for these stocks for 1 April 2022. There is no new stock assessment information available for CRA 6 (Chatham Islands), and CRA 9 (Taranaki/Westland) rock lobster fisheries, or for the PHC 1 (all of New Zealand) packhorse rock lobster[5] fishery.

7. A rebuilding strategy has been in place for the CRA 2 (Hauraki Gulf/ Bay of Plenty) fishery since April 2018 and changes to recreational rules were implemented from 1 July 2020 to support this rebuild.[6] New rapid assessment update results for CRA 2 suggest abundance has increased since 2018 and will continue to increase at current catch levels. A review of CRA 2 management settings is proposed at the time of the next CRA 2 stock assessment (currently proposed for 2022). Thorough community engagement will be undertaken to support this review given the high level of interest in the stock.

8. If you decide to reduce the Total Allowable Catch (TAC) for CRA 1, and in doing so reduce the recreational allowance, then a regulatory process to amend recreational controls (such as recreational daily limits) will need to follow to manage recreational harvest to the new allowance. FNZ would provide advice to you to progress this matter following the announcement of your decisions with input from the NRLMG.

[3] Maximum Sustainable Yield (MSY) is the greatest yield that can be achieved over time while maintaining the stock's productive capacity, having regard to the population dynamics of the stock and any environmental factors that influence the stock.
[4] Catch settings are the Total Allowable Catch (TAC), including the Total Allowable Commercial Catch (TACC) and allowances for customary Māori catch, recreational catch, and other sources of mortality to the stock caused by fishing (including illegal take).
[5] Pawharu, green rock lobster, *Sagmariasus verreauxi.*
[6] From 1 July 2020, the CRA 2 recreational daily bag limit was reduced from six to three red rock lobsters, and telson clipping was introduced for recreationally caught red rock lobsters. 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.

Table 1: Total Allowable Catch (TAC), allowance and Total Allowable Commercial Catch (TACC) final proposals (in tonnes) for CRA 1, CRA 7, and CRA 8 from 1 April 2022.
Options: *RA* – based on a rapid assessment update; and *SA* – based on a new stock assessment.

Stock	Option	TAC	TACC	Allowances			NRLMG member support
				Customary **Māori**	Recreational	Other mortality	
CRA 1 Northland	Option 1.1 Status quo	203	110	20	32	41	✓ Tangata whenua & Commercial
	Option 1.2 – RA Decrease the TAC by 5%	193 ↓(5%)	105 ↓(5%)	20	27 ↓	41	✓ Fisheries NZ
	Option 1.3 – RA Decrease the TAC by 9%	185 ↓ (9%)	99 ↓ (10%)	20	25 ↓	41	
	Option 1.4 – RA Decrease the TAC by 12%	179 ↓ (12%)	94 ↓ (15%)	20	24 ↓	41	✓ Recreational & Environmental
CRA 7 Otago	Option 7.1: Status quo	126.2	106.2	10	5	5	✓ Environmental
	Option 7.2 – SA *Amended post consultation* Increase the TAC by 7%	134.5 ↑(7%)	111.5 ↑ (5%)	10	5	8 ↑	✓ Tangata whenua[7], Recreational, Commercial, & Fisheries NZ
CRA 8 Southern	Option 8.1: Status quo	1282.7	1191.7	30	33	28	✓ Environmental
	Option 8.2 – SA *Amended post consultation* Increase the TAC by 10%	1413.5 ↑ (10%)	1215.5 ↑ (2%)	30	33	135 ↑	✓ Tangata whenua[7], Recreational
	Option 8.3 – SA *Amended post consultation* Increase the TAC by 13%	1453 ↑ (13%)	1251 ↑ (5%)	30	33	139 ↑	✓ Tangata whenua, Commercial & Fisheries NZ

3 NRLMG recommendations

9. The NRLMG is a national-level, multi-stakeholder group comprising representatives of tangata whenua[8], recreational and commercial fishing sectors, environmental interests, and FNZ. The NRLMG provides advice to FNZ and Ministers on catch limit, regulatory and other management actions that apply to rock lobster fisheries.

10. The current members of the NRLMG are from: Te Waka a Māui Fisheries Forum (South Island iwi), Te Ohu Kaimoana (as an agent for North Island and Chatham Islands Mandated Iwi and Imi Organisations), NZ Sport Fishing Council (NZSFC), NZ Underwater Association (NZUA), Environmental Conservation Organisations of New Zealand (ECO), Forest & Bird, and the NZ Rock Lobster Industry Council (NZ RLIC). FNZ supports the group by providing the secretariat as well as scientific and fisheries management advice. A new independent Chair was appointed in June 2021.

[7] Tangata whenua NRLMG members support both Option 8.2 and Option 8.3.
[8] The aim for tangata whenua membership is to be cognisant of, and integrate, the full range of sector harvesting rights held by Māori (customary, recreational and commercial).

11. The final proposals for each stock under review are based on discussions by the NRLMG, consideration of the best available information, and an analysis of submissions received from tangata whenua and other interested parties. The final proposals include considerations relevant to your decision under the Fisheries Act 1996 (the Act), chiefly sections 5, 8, 9, 10, 11, 13, 20 and 21, which are set out below.

12. The NRLMG was unable to reach consensus recommendations for CRA 1 (Northland), CRA 7 (Otago) or CRA 8 (Southern) this year.

3.1 CRA 1 (Northland)

13. The results of the 2021 rapid assessment update of the 2019 CRA 1 stock assessment suggested that spawning stock biomass[9] was well above the soft limit of 20%, where it is FNZ policy to implement a formal, time-constrained rebuilding plan. There is an agreed B_{MSY} (the biomass, or weight of fish, which produces the maximum sustainable yield (MSY)[10]) reference level for CRA 1. Vulnerable biomass[11] has declined since catch reductions were made in 2020 and was just above the B_{MSY} reference level in 2021, and is projected to increase slightly over the next four years with 2021 catch levels.

14. The expected impact of the proposed options on CRA 1 biomass relative to the B_{MSY} reference level, and the expected economic impact, is given in Table 2 below.

Table 2: Potential impact of the proposed CRA 1 TAC options for 1 April 2022 on CRA 1 biomass relative to the B_{MSY} reference level, and associated predicted economic impact. (continued over the page)

Stock	Option	Current TAC (tonnes)	Current biomass relative to the B_{MSY} reference level	Proposed TAC (tonnes)	Projected increase in biomass by 2025 relative to the B_{MSY} reference level	Economic impact (Values are approximate)
CRA 1 Northland	Option 1.1: Status quo	203	1.04 times (104%) the B_{MSY} reference level. Above the level with 60% probability.	203 (no change)	1.15 times (115%) the B_{MSY} reference level. 68% probability of being above the B_{MSY} reference level.	Maintains current commercial utilisation opportunities.
	Option 1.2: 5% TAC decrease	203		193 (↓ 10 t)	Projections unavailable. Expected to be between Option 1.1 and Option 1.3.	Annual loss of $340,000 to the catching sector alone.[12]
	Option 1.3: 9% TAC decrease	203		185 (↓ 18 t)	1.27 times (127%) the B_{MSY} reference level.	Annual loss of $750,000 to the catching sector alone.[13]

[9] Beginning of season autumn-winter spawning biomass (mature females).
[10] Maximum Sustainable Yield (MSY) is the greatest yield that can be achieved over time while maintaining the stock's productive capacity, having regard to the population dynamics of the stock and any environmental factors that influence the stock.
[11] Vulnerable biomass is the biomass that is vulnerable to fishing – beginning of season autumn-winter legal males and legal females not bearing eggs. Vulnerable biomass does not include mature females that become available to the fishery in spring-summer.
[12] Additional expected economic impacts include reduced availability of ACE and revenue loss which may lead to vessels becoming unviable. There will also be downstream impacts to associated businesses and communities; while difficult to measure, these are expected to compound the economic and mental stress caused by COVID-19 related impacts on the regional economy.
[13] The additional expected economic impacts mentioned in footnote 12 are expected to occur to a greater degree than for Option 1.2.

Stock	Option	Current TAC (tonnes)	Current biomass relative to the B_{MSY} reference level	Proposed TAC (tonnes)	Projected increase in biomass by 2025 relative to the B_{MSY} reference level	Economic impact (Values are approximate)
					81% probability of being above the B_{MSY} reference level.	
	Option 1.4: 12% TAC decrease	203		179 (↓ 24 t)	1.32 times (132%) the B_{MSY} reference level. 87% probability of being above the B_{MSY} reference level.	Annual loss of $1.09 million to the catching sector alone.[14]

15. In addition to the estimated economic impact given in Table 2 above, managing above the B_{MSY} reference level has potential cultural and social benefits. Managing above B_{MSY} is expected to lead to greater abundance, which is generally expected to lead to a greater size range, and higher catch rates and lower catching costs for all sectors, including commercial. While the nature and magnitude of these changes is unknown, they are expected to be smallest for Option 1.1 and greatest for Option 1.4.

16. Managing above B_{MSY} may also have environmental benefits, as increasing rock lobster abundance may enable the species to fulfil its role in the ecosystem to a greater degree; however, the nature and magnitude of these benefits is uncertain. The impact of an increase in rock lobster abundance on the ecosystem is unknown. While rock lobsters are important as both a predator and prey species, trophic interactions[15] are complex and not well understood. While the magnitude of these potential environmental changes is unknown, they are expected to be smallest for Option 1.1 and greatest for Option 1.4.

17. Submitters were divided on whether a decrease to the CRA 1 TAC is required. Commercial and some customary submitters supported the status quo, and considered that no further decreases are required at this time as the stock is above the B_{MSY} reference level and projected to increase. Recreational, environmental, some tangata whenua, and public submitters generally supported Option 1.4, or a non-specified decrease to catch settings, in order to address concerns regarding anecdotal declines in rock lobster abundance and the effect of rock lobster fishing on the aquatic environment.

18. **Tangata whenua and commercial NRLMG members** support Option 1.1, which is to retain the current settings for CRA 1. They note the stock assessment shows that the April 2020 reductions to the TAC, TACC and allowances in 2020 were sufficient to halt the decline in biomass that was projected by the 2019 stock assessment, and note that the vulnerable and spawning biomass are projected to increase by 2025 under the status quo according to the 2021 rapid assessment update. Commercial NRLMG members consider that there is no need for further reductions with consequent economic impact while work is undertaken on determining an appropriate management target during 2022.

19. Once an agreed management target is developed for CRA 1, which will be progressed in the coming year, the stock can be reviewed relative to this target.

[14] The additional expected economic impacts mentioned in footnote 12 are expected to occur to the greatest degree under this option (more than Options 1.2 and 1.3).
[15] Trophic interactions are two-way impacts between organisms of different trophic levels. A 'trophic level' is a measure of the position of an organism within a food web. Primary producers (e.g., algae) have a low trophic level, herbivores have a medium trophic level, and carnivores have higher trophic levels.

20. **Fisheries New Zealand** supports Option 1.2, which is to decrease the TAC by 10 tonnes, decrease the TACC by 5 tonnes, and decrease the recreational allowance by 5 tonnes. This option is projected to provide an increased likelihood and rate of biomass increase relative to the status quo. FNZ considers that this strikes the right balance between acknowledging concerns from some iwi and stakeholders regarding the status of the stock and the aquatic environment, and the utilisation of the stock, which is projected to stay above both the soft limit and the B_{MSY} reference level over the next four years under current catches.

21. **Recreational and environmental NRLMG members** support Option 1.4, which is to decrease the TAC by 24 tonnes, decrease the TACC by 16 tonnes, and decrease the recreational allowance by 8 tonnes. Recreational and environmental members consider that further reductions to the TAC are required to increase the likelihood that the vulnerable biomass will increase along the east coast of Northland where abundance is significantly lower than other areas. Environmental members also consider that increasing biomass in CRA 1 is particularly important given the important ecosystem services rock lobsters provide.

22. The NRLMG notes that the changes to the TAC proposed under Option 1.2, Option 1.3 and Option 1.4 should be accompanied by a review of management controls to manage recreational removals on average to this new allowance. If you choose to reduce the TAC and the recreational allowance for CRA 1, the NRLMG will provide subsequent advice regarding recreational management controls later in 2022.

23. Under all the above options the TAC will also be reviewed again for April 2023, following further work on developing an agreed management target for CRA 1 during 2022. This would provide a further opportunity to review catch settings and management controls to address any sustainability concerns.

3.2 CRA 7 (Otago)

24. The results of the 2021 CRA 7 & 8 stock assessment suggested that spawning stock biomass was well above the soft limit of 20%. There is an agreed B_{MSY} reference level for CRA 7 & 8 combined, with vulnerable biomass for CRA 7 & 8 combined well above this B_{MSY} reference level and projected to increase over the next four years at 2021 catch levels and for Option 7.2.

25. The expected impact of the proposed options on CRA 7 biomass relative to the B_{MSY} reference level for CRA 7 & 8 combined, and the expected economic impact, is given in Table 3 below.

Table 3: Potential impact of the proposed CRA 7 TAC options for 1 April 2022 on combined CRA 7 & 8 biomass relative to the combined CRA 7 & 8 B_{MSY} reference level, and associated predicted economic impact. (continued over the page)

Stock	Option	Current TAC (tonnes)	Current biomass relative to the B_{MSY} reference level	Proposed TAC (tonnes)	Projected increase in biomass by 2025 relative to the B_{MSY} reference level	Economic impact (Values are approximate)
CRA 7 Otago	Option 7.1: Status quo	126.2	*CRA 7 & 8 combined:* 1.46 times (146%) the B_{MSY} reference level.	126.2 (no change)	*CRA 7 & 8 combined:* 1.69 times (169%) the B_{MSY} reference level.	Maintains current commercial utilisation, but foregoes potential additional utilisation opportunities.
	Option 7.2: 7% TAC increase			134.5 (↑ 8.3 t)	Expected to increase further above the B_{MSY} reference level	Annual gain of $361,600 to the catching sector alone.[17]

[17] There will also be downstream benefits to associated businesses and communities; while difficult to measure, these are expected to be greater than Option 7.1.

Stock	Option	Current TAC (tonnes)	Current biomass relative to the B_{MSY} reference level	Proposed TAC (tonnes)	Projected increase in biomass by 2025 relative to the B_{MSY} reference level	Economic impact (Values are approximate)
					(though less than Option 7.1).[16]	

26. As explained above for CRA 1, in addition to the estimated economic impact given in Table 3 above, managing above the B_{MSY} reference level has potential cultural, social, and environmental benefits. While the magnitude of these changes is unknown, they are expected to be smaller for Option 7.2 than for Option 7.1.

27. Submitters were divided on whether an increase to the CRA 7 TAC is required, with the majority of submitters supporting Option 7.2 as originally consulted on. Tangata whenua, commercial, and some recreational submitters supported Option 7.2, while environmental, most public, and some recreational sector submitters supported retaining the status quo.

28. Option 7.2 was amended post consultation based on best available information supporting an alternate calculation of the other mortality allowance. The amended Option 7.2 has a slightly smaller TAC and other mortality allowance than was originally consulted on. Post consultation, FNZ and the NRLMG agreed to reduce the proposed TAC and the proposed other mortality allowance by seven tonnes. This reflects an alternative way of dividing the total estimate of illegal removals and handling mortality (estimated for CRA 7 & 8 combined) between the two stocks based on the proportion of commercial catch taken in CRA 7 & 8. FNZ and the NRLMG note that this is a relatively minor change.

29. **Environmental NRLMG members** support Option 7.1, which is to retain the current settings for CRA 7.

30. **Tangata whenua, recreational and commercial NRLMG members and Fisheries New Zealand** support Option 7.2, which is a to increase the TAC by 8.3 tonnes, increase the TACC by 5.3 tonnes, and increase the other mortality allowance by 8 tonnes. They consider that this reflects the healthy state of the fishery and the current utilisation opportunity.

31. The TAC will also be reviewed again for April 2023, following further work on developing an agreed management target for CRA 7 & 8 during 2022. This would provide an opportunity to adjust catch settings and management controls if required.

3.3 CRA 8 (Southern)

32. The results of the 2021 CRA 7 & 8 stock assessment suggested that spawning stock biomass was well above the soft limit of 20%. There is an agreed B_{MSY} reference level for CRA 7 & 8 combined, with vulnerable biomass for CRA 7 & 8 combined well above this B_{MSY} reference level and projected to increase over the next four years at 2021 catch levels and for Options 8.2 and 8.3.

33. The expected impact of the proposed options on CRA 8 biomass relative to the B_{MSY} reference level for CRA 7 & 8 combined, and the expected economic impact, is given in Table 4 below.

[16] See Addendum 2 – while unknown, the stock is expected to increase on a trajectory somewhere between status quo and the 10% decrease in catch.

Table 4: Potential impact of the proposed CRA 7 TAC options for 1 April 2022 on combined CRA 7 & 8 biomass relative to the combined CRA 7 & 8 B_{MSY} reference level, and associated predicted economic impact.

Stock	Option	Current TAC (tonnes)	Current biomass relative to the B_{MSY} reference level	Proposed TAC (tonnes)	Projected increase in biomass by 2025 relative to the B_{MSY} reference level	Economic impact (Values are approximate)
CRA 8 Southern	Option 8.1: Status quo	1282.7	*CRA 7 & 8 combined:* 1.46 times (146%) the B_{MSY} reference level.	1282.7 (no change)	*CRA 7 & 8 combined:* 1.69 times (169%) the B_{MSY} reference level.	Maintains current commercial utilisation, but foregoes potential additional utilisation opportunities.
	Option 8.2: 10% TAC increase	1282.7		1413.5 (↑ 130.8 t)	Expected to increase further above the B_{MSY} reference level (though less than Option 8.1).[18]	Annual gain of $1.62 million to the catching sector alone.[19]
	Option 8.3: 13% TAC increase	1282.7		1453 (↑ 170.3 t)	Expected to increase further above the B_{MSY} reference level (though less than Option 8.1 and 8.2).[20]	Annual gain of $4.05 million to the catching sector alone.[21]

34. As explained above for CRA 1, in addition to the estimated economic impact given in Table 4 above, managing above the B_{MSY} reference level has potential cultural, social, and environmental benefits. While the magnitude of these changes is unknown, they are expected to be smallest for Option 8.3 and greatest for Option 8.1.

35. Submitters were divided on whether an increase to the CRA 8 TAC is required, with the majority of submitters supporting either Option 8.2 or Option 8.3 as originally consulted on. The majority of commercial submitters supported Option 8.3, tangata whenua submitters supported either Option 8.2 or Option 8.3, and some recreational submitters supported Option 8.2. Some environmental, most public, and some recreational sector submitters supported retaining the status quo.

36. Options 8.2 and 8.3 were amended post consultation based on best available information supporting an alternate calculation of the other mortality allowance. The amended Options 8.2 and 8.3 have slightly larger TACs and other mortality allowances than were originally consulted on. Post consultation, FNZ and the NRLMG agreed to increase both the proposed TAC and other mortality allowance by 18 tonnes for Options 8.2 and 22 tonnes for 8.3. This reflects an alternative way of dividing the total estimate of illegal removals and handling mortality (estimated for CRA 7 & 8 combined) between the two stocks based on the proportion of commercial catch taken in CRA 7 & 8. FNZ and the NRLMG note that this is a relatively minor change.

37. **Environmental NRLMG members** support Option 8.1, which is to retain the current settings for CRA 8.

[18] See Addendum 2 – while unknown, the CRA 7 & 8 combined stock is expected to increase on a trajectory somewhere between status quo and the 10% decrease in catch.
[19] There will also be downstream benefits to associated businesses and communities; while difficult to measure, these are expected to be greater than Option 8.1.
[20] See Addendum 2 – while unknown, the CRA 7 & 8 combined stock is expected to increase on a trajectory somewhere between the status quo and the 10% decrease in catch.
[21] There will also be downstream benefits to associated businesses and communities; while difficult to measure, these are expected to be greater than Options 8.1 and 8.2.

38. **Recreational NRLMG members** support Option 8.2, which is to increase the TAC by 130.8 tonnes, increase the TACC by 23.8 tonnes, and increase the other mortality allowance by 107 tonnes. They consider that this reflects the healthy state of the fishery and the current utilisation opportunity, while taking a more cautious approach than Option 8.3.

39. **Commercial NRLMG members and Fisheries New Zealand** support Option 8.3, which is to increase the TAC by 170.3 tonnes, increase the TACC by 59.3 tonnes, and increase the other mortality allowance by 111 tonnes. They note the stock assessment projections suggest the biomass, which is well above the B_{MSY} reference level, will continue to increase with this revised catch level and it realises the current utilisation opportunity more fully than Option 8.2.

40. **Tangata whenua NRLMG members** support both Option 8.2 and 8.3, as they both represent a conservative increase to the TAC that the stock assessment results suggest the stock can support.

41. The TAC will also be reviewed again for April 2023, following further work on developing an agreed management target for CRA 8 during 2022. This would provide a further opportunity to adjust catch settings and management controls.

3.4 Other matters

42. The NRLMG has a number of matters in addition to these decisions it wishes to bring to your attention, including additional information on rock lobster management matters. These are set out in *Section 12.2 – Other management issues*.

4 Decisions

43. FNZ asks that you make the following decisions:

CRA 1 (Northland)

Option 1.1 (Status quo) *(NRLMG tangata whenua and commercial members recommended)*

Agree to retain the CRA 1 TAC at 203 tonnes and within the TAC:

i. Retain the allowance of 20 tonnes for Māori customary non-commercial fishing interests;

ii. Retain the allowance of 32 tonnes for recreational fishing interests;

iii. Retain the allowance of 41 tonnes for all other sources of mortality to the stock caused by fishing;

iv. Retain the CRA 1 TACC at 110 tonnes.

Agreed / Agreed as Amended / Not Agreed

OR

Option 1.2 *(Fisheries New Zealand recommended)*

Agree to reduce the CRA 1 TAC from 203 to 193 tonnes and within the TAC:

i. Retain the allowance of 20 tonnes for Māori customary non-commercial fishing interests;

ii. Reduce the allowance for recreational fishing interests from 32 to 27 tonnes;

iii. Retain the allowance of 41 tonnes for all other sources of mortality to the stock caused by fishing;

iv. Reduce the CRA 1 TACC from 110 to 105 tonnes.

Agreed / Agreed as Amended / Not Agreed

OR

Option 1.3

Agree to reduce the CRA 1 TAC from 203 to 185 tonnes and within the TAC:

i. Retain the allowance of 20 tonnes for Māori customary non-commercial fishing interests;

ii. Reduce the allowance for recreational fishing interests from 32 to 25 tonnes;

iii. Retain the allowance of 41 tonnes for all other sources of mortality to the stock caused by fishing;

iv. Reduce the CRA 1 TACC from 110 to 99 tonnes.

Agreed / Agreed as Amended / Not Agreed

OR

Option 1.4 *(NRLMG recreational and environmental members recommended)*

Agree to reduce the CRA 1 TAC from 203 to 179 tonnes and within the TAC:

i. Retain the allowance of 20 tonnes for Māori customary non-commercial fishing interests;

ii. Reduce the allowance for recreational fishing interests from 32 to 24 tonnes;

iii. Retain the allowance of 41 tonnes for all other sources of mortality to the stock caused by fishing;

iv. Reduce the CRA 1 TACC from 110 to 94 tonnes.

Agreed / Agreed as Amended / Not Agreed

CRA 7 (Otago)

Option 7.1 (Status quo) *(NRLMG environmental members recommended)*

Agree to retain the CRA 7 TAC at 126.2 tonnes and within the TAC:

i. Retain the allowance of 10 tonnes for Māori customary non-commercial fishing interests;

ii. Retain the allowance of 5 tonnes for recreational fishing interests;

iii. Retain the allowance of 5 tonnes for all other sources of mortality to the stock caused by fishing;

iv. Retain the CRA 7 TACC at 106.2 tonnes.

Agreed / Agreed as Amended / Not Agreed

OR

Option 7.2 *(NRLMG tangata whenua, commercial, and recreational members and Fisheries New Zealand recommended)*

Agree to increase the CRA 7 TAC from 126.2 to 134.5 tonnes and within the TAC:

i. Retain the allowance of 10 tonnes for Māori customary non-commercial fishing interests;

ii. Retain the allowance of 5 tonnes for recreational fishing interests;

iii. Increase the allowance for all other sources of mortality to the stock caused by fishing from 5 to 8 tonnes;

iv. Increase the CRA 7 TACC from 106.2 to 111.5 tonnes.

Agreed / Agreed as Amended / Not Agreed

CRA 8 (Southern)

Option 8.1 (Status quo) *(NRLMG environmental members recommended)*

Agree to retain the CRA 8 TAC at 1282.7 tonnes and within the TAC:

i. Retain the allowance of 30 tonnes for Māori customary non-commercial fishing interests;

ii. Retain the allowance of 33 tonnes for recreational fishing interests;

iii. Retain the allowance of 28 tonnes for all other sources of mortality to the stock caused by fishing;

iv. Retain the CRA 8 TACC at 1191.7 tonnes.

Agreed / Agreed as Amended / Not Agreed

OR

Option 8.2 *(NRLMG tangata whenua and recreational members)*

Agree to increase the CRA 8 TAC from 1282.7 to 1413.5 tonnes and within the TAC:

i. Retain the allowance of 30 tonnes for Māori customary non-commercial fishing interests;

ii. Retain the allowance of 33 tonnes for recreational fishing interests;

iii. Increase the allowance for all other sources of mortality to the stock caused by fishing from 28 to 135 tonnes;

iv. Increase the CRA 8 TACC from 1191.7 to 1215.5 tonnes.

Agreed / Agreed as Amended / Not Agreed

OR

Option 8.3 *(NRLMG tangata whenua and commercial members and Fisheries New Zealand recommended)*

Agree to increase the CRA 8 TAC from 1282.7 to 1453 tonnes and within the TAC:

i. Retain the allowance of 30 tonnes for Māori customary non-commercial fishing interests;

ii. Retain the allowance of 33 tonnes for recreational fishing interests;

iii. Increase the allowance for all other sources of mortality to the stock caused by fishing from 28 to 139 tonnes;

iv. Increase the CRA 8 TACC from 1191.7 to 1251 tonnes.

Agreed / Agreed as Amended / Not Agreed

Other management issues

Note the additional information on rock lobster management issues set out in *Section 12.2*

Noted

Hon David Parker
Minister for Oceans and Fisheries

13 / 2 / 2022

5 Why are we proposing that you review the TACs, allowances and TACCs?

44. The overall management approach for rock lobster fisheries is to monitor and manage them closely to provide for use while ensuring sustainability.

45. Every year the NRLMG considers the results from stock assessments or rapid assessment updates (and previously the output of management procedures). The outputs of this process inform advice to you and your decisions on whether catch settings should change for the upcoming fishing year. Being able to respond to changes in rock lobster abundance on an annual basis is important because the recruitment, abundance and availability of rock lobster populations can fluctuate over short time scales in response to changes in the environment.

46. Full scientific assessments of all rock lobster stocks except CRA 9 (Westland/Taranaki)[22] are carried out every four to five years. These assessments estimate the current status of the stock relative to requirements of the Act and the desired levels of abundance, and show how the stock has responded to previous management controls.

47. In years between full stock assessments, rapid assessment updates are run for most stocks (currently available for all stocks except CRA 6 & 9). Rapid assessment 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 assessments provide estimates of stock status and projections of stock biomass to guide management settings until the next full stock assessment.

48. A new stock assessment was carried out for CRA 7 and CRA 8 in late 2021. A rapid assessment update was conducted for CRA 1 in 2021. The results from these assessments and rapid assessment updates have informed the proposed changes to the TACs for these stocks.

6 Background information

6.1 Management approach for rock lobster

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

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

51. The NRLMG's management goal is for all 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".

52. The NRLMG is supportive of discussing initiatives to progress an ecosystem approach tofisheries management, in line with the environmental principles of the Act. In developing advice to you, FNZ and the NRLMG have considered the purpose (section 8 of the Act) and the

[22] 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 rock lobster stocks.

environmental principles (section 9 of the Act) which include the elements of ecosystem-based management, as these are mandatory considerations for you in making your decisions.

53. Additional detail about other management issues that relate to rock lobster is given in Section 12.2 and Addendum One.

6.2 Rock lobster science and monitoring information

54. Until April 2020, management procedures were used in most rock lobster stocks (including CRA 1, 7 and 8) between full assessment years. Management procedures set out pre-agreed management actions that would be taken in response to changes in commercial catch rates (catch per unit effort - CPUE), an indicator of relative rock lobster abundance. Management procedures were designed to set a TACC that maintained the stock at or above a level that could produce the maximum sustainable yield.

55. Electronic reporting of catch and effort information was implemented in New Zealand's commercial fisheries during 2019. In 2020, the Rock Lobster Working Group[23] 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. The New Zealand Rock Lobster Industry Council (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.

56. 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 assessment updates are being undertaken as an interim alternative to management procedures. In 2021, rapid assessment updates were conducted for CRA 1, CRA 2, CRA 3, CRA 4 and CRA 5.

57. The Rock Lobster Working Group will continue to develop the rapid assessment update approach. There is potential to use the rapid assessments as the basis for development of a new type of management procedure that could guide decisions on future TAC changes.

6.3 Estimation of B_{MSY} reference levels

58. For rock lobster, research to determine B_{MSY} reference levels has been undertaken from 2019 to 2021. These new B_{MSY} reference levels are tailored to the biological and fishery characteristics of each 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 MSY, while meeting the risk constraints in the Harvest Strategy Standard for New Zealand Fisheries, and therefore represent an interim management target.

59. B_{MSY} reference levels for CRA 1, CRA 7 and CRA 8 were accepted by the Rock Lobster Working Group in 2021. These reference levels provide a trade-off between fixed catch (higher stability of catch levels between years, lower average annual yield) and fixed fishing mortality (F) (higher average annual yield, lower stability of catch levels between years). The NRLMG notes that the estimated B_{MSY} reference levels provide some guidance for the rock lobster stocks under review, but that further work needs to occur, including stakeholder engagement, to recommend management targets for all rock lobster stocks to the Minister.

60. Management targets could be at or above the B_{MSY} reference level, depending on social, cultural, and economic factors, as well as stakeholder aspirations for each rock lobster fishery. These would need to be agreed by the Minister. Management targets should take into account stock implications (yield and catch rate), and the approach that will be used to move stocks

[23] The Rock Lobster Working Group is the FNZ science working group for rock lobster.

toward these new targets or maintain the stock at or above any targets. The role of rock lobster in maintaining biodiversity in a healthy marine environment will also be a consideration. Management targets could also consider the ability to measure and constrain catch, and the approach to allocate access under section 21 of the Act. The role of B_{MSY} in your TAC setting considerations, as well as environmental considerations, is set out further in Table 6 below.

61. Work to determine management targets for rock lobster stocks commenced in 2021 and is intended to inform future reviews of catch settings. The NRLMG supports the development of management targets and intends to progress the matter in 2022.

62. Table 5 provides a summary of the stock assessment model outputs that are relevant to the evaluation of the proposals presented in this document for each stock.

Table 5: Summary of key stock model outputs and definitions that are discussed for each stock in this document.

Model outputs	Description	Stock	
		CRA 1	CRA 7 & 8
Vulnerable biomass (B)	Beginning of season autumn-winter vulnerable biomass (legal males and legal females not bearing eggs)	✓	✓
Spawning biomass (SSB)	Beginning of season autumn-winter spawning biomass (mature females)	✓	✓
Total biomass (B_{TOT})	Beginning of season autumn-winter total biomass (all males and females; includes rock lobster under the legal size limit)	✓	✓
B_{MSY}	Biomass that can produce the maximum sustainable yield (MSY)	✓	✓

6.4 Economic value of rock lobster

63. Rock lobster is New Zealand's most valuable wild caught fishery, generating more than $350 million annually in export revenue. Rock lobster fishing supports a range of businesses and regional and coastal communities. The majority of New Zealand's rock lobsters (more than 90%) are exported live, with China being the primary market. Rock lobster exports typically target periods of higher market price, including the lunar New Year.

64. There is no accepted estimate of recreational or customary asset value of the fishery or non-market values of rock lobster.

7 Central statutory considerations

65. Table 6 provides an overview of your central statutory considerations for varying TACs and TACCs under the Act.

Table 6: Information on your key requirements when making decisions under the Act. NRLMG comments are highlighted in blue (continued over the page).

Decisions you may make	Requirements – things you must do when making decisions
Part 1: Preliminary Provisions	
Section 5a – International obligations The Act is to be interpreted, and all persons exercising or performing functions, duties, or powers under it are required to act, in a manner consistent with New Zealand's international obligations relating to fishing.	The two key pieces of international law relating to fishing, and to which New Zealand is a party, are the United Nations Convention on the Law of the Sea, 1982 (UNCLOS) and the United Nations Convention on Biological Diversity 1992 (the CBD).
Section 5b – Treaty of Waitangi (Fisheries Claims) Settlement Act 1992 The Act is to be interpreted, and all persons exercising or performing functions, duties, or powers under it are required to act in a manner consistent with the provisions of the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992 (the Settlement Act).	The Crown recognises that traditional fisheries are of importance to Māori. It is the Crown's Treaty duty to develop policies to help recognise use and management practices and provide protection for and scope for the exercise of rangatiratanga in respect of traditional fisheries. The development of customary regulations and Iwi Fisheries Forums to provide for the input and participation of tangata whenua in fisheries decisions, discussed elsewhere in this paper, are some of the ways in which the obligations in the Settlement Act are given effect to.
Part 2: Purpose and principles	
Section 8 - Purpose 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 any 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." The Supreme Court has stated that the purpose statement incorporates "the two competing social policies reflected in the Act" and that "both policies are to be accommodated as far as is practicable in the administration of fisheries under the quota management system....[I]n the attribution of due weight to each policy that given to utilisation must not be such as to jeopardise sustainability".[24]
Section 9 – Environmental principles You must take into account three environmental principles when exercising powers in relation to the utilisation of fisheries resources or ensuring sustainability.	(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 (c) habitat of particular significance for fisheries management should be protected.

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

Decisions you may make	Requirements – things you must do when making decisions
The NRLMG considers that the options presented in this paper will provide for the section 9 principles to be maintained. Rock lobster are taken by potting and hand-gathering fishing methods which have relatively low levels of bycatch. These methods are also considered to have very little direct effect on the aquatic environment. Habitats of particular significance for fisheries management That habitats of particular significance for fisheries management (HPSFM) should be protected is an environmental principle under the Act. 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). As an initial response to this report, FNZ has introduced more detail as to what is known about HPSFM in advice relating to the review of sustainability measures. Table 7 below provides a summary of HPSFM for rock lobster. As noted in Table 7 below, the open ocean is important for the survival of rock lobster larvae, and structurally complex rocky reefs are important for the settlement and survival of juvenile and adult rock lobster. These habitats are common throughout New Zealand, and are included in a range of spatial protection measures throughout NZ. Further work needs to be done to confirm rocky reefs are HSPFM for particular life cycle stages of rock lobster. Urchin barrens, other grazing on kelp (e.g., by butterfish), 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 rock lobster as a refuge, as well as the availability of prey species. Further work to explore particular areas of significance for rock lobster will be considered. Further work to address adverse impacts on these areas may then be considered in a separate process using the appropriate tools under the Act and relevant Regulations.	
Section 10 – Information principles You must take into account four information principles when exercising powers in relation to the utilisation of fisheries resources or ensuring sustainability.	a) Decisions should be based on the best available information; b) Decision makers should take into account any uncertainty in the available information; c) Decision makers should be cautious when information is uncertain, unreliable, or inadequate; and 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 the Act. 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 Fisheries New Zealand Fishery Assessment Plenary Report is considered the best available information on stock status and should be given significant weighting. The information 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.[25] Corroborated anecdotal information also has a useful role to play in the stock assessment process and in the management process.
The NRLMG considers that the best available information has been used as the basis for the proposals in this paper. All science information on which the management proposals are based, has been peer-reviewed by one of Fisheries New Zealand's Fisheries Assessment Working Groups and meets the Fisheries New Zealand Research and Science Information Standard for New Zealand Fisheries.	

[25] A non-binding FNZ Policy Document.

Decisions you may make	Requirements – things you must do when making decisions
Section 11A You may approve or revoke fisheries plans And Before setting or varying any sustainability measure you must take into account any relevant fisheries plan that has been approved. (Section 11(2A)(b)).	Fisheries plans may include: (a-c) fisheries management objectives, strategies to achieve them, and performance criteria to measure achievement (d) Conservation or fisheries services (e) Contingency strategies to deal with foreseeable variations in circumstances.
To date national fisheries plans have been approved only for deepwater and highly migratory species, the Foveaux Strait oyster fishery and some paua fisheries (PAU 3 and PAU 4).	
Section 11 Sustainability measures You may set or vary sustainability measures for any stock Section 11(3) sustainability measures may relate to (but are not limited to): • Catch limits • Size, sex or biological state • Areas • Fishing methods • Fishing seasons	(1) after taking into account: (a) effects of fishing on any stock and aquatic environment; and (b) any existing controls under this Act that apply to the stock/area concerned; and (c) the natural variability of the stock concerned.

Decisions you may make	Requirements – things you must do when making decisions
	Rock lobster fishing methods (potting and hand gathering) are thought to have little direct effect on non-target species and the aquatic environment. The levels of incidental catch of species other than rock lobster landed from red rock lobster potting were summarised for the period from 2016–17 to 2020–21. Non-rock lobster catch landed by QMA ranged from 1 to 10% of the estimated catches only, with an average of about 5%; however, it is likely that not all bycatch is reported (only the top five bycatch species were required to be reported up to 2019 and not all vessels report non-CRA catches). The most frequently reported incidental species caught were, in decreasing order of catch across all QMAs: conger eel, octopus, carpet shark, blue cod, wrasses, snapper, marblefish, red cod, ling and blue moki. Of these species, five are in the QMS: blue cod (BCO), snapper (SNA), red cod (RCO), ling (LIN) and blue moki (MOK). Of the stocks that overlap with the CRA 1, 7 & 8 Quota Management Areas, their status is generally estimated to be at or above the management level or soft limits (SNA 8, MOK1, BCO5, RCO3, LIN5), or unknown (BCO1, RCO1, LIN1). The exception is snapper in east Northland and the Bay of Plenty (SNA1), assessed as unlikely to be above the management target and as likely as not to be below the soft limit in 2013. Comprehensive monitoring and management measures were implemented in 2013, including a reduced recreational bag limit and increase in minimum legal size increased. A new SNA1 stock assessment is currently underway and expected to be completed in May 2022. Little is known about the status of the non-QMS species. A range of management controls apply to the stocks discussed in this paper including minimum legal sizes, daily bag limits for recreational fishers, method restrictions, and protection of egg-bearing females. In CRA 7 and CRA 8, differential minimum legal sizes apply for commercial fishers. In CRA 7, commercial fishers can take male and female rock lobsters at or above 127 mm tail length from 1 June to 19 November. In CRA 8, commercial fishers can take female rock lobsters at or above 57 mm tail width at any time of year. Recruitment to rock lobster stocks is highly variable and this was taken into account during the stock assessments used to inform development of options discussed in this paper. Rock lobsters have a long larval life, swimming and drifting in the ocean for 12-15 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 phase that moults into a juvenile rock lobster, that settle to the sea floor varies among areas and from year to year. 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.
	(2) before setting or varying any sustainability measure, have regard to: (a) any regional policy statement, regional plan or proposed regional plan under the Resource Management Act 1991; and (b) any management strategy or plan under the Conservation Act 1987; and (c) sections 7 and 8 of the Hauraki Gulf Marine Park Act 2000; and (ca) regulations made under the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012; and (d) a planning document lodged with you by a customary marine title group under section 91 of Marine and Coastal Area (Takutai Moana) Act 2011.

Decisions you may make	Requirements – things you must do when making decisions
	that apply to the coastal marine area and are considered by you to be relevant.
	The NRLMG advice seeks to improve stock status and manage above reference levels, and to address any adverse effects of rock lobster potting. On behalf of the NRLMG, FNZ has considered these matters and considers that the options set out in the document are consistent with their intent. Marine and Coastal Area (Takutai Moana) Act There are no planning documents that have been lodged by customary marine title groups under section 91 of the Marine and Coastal Area (Takutai Moana) Act 2011 in the areas that overlap with CRA 1, 7 & 8. Numerous customary marine title applications have been made however, the majority of these are still being processed. Regional Plans There are three Regional Councils that have coastline within CRA 1, 7 & 8 boundaries respectively. Each of these regional councils have multiple plans to manage the coastal and freshwater environments, including terrestrial and coastal linkages, ecosystems and habitats. The NRLMG considers that the proposed management options presented 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. Conservation Management Strategies The three Regional Councils that have coastline within CRA 1, 7 & 8 boundaries have Conservation Management Strategies in place. Conservation Management Strategies are required under the Conservation Act 1987 and are recognised under the Resource Management Act 1991. They 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 fishstocks being reviewed. Te Mana o te Taiao (Aotearoa New Zealand Biodiversity Strategy) 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, 7 & 8 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. While the Strategy is a non-statutory document, the NRLMG sees it as a relevant consideration and considers that the options in this document are consistent with the above objectives. Hauraki Gulf Marine Park The CRA 1, 7, and 8 fisheries do not intersect with the Hauraki Gulf Marine Park; therefore, there are no relevant considerations for these stocks under the Act.
	(2A) before setting or varying any sustainability measure, take into account: (a) any conservation or fisheries services; and

Decisions you may make	Requirements – things you must do when making decisions
	(b) any relevant fisheries plan approved under section 11A; and (c) any decisions not to require conservation or fisheries services.
	Services of particular relevance to the decisions in this paper relate to contracted projects for stock monitoring and stock assessment, tag deployment and recapture, and puerulus settlement monitoring. Work will also be undertaken to develop the stock assessment approaches used and management procedures. There is no approved fisheries plan relating to red or packhorse rock lobster.
Section 13 Variation of the TAC You shall set (unless you do not intend to set initial TACC – section 20), and may vary, TAC for quota management stocks	(2) You shall set (and may vary – sub-section (4)) a TAC that: (a) maintains the stock at or above a level that can produce the MSY, having regard to the interdependence of stocks; or (b) enables the level of any stock below a level that can produce MSY to be altered: (i) in a way and at a rate that will restore the stock to a level that can produce MSY having regard to interdependence; and (ii) within a period appropriate to the stock, having regard to the biological characteristics of the stock and environmental conditions affecting it, or (c) enables the level of any stock above MSY to be altered in a way and at a rate to move the stock toward or above MSY having regard to interdependence. (2A) If you consider that the stock level to produce MSY is not able to be estimated reliably using best available information, you must: (a) not use the absence of, or any uncertainty in, that information as a reason to postpone or fail to set a TAC; and (b) have regard to the interdependence of stocks, biological characteristics of the stock and any environmental conditions affecting the stock; and (c) set a TAC (i) using the best available information; and (ii) that is not inconsistent with the objective of maintaining the stock at or above, or moving the stock towards or above MSY. (3) In considering the way and rate at which stock is moved toward or above MSY you shall have regard to such social, cultural and economic factors as you consider relevant. (4) You may, by notice in the *Gazette*, vary any total allowable catch set for any quota management stock under this section. When considering any variation, you are to have regard to the matters specified in subsections (2), (2A) (if applicable), and (3).

MSY level for rock lobster

The B_{MSY} reference level, the level associated with MSY, is available for all stocks reviewed in this document. As an estimate of B_{MSY} is available, and all stocks under review are 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.

All options are expected to retain the stocks above their respective B_{MSY} levels. The options reflect different trade-offs for each stock: whether the stock is maintained at or above B_{MSY} (status quo – Option 1.1 for CRA 1, Option 7.1 for CRA 7, and Option 8.1 for CRA 8); whether the TAC is decreased to move the stock above B_{MSY} to a greater degree and with greater certainty (Options 1.2, 1.3 and 1.4 for CRA 1, which offer increasingly greater predicted degrees of biomass increase and certainty of increasing above B_{MSY}); or whether the TAC is increased to continue moving the stock above B_{MSY} (Option 7.2 for CRA 7 and Options 8.2 and 8.3 for CRA 8, which offer increasingly greater utilisation opportunities).

FNZ notes that while information regarding the ecological role of the rock lobster in the ecosystem, and the potential impact of rock lobster fishing on the aquatic environment, is uncertain and complicated by a range of factors, you could choose to

Decisions you may make	Requirements – things you must do when making decisions

manage rock lobster biomass above B_{MSY} to increase the biomass of rock lobster in the ecosystem (as is provided for under Options 1.1, 1.2, 1.3 and 1.4 for CRA 1, to increasingly greater levels, respectively).

FNZ, informed by the NRLMG, will provide future advice to you late in 2022 regarding management targets for rock lobster stocks. These management targets will need to be at or above the B_{MSY} reference level to fulfil your obligations under section 13(2). You will be asked to agree to suggested management targets, which will involve trade-offs between social, economic, and cultural factors (such as trade-offs between catch rates and yield). In the absence of agreed management targets, the accepted B_{MSY} reference levels can be considered as interim management target.

Interdependence of stocks

In New Zealand, red rock lobster fisheries extend from the Three Kings Islands in the north to the Auckland Islands in the south, and east to the Chatham Islands. The long larval phase and long-distance movements of adults in some areas suggest a single red rock lobster stock around the mainland.

The interdependence of stocks also involves the consideration of the effects of fishing on associated stocks harvested affected by fishing for the target stock. Examples include other non-target species (bycatch) or benthic species that are incidentally taken or affected by fishing gear. The role of the target stock in the food chain should also be considered.

Potting is the method commercial fishers use to target red and packhorse rock lobsters, while recreational fishers use potting and hand gathering methods. These methods are considered to have limited direct effect on non-target species and benthic species. The most frequently reported incidental species caught are, in decreasing order of catch across all QMAs: conger eel, octopus, carpet shark, blue cod, wrasses, snapper, marblefish, red cod, ling and blue moki. This is based on an analysis of estimated incidental catches for the period from 2016/17 to 2020/21.

Rock lobsters feed on a wide range of small shellfish, crabs, starfish and kina, depending on local availability; the extent of their impact on these species is however unknown. Predation on red rock lobsters is known from a variety of fish species (such as snapper, blue cod, spotty wrasse, leatherjacket, and groper), octopus, southern dogfish, rig, seals, and other rock lobsters. Predation on packhorse rock lobsters is known from octopus.

While the impact of changing rock lobster abundance on those species that interact with rock lobsters is unknown, it can be expected that reducing rock lobster abundance (e.g., by increasing the TAC) could potentially lead to species that are prey to rock lobsters increasing in abundance, and predator species that predate on rock lobsters decreasing in abundance in or near rock lobster habitat. Similarly, changing the TAC may alter the abundance of species caught as incidental catch in rock lobster pots. Conversely, increasing rock lobster abundance (e.g., by decreasing the TAC) could potentially lead to a decline in prey species and an increase in predator species in those areas. The likely scale and magnitude of these potential changes in benthic community structure and trophic interactions are could be complex, with multiple factors at play. FNZ considers that these effects are unlikely to be detrimental to the ecosystem at the scales of change proposed.

Sea urchin barrens

There is evidence from some locations in northern New Zealand that the lower abundance of fished species such as rock lobsters, snapper and other fishes has reduced predation on kina by large reef predators, resulting in larger sea urchin populations that graze heavily on kelp and the creation of urchin barrens (e.g., Babcock et al 1999, Shears & Babcock 2003).

Reciprocal changes in the relative proportions of predator and prey through a food chain that results in a shift in the community structure is called a trophic cascade. The impacts of trophic cascades on ecosystem structure may however be moderated or influenced by a range of other environmental factors such as bottom-up forces, environmental and climatic influences, species' demographics, and catchment-derived sedimentation (Schiel 2013). Even where fishing occurs, extensive areas of New Zealand's coastline do not appear to be affected by kina barrens or trophic cascades.

The main evidence for decreased predation leading to increased kina abundance and barrens in northern areas of New Zealand comes from trends observed in areas closed to fishing (Shears & Babcock 2003), and comparative studies between protected areas and nearby unprotected areas (Shears et al 2008, Salomon et al 2008). On northern New Zealand reefs, the strength of trophic cascade effects varies with environmental context, e.g., depth and wave exposure (Shears et al 2008, Salomon et al 2008, 2010).

In more southern areas, kina barrens are less common, but not absent (Barker 2013). In localised areas of the South Island kina barrens can be quite extensive, covering >60% of some shallow reefs (Shears & Babcock, 2004). Monitoring of shallow reefs around most of New Zealand has not been targeted to track trophic cascades and the emergence of kina barrens and provide little insight on how widespread the problem might be.

Decisions you may make	Requirements – things you must do when making decisions
Fisheries New Zealand is currently developing a research project to review and update the trophic cascade hypothesis as it relates to kina barrens. This project is intended to include a multi-stakeholder workshop to review available information and determine research needs and potential methodologies moving forward. The results of this project will be included in subsequent advice to you. *Role of rock lobsters in the ecosystem* The relative trophic importance of rock lobsters is suggested to have declined in the Hauraki Gulf (CRA 2) since human arrival[26]. This information is not available for other areas, but some members of the recreational and environmental sectors note anecdotal reports of declines in abundance in CRA 1. Commercial and tangata whenua NRLMG members note that the available science on the impact of lobster abundance on kina barrens is uncertain and context dependent, and that other factors seem to be important drivers for urchin and macropyte abundance depending on the area. They suggest that you should retain the status quo in CRA 1 provides for increasing biomass and the potential amelioration of these issues. Any further decrease to the TAC is not necessary given this uncertainty (as well as the social and economic impacts discussed under section *9.5 – Analysis* below) and while work is undertaken on a management target in 2022. Recreational and environmental NRLMG members suggest that low rock lobster abundance may lead to further sea urchin barrens, and suggest that a precautionary approach is justified in CRA 1 in order to provide for wider ecosystem benefits and address potential effects of rock lobster fishing on the aquatic environment. FNZ recommends that you balance the potential socio-economic impacts of further TAC cuts with the potential benefits of increasing abundance further in CRA 1 (noting that these are uncertain and not able to be defined), and that you note that the stock will be reviewed again once a management target has been set for this stock. Biological characteristics and environmental conditions A variety of environmental factors are thought to influence the productivity of rock lobster populations, including water temperature, ocean currents, latitude, shelter availability, and food availability. Rock lobsters grow at different rates around New Zealand and female lobsters mature at different sizes. Variability in growth, maturity, available abundance, mortality, and recruitment were taken into account during the development of the proposals for the rock lobster stocks discussed in this paper.	
Sections 20 & 21 Variation of the TACC You shall set and may vary TACC for quota management stocks, unless a TAC has not been set for the stock	Section 21 (1) in setting or varying any TACC you shall have regard to the TAC and shall allow for (a)(i) Māori customary non-commercial interests; and (a)(ii) Recreational interests; and (b) all other mortality to the stock caused by fishing. (2-3) Before setting or varying a TACC you shall consult representatives of classes of people that have an interest and give reasons for your decision (4) when allowing for Māori customary interests you must take into account (a) any mātaitai reserve in the Quota Management Area declared under section 186; and (b) any area closure or method restrictions/prohibitions imposed under section 186A. (5) when allowing for recreational interests you must take into account any regulations that prohibit or restrict fishing under section 311.
Guidance – Case law The Act does not provide an explicit statutory mechanism to apportion available catch between sector groups either in terms of a quantitative measure or prioritisation of allocation. Accordingly, you have the discretion to make allowances for various	

[26] Pinkerton, M.H.; MacDiarmid, A.; Beaumont, J.; Bradford-Grieve, J.; Francis, M.P.; Jones, E.; Lalas, C.; Lundquist, C.J.; McKenzie, A.; Nodder, S.D.; Paul, L.; Stenton-Dozey, J.; Thompson, D.; Zeldis, J. (2015). Changes to the food-web of the Hauraki Gulf during the period of human occupation: a mass-balance model approach. New Zealand Aquatic Environment and Biodiversity Report No. 160. 346 p.

Decisions you may make	Requirements – things you must do when making decisions

sectors based on best available information. Having set or varied the TAC you in effect apportion it between the relevant interests.[27]

The Courts have in a number of cases considered what is involved in allowing for non-commercial interests. In the Snapper 1 judgment[28] the Court of Appeal said that the recreational allowance is simply the best estimate of what recreational fishers will catch while being subject to the controls which you decide to impose upon them, e.g. bag limits and minimum lawful sizes.

The Supreme Court endorsed this approach in the Kahawai judgment[29] and said that the words "allow for" require you both to take into account the interests and make provision for them in the calculation of the TACC.[30] It also said that although what the Minister allows for is an estimate of what recreational interests will catch, it is an estimate of a catch the Minister is able to control by for example daily bag and fish length limits; that the allowance represents what the Minister considers recreational interests should be able to catch, but also all that they will be able to catch. The Act envisages that the relevant powers will be exercised as necessary to achieve that goal.[31]

The Supreme Court went on to say that sections 20 and 21 prescribe a framework within which you must operate when setting or varying the TACC. The framework requires apportionment of the TAC by you among the various interests and other mortality. The sequential nature of the method of allocation provided for in section 21 does not indicate that non-commercial fishing interests are to be given any substantive priority over commercial interests. In particular the allowance for recreational interests is to be made keeping commercial interests in mind.[32]

The Supreme Court said that in the end, within the limits provided for by the Act, you make a policy decision as to what allocations are appropriate for non-commercial interests and other mortality and what is to be the TACC. These decisions are interdependent. The Act does not confer priority for any interests over the other. It leaves that to your judgement.[33]

Mātaitai reserves

There are a number of mātaitai reserves and temporary closures that fall within each of the red rock lobster stocks under review (see Table 8 in section *8.2 Kaitiakitanga* below).

The NRLMG notes the proposals in this document are unlikely to limit the ability to take rock lobsters for customary purposes or have an effect on the mātaitai reserves in each area. As the proposals are intended to ensure rock lobster stocks are maintained at sustainable levels, they may increase abundance of these species in these areas.

Table 7: Summary of information on habitats of particular significance for fisheries management for New Zealand rock lobster (continued over the page).

Fish Stock	Rock Lobster
Habitat	<u>Juveniles:</u> • Rock lobsters have high fecundity (fertility) 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 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 rock lobsters preferentially inhabit holes and crevices in hard substrates where light levels are low. <u>Adults:</u> • Adult rock lobsters are found in reef habitats up to depths of 200 m, where they inhabit crevices, caves, and rocky overhangs.

[27] New Zealand Fishing Industry Association (Inc) v Minister of Fisheries CA 82/97, 22 July 1997 ("Snapper 1").
[28] Snapper 1, p 17.
[29] New Zealand Recreational Fishing Council Inc v Sanford Limited [2009] NZSC 54 ("Kahawai")
[30] Kahawai [55]
[31] Kahawai [56]
[32] Kahawai [61]
[33] Kahawai [65]

Fish Stock	Rock Lobster
	• 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. • Rock lobsters are predators that forage on benthic invertebrates such as pāua, ophiuroids and sea urchins. The presence of macroalgae on reef habitats increases structural complexity and provides habitat and food for prey species, thus benefitting rock lobsters. • 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 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 rock lobster stocks.
Risks/Threats	• Land-based practices can impact coastal reef habitats, including through sedimentation and eutrophication. • 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 rock lobster larvae. • Seawater change is known to affect larval energy, swimming, and presumed survival in packhorse rock lobster.[34] • Settlement processes for rock lobster are complex, involving larval behaviour, biological and environmental factors, and oceanographic processes.[35] 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.[36] • There is evidence that acoustic shock and vibration can affect phylosoma and settlement (e.g., seismic testing).[37] [38]

8 Input and participation, and consultation

8.1 Input and participation of tangata whenua

66. The Act and the Fisheries Settlement make particular provision for customary non-commercial use and management of fisheries resources (see Table 6 above).

67. The Minister has a legislative obligation to provide for the input and participation of tangata whenua into the sustainability decision-making process under section 12(1)(b) of the Act. FNZ

[34] 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.
[35] 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.
[36] See previous footnote.
[37] McCauley, R. D., Day, R. D., Swadling, K. M., Fitzgibbon, Q, P., Watson, R,. A. & Semmens, J. M. 2017. Widely used marine seismic survey air gun operations negatively impact zooplankton. *Nature Ecology & Evolution* (1) 0195.
[38] Day, R. D., McCauley, R. D., Fitzgibbon, Q. P. & Semmens, J. M. Assessing the Impact of Marine Seismic Surveys on Southeast Australian Scallop and Lobster Fisheries Final Report 2012-008-DLD (FRDC, 2016).

has established Iwi Fisheries Forums to support that obligation. Each Iwi Fisheries Forum is supported to develop a non-statutory Iwi Fisheries Forum Plan that describes how the iwi in the Forum exercise kaitiakitanga[39] over the fisheries of importance to them, and their objectives for the management of their rights and interest in fisheries. Particular regard must be given to kaitiakitanga when making sustainability decisions.

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. CRA 7 and CRA 8 are relevant to the rohe of the Te Waka a Māui me Ōna Toka Iwi Forum. Input and participation from tangata whenua represented by members of the Forum on the proposed review of these stocks was sought in November 2021 and in February 2022 and the views these forums are outlined in the table below.

Table 8: Iwi Fisheries Forum input received on the rock lobster stocks under review (continued over the page).

Iwi Fisheries Forum	Stock	Input into CRA stock
Te Hiku o Te Ika (early input into advice paper)	CRA 1	The Forum initially had mixed views, but generally supported retaining the status quo, noting that even a small decrease in the stock would have a big impact on small annual catch entitlement (ACE) fishers and Māori fishing assets. The Forum noted that the minimum legal size (MLS) for rock lobster is very small and considered that the MLS should be increased before considering a reduction to the TAC.
Te Hiku o Te Ika (Response to advice paper)	CRA 1	The Forum supports Option 1.4 (12% TAC decrease).
Mid-North (early input into advice paper)	CRA 1	The Forum would like this fishery reviewed and supports a decrease to catch limits. Rock lobster has declined in abundance and the Forum would like abundance to increase back to historical levels. Regarding commercial fishing, the Forum notes that rock lobster are abundant where there is no commercial fishing pressure. The Forum does not support targeting rock lobster while they are migrating and would like to explore ways to restrict this.
Mid-North (Response to advice paper)	CRA 1	The Forum supports Option 1.4 (12% TAC decrease).
Te Waka a Māui me Ōna Toka Iwi Forum (early input into advice paper)	CRA 7 & 8	CRA 7 & 8 are entirely within the Ngāi Tahu Takiwā. Otago and Southland Ngāi Tahu Papatipu Rūnanga, and their Tangata Tiaki expressed continual concern with the lack of information on recreational fishing levels for these stocks, and with the lack of management of recreational charter fishing in the Fiordland Marine Area in particular. This is concern shared by the Fiordland Marine Guardians. Ngāi Tahu Seafood are supportive of conservative TACC increases for both stocks. In order to fulfil customary fishing needs, tangata whenua are generally reliant on commercial fishers, and are generally unable to find sufficient rock lobsters in inshore waters outside of mātaitai and taiāpure. There is concern that recreational fishing is putting pressure on rock lobster stocks and inhibiting tangata whenua's customary access, particularly in nearshore waters.

[39] The 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.

Iwi Fisheries Forum	Stock	Input into CRA stock
Te Waka a Māui me Ōna Toka Iwi Forum (Response to advice paper)	CRA 7 & 8	As above. Te Rūnanga o Ngāi Tahu supports Option 7.2 (7% TAC increase) for CRA 7 and either Option 8.2 (10% TAC increase) or Option 8.3 (13% TAC increase) for CRA 8.

69. Additional input and participation of tangata whenua is provided through the NRLMG membership. A Te Waka a Māui me Ōna Toka Iwi Forum representative is a member of the NRLMG, who directly inputs into decision-making on behalf of South Island tangata whenua.

70. A representative of Te Ohu Kaimoana is also a member of the NRLMG and represents North Island and Chatham Island iwi and imi. Having a mandated representative of MIOs provides an alternative framework through which Te Ika-a-Māui and Chatham Island tangata whenua can be represented at a national level on a body such as NRLMG. However, Te Ohu Kaimoana does not seek to override the mana of any MIO or of tangata whenua to have direct input into the management of rock lobster fisheries within their rohe moana.

8.2 Kaitiakitanga

71. Rock lobster is listed as a taonga species in the fisheries plans of the Te Hiku o Te Ika and Te Waka a Māui me Ōna Toka Iwi Forum.

72. 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, as they are all projected to ensure these rock lobster stocks are above their respective soft limits and B_{MSY} reference levels, enabling rock lobster to be sustainably utilised:

- 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 Hapu.
        1. The CRA 1 options represent trade-offs in social, cultural and economic gains (see *9.5 – Analysis* below). All provide for the stock to remain above the B_{MSY} reference level.
        2. No options make any change to the current Māori customary allowance, which is believed to adequately provide for the known level of customary catch.
- In relation to CRA 7 and 8, Te Waka a Māui me Ōna Toka Iwi Forum's Fisheries Plan:
    i. To develop environmentally responsible, productive, sustainable and culturally appropriate commercial fisheries that create long-term commercial benefits and economic development opportunities for South Island Iwi.
        1. The CRA 7 & 8 options represent trade-offs in social, cultural and economic gains (see *10.5 – Analysis* and *11.5 – Analysis* below). All provide for these combined stocks to remain above the combined B_{MSY} reference level.
        2. No options make any change to the current Māori customary allowance, which is believed to adequately provide for the known level of customary catch.

73. Customary tools utilised under the Fisheries (Kaimoana Customary Fishing) Regulations 1998, the Fisheries (South Island Customary Fishing) Regulations 1999, and the Fisheries Act 1996, provide for tāngata whenua to manage local fisheries in ways that best fit local customary practices in the form of mātaitai, taiāpure and temporary closures.

74. There are several mātaitai, taiāpure, and section 186A/B area closures that fall within each of the rock lobster stocks under review, which are set out in Table 9. It is not anticipated that the

options proposed would negatively impact the availability of rock lobster in these areas in CRA 1, however any positive impacts are unknown. In CRA 7 & 8, the proposed TAC increases could potentially result in increased rock lobster abundance and availability in these areas (to a comparatively greater level for Option 8.1 than Option 8.2 and 8.3).

Table 9: Customary fisheries management areas in CRA 1, CRA 7 & CRA 8.

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.*
CRA 7 Otago	Moeraki Ōtākou Puna-wai-Toriki	
CRA 8 Southern	Waikawa Harbour/Tumu Toka Motupōhue Oreti Pikomamaku Te Whaka a Te Wera Kaihuka Horomamae Waitutu Okuru Tauparikaka Mahitahi Manakaiaua Okarito Lagoon	
CRA 7 Otago	East Otago	**Taiāpure** *All types of fishing are permitted within a taiāpure. The management committee can recommend regulations for commercial and recreational fishing.*
CRA 1 Northland	Maunganui Bay[40] Marsden Bank and Mair Bank[41]	Temporary closures *These areas are temporarily closed to all fishing or certain fishing methods, for everyone. These closures are issued under sections 186A or 186B of the Act and apply for 2 years.*

8.3 Consultation process

75. FNZ and the NRLMG consulted on the rock lobster sustainability proposals from 15 December 2020 to 8 February 2021. A standard consultation process was followed, consisting of posting the consultation document on the FNZ website and alerting stakeholders to the consultation through a media release, social media posts, and email notifications.

Submissions received

76. A total of seventy-three submissions were received from various organisations, groups, and individuals, with some submitters submitting on multiple stocks. Where a submitter provided multiple submissions on the same stock, it was recorded as one submission.

77. Submissions received and considered by FNZ and the NRLMG are set out in Table 10 below. Each submission is discussed in the chapters below, as relevant to each stock. Matters raised that did not directly relate to the sustainability proposals are listed in *Addendum 1 – Other matters raised in submissions*. Should you wish to view any submissions received on rock

[40] Applies to all fisheries resources except kina.
[41] Applies to all shellfish (including rock lobster).

lobster proposals, a full copy of the rock lobster submissions, titled *"Public Submissions received for the April 2022 Sustainability Round "* has been provided to your office.

Table 10: Written submissions received on the rock lobster consultation options for the 1 April 2022 fishing year. (continued over the page)
cus: customary sector/tangata whenua/Māori organisations; *env*: environmental sector; *rec*: recreational sector; *com*: commercial sector; *pub*: member of the public.

Sector	Submitter	Option Supported											
		CRA 1 (Northland)					CRA 7 (Otago)			CRA 8 (Southern)			
		1.1 status quo	1.2	1.3	1.4	Other	7.1 status quo	7.2	Other	8.1 status quo	8.2	8.3	Other
Cus	Iwi Collective Partnership (ICP)	✓	✓										
Cus	Matawai Pokapu Komiti Maori	✓											
Cus	Ngapuhi Asset Holding Company	✓											
Cus	Ngatiwai Holdings Ltd and Ngatiwai Fishing Ltd (Ngatiwai Trust Board)				✓								
Cus	Ngatiwai Marae Committee and Moana Futures Ltd	✓											
Cus	Patuharakeke Te Iwi Trust Board				✓								
Cus	Te Ohu Kaimoana	✓						✓					✓
Cus	Te Runanga o Whaingaroa				✓								
Cus	Wakaminenga ki Waitangi Komiti Maori	✓											
Env	Environment Conservation Organisations of New Zealand (ECO)				✓		✓			✓			
Env	Environment Defence Society (EDS)					✓							
Env	Environmental Law Initiative (ELI)					✓							
Env	Fiordland Marine Guardians												✓
Env	Forest and Bird				✓		✓			✓			
Env	Mountains to Sea Conservation Trust (MTSCT)				✓								
Env	Prof Andrew Jeffs					✓							
Rec	Andrew Dean				✓								
Rec	Blair Jones				✓								
Rec	Brad Olsen							✓					
Rec	Jack Worthington					✓							
Rec	Kim Jones				✓								
Rec	Luke Williamson				✓		✓			✓			
Rec	Joint submission from New Zealand Sport Fishing Council (NZSFC), New Zealand Angling and Casting Association (NZACA), New Zealand Underwater Association (NZUA), and LegaSea (Joint recreational submitters)				✓			✓			✓		
Rec	Oceandiversity Sea Adventures Ltd.				✓								
Rec	Richard Ridler					✓							
Rec	Ross Scobie				✓								
Rec	Ryan Welsh				✓								

Sector	Submitter	Option Supported											
		CRA 1 (Northland)					CRA 7 (Otago)			CRA 8 (Southern)			
		1.1 status quo	1.2	1.3	1.4	Other	7.1 status quo	7.2	Other	8.1 status quo	8.2	8.3	Other
Rec	Tania Belworthy										✓		
Rec	Terence Brocx			✓									
Rec	Tom Webb				✓								
Com	Allison Fishing							✓					
Com	Anderson Family Trust Partnership							✓					
Com	Bob Lovell	✓											
Com	Bruce Sanderson	✓											
Com	Chris Cooper							✓					
Com	CRA 1 Rock Lobster Industry Association (CRAMAC 1)	✓						✓				✓	
Com	CRA 2 Rock Lobster Industry Association (CRAMAC 2)	✓						✓				✓	
Com	CRA 4 Rock Lobster Industry Association (CRAMAC 4)	✓						✓				✓	
Com	CRA 6 Rock Lobster Industry Association (CRAMAC 6)	✓						✓				✓	
Com	CRA 8 Rock Lobster Industry Association (CRA 8 RLIA)	✓						✓				✓	
Com	David Anderson							✓					
Com	Elbury Holdings											✓	
Com	Emma Creighton	✓											
Com	Geoff Creighton	✓											
Com	Gisborne Fisheries	✓			✓			✓				✓	
Com	Glen Coulston	✓											
Com	GT & SM Wardrop Ltd, Piko Trust											✓	
Com	James Creighton	✓											
Com	KPF Investments Ltd							✓				✓	
Com	Leigh Lobster & Associates Ltd	✓											
Com	Loyal Fishing											✓	
Com	Lucy Creighton	✓											
Com	Nat Davey	✓											
Com	NZ Red Holdings Ltd (NZ Red)	✓											
Com	New Zealand Rock Lobster Industry Council (NZ RLIC)	✓						✓				✓	
Com	Norman Byrne	✓											

Sector	Submitter	Option Supported											
		CRA 1 (Northland)					CRA 7 (Otago)			CRA 8 (Southern)			
		1.1 status quo	1.2	1.3	1.4	Other	7.1 status quo	7.2	Other	8.1 status quo	8.2	8.3	Other
Com	Otago Rock Lobster Industry Association (ORLIA)							✓				✓	
Com	Phillippa La Rosa	✓											
Com	Sophie Boberg	✓											
Com	Southern Ocean Lobster Ltd											✓	
Com	Tairawhiti Rock Lobster Industry Association (TRLIA)	✓						✓				✓	
Com	Lee Fish Ltd	✓											
Com	Vincent La Rosa	✓											
Pub	Andrew Caldwell-Smith				✓		✓			✓			
Pub	Dino Pavlovich				✓		✓			✓			
Pub	Dyne Hemara	✓											
Pub	Jeffrey Clarke	✓											
Pub	Justin Caldwell-Smith				✓		✓			✓			
Pub	Karen Wealleans								✓				✓
Pub	Nadia Pavlovich				✓		✓			✓			
Pub	Richard Potter					✓			✓	✓			✓
Pub	Shaun Lee					✓							
Pub	Vicky Pavlovich				✓		✓			✓			

9 Review of the CRA 1 (Northland) rock lobster fishery

9.1 CRA 1 fishery overview

Māori customary fishing

78. Rock lobster (kōura) is a taonga species for tangata whenua. CRA 1 (Northland) customary Māori 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, 302 unspecified units[42] of 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.

79. An estimate of 10 tonnes was used in the 2019 CRA 1 stock assessment model and the 2021 rapid assessment update to represent customary catches.

Recreational fishing

80. Relevant sources of information for estimating recreational catch include the results of National Panel Surveys and creel surveys[43], the model estimate from the most recent stock assessment, and estimates from the more recent rapid assessment update.

81. 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, and the 2013/14 Blue Water Marine Research (Holdsworth) survey were used to construct a recreational catch trajectory. It was assumed that recreational catch was proportional to CRA 1 abundance, estimated from trends in spring-summer commercial CPUE from statistical areas 903 and 904 (the east coast of Northland where the majority of recreational fishing takes place in CRA 1) (Figure 2)[44].

82. The 2019 stock assessment model input of CRA 1 recreational catch was 31.5 tonnes for 2018. The 2017/18 National Panel Survey estimate of CRA 1 recreational catch, while uncertain, was 15.9 tonnes (±14.7 tonnes). For the 2020/21 fishing year, the recreational catch estimate assumed for the rapid assessment update model was 28.04 tonnes.

83. The COVID-19 outbreak will have significantly reduced recreational participation and catch over the lockdown period(s) in 2020 and 2021 due to movement restrictions in and out of Auckland.

[42] Customary harvest of rock lobster is usually reported as kilograms or number of individuals, but in some cases the unit used is not specified, which is the case in CRA 1.
[43] Creel surveys involve interviewing fishers, asking how many fish were caught, and measuring any fish caught.
[44] The National Panel Surveys occurred over an October fishing year (October to September), and the Blue Water Marine Research Survey occurred over an April fishing year (April to March).

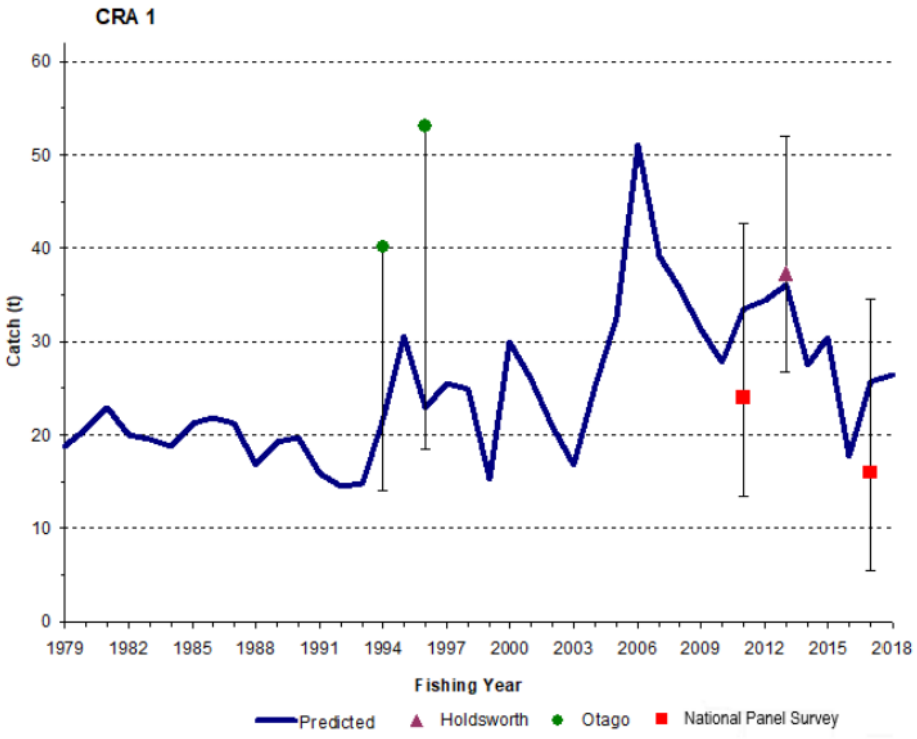

Figure 2: CRA 1 recreational catch trajectory for the 2019 CRA 1 stock assessment (error bars are ±2 standard errors, with the upper bounds of the Otago University survey estimates suppressed).

Other mortality

84. In the 2019 CRA 1 stock assessment, the Rock Lobster Working Group agreed that illegal catch would be assumed to be 20% of the total commercial catch from 1981 to 2018, scaled proportionally to the commercial CPUE for each year over the same period. This acknowledged that illegal take was likely to be influenced by available abundance (Figure 3). Before 1980, export discrepancies (the difference between reported catch totals and total exported weight) were used to estimate illegal catch. For the 2020/21 fishing year, the illegal catch estimate assumed for the rapid assessment update model was 35.4 tonnes.

85. The CRA 1 stock assessment also assumed that handling mortality was 10% of returned lobsters until 1990, and then 5% thereafter. The model estimate of handling mortality was 2.4 tonnes for 2018, and 1.8 tonnes for 2020 based on the new rapid assessment update.

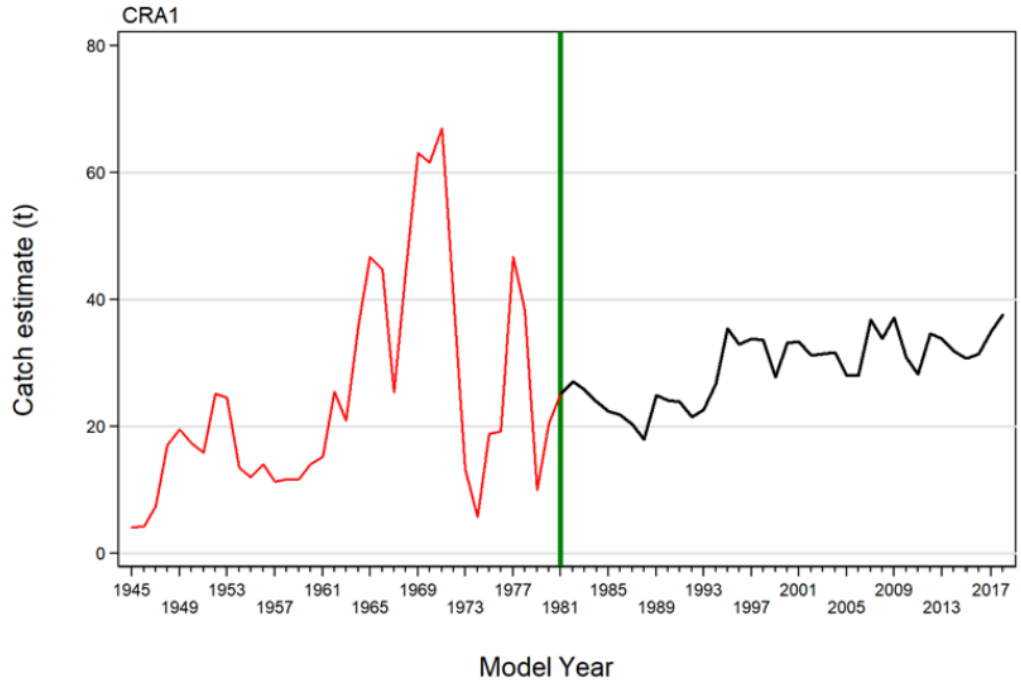

Figure 3: CRA 1 illegal catch trajectory assumed for the 2019 CRA 1 stock assessment.[45]

Commercial fishing

86. CRA 1 commercial landings have remained at or near the TACC since the early 1990s (Figure 4). The TACC was 131 tonnes from the early 1990s 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 an under-catch of the TACC in 2019/20. Between 2015 and 2019 a formally adopted CRA 1 management procedure was used to annually review the TACC to ensure that catches reflected available abundance.

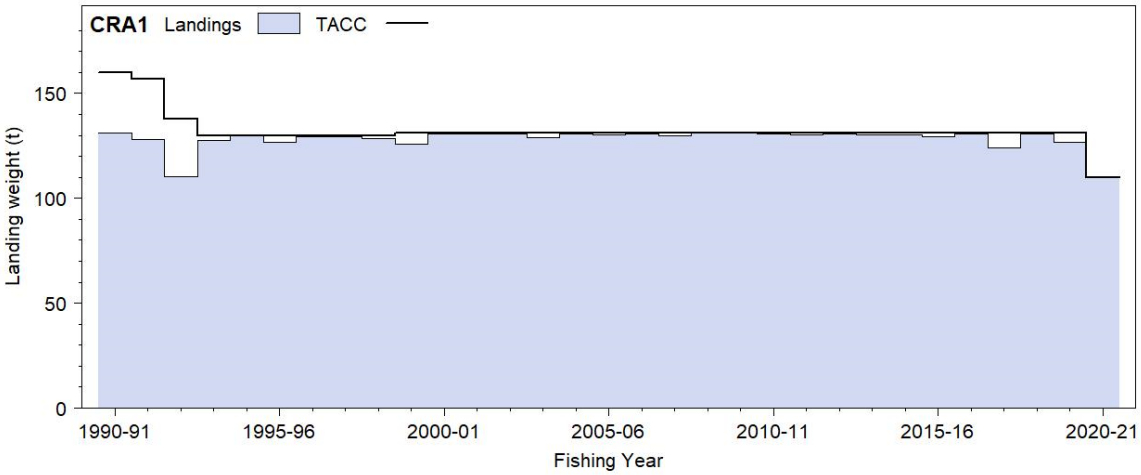

Figure 4: CRA 1 commercial landings and the TACCs from 1990 to 2020.

87. The current asset value of CRA 1 quota is estimated to be over $112 million based on the current TACC and the average quota share price for the 2017/18 fishing year.[46] The average price of CRA 1 ACE (the earnings quota owners receive when selling their ACE) for the

[45] The vertical green line refers to when a new approach to estimating illegal catch was applied in 1981.
[46] 2017/18 is the most recent fishing year with sufficient quota trades to calculate an average price for CRA 1.

2020/21 fishing year was $29,484.64 per tonne. For more detail on CRA 1 ACE and quota prices over the last five years, see Table 11.

Table 11: Number of transfers and average prices of Annual Catch Entitlement (ACE) and quota for CRA 1.[47]

April Fishing Year	Annual Catch Entitlement (ACE)		Quota	
	Number of transfers	Average price (per tonne)	Number of transfers	Average price (per tonne)
2016/17	89	$40,799.32	0	
2017/18	86	$40,576.41	5	$1,026,119.05
2018/19	75	$42,322.79	0	
2019/20	76	$43,525.05	0	
2020/21	64	$29,484.64	1	

88. In the 2020/21 fishing year, 14 vessels reported landing at least 1 tonne of rock lobster.

9.2 CRA 1 stock status

89. A stock assessment for CRA 1 was conducted in 2019, and a new rapid assessment update was performed in 2021.

Summary of 2019 stock assessment results

90. The 2019 stock assessment results suggested that vulnerable biomass was 16% of the unfished level and total biomass was 26% of the unfished level. Spawning biomass 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, with 2019 catch levels and recent recruitment, suggested that vulnerable and total biomass would both decline, while spawning biomass was projected to remain constant. At the time of the 2019 CRA 1 stock assessment, a B_{MSY} reference level had not yet been generated.

91. As a result of 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%), 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 130 tonnes to 110 tonnes (15%).

Summary of the 2021 rapid assessment update

92. The results of the 2021 rapid assessment update suggest that CRA 1 vulnerable biomass is 15% of the unfished level. Over the next four years, with 2021 catch levels and recent recruitment, CRA 1 vulnerable biomass is projected to increase to 16% of the unfished level (Figure 5 and Table 12).

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

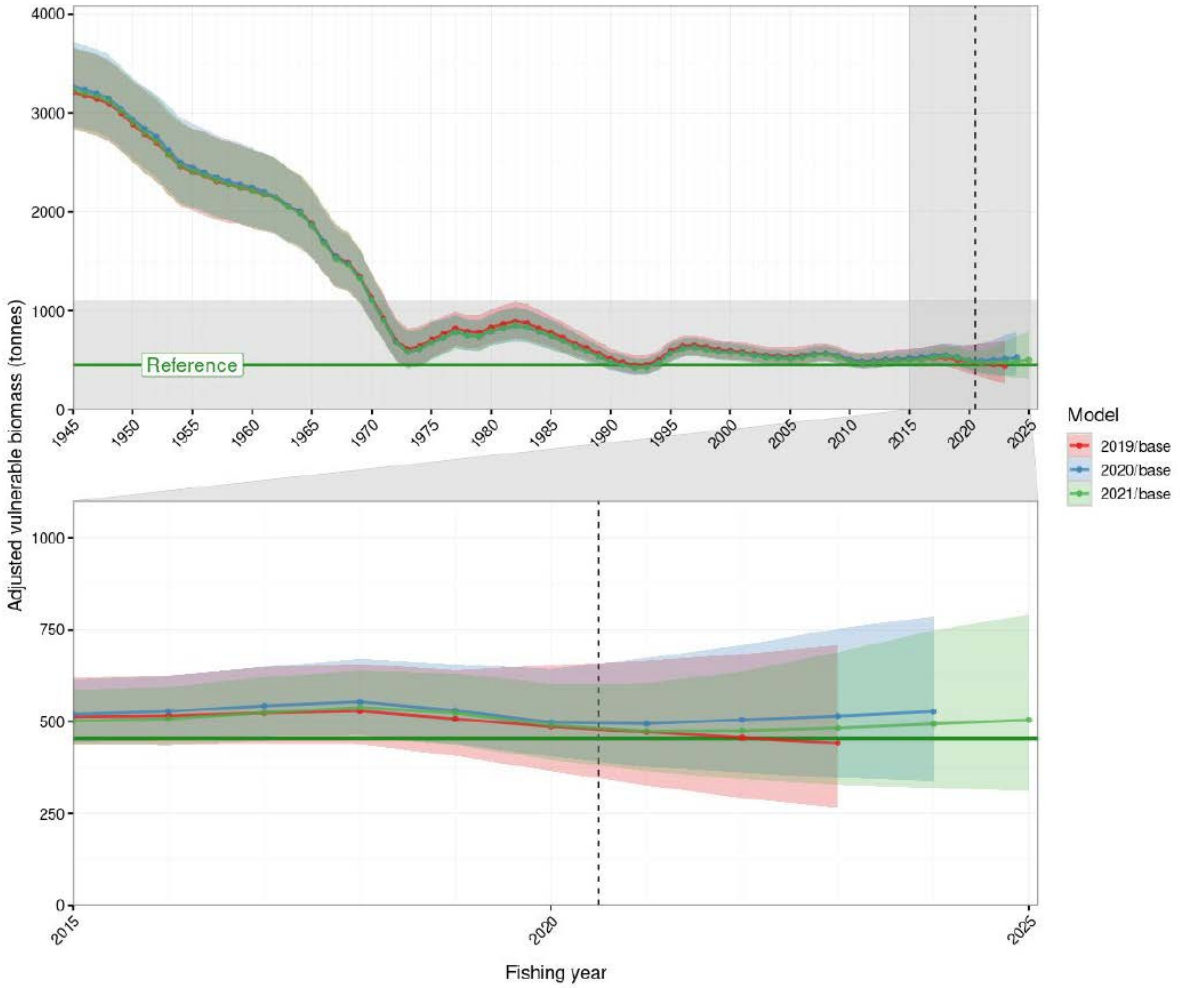

Figure 5: CRA 1 vulnerable biomass trajectories from the 2019 stock assessment (red line and shading), the 2020 rapid assessment update (blue line and shading) and the 2021 rapid assessment update (green line and shading), including the B_{MSY} reference level (solid green line). The solid line and points represent the median and the shaded region represents the 90% credible interval.

93. The rapid assessment results suggest that CRA 1 spawning biomass is 36% of unfished levels. Spawning biomass is 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 (Figure 6).

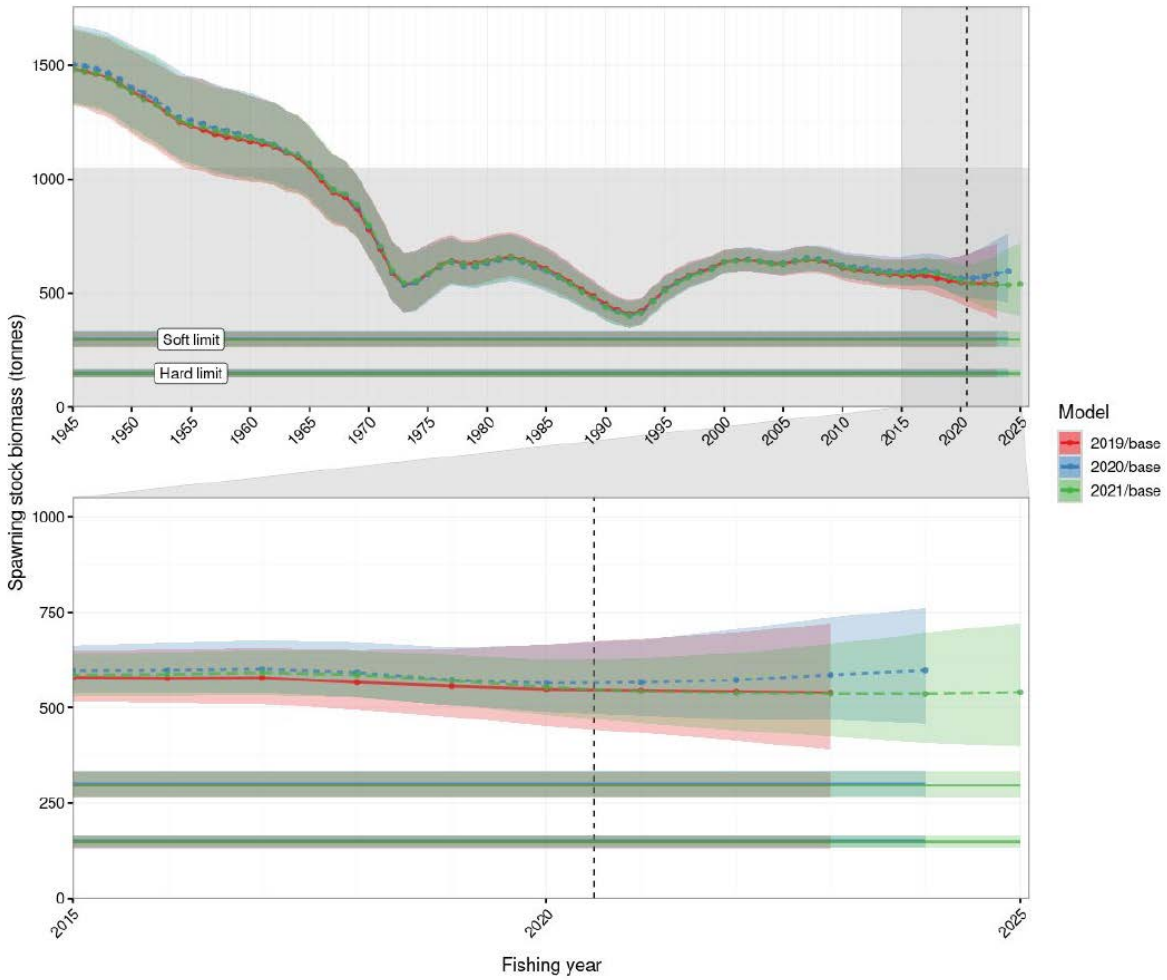

Figure 6: CRA 1 spawning biomass (SSB) trajectories from the 2019 stock assessment (red line and shading), the 2020 rapid assessment update (blue line and shading) and the 2021 rapid assessment update (green line and shading), including the soft limit (20% SSB_0)[48], and the hard limit (10% SSB_0)[49]. The solid line and points represent the median and the shaded region represents the 90% credible interval.

94. Table 12 provides further results of the 2021 rapid assessment update in terms of vulnerable, total and spawning stock biomass, with the uncertainties in the results also shown. For example, with 2021 catch levels, vulnerable biomass in 2025 is predicted to be at 16% (or 0.158) of unfished levels (median result), with a range of 9% (or 0.092) and 27% (or 0.268) of unfished levels (5% and 95% quantiles).

[48] The soft limit is 20% of the unfished spawning biomass; the level at which it is FNZ policy to implement a formal, time-constrained rebuilding plan.
[49] The hard limit is 10% of the unfished spawning biomass level; the level at which it is FNZ policy to consider closing the fishery.

Table 12: Median results from the 2021 CRA 1 rapid assessment update. 5% and 95% quantiles are provided to show the spread and uncertainty of the data.[50]

Performance indicators	5% quantile	Median	95% quantile	Interpretation of the median results
Vulnerable biomass (B) – Beginning of season autumn-winter vulnerable biomass (legal males and females not bearing eggs)				
B_{2021} / B_0	0.109	0.146	0.198	Vulnerable biomass in 2021 was 15% of unfished levels
B_{2025} / B_0	0.092	0.158	0.268	Vulnerable biomass in 2025 will be 16% of unfished levels
B_{2025} / B_{2021}	0.745	1.095 ↑	1.569	Vulnerable biomass in 2025 will be 110% of 2021 levels (an increase of 10%)
Total biomass (Btot) – Beginning of season autumn-winter total biomass (all males and females)				
$Btot_{2025}$ / $Btot_{2021}$	0.842	1.040 ↑	1.277	Total biomass in 2024 will be 104% of 2021 levels (an increase of 4%)
Spawning stock biomass (SSB) – Beginning of season autumn-winter spawning biomass (mature females)				
SSB_{2021} / SSB_0	0.307	0.363	0.438	Spawning biomass in 2021 was 36% of unfished levels
SSB_{2025} / SSB_0	0.264	0.364	0.496	Spawning biomass in 2021 will be 36% of unfished levels
SSB_{2025} / SSB_{2021}	0.823	0.998	1.211	Spawning biomass in 2025 will be 100% of 2021 levels (no change)
Probabilities				
$P(B_{2025}>B_{2021})$		0.654		65% probability that 2025 vulnerable biomass will be greater than 2021 levels
$P(Btot_{2025}>Btot_{2021})$		0.630		63% probability that 2025 total biomass will be greater than 2021 levels
$P(SSB_{2025}>SSB_{2021})$		0.494		49% probability that 2025 spawning biomass will be greater than 2021 levels

95. The B_{MSY} reference level was calculated based on the 2021 CRA 1 rapid update assessment as a vulnerable biomass level of 454 tonnes. The results, given in Figure 5 above and Table 13 below, suggest that vulnerable biomass was above (104%) the B_{MSY} reference level in 2021 (with a 60% probability), and is projected to increase to 115% of the B_{MSY} reference level by 2025.

96. Table 13 provides further results of the 2021 B_{MSY} reference level calculation in terms of vulnerable biomass, with the uncertainties in the results also shown. For example, vulnerable biomass in 2021 is estimated to be at 475 tonnes (median result), with a range of 364 tonnes and 604 tonnes (5% and 95% quantiles).

Table 13: B_{MSY} reference level results for CRA 1 and estimated vulnerable biomass level in 2021 (B_{2021}) from the 2021 rapid assessment update. 5% and 95% quantiles are provided to show the uncertainty of the biomass estimates. (continued over the page)

Vulnerable biomass (tonnes)	5% quantile	Median	95% quantile	Interpretation of the median results
B_R, reference level (tonnes)		454		The vulnerable biomass that can produce MSY is 454 tonnes
Probability B_{2021} greater than B_R		0.603		60% probability that vulnerable biomass in 2021 was greater than the B_{MSY} reference level
B_{2021}	364	475	604	Vulnerable biomass in 2021 was 475 tonnes

[50] 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.

Vulnerable biomass (tonnes)	5% quantile	Median	95% quantile	Interpretation of the median results
B_{2021} / B_R	0.802	1.044	1.330	Vulnerable biomass in 2021 was 1.04 times (104%) the reference level
B_{2025}	295	521	841	Vulnerable biomass in 2025 will be 525 tonnes
B_{2025} / B_R	0.649	1.147	1.850	Vulnerable biomass in 2025 will be 1.15 times (115%) the reference level

97. A rapid assessment update will be conducted for CRA 1 in 2022 and will provide an opportunity to consider a review of the catch settings for April 2023.

9.3 Final CRA 1 options

98. Table 14 shows the final options proposed for CRA 1 (Northland), which are the same as the consultation options. The results from the 2021 rapid assessment update of the 2019 CRA 1 stock assessment have been used to guide the options for varying the TAC. There is an agreed B_{MSY} reference level for CRA 1, but there is currently no agreed target biomass. Vulnerable biomass was above the reference level in 2021, and is projected to increase under current catch levels over the next four years.

Table 14: Proposed management options (in tonnes) for CRA 1 from 1 April 2022.

Stock	Option	TAC	TACC	Allowances			NRLMG support
				Customary **Māori**	Recreational	Other mortality	
CRA 1 Northland	Option 1.1 – Status quo	203	110	20	32	41	✓ Tangata whenua & Commercial
	Option 1.2 – Decrease the TAC by 5%	193 ↓(5%)	105 ↓(5%)	20	27 ↓	41	✓ Fisheries NZ
	Option 1.3 – Decrease the TAC by 9%	185 ↓ (9%)	99 ↓ (10%)	20	25 ↓	41	
	Option 1.4 – Decrease the TAC by 12%	179 ↓ (12%)	94 ↓ (15%)	20	24 ↓	41	✓ Recreational & Environmental

99. The NRLMG did not reach consensus on a preferred option for CRA 1. The NRLMG agrees that stock biomass should be increased for CRA 1, but have differing opinions about the rate and certainty of biomass increase needed in the short term.

100. NRLMG tangata whenua and commercial members recommend that you agree to Option 1.1 (status quo) because the most recent rapid assessment update projections suggest that the reductions to the TAC, TACC and allowances in 2020 were sufficient to halt the decline in biomass and provide for an increase in vulnerable and spawning biomass by 2025. They consider that further reductions to the TAC with consequent economic impact are not needed while work is undertaken on determining an agreed management target.

101. FNZ supports Option 1.2 because it strikes a balance between increasing the likelihood and magnitude of predicted biomass increase over the next four years compared to the status quo, while decreasing recreational and commercial catch to a lesser degree than Options 1.3 and 1.4. FNZ considers that a 5% decrease to commercial and recreational catch is projected to lead to a sufficient increase in biomass (see *Stock biomass projections for different catch rates* below) to take into account concerns from some tangata whenua and stakeholders. FNZ acknowledges that the stock is above the soft limit and the B_{MSY} reference level, and considers that a small decrease is justified to increase the rate and certainty of biomass increase, while work is done to confirm a management target for the CRA 1 fishery which can then be used to guide future management decisions.

102. NRLMG recreational and environmental members support Option 1.4 because they consider that a further reduction of 12% to the TAC is required to increase the likelihood that the vulnerable biomass will increase across all areas in CRA 1. They support Option 1.4 because it provides the greatest likelihood and magnitude of biomass increase of all the options consulted on (see *Stock biomass projections for different catch rates* below). They expect that when a management target is set for CRA 1, it will be higher than the current B_{MSY} reference level.

103. The NRLMG agrees that the status of the stock can be monitored in future with rapid assessment updates, and that further management action can be considered if required. The NRLMG notes that it will continue work to determine management targets for each red rock lobster fishery in 2022, which could be used to inform future reviews of catch settings and management controls.

Stock biomass projections for different catch setting proposals

104. Projections of vulnerable and spawning biomass for the next four years under different levels of catch are given in Figures 7 and 8 below. The different catch levels reflect three of the four proposed options:

- current catch levels (Option 1.1);
- a 10% reduction (Option 1.3); and
- a 15% reduction (Option 1.4).

105. As per the proposed options the projected catch adjustments are made to commercial and recreational catch and assume that illegal catch and customary catch are unchanged from 2021 levels. Biomass projections are not available for Option 1.2 (5% TAC decrease); however, it can be assumed that vulnerable and spawning biomass under this option are between the current catch projection and the 10% decrease in catch projection.

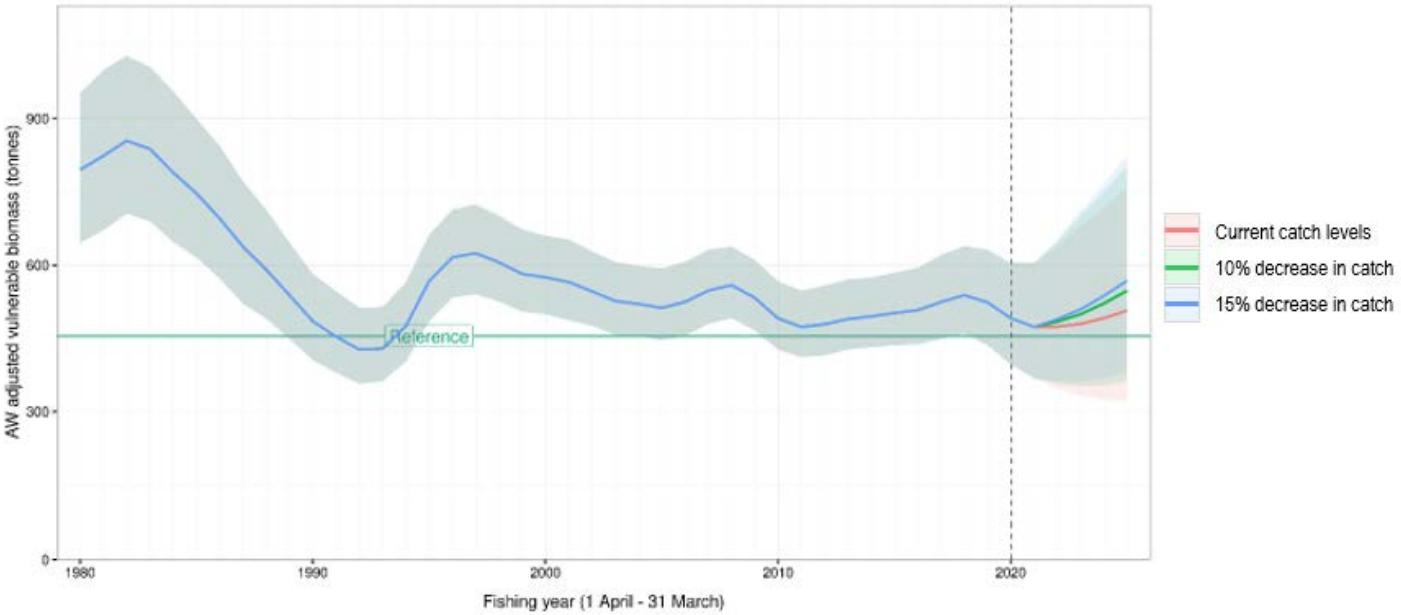

Figure 7: Projections of CRA 1 autumn/winter (AW) adjusted vulnerable biomass over the next four years at a range of catch levels (catch reductions apply to commercial and recreational catch only). The solid lines represent the median and the shaded region represents the 90% credible interval. The horizontal green line shows the B_{MSY} reference level.

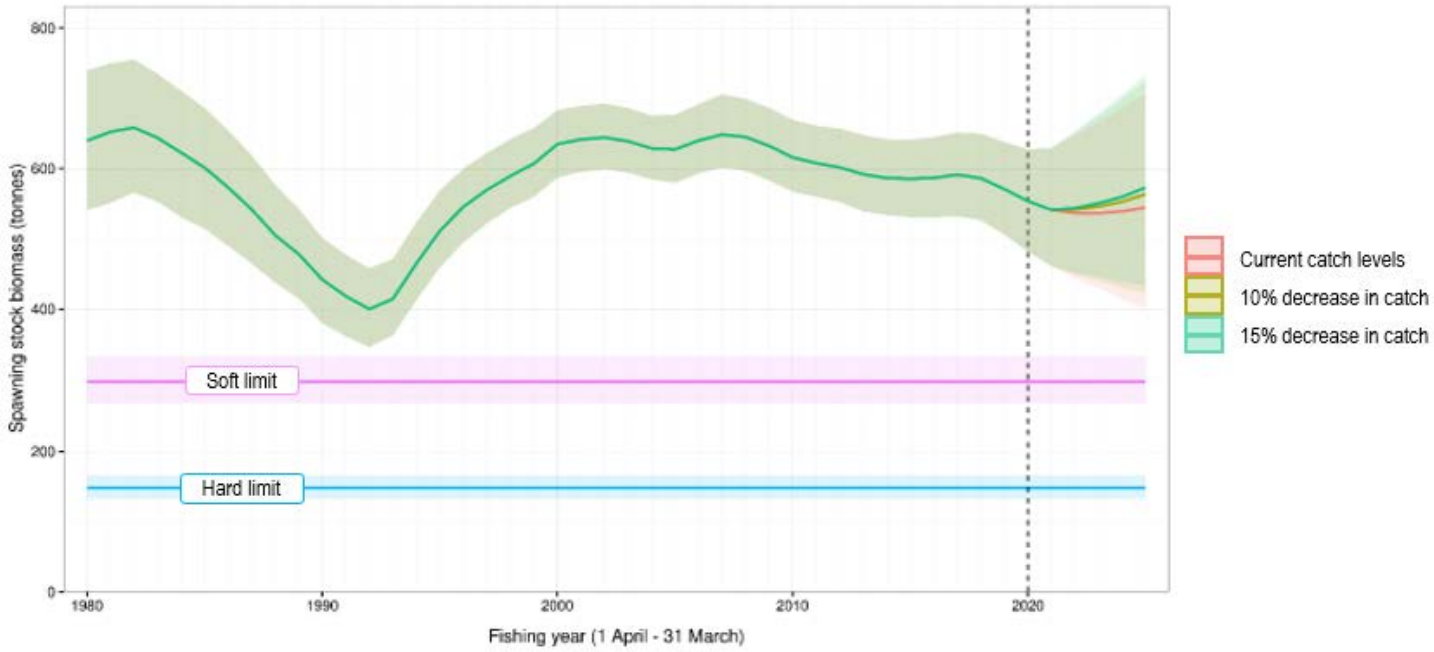

Figure 8: Projections of CRA 1 spawning stock biomass over the next four years at a range of catch levels (catch reductions apply to commercial and recreational catch only) including the soft limit (20% SSB_0), and the hard limit (10% SSB_0). The solid lines represent the median and the shaded region represents the 90% credible interval.

106. For each level of modelled catch, the projected effect over the next four years on the vulnerable, spawning, and total biomass, and the probability of being above 2021 levels, are given in Table 15 below.

Table 15: Projected change in vulnerable biomass for CRA 1 under three catch levels.[51] 5% and 95% quantiles are provided to show the spread and uncertainty of the data. (continued over the page)

Performance indicators	Change to recreational and commercial catch	5% quantile	Median	95% quantile	Interpretation of the median results
Vulnerable biomass (B) – Beginning of season autumn-winter vulnerable biomass (legal males and females not bearing eggs)					
B_{2021} / B_0	All	0.110	0.154	0.198	Vulnerable biomass in 2021 was 15% of unfished levels
B_{2025} / B_0	Status quo	0.095	0.161	0.255	Vulnerable biomass in 2025 will be 16% of unfished levels
	-10%	0.109	0.176	0.272	Vulnerable biomass in 2025 will be 18% of unfished levels
	-15%	0.116	0.185	0.280	Vulnerable biomass in 2025 will be 19% of unfished levels
B_{2025} / B_{2021}	Status quo	0.742	1.095 ↑	1.569	Vulnerable biomass in 2025 will be 110% of 2020 levels (an increase of 10%)
	-10%	0.860	1.203 ↑	1.676	Vulnerable biomass in 2025 will be 120% of 2021 levels (an increase of 20%)

[51] The projections for CRA 1 under different catch levels were conducted separately from the 2021 rapid assessment update. The performance indicators under current catch levels given here differ slightly from the values in Table 12 because of minor variations in how recruitment is estimated, which occur each time the model is run.

Performance indicators	Change to recreational and commercial catch	5% quantile	Median	95% quantile	Interpretation of the median results
	-15%	0.917	1.257 ↑	1.733	Vulnerable biomass in 2025 will be 126% of 2021 levels (an increase of 26%)
Total biomass (Btot) – Beginning of season autumn-winter total biomass (all males and females)					
$Btot_{2025}$ / $Btot_{2021}$	Status quo	0.840	1.034 ↑	1.293	Total biomass in 2025 will be 103% of 2021 levels (an increase of 3%)
	-10%	0.895	1.086 ↑	1.341	Total biomass in 2025 will be 109% of 2021 levels (an increase of 9%)
	-15%	0.923	1.111 ↑	1.367	Total biomass in 2025 will be 111% of 2021 levels (an increase of 11%)
Spawning stock biomass (SSB) – Beginning of season autumn-winter spawning biomass (mature females)					
SSB_{2021} / SSB_0	All	0.307	0.363	0.438	Spawning biomass in 2021 was 36% of unfished levels
SSB_{2025} / SSB_0	Status quo	0.264	0.364	0.496	Spawning biomass in 2025 will be 36% of unfished levels
SSB_{2025} / SSB_{2021}	Status quo	0.826	0.998	1.209	Spawning biomass in 2025 will be 100% of 2021 levels (no change)
	-10%	0.866	1.032 ↑	1.241	Spawning biomass in 2025 will be 103% of 2021 levels (an increase of 3%)
	-15%	0.888	1.049 ↑	1.257	Spawning biomass in 2025 will be 105% of 2021 levels (an increase of 5%)
Probabilities					
$P(B_{2025}>B_{2021})$	Status quo		0.674		67% probability that 2025 vulnerable biomass will be greater than 2021 levels
	-10%		0.828		83% probability that 2025 vulnerable biomass will be greater than 2021 levels
	-15%		0.889		89% probability that 2025 vulnerable biomass will be greater than 2021 levels
$P(Btot_{2025}>Btot_{2021})$	Status quo		1.051		100% probability that 2025 total biomass will be greater than 2021 levels
	-10%		1.101		100% probability that 2025 total biomass will be greater than 2021 levels
	-15%		1.126		100% probability that 2025 total biomass will be greater than 2021 levels
$P(SSB_{2025}>SSB_{2021})$	Status quo		0.491		49% probability that 2025 spawning biomass will be greater than 2021 levels
	-10%		0.634		63% probability that 2025 spawning biomass will be greater than 2021 levels
	-15%		0.685		69% probability that 2025 spawning biomass will be greater than 2021 levels

107. For each level of modelled catch, the projected effect over the next four years on vulnerable biomass and the probability of being above the B_{MSY} reference level are given in Table 16 below. Biomass projections are not available for Option 1.2 (5% TAC decrease) because the catch settings for this option were not specifically modelled; however, it can be assumed that vulnerable and spawning biomass under this option are between current catch settings and a 10% decrease in commercial and recreational catch.

Table 16: Projected change in B_{MSY} reference level and vulnerable biomass level in 2021 (B_{2021}) and 2025 (B_{2025})for CRA 1 under three catch levels.[52] 5% and 95% quantiles are provided to show the uncertainty of the biomass estimates.

Vulnerable biomass (tonnes)	Change to recreational and commercial catch	5% quantile	Median	95% quantile	Interpretation of the median results
B_R, reference level (tonnes)	All		454		The vulnerable biomass that can produce MSY is 454 tonnes
Probability B_{2021} greater than B_R	All		0.607		61% probability that vulnerable biomass in 2021 was greater than the B_{MSY} reference level
B_{2021}	All	367	473	604	Vulnerable biomass in 2021 was 473 tonnes
B_{2021} / B_R	All	0.809	1.042	1.329	Vulnerable biomass in 2021 was 1.04 times (104%) the reference level
B_{2025}	Status quo	313	525	802	Vulnerable biomass in 2025 will be 525 tonnes
	-10%	359	575	856	Vulnerable biomass in 2025 will be 575 tonnes
	-15%	383	600	882	Vulnerable biomass in 2025 will be 600 tonnes
Probability B_{2025} greater than B_R	Status quo		0.680		68% probability that vulnerable biomass in 2025 will be greater than the B_{MSY} reference level
	-10%		0.806		81% probability that vulnerable biomass in 2025 will be greater than the B_{MSY} reference level
	-15%		0.867		87% probability that vulnerable biomass in 2025 will be greater than the B_{MSY} reference level
B_{2025} / B_R	Status quo	0.689	1.154	1.765	Vulnerable biomass in 2025 will be 1.15 times (115%) the reference level
	-10%	0.791	1.265	1.883	Vulnerable biomass in 2025 will be 1.27 times (127%) the reference level
	-15%	0.843	1.320	1.941	Vulnerable biomass in 2025 will be 1.32 times (132%) the reference level

9.4 Summary of CRA 1 submissions

108. Fifty-nine submissions were received for CRA 1.

Support for Option 1.1 (status quo)

109. Sixteen organisations (CRAMAC 1, CRAMAC 2, CRAMAC 4, CRAMAC 6, CRA 8 RLIA, Gisborne Fisheries, Iwi Collective Partnership, Lee Fish Ltd, Leigh Lobster & Associates Ltd, Matawai Pokapu Komiti Maori, Ngapuhi Asset Holding Company, NZ Red Holdings Ltd, NZ RLIC, Otago RLIA, Te Ohu Kaimoana, Tairawhiti RLIA) and fourteen individuals (Emma, Geoff, James and Lucy Creighton, Bob Lovell, Bruce Sanderson, Dyne Hemara, Glen Coulston, Jeffery Clarke, Nat Davey, Norman Byrne, Philippa and Vincent La Rosa, and Sophie Boberg) supported Option 1.1.

110. CRAMAC 1, CRAMAC 2, CRAMAC 4, CRAMAC 6, Gisborne Fisheries, Lee Fish Ltd, Leigh Lobster & Associates Ltd, Ngapuhi Asset Holding Company, NZ Red Holdings Ltd, NZ RLIC, ORLIA, Bruce Sanderson, Glen Coulston, Jeffrey Clarke, Norman Byrne, Phillippa and Vincent La Rosa, Sophie Boberg, and Emma, Geoff, James, and Lucy Creighton note that the stock

[52] The projected vulnerable biomass for CRA 1 under different catch levels was conducted separately from the 2021 rapid assessment update. The values given here under current catch levels differ slightly from the values in Table 12 because of minor variations in how recruitment is estimated, which occur each time the model is run.

assessment shows that the 21 tonne TAC reduction in 2020 has been sufficient to reverse the decline in biomass. The stock is above the soft limit and B_{MSY} reference level and that vulnerable biomass is projected to increase and spawning biomass is projected to remain stable under the status quo; therefore, any further reduction to the TAC is unwarranted. They consider that further reductions to the TAC and TACC would have an unnecessary impact on the regional economy and the incomes of fishing families at this time, particularly when the stock is assessed to be on a trajectory of increasing biomass.

111. The above submitters are concerned that further reductions to the TACC will result in additional economic losses for fishers, associated serving and support businesses, and coastal communities, including tangata whenua, which will be particularly difficult given the ongoing negative social and economic impacts of the COVID-19 pandemic on the Northland regional economy. They note that the financial losses as a result of the 2020 TACC reduction caused considerable stress for those involved in the industry, with estimates of losses including $1.8 million in revenue to the catch sector and $21 million in loss of quota assets. Despite those impacts, the industry supported the catch reduction in 2020 as necessary to get the fishery on a trajectory of increasing biomass.

112. NZ RLIC supports work to develop an agreed management target for the CRA 1 stock in 2022. The NRLMG has not yet addressed the trade-offs that arise in managing at higher biomasses, particularly the lower yield, current management of recreational take is ineffective, and discussion is needed on how to use available science to apply the environmental principles of the Act. While that work is undertaken there is no urgency for further TACC reductions given the stock assessment suggests an increasing biomass and a spawning stock nearly double the soft limit.

113. CRAMAC 1 want to ensure the best possible data is available to support future management decisions and will continue their investment in voluntary and industry-funded logbooks, observer catch sampling and tag recapture programmes, despite the financial challenges faced.

114. Iwi Collective Partnership believes the current management settings, in combination with the 15% TAC cut in 2020, are sufficient to safeguard the future health of the CRA 1 fishery.

115. Matawai Pokapu Komiti Maori support Option 1.1 for the purposes of customary and commercial take.

116. Bob Lovell and Norman Byrne consider that the last TAC reduction in 2020 should be given time to take effect before further changes to the TAC are considered. CRA 8 RLIA and CRAMAC 6 also supported Option 1.1.

117. Nat Davey supports the status quo, pointing out that CRA 1 had a TACC reduction in 2020.

118. CRA 8 RLIA and Dyne Hemara supported Option 1.1 but did not provide any supporting rationale.

119. Ngatiwai Marae Committee and Moana Futures Ltd note that they do not support an increase to the TAC for purely commercial monetary gains.

Support for Option 1.2 (5% TAC decrease)

120. ICP also supports Option 1.2, recognising that this option would help increase the certainty of the stock staying at or above the B_{MSY} reference level and ensure, more so than Option 1.1, the health of the fishery.

Support for Option 1.3 (9% TAC decrease)

121. Terence Brocx supported Option 1.3 in order to restore CRA 1 biomass.

Support for Option 1.4 (12% TAC decrease)

122. Joint recreational submitters (NZSFC, NZACA, NZUA and LegaSea), Forest & Bird, ECO, Ngatiwai Trust Board, Te Runanga o Whaingaroa, Patuharakeke Te Iwi Trust Board, MTSCT, Oceandiversity Sea Adventures and twelve individual submitters supported Option 1.4. Submitters generally noted concerns for the declining abundance of rock lobsters in CRA 1, particularly in areas on the east coast of Northland where most recreational fishing occurs, and the need to cut the TAC further to support a rebuild of the stock.

123. Oceandiversity Sea Adventures Ltd, Ryan Welsh, and Kim and Blair Jones generally submitted that current levels of take, linked to an increasing population, are putting too much pressure on the CRA 1 fishery. They considered that Option 1.4 would provide the best chance for this important fishery to recover to a level that would allow for sustainable take.

124. MTSCT submitted that the CRA 1 stock is not at a healthy or sustainable level and considered that the stock has been severely overfished for many years. In order to increase stock biomass, MTSCT considers decreasing the TAC by 12% is the most appropriate option given the ecological value of rock lobster. This option will also most likely result in a faster rate of biomass increase, aiding the restoration of the marine environment as witnessed in the marine reserves in the north-eastern North Island.

125. Te Runanga o Whaingaroa, Ngatiwai Trust Board and Ross Scobie all supported Option 1.4 to provide the greatest probability of achieving an increase in biomass to healthy and sustainable levels and to safeguard the resource for future generations.

126. Forest & Bird submitted that under current management settings, the severely overfished CRA 1 stock is unlikely to rebuild at an acceptable rate and may not rebuild at all. Option 1.4 sets a precautionary TAC and provides the highest probability of rebuilding the stock to sustainable levels.

127. Joint recreational submitters did not support maintaining this important cultural, social and ecological stock at close to historically low levels and did not consider a vulnerable biomass increase from 15% in to around 16% in 2025 under status quo to be an acceptable rebuild rate. They submitted that the CRA 1 stock needs to be increased and that a 12% TAC reduction is required now with a further review after the next stock assessment in 3 years' time.

128. ECO supported further catch reductions in CRA 1 as previous cuts made in 2020 only flattened stock decline. ECO consider that Option 1.4 provides the best probability of an increase to vulnerable biomass, which would improve overall ecosystem health.

129. Luke Williamson and Tom Webb supported Option 1.4.

Feedback on recreational management controls

130. Thirteen submitters (CRAMAC 1, CRAMAC 2, CRAMAC 4, CRAMAC 6, CRA 8 RLIA, Gisborne Fisheries, Joint recreational submitters, Lee Fish Ltd, Ngatiwai Trust Board, NZ Red, NZ RLIC, Leigh Lobster & Associates Ltd, Te Ohu Kaimoana, TRLIA and Bruce Sanderson, Glen Coulston, Ross Scobie, Ryan Welsh, Geoff Creighton) provided feedback on whether a change to CRA 1 recreational management controls should be considered. Most submitters supported a decrease to the recreational bag limit.

131. Gisborne Fisheries, Lee Fish Ltd, NZ Red Holdings, Leigh Lobster & Associates Ltd and Bruce Sanderson all submitted that any reductions in catch, which are required to ensure the sustainability of the CRA 1 fishery, need to be shared equally by both the recreational and commercial sectors. They expressed support for decreases to recreational bag limits at the same time catch reductions are imposed on the commercial sector and for recreational catch to be adequately monitored going forward.

132. Joint recreational submitters, Te Ohu Kaimoana, Ngatiwai Trust Board and Ryan Welsh generally noted that simply changing the recreational allowance would not constrain take from the recreational sector and that a reduction to the daily bag limit needs to occur in conjunction

with a decrease to the recreational allowance to make a meaningful difference. Ngatiwai Trust Board and Ryan Welsh noted support for reducing the CRA 1 daily bag limit to four and three, respectively, and joint recreational submitters supported a consultation process to review the amateur bag limit in CRA 1.

133. NZ RLIC and Glen Coulston both supported status quo for CRA 1 but generally noted that if a reduction is implemented, recreational daily bag limits need to be reduced, in conjunction with any reductions to the recreational allowance, to constrain catch to the allowances set.

134. CRAMAC 1, CRAMAC 2, CRAMAC 4, CRAMAC 6, CRA 8 RLIA, NZ Red, NZ RLIC, TRLIA, Geoff Creighton, and Glen Coulston submitted that there is currently a high degree of uncertainty regarding recreational catch and that until this is addressed, recreational catch cannot be effectively managed to the allowance set in the TAC. They note that commercial catch has been reduced, and further reductions are sought by some groups. Although the recreational allowance has been adjusted, no changes to controls on recreational take have been implemented. Recreational controls, principally bag limits, should be amended so that recreational catch will be constrained to its allowance as CRA 1 biomass increases. Without such adjustments, changes to the recreational allowance have no practical effect.

135. Ross Scobie supported a reduction to the daily bag limit for rock lobster noting the increased fishing pressure in Northland and the need to safeguard the resource for future generations.

Other comments

136. Te Ohu Kaimoana noted in its response that reviewing CRA 1 so soon after the last TAC review was inappropriate, and that there was insufficient time for iwi to fully engage with in the review. Te Ohu Kaimoana notes there is no sustainability concern under Option 1.1 (status quo), and the stock is projected to increase above the reference level under Option 1.1, and to increasingly greater degrees under Options 1.2, 1.3 and 1.4. Te Ohu Kaimoana directs FNZ to work with tangata whenua to determine an appropriate response.

137. EDS and Shaun Lee did not support including Option 1.1 for ministerial consideration and noted that Options 1.2 to 1.4 do not go far enough to protect the CRA 1 stock from further decline, restore the stock to sustainable levels, or address marine ecosystem issues, particular given the uncertainty of current information. They propose an alternative option that comprises permanent restrictions on the CRA 1 maximum legal size, a prohibition on commercial and recreational rock lobster harvest within the 15-meter depth limit, and the development of an ecosystem-based management target and monitoring plan. EDS further propose a requirement to keep urchin barren zones closed to harvest until the stock and kelp habitat has recovered to sustainable levels, introducing permanent area-based restrictions to protect important kelp habitat, and a significant reduction to the TAC.

138. ELI noted and welcomed the changed scoping of consultation options and altered framing of the issues, but did not consider that the proposals address the issues they raised in the current judicial review of your 2021 CRA 1 decision.

139. Professor Jeffs submitted that marked changes in reef habitats – transition from macroalgal-dominated habitats to urchin barrens – have been widespread throughout coastal areas of the Northland, Hauraki Gulf, Bay of Plenty and East Coast. In some areas, the change has been estimated to have affected well over 50% of reef habitats. There is good evidence that once urchin predator populations (e.g., rock lobster, snapper, blue cod) increase locally, then the macroalgal habitats are restored. The consultation document discusses this issue but does not address it.

140. Professor Jeffs also noted that the widespread decline of macroalgal habitat in New Zealand is of serious concern for a range of scientifically sound reasons, but FNZ continues to overlook the evidence that the reduction of the abundance and size of rock lobsters is a significant contributor to this adverse effect in our marine environment.

141. Matawai Pokapu Komiti Maori state it would like to see the recreational allowance reduced to 20 tonnes.

142. Luke Williamson noted that it is clear a TAC decrease is needed, but that the maximum decrease proposed (12%) may not be enough. He suggested a 10-20% TAC decrease may be more appropriate until there is a clear increase in the CRA 1 stock size.

143. James Worthington submitted that legal size crayfish have declined around the Bay of Islands and that he believes it is imperative to reduce commercial and recreational take in the area, but did not specify the magnitude of decrease supported.

144. Norman Byrne notes that since the 1980s when quota was introduced, commercial catch has been reduced by 50% whereas the amateur catch has not been reduced at all. Bob Lovell notes it is unfair that the commercial sector has had TACC cuts while the customary allowance has remained untouched.

145. Nat Davey outlines the increase in abundance experienced in most of the CRA 1 fishery since the TAC reduction, except in eastern Northland where most fishing is recreational, and expresses his concern about the lack of action to constrain recreational fishing pressure.

146. Richard Ridler expressed concerns regarding anecdotal declines of rock lobster abundance and the ability to catch a feed in CRA 1, particularly in the last five to ten years.

9.5 Analysis

Varying the TAC

147. The CRA 1 TAC options represent trade-offs in social, cultural and economic considerations, and the relative importance placed on the rate of increase in biomass (including the relative ability of rock lobster to fulfil its role in the ecosystem) (Table 17). You have discretion in how to respond given these different considerations. All options for CRA 1 are projected to continue increasing biomass above the B_{MSY} reference level over next four years (consistent with s 13(2)(a)). You could choose to reduce the TAC in order to increase the rate and likelihood of projected biomass increase (Options 1.2, 1.3 and 1.4).

Table 17: Summary of analysis of the proposed TAC options for CRA 1 for 1 April 2022. (continued over the page)

Option	Projected change over the next four years	Relevant section of the Act for varying the TAC	Relevant considerations under the Act (see also Table 6)
Current status (2021)	The stock is above the B_{MSY} reference level with 60% probability. It is 1.04 times (or 104%) the B_{MSY} reference level. Vulnerable biomass is 15% of the unfished level. Spawning stock biomass is 36% of unfished biomass (well above the soft limit of 20%)		
Option 1.1: Status quo	The stock will be above the B_{MSY} reference level with 68% probability. The stock will be 1.15 times (or 115%) the B_{MSY} reference level. Vulnerable biomass will increase to 16% of the unfished level Spawning stock biomass will remain constant at 36% of	s 13(2)(a)	The stock will be above the level that can produce B_{MSY} (the B_{MSY} reference level) with greater certainty than in 2021. The stock will be above the B_{MSY} reference level to a greater degree than in 2021. The stock will remain well above the level where it is FNZ policy to implement a time-bound rebuild plan. Increased abundance under this option will provide for continued customary and recreational use, and is

Option	Projected change over the next four years	Relevant section of the Act for varying the TAC	Relevant considerations under the Act (see also Table 6)
	unfished biomass (well above the soft limit of 20%).		expected to allow rock lobster to continue to fulfil its role in the ecosystem.[53] This option would maintain current commercial utilisation opportunities.
Option 1.2: Decrease the TAC by 5%	Projections unavailable, but are expected to be between Option 1.1 and Option 1.3.	s 13(2)(a)	The stock will be above the level that can produce B_{MSY} (the B_{MSY} reference level) with greater certainty than Option 1.1. The stock will be above the B_{MSY} reference level to a greater degree than Option 1.1. Spawning biomass may increase slightly relative to Option 1.1 and will remain well above the level where it is FNZ policy to implement a time-bound rebuild plan. Increased abundance is expected to provide for continued customary and recreational use, and is expected to allow rock lobster to fulfil its role in the ecosystem to an unknown but potentially greater level than Option 1.1. This option could result in a loss of annual revenue to the catching sector alone of approximately $340,000. Reduced availability of ACE and revenue loss may lead to vessels becoming unviable. There will be downstream impacts to associated businesses and communities; while difficult to measure, these are expected to compound the economic and mental stress caused by COVID-19 related impacts on the regional economy.
Option 1.3: Decrease the TAC by 9%	The stock will be above the B_{MSY} reference level with 81% probability. The stock will be 1.27 times, (or 127%) the B_{MSY} reference level. Vulnerable biomass will increase to 18% of the unfished level. Spawning stock biomass will increase by 3% of 2021 levels.	s 13(2)(a)	The stock is projected to be above the level that can produce B_{MSY} (the B_{MSY} reference level) with greater certainty than Options 1.1 and 1.2. The stock is projected to be above the B_{MSY} reference level to a greater degree than Options 1.1 and 1.2. Spawning biomass is projected to increase slightly relative to Options 1.1 and 1.2 and will remain well above the level where it is FNZ policy to implement a time-bound rebuild plan. Increased abundance is expected to provide for increased customary and recreational use, and is expected to allow rock lobster to fulfil its role in the ecosystem to an unknown but potentially greater level than Options 1.1 and 1.2. This option could result in a loss of annual revenue to the catching sector alone of approximately $750,000. The negative economic impacts mentioned for Option 1.2 are expected to occur to a greater degree.
Option 1.4: Decrease the TAC by 12%	The stock will be above the B_{MSY} reference level with 87% probability.	s 13(2)(a)	The stock is projected to be above the level that can produce B_{MSY} (the B_{MSY} reference level) with greater certainty than Options 1.1 and 1.2. The stock is projected to be above the B_{MSY} reference level to a greater degree than Options 1.1 and 1.2.

[53] Table 6

Option	Projected change over the next four years	Relevant section of the Act for varying the TAC	Relevant considerations under the Act (see also Table 6)
	The stock will be 1.32 times (or 132%) the B_{MSY} reference level. Vulnerable biomass will increase to 19% of the unfished level. Spawning stock biomass will increase by 26% of 2021 levels.		Spawning biomass is projected to increase slightly relative to Options 1.1 and 1.2 and will remain well above the level where it is FNZ policy to implement a time-bound rebuild plan. Increased abundance is expected to provide for increased customary and recreational use, and is expected to allow rock lobster to fulfil its role in the ecosystem to an unknown but potentially greater level than the other options. This option could result in a loss of annual revenue to the catching sector alone of approximately $1.09 million. The negative economic impacts mentioned for Option 1.2 are expected to occur to the greatest degree under this option.

148. Option 1.1 (status quo) provides the most recognition of the economic impacts that would result from a further TACC reduction as it maintains the TACC at its current level. While this option provides for social and cultural use and environmental benefits as rock lobster biomass is predicted to increase slightly and remain above the B_{MSY} reference level, the degree of biomass increase predicted is smaller than for Options 1.2 to 1.4.

149. Options 1.2 to 1.4 decrease the CRA 1 TAC, TACC and recreational allowance by increasingly larger degrees, and are predicted to increase biomass by increasingly larger degrees than predicted for Option 1.1 (status quo) (Table 17). They therefore represent a potential increase in social, and cultural and environmental benefits associated with higher abundance.

150. As Options 1.2 to 1.4 would likely lead to economic losses as a result of reduced quota and ACE (smallest for Option 1.2 and greatest for Option 1.4), they represent a lesser degree of economic utilisation than Option 1.1 (status quo). They may necessitate a subsequent reduction to the recreational bag limit, and therefore represent a potentially lesser degree of social utilisation than Option 1.1 (status quo) in future while this reduced bag limit applies.

151. Under Option 1.1 (status quo), the CRA 1 TAC would remain unchanged at 203 tonnes. This option acknowledges that the TAC has recently been decreased and that this decrease has assisted in maintaining CRA 1 above the B_{MSY} reference level (at 104% in 2021). Under this option, over the next four years, vulnerable biomass is projected to increase by 10%, the stock is projected to increase to 115% of the B_{MSY} reference level, and spawning biomass is predicted to stay constant at well above the soft limit of 20%.

152. Options proposing decreases to the TAC recognise that CRA 1 is near the B_{MSY} reference level and aim to increase the certainty that the stock will remain at or above this level. It is also noted that tangata whenua and stakeholders' views on the performance of the fishery vary, with some preferring to see the stock managed more cautiously, while others are satisfied that the TAC reduction of 2019 has enabled the rebuild to commence.

153. Under Option 1.2 (5% TAC decrease), the TAC would be decreased to 193 tonnes. Model projections are not available for this option, though it can be assumed projections will fall between those of Option 1.1 and Option 1.3. Vulnerable biomass and spawning stock biomass are projected to increase over the next four years – vulnerable biomass is likely to increase between 10 and 20%, and spawning biomass is projected to stay stable or increase up to 3%. Under this option the stock is likely to be in the range of 115 and 127% of the B_{MSY} reference level by 2025, and to stay above the soft limit.

154. Under Option 1.3 (9% TAC decrease), the TAC would be decreased to 185 tonnes. Vulnerable biomass and spawning stock biomass are projected to increase under this option over the next four years, to a greater degree than Option 1.1 (status quo), and, presumably, Option 1.2 (5% TAC decrease). Under this option, over the next four years, vulnerable biomass is projected to increase by 20%, the stock is projected to increase to 127% of the B_{MSY} reference level, and spawning biomass is predicted to increase by 3% and stay constant at well above the soft limit of 20%.

155. Under Option 1.4 (12% TAC decrease), the TAC would be decreased to 179 tonnes. Under this option, over the next four years, vulnerable biomass is projected to increase by 26%, the stock is projected to increase to 132% of the B_{MSY} reference level, and spawning biomass is predicted to increase by 5% and stay constant at well above the soft limit of 20%. This option gives the greatest increased likelihood of vulnerable and spawning biomass increasing in the next four years and is projected to increase the stock to the highest level above the B_{MSY} reference level of the four options.

Varying allowances and the TACC

156. Table 18 provides a summary of information on current non-commercial allowances for CRA 1 (Northland) and stock assessment assumptions of non-commercial catch.

Table 18: Current CRA 1 allowances and model assumptions of non-commercial catches (in tonnes).

CRA 1 (Northland)	Customary **Māori**	Recreational	Other mortality	Total
Current allowances	20	32	41	93
Non-commercial catch assumptions for the 2019 stock assessment	10	Assumed to vary with biomass. Estimated at 31.5 for 2018.	40.4 (38 illegal + 2.4 handling mortality)	81.9
Non-commercial catch assumptions for the 2021 rapid assessment update	10	Assumed to vary with biomass. Estimated at 28.0 for 2020	37.2 (35.4 illegal + 1.8 handling mortality)	75.5

Māori customary fishing

157. 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, it is assumed that current harvest is within the 20 tonne allowance for customary Māori interests at this time.

Recreational fishing

158. Under Option 1.1 (status quo), no change would be made to the 32 tonne recreational allowance for CRA 1, which was reduced from 50 to 32 tonnes for 1 April 2020. While noting the uncertainty in the CRA 1 recreational harvest information (the 2017/18 National Panel Survey estimate of recreational catch was 15.9 tonnes ± 14.7 tonnes), it is assumed that current harvest is within the 32 tonne recreational allowance. The 2021 rapid assessment used a model input of 28.3 tonnes for CRA 1 recreational catch.

159. Under Option 1.2 (5% TAC decrease), the recreational allowance would be decreased to 27 tonnes. This is a 5% decrease from the 2021 rapid assessment update estimate of 28 tonnes.

160. Under Option 1.3 (9% TAC decrease), the recreational allowance would be decreased to 25 tonnes. This is a 10% decrease from the 2021 rapid assessment update estimate of 28 tonnes.

161. Under Option 1.4 (12% TAC decrease), the recreational allowance would be decreased to 24 tonnes. This is a 14% decrease from the 2021 rapid assessment update estimate of 28 tonnes and a 25% increase from the current allowance.

162. Under the status quo and all decrease options it is expected that vulnerable biomass will increase. As recreational catch is likely to increase under these options as stock abundance increases, the NRLMG suggests that consideration needs to be given to initiating a process for reducing the CRA 1 recreational daily limit. This would increase the likelihood that the increase in CRA 1 biomass is able to be achieved while maintaining recreational harvest within the allowance on average.

163. If you decide to reduce the CRA 1 TAC, a regulatory change process should be commenced in 2022 to reduce the recreational daily limit in CRA 1 with the objective of maintaining recreational harvest within the proposed allowance on average. This approach reflects the shared nature of this fishery and that all fishing interests should contribute to any rebuild of the stock. While initial feedback was sought as part of the current review of the CRA 1 TAC (see *Feedback on recreational management controls* above), such a step would be subject to further formal consultation on the precise settings.

Other mortality

164. No change is proposed to the 41 tonne CRA 1 allowance for other sources of fishing-related mortality (i.e., illegal catch and handling mortality). While noting the incompleteness and uncertainty in the CRA 1 information, it is assumed that current illegal harvest and handling mortality is within the 41 tonne allowance. The NRLMG propose that no change is needed to the other mortality allowance, as the rapid assessment update estimate is within the current allowance.[54]

Total Allowable Commercial Catch

165. Under Option 1.1 (status quo), the CRA 1 TACC would stay at its current level of 110 tonnes. This option would maintain current commercial utilisation opportunities.

166. Under Option 1.2 (5% TAC decrease) the TACC would be reduced to 105 tonnes. The proposed 5 tonne TACC decrease has the potential to result in a loss of annual revenue to the catching sector alone of approximately $340,000 (based on 2020/21 average port price information of $68.23 per kg). 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. There will also be losses of quota assets which will increase with the levels of TACC reduction. There will be downstream impacts to associated businesses and communities, and these will compound the economic and mental stress caused by COVID-19 related impacts on the regional economy. These adverse impacts will be greater for options where larger decreases to the CRA 1 TACC are implemented.

167. Under Option 1.3 (9% TAC decrease) the TACC would be reduced to 99 tonnes. The proposed 11 tonne TACC decrease has the potential to result in a loss of annual revenue alone to the catching sector of approximately $750,000 (based on 2020/21 average port price information of $68.23 per kg).

168. Under Option 1.4 (12% TAC decrease) the TACC would be reduced to 94 tonnes. The proposed 16 tonne TACC decrease has the potential to result in a loss of annual revenue to the catching sector of approximately $1.09 million (based on 2020/21 average port price information of $68.23 per kg). Of the four proposed options, this option has the greatest predicted negative financial impact on the commercial sector, and on associated businesses, communities, and employment.

[54] NZ RLIC believes you should adjust the other mortality allowance to 37.5 tonnes to reflect the estimates from the 2021 assessment, but notes the NRLMG agreed to suggest that you retain the other mortality allowance at 41 tonnes.

10 Review of the CRA 7 (Otago) rock lobster fishery

10.1 CRA 7 fishery overview

Māori customary fishing

169. Rock lobster (kōura) is a taonga species for tangata whenua. Reporting of customary Māori catch of rock lobster is fully operational in CRA 7 (Otago). In the last five years, an average of approximately 2,000 lobsters per year were reported as harvested from CRA 7.

170. An estimate of 1 tonne was used in the 2021 CRA 7 stock assessment model to represent customary catches in CRA 7.

Recreational fishing

171. The CRA 7 rock lobster fishery supports a relatively small recreational fishery off the Otago coastline.

172. There are no reliable recreational catch survey estimates for CRA 7. In the absence of any reliable information, recreational catch estimates for CRA 7 in the 2021 CRA 7 & 8 stock assessment were assumed to be at 1 tonne in 1945 and were increased to 5 tonnes in 1979. A constant estimate of 5 tonnes was assumed from 1979 to 2020 for CRA 7 recreational catch. In addition, 1.7 tonnes of rock lobster were assumed to be taken in CRA 7 by commercial fishers for non-commercial purposes under section 111 of the Act. There is no reliable National Panel Survey estimate for CRA 7 given the low number of fishers and events covered in the survey and the high variance (0.09 tonnes in 2017/18 (±0.2 tonnes)).

Other mortality

173. In the 2021 CRA 7 & 8 stock assessment, the Rock Lobster Working Group assumed illegal catch in CRA 7 was 10% of the total commercial catch before 1990, and 2% of the summed commercial catch beginning in 1990, with illegal catch scaled proportionately to CPUE where possible. This acknowledges that illegal take is likely to be influenced by available abundance (Figure 9). For the 2020/21 fishing year, the illegal catch estimate assumed in Region 1 for the model (which includes all of CRA 7 and the Southland part of CRA 8) was approximately 8.4 tonnes. An estimate of handling mortality was generated for the first time of approximately 16.4 tonnes for Region 1 (which includes part of CRA 8).

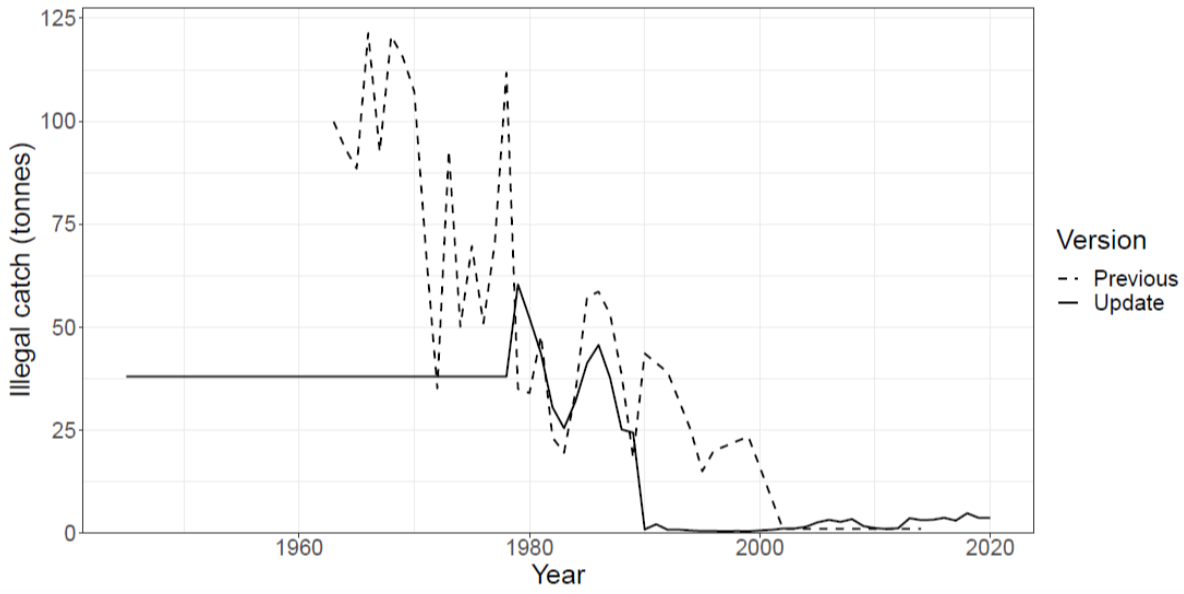

Figure 9: CRA 7 illegal catch trajectory assumed for the 2021 CRA 7 & 8 stock assessment (solid black line), showing the trajectory from the previous stock assessment in 2015 (dashed line).

Commercial fishing

174. Annual landings and the TACC for CRA 7 (Otago) since 1990 are shown in Figure 10. 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 1996 and 2019 a formally adopted CRA 7 management procedure was used annually to review the TACC to ensure that catches reflected available abundance.

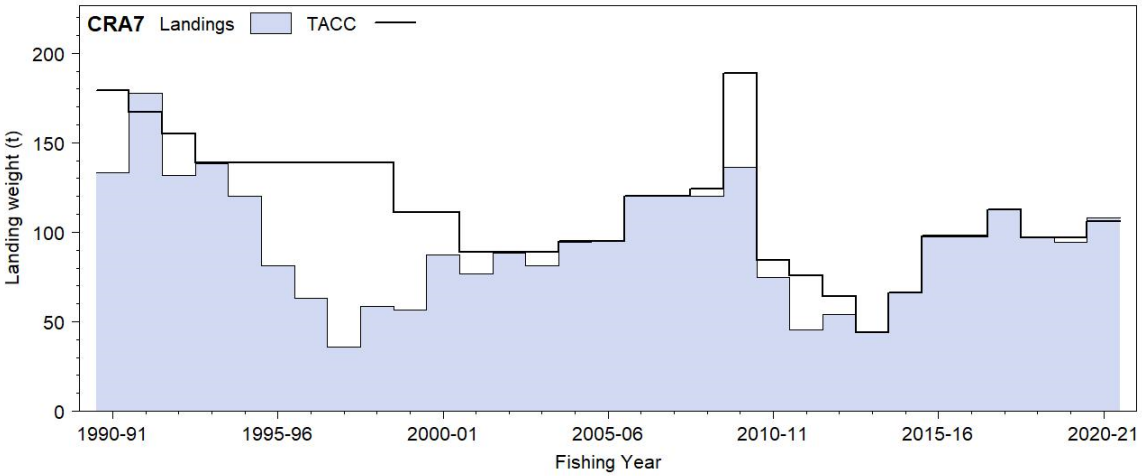

Figure 10: CRA 7 commercial landings and TACCs from 1990 to 2020. The under-catch in 2019/20 due to the COVID-19 outbreak led to approved ACE carry-forward in 2020/21.

175. FNZ estimates the current asset value of CRA 7 quota to be over $78 million based on the current TACC and the average quota share price for the 2019/20 fishing year (Table 19).[55] The average price of CRA 7 ACE (the earnings quota owners receive when selling their ACE) for the 2020/21 fishing year was $34,894.16 per tonne. For more detail on CRA 7 ACE and quota prices over the last five years, see Table 19 below.

Table 19: Number of transfers and average prices of Annual Catch Entitlement (ACE) and quota for CRA 7.[56]

April Fishing Year	Annual Catch Entitlement (ACE)		Quota	
	Number of transfers	Average price (per tonne)	Number of transfers	Average price (per tonne)
2016/17	35	$41,893.10	3	$619,252.44
2017/18	33	$36,486.81	3	$750,062.19
2018/19	46	$36,883.30	2	
2019/20	43	$41,088.95	3	$738,971.98
2020/21	32	$34,894.16	1	

176. In the 2020/21 fishing year, 12 vessels reported landing at least 1 tonne of rock lobster.

[55] 2019/20 is the most recent fishing year with sufficient quota trades to calculate an average price for CRA 7.
[56] Quota and ACE trading prices registered with FishServe may include transactions between related commercial entities and the averages may understate true market/transfer price.

10.2 CRA 7 stock status

177. A new stock assessment was conducted for CRA 7 & 8 in 2021. The stock assessment modelled CRA 7 & 8 as one biological stock with two regions (Figure 11):

- **Region 1 (Otago/Southland):** CRA 7 and statistical areas 922, 923, 924 and 925; and
- **Region 2 (Fiordland):** Statistical areas 926, 927 and 928.

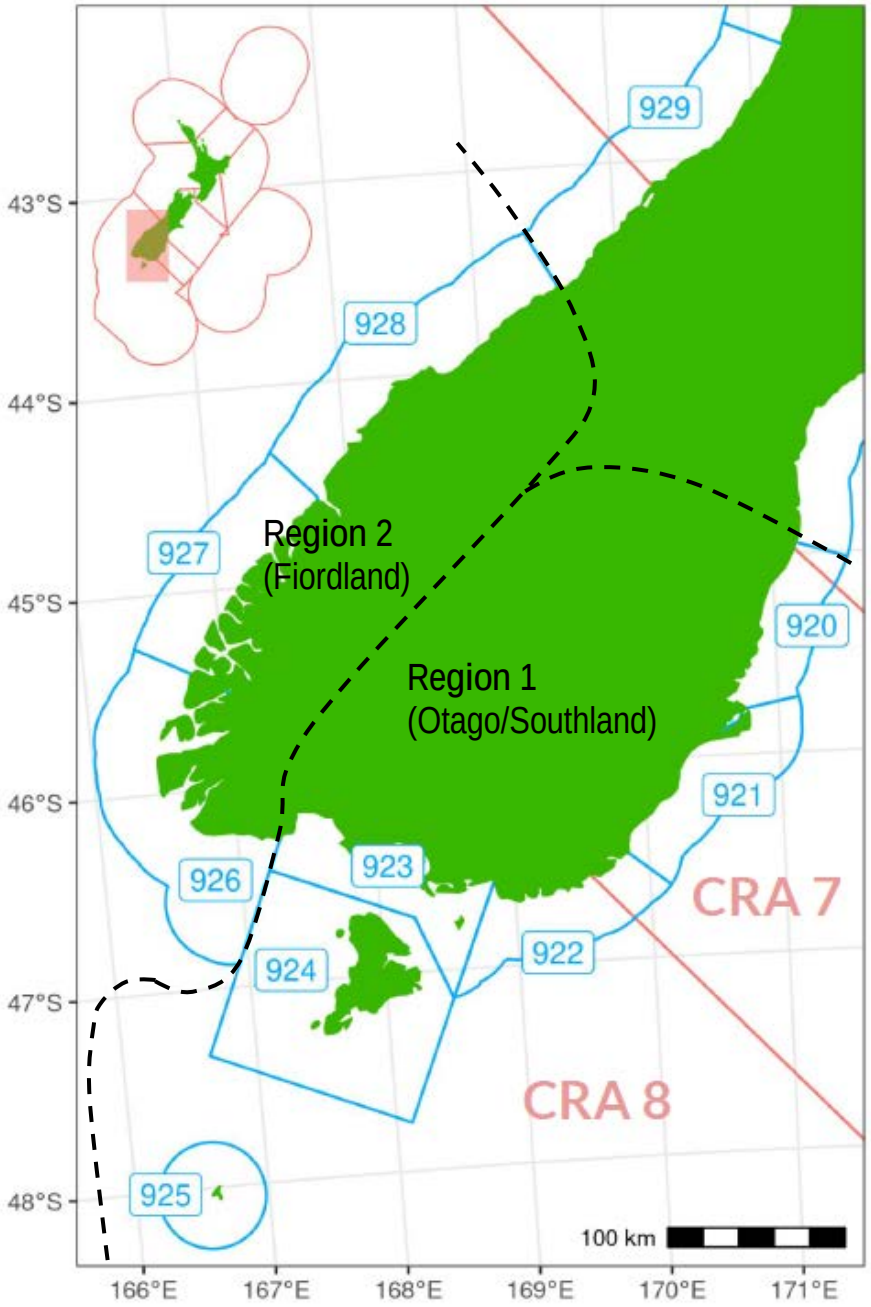

Figure 11: The CRA 7 (Otago) and CRA 8 (Southern) Quota Management Areas and statistical areas, showing approximate boundary of the two regions used in the 2021 CRA 7 & 8 stock assessment model (black dashed lines).

178. The assessment results are summarised in Figures 12 and 13 and Table 20 below. They suggest that, for the combined CRA 7 & 8 fishery, 2021 vulnerable biomass is 21% of the unfished level, and total biomass is 38% of the unfished level. Spawning biomass in 2021 was 48% of the unfished level, well above the soft limit of 20% where it is FNZ policy to implement a formal, time-constrained rebuilding plan.

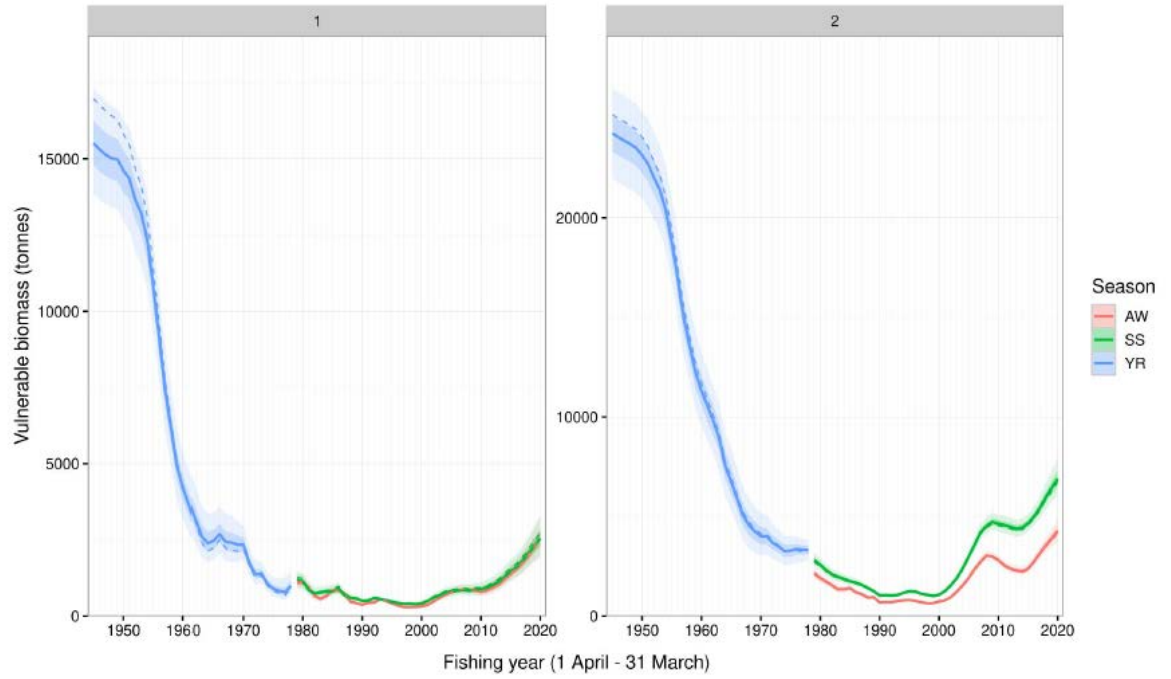

Figure 12: CRA 7 & 8 combined vulnerable biomass trajectory for Region 1 (Otago/Southland) and Region 2 (Fiordland) from the 2021 CRA 7 & 8 stock assessment by season. The solid line indicates the median, the dashed line indicates the MAP (maximum a posteriori) estimate, and variable shading intensity indicates the 50% and 90% credible intervals.

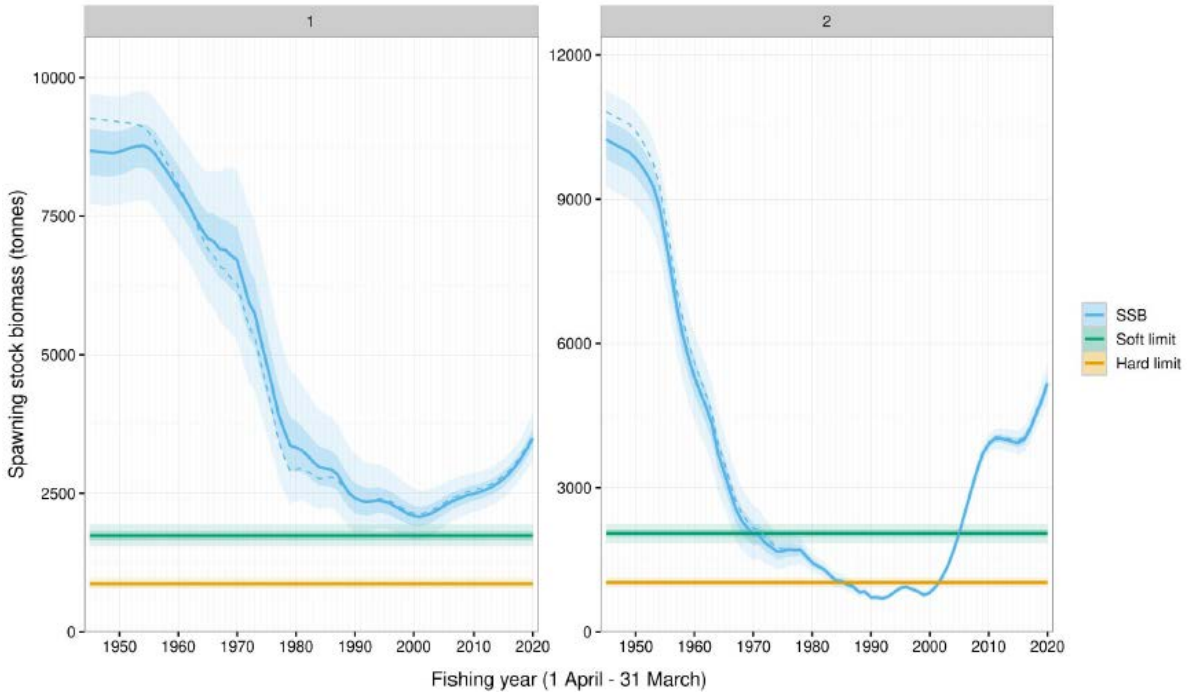

Figure 13: CRA 7 & 8 combined spawning biomass (SSB) trajectory for Region 1 (Otago/Southland) and Region 2 (Fiordland) from the 2021 CRA 7 & 8 stock assessment, including the soft limit (20% SSB_0) , and the hard limit (10% SSB_0). The solid line indicates the median, the dashed line indicates the MAP (maximum a posteriori) estimate, and variable shading intensity indicates the 50% and 90% credible intervals.

179. Table 20 provides further results of the 2021 stock assessment in terms of vulnerable, total, and spawning stock biomass, with uncertainties in the results also shown.

180. Over the next four years, with 2021 catch levels[57] and recent recruitment, vulnerable biomass, total biomass, and spawning biomass for the entire CRA 7 & 8 area are all projected to increase in comparison to current levels. Vulnerable biomass is projected to increase to 25% (or 0.25) of unfished levels by 2025 with a range of 19% (or 0.19) and 32% (or 0.32) (5% and 95% quantiles).

181. Total biomass is projected to increase to 42% of unfished levels by 2025, and spawning biomass is projected to increase to 54% of unfished levels by 2025. There is currently about 89% probability that the overall combined CRA 7 & 8 vulnerable biomass will increase by 2025 and a 100% probability that spawning stock biomass will increase.

Table 20: Median results from the 2021 CRA 7 & 8 stock assessment. 5% and 95% quantiles are provided to show the uncertainty of the biomass ratios.

Performance indicators	5% quantile	Median	95% quantile	Interpretation of the median results
Vulnerable biomass (B) – Beginning of season autumn-winter vulnerable biomass (legal males and females not bearing eggs)				
B_{2021} / B_0	0.18	0.21	0.25	Vulnerable biomass in 2021 was 21% of unfished levels
B_{2025} / B_0	0.19	0.25	0.32	Vulnerable biomass in 2025 will be 25% of unfished levels
B_{2025} / B_{2021}	0.96	1.15 ↑	1.37	Vulnerable biomass in 2025 will be 115% of 2021 levels (an increase of 15%)
Total biomass (Btot) – Beginning of season autumn-winter total biomass (all males and females)				
$Btot_{2021}$ / $Btot_0$	0.33	0.38	0.43	Total biomass in 2021 was 38% of unfished levels
$Btot_{2025}$ / $Btot_0$	0.35	0.42	0.49	Total biomass in 2025 will be 42% of unfished levels
$Btot_{2025}$ / $Btot_{2021}$	1.02	1.10 ↑	1.19	Total biomass in 2025 will be 110% of 2021 levels (an increase of 10%)
Spawning stock biomass (SSB) – Beginning of season autumn-winter spawning biomass (mature females)				
SSB_{2021} / SSB_0	0.44	0.48	0.52	Spawning biomass in 2021 was 48% of unfished levels
SSB_{2025} / SSB_0	0.48	0.54	0.61	Spawning biomass in 2025 will be 54% of unfished levels
SSB_{2025} / SSB_{2021}	1.04	1.12 ↑	1.20	Spawning biomass in 2025 will be 112% of 2021 levels (an increase of 12%)
Probabilities				
P(B_{2025}>B_{2021})		0.89		89% probability that 2025 vulnerable biomass will be greater than 2021 levels
P($Btot_{2025}$>$Btot_{2021}$)		0.97		97% probability that 2025 spawning biomass will be greater than 2021 levels
P(SSB_{2025}>SSB_{2021})		1.00		100% probability that 2025 total biomass will be greater than 2021 levels

B_{MSY} reference level

182. The B_{MSY} reference level for the combined CRA 7 & 8 stock was calculated based on the 2021 CRA 7 & 8 stock assessment as a vulnerable biomass level of 4,863 tonnes. The results, given in Figure 14 and Table 21 below, suggest that vulnerable biomass was above the reference level (the green line) in 2021 (1.46 times the B_{MSY} reference level), and is projected to increase

[57] CRA 7 & 8 commercial catch was assumed to be 1,411.59 tonnes in 2020 (available ACE in 2020 due to ACE carry-forward into the 2020/21 fishing year as a result of COVID-19), and 1,298 tonnes (the combined 2021 CRA 7 & 8 TACCs) from 2021-2025.

further above the B_{MSY} reference level (1.69 times the B_{MSY} reference level) under current catch levels by 2025.

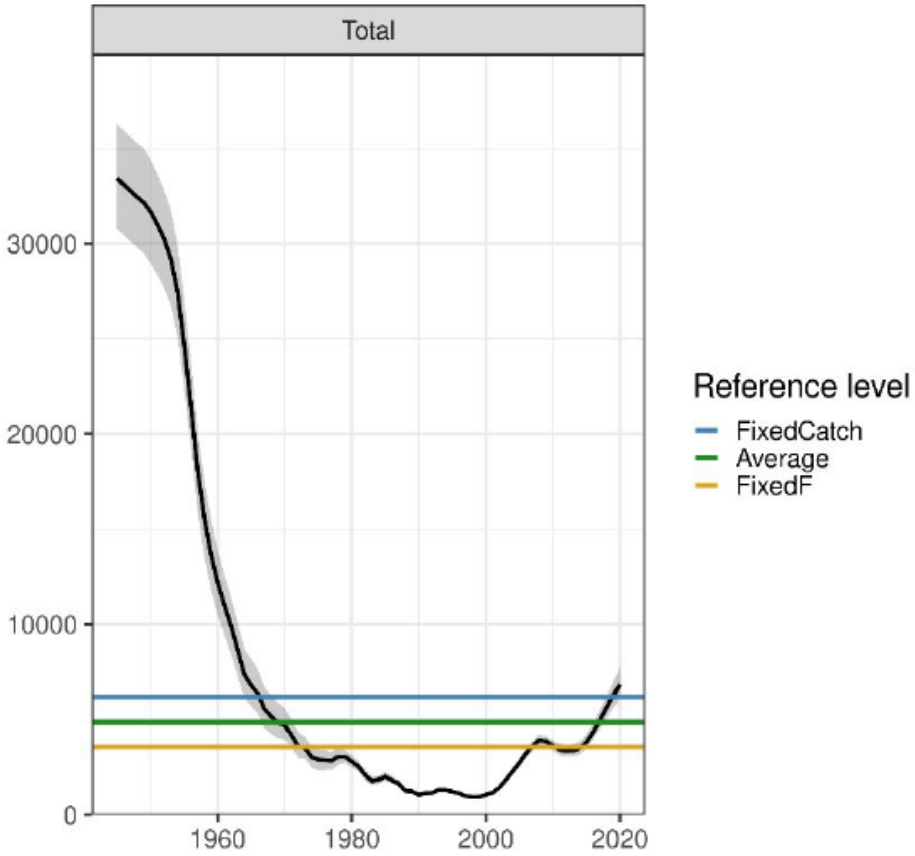

Figure 14: CRA 7 & 8 combined vulnerable biomass from the 2021 stock assessment, showing the B_{MSY} reference level (green line), which is the average of the fixed catch (blue line) and fixed fishing mortality (*F*) (yellow line) levels that maximise catch while meeting risk constraints.

183. Table 21 provides further results of the 2021 B_{MSY} reference level calculation in terms of vulnerable biomass, with the uncertainties in the results also shown. For example, vulnerable biomass in 2021 was estimated to be at 7,114 tonnes (median result), with a range of 6,178 tonnes and 8,209 tonnes (5% and 95% quantiles).

Table 21: B_{MSY} reference level results for CRA 7 & 8, and estimated vulnerable biomass level in 2025, from the 2021 stock assessment. 5% and 95% quantiles are provided to show the uncertainty of the biomass estimates.

Vulnerable biomass (tonnes)	5% quantile	Median	95% quantile	Interpretation of the median results
B_R, reference level (tonnes)		4863		The vulnerable biomass that can produce MSY is 4,863 tonnes
B_{2021}	6178	7114	8209	Vulnerable biomass in 2021 was 7,114 tonnes
B_{2021} / B_R	1.27	1.46	1.69	Vulnerable biomass in 2021 was 1.46 times (146%) the reference level
B_{2025}	6355	8203	10 310	Vulnerable biomass in 2025 will be 8,203 tonnes
B_{2025} / B_R	1.31	1.69	2.12	Vulnerable biomass in 2025 will be 1.69 times (169%) the reference level

184. Catch projections were run for the combined CRA 7 & 8 stock under different levels of catch. See Addendum 2 for more details.

185. A rapid assessment update will be conducted for CRA 7 and CRA 8 in 2022 and will provide an opportunity to consider a review of the catch settings and management controls for April 2023.

10.3 Final CRA 7 options

186. Table 22 shows the consultation options for CRA 7 (Otago), which were modified post consultation into the final options proposed for CRA 7 shown in Table 23 below. This way done by decreasing the TAC and other mortality allowance based on best available information, which supported an alternate calculation of the other mortality allowance based on the proportion of commercial catch in CRA 7 & 8. The results from the new CRA 7 & 8 stock assessment have been used to guide the options for varying the TAC. There is an agreed B_{MSY} reference level for CRA 7 & 8 combined, but there is currently no agreed target biomass. Vulnerable biomass for CRA 7 & 8 combined was above the reference level in 2021, and is projected to increase under current catch levels over the next four years.

Table 22: Proposals consulted on for TAC, allowance and TACC options (in tonnes) for CRA 7 from 1 April 2022.

Stock	Option	TAC	TACC	Allowances		
				Customary **Māori**	Recreational	Other mortality
CRA 7 Otago	Option 7.1: Status quo	126.2	106.2	10	5	5
	Option 7.2: Increase the TAC by 16%	146.5 ↑ (16%)	111.5 ↑ (5%)			20 ↑ (15 t)

Table 23: Final proposed TAC, allowance and TACC options (in tonnes) for CRA 7 from 1 April 2022.

Stock	Option	TAC	TACC	Allowances			NRLMG support
				Customary **Māori**	Recreational	Other mortality	
CRA 7 Otago	Option 7.1 – Status quo	126.2	106.2	10	5	5	✓ Environmental
	Option 7.2 *Amended post consultation* Increase the TAC by 7%	134.5 ↑(7%)	111.5 ↑ (5%)	10	5	8 ↑	✓ Tangata whenua, Recreational, Commercial & Fisheries NZ

187. The NRLMG did not reach consensus on a preferred option for CRA 7.

188. NRLMG environmental members recommend that you agree to Option 7.1 (status quo) because a cautious approach is needed in interpreting the results of the stock assessment.

189. NRLMG tangata whenua and commercial members and FNZ recommend that you agree to Option 7.2 because the 2021 stock assessment results suggest that the stock is healthy and can support the increased utilisation opportunity.

190. The NRLMG agrees that the status of the stock can be monitored in future with rapid assessment updates, and that further management action can be considered if required. The NRLMG notes that it will continue work to determine management targets for each red rock lobster fishery in 2022, which could be used to inform future reviews of review of catch settings and management controls.

10.4 Summary of CRA 7 submissions

191. Twenty-six submissions were received for CRA 7.

Support for Option 7.1 (status quo)

192. ECO, Forest & Bird, and six individuals (Andrew and Justin Cauldwell-Smith, Luke Williamson, and Dino, Nadia and Vicky Pavlovich) supported retaining the status quo. Forest & Bird did not

provide written submission on CRA 7, but gave verbal feedback at the NRLMG meeting on 11 February 2022. ECO and Forest & Bird noted concerns regarding the assumptions used in the new combined CRA 7 & 8 stock assessment, considered that the stocks should be assessed separately, and suggested that a more precautionary approach should be adopted. Luke Williamson noted anecdotal evidence of recreational fishers struggling to catch rock lobster and criticised commercial fishing pressure and the commercial sector's involvement in the catch setting process.

193. ORLIA objects to Option 7.1, noting that retaining the status quo will cause financial and mental stress for fishers, businesses, and associated communities, many of whom have faced social and economic hardships as a result of the COVID-19 pandemic.

Support for Option 7.2 (16% TAC increase was consulted on)

194. Fourteen organisations (Allison Fishing, Anderson Family Trust Partnership, CRAMAC 1, CRAMAC 2, CRAMAC 4, CRAMAC 6, CRA 8 RLIA, Gisborne Fisheries, joint recreational submitters (NZSFC, NZACA, NZUA and LegaSea), KPF Investments Ltd, ORLIA, Te Ohu Kaimoana, TRLIA, and NZ RLIC) and three individuals (Brad Olsen, Chris Cooper, and David Anderson) supported Option 7.2.

195. Allison Fishing, Anderson Family Trust Partnership, CRAMAC 1, CRAMAC 2, CRAMAC 4, CRAMAC 6, CRA 8 RLIA, Gisborne Fisheries, NZ RLIC, KPF Investments Ltd, ORLIA, Te Ohu Kaimoana, and one individual (Brad Olsen) note that vulnerable biomass in the CRA 7 fishery is above the reference level and projected to increase and will continue to increase under Option 7.2. This option is relatively conservative yet recognises high current abundance in CRA 7 and allows for a modest increase in utilisation. They note that increasing the TACC will result in economic benefits to fishers, associated businesses, and coastal communities, including tangata whenua, which will be particularly welcome given the ongoing economic impacts of the COVID-19 pandemic. They support the use of rapid assessment updates, and note that the upcoming rapid assessment update scheduled for later in 2022 will provide the opportunity to review catch settings if needed for the next fishing year in 2023.

196. ORLIA remain committed to the voluntary and industry funded data collection program that supports the stock assessment. They fund technician catch sampling across the small fleet on an annual basis and a tag recapture research programme. ORLIA considers that allowing their fishers a reasonable opportunity for increased utilisation will not impact on utilisation benefits for recreational and customary fishers.

197. ORLIA considers that allowing their fishers a reasonable opportunity for an increased utilisation appropriately reflects the nature of a shared fishery.

198. Te Rūnanga o Ngāi Tahu and Te Ohu Kaimoana support Option 7.2. Te Rūnanga o Ngāi Tahu did not provide a written submission, but gave verbal feedback at the NRLMG meeting on 11 February 2022. Te Rūnanga o Ngāi Tahu supports a moderate increase to the CRA 7 TAC, TACC and other mortality allowance, does not support an increase to the recreational allowance, and supports retaining the current customary allowance. Te Rūnanga o Ngāi Tahu expressed concerns regarding the unconstrained nature of recreational take, low confidence in estimates of recreational take, and the inability of tangata whenua to fulfil their customary fishing needs, particularly close to shore, which they attribute to recreational fishing pressure. Te Ohu Kaimoana notes its support for Option 7.2 is on the provision that FNZ commits to implementing Te Rūnanga o Ngāi Tahu's aspirations for this fishery.

199. David Anderson and Chris Cooper believe that an increase to the TACC would be sustainable with the current trends in the fishery. Mr Cooper notes that this is a positive example of the sustainability of the QMS and the management approach taken by CRA 7 fishers.

200. Joint recreational submitters (NZSFC, NZACA, NZUA and LegaSea) supported Option 7.2 given the evidence of good recruitment and increased abundance. They note that there is nothing to suggest that the current allowances for recreational catch and Māori customary

harvest is not adequate, and that these can be reviewed when new information becomes available.

Support for decreasing catch settings

201. Two individuals (Karen Wealleans and Luke Williamson) suggested that the TAC for CRA 7 should be decreased to allow the stock biomass to increase, which was not an option consulted on. Luke Williamson supported a decrease for the long-term sustainability of the fishery. Karen Wealleans considered there to be an economic emphasis on the management of fish stocks, and raised concerns that the marine environment remains largely unprotected.

10.5 Analysis

Varying the TAC

202. The best available information suggests the combined CRA 7 & 8 stock biomass is well above the B_{MSY} reference level and projected to increase over the next four years under current catches.

203. The CRA 7 TAC options represent trade-offs in social, cultural and economic gains, and the relative importance placed on the level of biomass (including of the relative ability of rock lobster to fulfil its role in the ecosystem) (Table 24). You have discretion in how to respond given these different considerations. All options for CRA 7 are projected to maintain biomass well above the B_{MSY} reference level over next four years (consistent with s 13(2)(a)). You could choose to increase the TAC in order to manage provide for a smaller increase above B_{MSY}, while still remaining well above that level (Option 7.2).

Table 24: Summary of analysis of the proposed TAC options for CRA 7 for 1 April 2022. (continued over the page)

Option	Projected change over the next four years	Relevant section of the Act for varying the TAC	Relevant considerations under the Act (see also Table 6)
Current status (2021)	The combined CRA 7 & 8 stock is 1.46 times (or 146%) the B_{MSY} reference level[58]. Vulnerable biomass is 21% of the unfished level[59]. Spawning stock biomass is 48% of unfished biomass (well above the soft limit of 20%)[60]		
Option 7.1: Status quo	The combined CRA 7 & 8 stock will be 1.69 times (or 169%) the B_{MSY} reference level.[61] Combined CRA 7 & 8 vulnerable biomass is projected to increase by 15% of 2021 levels to 25% of the unfished level.[62] Combined CRA 7 & 8 spawning stock biomass is projected to increase by 12%	s 13(2)(a)	The stock will be further above the level that can produce B_{MSY} (the B_{MSY} reference level) than in 2021. The stock will remain well above the level (20% unfished spawning stock biomass) where it is FNZ policy to implement a time-bound rebuild plan. Increased abundance under this option will provide for continued customary and recreational use, and is expected to allow rock lobster to continue to fulfil its role in the ecosystem.[64] This option would maintain current commercial utilisation but forego potential additional utilisation opportunities.

[58] Table 21
[59] Table 20
[60] Table 20
[61] Table 21
[62] Table 20
[64] Table 6

Option	Projected change over the next four years	Relevant section of the Act for varying the TAC	Relevant considerations under the Act (see also Table 6)
	of 2021 levels to 54% of the unfished level.[63]		
Option 7.2: Increase the TAC by 7%	Projections unavailable, but the combined CRA 7 & 8 stock is expected to increase under this option.[65] It is expected that the combined CRA 7 & 8 stock will increase further above the B_{MSY} reference level and remain well above this level, potentially to a slightly lesser degree than Option 7.1. It is expected that both the spawning and vulnerable biomass will increase, though potentially to a slightly lesser degree than Option 7.1.	s 13(2)(a)	The stock will be further above the B_{MSY} reference level than in 2021. While the stock may be at a slightly lower level than under Option 7.1, it is expected to continue to increase and remain well above the B_{MSY} reference level. The stock will remain well above the level (20% unfished spawning stock biomass) where it is FNZ policy to implement a time-bound rebuild plan. Increased abundance under this option will provide for continued customary and recreational use, and, while uncertain, is expected to allow rock lobster to continue to fulfil its role in the ecosystem[66] to a greater level than the status quo. This option takes into account updated estimates of illegal take and handling mortality from the 2021 CRA 7 & 8 stock assessment. This option would allow the commercial sector to realise some increase in utilisation benefits. It could lead to approximately $361,600 additional revenue to the catching sector, as well as expected downstream benefits to associated businesses and communities.

204. Option 7.1 (status quo) provides for the greatest increase in abundance and represents the greatest potential social, cultural and environmental benefits associated with higher abundance. It may also allow rock lobster to inhabit a greater role in the ecosystem. It reflects a foregone utilisation opportunity and may not be as economically beneficial for customary and commercial fishing sectors as Option 7.2.

205. Under Option 7.1 (status quo), the CRA 7 TAC would stay at its current level of 126.2 tonnes from 1 April 2022. Compared with Option 7.2 (7% TAC increase), this option could result in increased abundance in the CRA 7 fishery in the short-term, increased non-commercial catches and catch rates, and higher CPUE for commercial fishers, which may result in reduced harvesting costs. It may also allow rock lobster to inhabit a greater role in the ecosystem.

206. Option 7.2 provides for greater commercial benefits and economic development opportunities (to a greater degree for Option 8.3 than for Option 8.2). This economic gain is expected to apply to tangata whenua as well as associated businesses and communities. Biomass overall is expected to continue to increase, which may also allow rock lobster to inhabit a greater role in the ecosystem (though potentially to a lower level than Option 7.1). Increased levels of recreational take under these options could potentially lead to reduced abundance in certain areas, such as the inshore areas of concern for Te Rūnanga o Ngāi Tahu, though abundance overall is expected in increase.

207. Under Option 7.2 (7% TAC increase), the CRA 7 TAC would be increased to 134.5 tonnes. Vulnerable biomass and spawning stock biomass are projected to continue to increase with this catch level over the next four years, and the stock would remain more than 150% of the B_{MSY}

[63] Table 20
[65] See Addendum 2 – while unknown, the stock is expected to increase on a trajectory somewhere between status quo and the 10% decrease in catch.
[66] Table 6

reference level. This option would enable the level of the stock, which is above that which can produce MSY, 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 MSY, having regard to the interdependence of stocks. This has the effect of enabling increased utilisation.

Varying allowances and the TACC

208. Table 25 provides a summary of information on current non-commercial allowances for CRA 7 (Otago) and stock assessment assumptions of non-commercial catch.

Table 25: Current CRA 7 allowances and model assumptions of non-commercial catches (in tonnes).

CRA 7 (Otago)	Customary **Māori**	Recreational	Other mortality	Total
Current allowances	10	5	5	20
Non-commercial catch assumptions for the 2021 stock assessment (note: Region 1, which includes CRA 7 and part of CRA 8)	1	Assumed to vary with biomass. Estimated at 6.7 for 2020.	14 (8 illegal + 6 handling[67])	21.7

Māori customary fishing

209. No change is proposed to the 10 tonne customary Māori allowance. Current harvest is considered to be well within the allocation for this interest at this time. Ngāi Tahu Tāngata Tiaki consider that their customary allowance is not able to be fished due to low abundance in nearshore waters. Abundance is expected to increase under both proposed options, which is expected to partially address these concerns, and FNZ will continue to work with Te Rūnanga o Ngāi Tahu regarding additional management options.

Recreational fishing

210. No change is proposed to the 5 tonne recreational allowance for CRA 7. The 2021 CRA 7 & 8 stock assessment model estimate of recreational catch is 6.7 tonnes for Region 1, which includes CRA 7 and part of CRA 8, but there is considerable uncertainty in the current estimate of recreational take, and it is likely that, on average, the current 5 tonne allowance adequately allows for recreational take in CRA 7.

211. Joint recreational submitters supported retaining the current recreational allowance and noted there is no new information to suggest the current allowance is not adequate. NZ RLIC noted it would be willing to consider increasing the recreational allowance to 5 tonnes but acknowledged Te Rūnanga o Ngāi Tahu's position and the unreliable information on take and supported no change to the allowance. Te Rūnanga o Ngāi Tahu, Te Ohu Kaimoana, and NZ RLIC consider that action is needed to better measure and control recreational take.

Other mortality

212. Under Option 7.1 (status quo), the CRA 7 other mortality allowance would stay at its current level of 5 tonnes. This would not account for updated information on the estimated other mortality from the 2021 CRA 7 & 8 stock assessment.

213. Under Option 7.2 (7% TAC increase), a 3 tonne increase is proposed to the 5 tonne CRA 7 allowance for other sources of fishing-related mortality, based on the new illegal take estimate and estimate of handling-related mortality from the 2021 CRA 7 & 8 stock assessment.

[67] The handling mortality estimate for CRA 7 & 8 combined from the 2021 CRA 7 & 8 stock assessment is 97 tonnes. When this estimate is divided by the current commercial catch taken for each stock, this results in CRA 7 (35% of the combined other commercial catch in 2019/20) having an estimated 6 tonnes of handling mortality.

214. In the consultation document, it was proposed that the total estimates of illegal take and handling mortality be divided between CRA 7 and CRA 8 depending on the proportion of the existing other mortality allowance for each QMA. Estimates of illegal take and handling mortality generated by the stock assessment model are available for Region 1 (all of CRA 7 and part of CRA 8) and Region 2 (part of CRA 8) (Figure 11 and Tables 25 and 30).NZ RLIC suggested that it would be more appropriate to use the proportion of commercial catch that was taken for each QMA in each region to apportion the handling mortality, given both estimates are derived from commercial catch.[68] Following consultation, FNZ and the NRLMG agreed to use NZ RLIC's suggested methodology, and amended the other mortality allowance and TAC accordingly for Option 7.2.

Total Allowable Commercial Catch

215. Under Option 7.1 (status quo), the CRA 7 TACC would stay at its current level of 106.2 tonnes. This option maintains the current level of commercial utilisation.

216. Under Option 7.2 (7% TAC increase) the TACC would be increased by 5.3 tonnes to 111.5 tonnes. If the TACC is increased under this option, it would allow the commercial sector to realise some increase in the utilisation benefits. This is unlikely to affect current utilisation benefits for non-commercial fishers.

217. The proposed 5.3 tonne TACC increase under Option 7.2 (7% TAC increase) has the potential to result in an increase of annual revenue to the catching sector alone of approximately $361,600 (based on 2020/21 average port price information of $68.23 per kg). Downstream benefits to associated businesses and communities are also anticipated, though these benefits are more difficult to measure.

11 Review of the CRA 8 (Southern) rock lobster fishery

11.1 CRA 8 fishery overview

Māori customary fishing

218. Rock lobster (kōura) is a taonga species for tangata whenua. Reporting of customary Māori catch of rock lobster is fully operational in CRA 8 (Southern). In the last five years, an annual average of approximately 19,200 rock lobsters, plus 680 kg, were reported as harvested from CRA 8.

219. An estimate of 6 tonnes was used in the 2021 CRA 8 stock assessment model to represent customary catches from 1963 to 2012, which was then increased proportionately to 15 tonnes in 2014. An estimate of 15 tonnes was used each year from 2014 to 2020.

Recreational fishing

220. The CRA 8 fishery has a number of areas closed to commercial fishing, which provide non-commercial fishers with exclusive access to rock lobsters. In Fiordland, the inner fiords are closed to commercial rock lobster fishing. These closures were established in 2005 by the Fiordland Marine Guardians.

221. The Fiordland Marine Guardians have expressed concerns about increased recreational fishing effort in Fiordland, particularly from amateur charter-fishing vessels (ACVs). They are proposing changes to the rules for recreational fishing to reduce the level of catch. The Fiordland Marine Guardians consider that the current recreational fishing rules for Fiordland are no longer fit for

[68] For the 2020/21 fishing year, estimates of illegal catch (8.4 tonnes) and handling mortality (16.4 tonnes) were generated for Region 1 for the model (which includes all of CRA 7 and part of CRA 8). CRA 7 currently makes up 35% of commercial catch in Region 1. Taking 35% of the Region1 estimates suggests an allowance of 2.8 tonnes for illegal catch, and 5.6 tonnes for handling mortality for CRA 7, which (when added together) suggests an 8.4 tonne estimate of other mortality for CRA 7 (8 tonnes when rounded to the nearest tonne).

purpose due to an increasing number of recreational fishers. Central to this advice is the Guardians' concept of "Fish for a Feed (and not to fill the freezer)". FNZ is separately providing you with advice on the Fiordland Marine Guardians in the coming months.

222. Overall, little is known about recreational catch in CRA 8. In the 2021 CRA 7 & 8 stock assessment, a recreational catch trajectory was constructed for CRA 8 as follows: beginning at 1 tonne in 1945, recreational catch was increased to 5 tonnes in 1979, and then from 1979 to 2020 recreational catch was assumed to be a constant 20 tonnes. In addition, 18.8 tonnes of rock lobster were assumed to be taken each year in CRA 8 by commercial fishers for non-commercial purposes under section 111 of the Act. The 2017/18 National Panel Survey estimate of CRA 8 recreational catch was 16.17 tonnes (±11.4 tonnes) but has a high variance and came from a relatively low number of fishers in the survey.

Other mortality

223. In the 2021 CRA 7 & 8 stock assessment, the Rock Lobster Working Group assumed illegal catch in CRA 8 was 10% of the total commercial catch before 1990, and 2% of the summed commercial catch beginning in 1990, with illegal catch scaled proportionately to CPUE where possible. This acknowledges that illegal take is likely to be influenced by available abundance (Figure 15). For the 2020/21 fishing year, while uncertain, the illegal catch estimate assumed in Region 2 (the Fiordland part of CRA 8) for the model was approximately 38.8 tonnes. An estimate of handling mortality was generated for the first time of approximately 16.4 tonnes for Region 1 (which includes part of CRA 7) and approximately 81.4 tonnes for Region 2 (the Fiordland area of CRA 8).

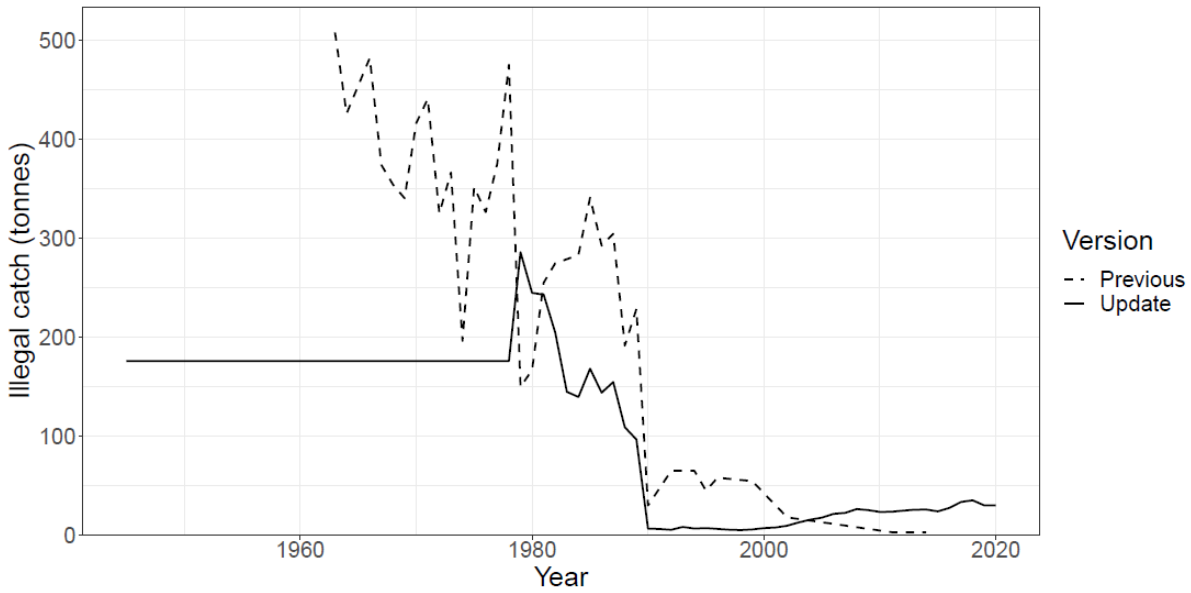

Figure 15: CRA 8 illegal catch trajectory assumed for the 2021 CRA 7 & 8 stock assessment (solid black line), showing the trajectory from the previous stock assessment in 2015 (dashed line).

Commercial fishing

224. CRA 8 is the largest commercial rock lobster fishery in New Zealand. Annual landings and the TACC for CRA 8 since 1990 are shown in Figure 16. The COVID-19 outbreak, particularly the effective closure of the Chinese export market for a period coupled with low prices for exports, contributed to an under-catch of the TACC in 2019/20. Carry-forward provided for a catch greater than the TACC in 2020/21. Between 1996 and 2019 a formally adopted CRA 8 management procedure was used to annually review the TACC to ensure that catches reflected available abundance.

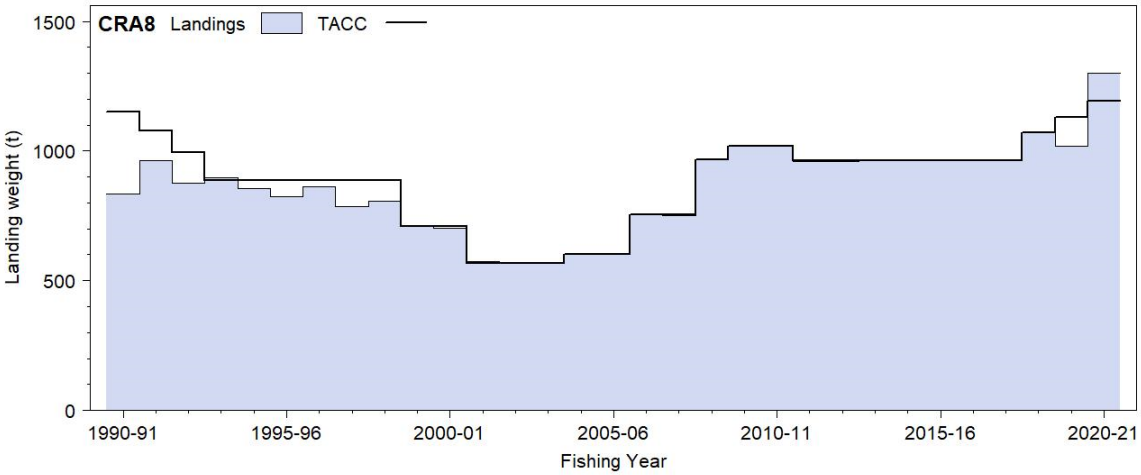

Figure 16: CRA 8 commercial landings and TACCs from 1990 to 2020. The under-catch in 2019/20 due to the COVID-19 outbreak led to additional approved ACE carry-forward in 2020/21.

225. FNZ estimates the current asset value of CRA 8 quota to be approximately $1.8 billion based on the current TACC and the average quota share price for the 2020/21 fishing year (Table 26). The average price of CRA 8 ACE (the earnings quota owners receive when selling their ACE) for the 2020/21 fishing year was $44,439.21 per tonne. For more detail on CRA 8 ACE and quota prices over the last five years, see Table 26 below.

226. In the 2020/21 fishing year, 67 vessels reported landing at least 1 tonne of rock lobster.

Table 26: Number of transfers and average prices of Annual Catch Entitlement (ACE) and quota for CRA 8.[69]

April Fishing Year	Annual Catch Entitlement (ACE)		Quota	
	Number of transfers	Average price (per tonne)	Number of transfers	Average price (per tonne)
2016/17	251	$58,549.58	28	$1,275,969.46
2017/18	264	$47,217.25	19	$1,279,989.39
2018/19	306	$51,037.82	24	$1,525,323.52
2019/20	293	$56,647.37	11	$1,441,139.60
2020/21	226	$44,439.21	14	$1,487,508.51

11.2 CRA 8 stock status

227. The new quantitative stock assessment conducted in 2021 combined CRA 7 & 8 to reflect that they behave as one biological stock. See *9.2 – CRA 7 stock status* above for a summary of the combined CRA 7 & 8 stock status and B_{MSY} reference level.

228. A rapid assessment update will be conducted for CRA 7 and CRA 8 in 2022 and will provide an opportunity to consider a review of the catch settings and management controls for April 2023.

11.3 Final CRA 8 options

229. Table 27 shows the consultation options for CRA 8 (Southern), which were modified post consultation into the final options proposed for CRA 8 shown in Table 28 below. This way done by decreasing the TAC and other mortality allowance based on best available information, which supported an alternate calculation of the other mortality allowance based on the

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

proportion of commercial catch in CRA 7 & 8. The results from the new CRA 7 & 8 stock assessment, being the best available information, have been used to guide the options for varying the TAC. There is an agreed B_{MSY} reference level for CRA 7 & 8 combined, but there is currently no agreed target biomass. Vulnerable biomass for CRA 7 & 8 combined was well above the reference level in 2021, and is projected to increase under current catch levels over the next four years.

Table 27: Proposals consulted on for TAC, allowance and TACC options (in tonnes) for CRA 8 from 1 April 2022.

Stock	Option	TAC	TACC	Allowances		
				Customary **Māori**	Recreational	Other mortality
CRA 8 Southern	Option 8.1: Status quo	1282.7	1191.7	30	33	28
	Option 8.2: Increase the TAC by 9%	1395.5 ↑ (9%)	1215.5 ↑ (2%)			117 ↑ (89 t)
	Option 8.3: Increase the TAC by 11%	1431 ↑ (11%)	1251 ↑ (5%)			

Table 28: Final proposed TAC, allowance and TACC options (in tonnes) for CRA 8 from 1 April 2022.

Stock	Option	TAC	TACC	Allowances			NRLMG support
				Customary **Māori**	Recreational	Other mortality	
CRA 8 Southern	Option 8.1 – Status quo	1282.7	1191.7	30	33	28	✓ Environmental
	Option 8.2 *Amended post consultation* Increase the TAC by 10%	1413.5 ↑ (10%)	1215.5 ↑ (2%)	30	33	135 ↑	✓ Tangata whenua, Recreational
	Option 8.3 *Amended post consultation* Increase the TAC by 13%	1453 ↑ (13%)	1251 ↑ (5%)	30	33	139 ↑	✓ Tangata whenua, Commercial & Fisheries NZ

230. The NRLMG did not reach consensus on a preferred option for CRA 8.

231. NRLMG environmental members support Option 8.1 (status quo) because they consider that a cautious approach is needed.

232. NRLMG tangata whenua, recreational and commercial recreational members and FNZ consider that an increase to the TAC is appropriate, given the 2021 stock assessment results suggest that the stock is healthy and can support increased utilisation. The sectors differ in the degree of increase to the TAC they support.

233. NRLMG recreational members support Option 8.2 (10% TAC increase) because they consider that while a small increase to the TAC is justified, a more conservative approach is needed.

234. NRLMG commercial members and FNZ support Option 8.3 (13% TAC increase) because the biomass is well above the B_{MSY} reference level and will continue to increase under this option. The increase would recognise the greater utilisation opportunity available and benefits for tangata whenua, fishers, and associated businesses and communities.

235. Tangata whenua NRLMG members support both Option 8.2 and 8.3, as they both represent a conservative increase to the TAC that the stock assessment results suggest the stock can support.

236. The NRLMG agrees that the status of the stock can be monitored in future with rapid assessment updates, and that further management action can be considered if required. The

NRLMG notes that it will continue work to determine management targets for each red rock lobster fishery in 2022, which could be used to inform future reviews of review of catch settings and management controls.

11.4 Summary of CRA 8 submissions

237. Twenty-eight submissions were received for CRA 8.

Support for Option 8.1 (status quo)

238. ECO and Forest & Bird supported Option 8.1. Forest & Bird did not provide written submission on CRA 8, but gave verbal feedback at the NRLMG meeting on 11 February 2022. ECO and Forest & Bird noted concerns regarding the assumptions used in the new combined CRA 7 & 8 stock assessment, considered that the stocks should be assessed separately, and suggested that a more precautionary approach should be adopted.

239. Six individuals (Andrew and Justin Caldwell-Smith, Luke Williamson, and Dino, Nadia and Vicky Pavlovich) support retaining the status quo for CRA 8, but did not provide any supporting rationale.

Support for Option 8.2 (9% TAC increase was consulted on; now 10% TAC increase)

240. Te Rūnanga o Ngāi Tahu, Te Ohu Kaimoana, joint recreational submitters (NZSFC, NZACA, NZUA and LegaSea) and one individual (Tania Belworthy) support Option 8.2.

241. Te Rūnanga o Ngāi Tahu did not provide a written submission, but gave verbal feedback at the NRLMG meeting on 11 February 2022. Te Rūnanga o Ngāi Tahu supports a moderate increase to the CRA 8 TAC, TACC and other mortality allowance, does not support an increase to the recreational allowance, and supports retaining the current customary allowance. Te Rūnanga o Ngāi Tahu expressed concerns regarding the unconstrained nature of recreational take, low confidence in estimates of recreational take, and the inability of tangata whenua to fulfil their customary fishing needs, particularly close to shore, which they attribute to recreational fishing pressure. Te Rūnanga o Ngāi Tahu support both Option 8.2 and 8.3. Te Ohu Kaimoana support an increase to the CRA 8 TAC and support Te Rūnanga o Ngāi Tahu's views.

242. Joint recreational submitters supported increasing the TAC as proposed to better account for an updated estimate of other mortality to the stock caused by fishing, and to provide a modest increase to the TACC noting recent good recruitment and increased abundance. They supported not changing the allowances for customary and recreational fishing until new information supports a change in future.

243. Tania Belworthy supports a 5% increase to the CRA 8 TACC and noted she is committed to the sustainable management of New Zealand's fishstocks for future generations.

Support for Option 8.3 (11% TAC increase was consulted on; now 13% TAC increase)

244. CRAMAC 1, CRAMAC 2, CRAMAC 4, CRAMAC 6, CRA 8 RLIA, Elbury Holdings Ltd, Gisborne Fisheries, Loyal Fishing, Te Rūnanga o Ngāi Tahu, NZ RLIC, ORLIA, Te Ohu Kaimoana, and TRLIA support Option 8.3.

245. Te Rūnanga o Ngāi Tahu and Te Ohu Kaimoana support Option 8.3 for the same reasons as Option 8.2 (see above).

246. CRAMAC 1, CRAMAC 2, CRAMAC 4, CRAMAC 6, CRA 8 RLIA, Elbury Holdings Ltd, ORLIA, NZ RLIC, and TRLIA note that vulnerable biomass is well above B_{MSY} reference level, spawning stock biomass is well above the soft limit, and both vulnerable and spawning biomass are projected to continue to increase over the next four years (with high probability) with the increase in TAC and TACC proposed. They consider that this supports the relatively conservative 5% proposed increase to the TACC. They also support the use of rapid assessment updates to manage the fishery.

247. CRA 8 RLIA and Loyal Fishing note anecdotal evidence from experienced fishers that catches and catch rates are at record highs, and that there are no sustainability concerns with the proposed TAC increase. Loyal Fishing considers the proposed TACC increase to be conservative based on the significant increase in catch rates experienced in the last ten years. NZ RLIC notes that operators are reporting on going increase in catch rates (supported by logbook data) and a reduction in effort – the number of potlifts needed to take the TACC has been steadily decreasing over the last 5 years.

248. More generally, CRA 8 RLIA notes that the ability to target fishing effort to certain times of the year and certain grades when market prices are at their most favourable is a desirable outcome, which is achieved by maintaining a consistently high biomass. CRA 8 RLIA notes that while vulnerable biomass is calculated in the autumn/winter, more biomass is available to industry during the spring/summer, when mature females are available to harvest. CRA 8 RLIA also supports research to establish improved data to guide setting recreational and other mortality allowance, and considers that management action to constrain illegal take and manage recreational take is high priority.

249. The CRA 8 RLIA is committed to the voluntary and industry funded data collection program that supports the stock assessment. They will maintain the required level of logbooks across the CRA 8 fleet and work to ensure the coverage is representative across the large geographic region that is CRA 8. The also maintain their commitment to periodic funding of the tag recapture research programme.

Other comments

250. The Fiordland Marine Guardians considered that the options consulted on were appropriate, but did not submit in support of a particular option. The Fiordland Marine Guardians note consistent and regular feedback from the community that rock lobster abundance has been increasing for some years now, and acknowledge the conservative management and stewardship of the CRA 8 RLIA.

251. GT & SM Wardrop Ltd supported an 11% increase to the TACC with no change to the other mortality allowance, as there is no evidence of increases in illegal take or mortality due to fishing. GT & SM Wardrop Ltd considered that the commercial sector, which had quota cuts when the TACC was reduced, should have the benefit of the TAC increase. GT & SM Wardrop Ltd also noted that a greater TACC increase of 15% is possible (see Addendum 2).

252. Karen Wealleans suggested that the TAC for CRA 8 should be decreased to allow the stock biomass to increase, which was not an option consulted on. She considered there to be an economic emphasis on the management of fish stocks, and raised concerns that the marine environment remains largely unprotected.

11.5 Analysis

Varying the TAC

253. The best available information suggests the combined CRA 7 & 8 stock biomass is well above the B_{MSY} reference level and projected to increase over the next four years under current catches.

254. The CRA 8 TAC options represent trade-offs in social, cultural and economic gains, and the relative importance placed on the level of biomass (including the relative ability of rock lobster to fulfil its role in the ecosystem) (Table 29). You have discretion in how to respond given these different considerations. All options for CRA 8 are projected to maintain biomass well above the B_{MSY} reference level over next four years (consistent with s 13(2)(a)). You could also choose to increase the TAC in order to provide for a smaller increase above B_{MSY}, while still remaining well above that level (Options 8.2 and 8.3).

Table 29: Summary of analysis of the proposed TAC options for CRA 8 for 1 April 2022. (continued over the page)

Option	Projected change over the next four years	Relevant section of the Act for varying the TAC	Relevant considerations under the Act (see also Table 6)
Current status (2021)	The combined CRA 7 & 8 stock is 1.46 times (or 146%) the B_{MSY} reference level. Vulnerable biomass is 21% of the unfished level. Spawning stock biomass is 48% of unfished biomass (well above the soft limit of 20%)		
Option 8.1: Status quo	The combined CRA 7 & 8 stock will be 1.69 times (or 169%) the B_{MSY} reference level. Combined CRA 7 & 8 vulnerable biomass is projected to increase by 15% of 2021 levels to 25% of the unfished level. Combined CRA 7 & 8 spawning stock biomass is projected to increase by 12% of 2021 levels to 54% of the unfished level.	s 13(2)(a)	The stock will be further above the level that can produce B_{MSY} (the B_{MSY} reference level) than in 2021. The stock will remain well above the level where it is FNZ policy to implement a time-bound rebuild plan. Increased abundance under this option will provide for continued customary and recreational use, and is expected to allow rock lobster to continue to fulfil its role in the ecosystem.[70] This option would maintain current commercial utilisation but forego potential additional utilisation opportunities.
Option 8.2: Increase the TAC by 10%	Projections unavailable, but the combined CRA 7 & 8 stock is expected to increase under this option.[71] It is expected that the combined CRA 7 & 8 stock will increase further above the B_{MSY} reference level and remain well above this level, potentially to a slightly lesser degree than Option 8.1. It is expected that both the spawning and vulnerable biomass will increase, though potentially to a slightly lesser degree than Option 8.1.	s 13(2)(a)	The stock will be further above the B_{MSY} reference level than in 2021. While the stock may be at a slightly lower level than under Option 8.1, it is expected to continue to increase and remain well above the B_{MSY} reference level. The stock will remain well above the level where it is FNZ policy to implement a time-bound rebuild plan. Increased abundance under this option will provide for continued customary and recreational use, and, while uncertain, is expected to allow rock lobster to continue to fulfil its role in the ecosystem[72] to an increased level (though potentially to a slightly lower level than the status quo). This option takes into account updated estimates of illegal take and handling mortality from the 2021 CRA 7 & 8 stock assessment. This option would allow the commercial sector to realise some increase in utilisation benefits, to a greater degree than the status quo (approximately $1.62 million additional revenue to the catching sector, as well as expected downstream benefits to associated businesses and communities).
Option 8.3: Increase the TAC by 13%	Projections unavailable, but the combined CRA 7 & 8 stock is expected to increase under this option.[73]	s 13(2)(a)	The stock will be further above the B_{MSY} reference level than in 2021. While the stock may be at a slightly lower level than under Options 8.1 and 8.2, it is expected to continue to increase and remain well above the B_{MSY} reference level.

[70] Table 3
[71] See Addendum 2 – while unknown, the stock is expected to increase on a trajectory somewhere between status quo and the 10% decrease in catch.
[72] Table 3
[73] See Addendum 2.

Option	Projected change over the next four years	Relevant section of the Act for varying the TAC	Relevant considerations under the Act (see also Table 6)
	It is expected that the combined CRA 7 & 8 stock will increase further above the B_{MSY} reference level and remain well above this level, potentially to a slightly lesser degree than Options 8.1 and 8.2. It is expected that both the spawning and vulnerable biomass will increase, though potentially to a slightly lesser degree than Options 8.1 and 8.2.		The stock will remain well above the level where it is FNZ policy to implement a time-bound rebuild plan. Increased abundance under this option will provide for continued customary and recreational use, and, while uncertain, is expected to allow rock lobster to continue to fulfil its role in the ecosystem to an increased degree (though potentially to a slightly lower level than Options 8.1 and 8.2). This option takes into account updated estimates of illegal take and handling mortality from the 2021 CRA 7 & 8 stock assessment. This option would allow the commercial sector to realise the greatest increase in utilisation benefits (approximately $4.05 million additional revenue to the catching sector, as well as expected downstream benefits to associated businesses and communities).

255. Option 8.1 (status quo) provides for the greatest increase in abundance and represents the greatest potential social, cultural and environmental benefits associated with higher abundance. It reflects a foregone utilisation opportunity and may not be as economically beneficial for customary and commercial fishing sectors as Option 7.2.

256. Under Option 8.1 (status quo), the CRA 8 TAC would stay at its current level of 1282.7 tonnes from 1 April 2022. This option could result in increased abundance in the CRA 8 fishery in the short-term, increased non-commercial catches and catch rates compared with Option 8.2 (9% TAC increase) and Option 8.3 (11% TAC increase), and higher CPUE for commercial fishers, which may result in reduced harvesting costs.

257. Options 8.2 (10% TAC increase) and 8.3 (13% TAC increase) provide for greater commercial benefits and economic development opportunities (to a greater degree for Option 8.3 than for Option 8.2). This economic gain is expected to apply to tangata whenua as well as associated businesses and communities. Biomass overall is expected to continue to increase, which may also allow rock lobster to inhabit a greater role in the ecosystem (though potentially to a lower level than Option 8.1). Increased recreational levels of take under these options could potentially lead to reduced abundance in certain areas, such as the inshore areas of concern for Te Rūnanga o Ngāi Tahu, though abundance overall is expected in increase.

258. Under Option 8.2 (10% TAC increase) and Option 8.3 (13% TAC increase), vulnerable biomass and spawning stock biomass are projected to continue to increase over the next four years, and the stock would likely remain at more than 150% of the B_{MSY} reference level. Option 8.3 (13% TAC increase) provides for a comparatively greater utilisation opportunity, noting that the stock is well above the B_{MSY} reference level and expected to increase. Option 8.2 reflects a more cautious approach and is expected to ensure that the stock is maintained at a slightly higher level of biomass than Option 8.3, though it forgoes some of the utilisation opportunity of the larger TAC increase proposed for Option 3.

Varying allowances and the TACC

259. Table 30 provides a summary of information on current non-commercial allowances for CRA 8 (Southern) and stock assessment assumptions of non-commercial catch.

Table 30: Current CRA 8 allowances and model assumptions of non-commercial catches (in tonnes).

CRA 8 (Southern)	Customary **Māori**	Recreational	Other mortality	Total
Current allowances	30	33	28	91
Non-commercial catch assumptions for the 2021 stock assessment (note: Region 2, which is only part of CRA 8)	15	38.8	115 (34 illegal + 81 handling[74])	176

Māori customary fishing

260. No change is proposed to the 30 tonne customary Māori allowance. Current harvest is considered to be well within the allowance at this time. Ngāi Tahu Tāngata Tiaki consider that their customary requirements are not able to be fished due to low abundance in nearshore waters. Abundance is expected to increase under all proposed options, which is expected to partially address these concerns, and FNZ will continue to work with Te Rūnanga o Ngāi Tahu regarding additional management options.

Recreational fishing

261. No change is proposed to the 33 tonne recreational allowance for CRA 8. The Rock Lobster Working Group assumed recreational harvest of 38.8 tonnes in recent years for use in the 2021 CRA 7 & 8 stock assessment model. There is no new information at this time to change the current 33 tonne allowance for recreational take in CRA 8; noting the considerable uncertainty in the information, it is believed that recreational take on average is within the current allowance.

262. Joint recreational submitters supported retaining the current recreational allowance and noted there is no new information to suggest the current allowance is not adequate. NZ RLIC noted it would be in principle willing to consider increasing the recreational allowance but acknowledged Te Rūnanga o Ngai Tahu's position and the very unreliable information on take and supported no change to the allowance. Te Rūnanga o Ngāi Tahu, NZ RLIC and CRA 8 RLIA noted their ongoing and increasing concern about the lack of any effective action to better measure and control recreational take.

Other mortality

263. Under Option 8.1 (status quo), the CRA 8 other mortality allowance would stay at its current level of 28 tonnes. This would not account for updated information on the estimated other mortality from the 2021 CRA 7 & 8 stock assessment.

264. Under Option 8.2, a 107 tonne increase is proposed to the 28 tonne CRA 8 allowance for other sources of fishing-related mortality, based on the new illegal take estimate and estimate of handling-related mortality from the 2021 CRA 7 & 8 stock assessment and then increasing it by 2% to reflect likely increases in other mortality as a result of increased abundance and fishing activity.

265. Under Option 8.3, a 111 tonne increase is proposed to the 28 tonne CRA 8 allowance for other sources of fishing-related mortality, based on the new illegal take estimate and estimate of handling-related mortality from the 2021 CRA 7 & 8 stock assessment and then increasing it by 5% to reflect likely increases in other mortality as a result of increased abundance and fishing activity.

[74] The handling mortality estimate for CRA 7 & 8 combined from the 2021 CRA 7 & 8 stock assessment is 97 tonnes. When this estimate is divided by the commercial catch taken for each stock between these two stocks, this results in CRA 8 (65% of the commercial catch in 2019/20 for Region 1, and 100% for Region 2) having an estimated 93 tonnes of handling mortality.

266. In the consultation document, it was proposed that the total estimates of illegal take and handling mortality be divided between CRA 7 and CRA 8 depending on the proportion of the existing other mortality allowance for each QMA. Estimates of illegal take and handling mortality generated by the stock assessment model are available for Region 1 (all of CRA 7 and part of CRA 8) and Region 2 (part of CRA 8) (Figure 11 and Tables 25 and 30 above). NZ RLIC suggested that it would be more appropriate to use the proportion of commercial catch that was taken for each QMA in each region given both estimates are derived from commercial catch.[75] Following consultation, FNZ and the NRLMG agreed to use NZ RLIC's suggested methodology, and amended the other mortality allowance and TAC accordingly for Option 8.2 and 8.3.

Total Allowable Commercial Catch

267. Under Option 8.1 (status quo), the CRA 8 TACC would stay at its current level of 1191.7 tonnes. This option maintains the current level of commercial utilisation.

268. Under Option 8.2 (10% TAC increase) the TACC would be increased by 23.8 tonnes to 1215.5 tonnes. If the TACC is increased under this option, it would allow the commercial sector to realise some increase in the utilisation benefits. This is unlikely to affect current utilisation benefits for non-commercial fishers.

269. The proposed 23.8 tonne TACC increase under Option 8.2 (10% TAC increase) has the potential to result in an increase of annual revenue to the catching sector alone of approximately $1.62 million (based on 2020/21 average port price information of $68.23 per kg). Downstream benefits to associated businesses and communities are also anticipated, though these benefits are more difficult to measure.

270. Under Option 8.3 (13% TAC increase) the TACC would be increased by 59.3 tonnes to 1251 tonnes. If the TACC is increased under this option, it would allow the commercial sector to realise a larger increase in the utilisation benefits than Option 8.2 (10% TAC increase). This is unlikely to affect current utilisation benefits for non-commercial fishers.

271. The proposed 59.3 tonne TACC increase under Option 8.3 (13% TAC increase) has the potential to result in an increase of annual revenue to the catching sector alone of approximately $4.05 million (based on 2020/21 average port price information of $68.23 per kg). Downstream benefits to associated businesses and communities are also anticipated, though these benefits are more difficult to measure.

272. CRA 8 RLIA submit that the 59.3 tonne TACC increase under Option 8.3 (13% TAC increase) will be worth approximately $5.3 million to CRA 8 fishers, with export earnings higher again. CRA 8 RLIA suggest a large portion of this will be spent within the southern economy, noting that this aligns with the government's aim of encouraging regional economic development. NZ RLIC note that economic gains will be particularly welcome to industry and associated businesses and the southern regional communities heavily impacted by the loss of tourism associated with the COVID-19 pandemic.

[75] For the 2020/21 fishing year, estimates of illegal catch (8.4 tonnes) and handling mortality (16.4 tonnes) were generated for Region 1 for the model (which includes all of CRA 7 and part of CRA 8), and estimates of illegal catch (34 tonnes) and handling mortality (81.4 tonnes) were generated for Region 2 (part of CRA 8). CRA 8 currently makes up 65% of commercial catch in Region 1, and all of Region 2. Taking 65% of each Region 1 estimate and adding Region 2 estimates suggests an allowance of 39.6 tonnes for illegal catch, and 93.4 tonnes for handling mortality for CRA 8, which (when added together) suggests a 132 tonne other mortality allowance for CRA 8. This allowance was increased by 2% to get the 135 tonne allowance proposed for Option 8.2, and increased by 5% to get the 139 tonne allowance proposed for Option 8.3.

12 Other relevant matters

12.1 Deemed values

273. Deemed values are charges commercial fishers must pay for every kilogram of stocks landed in excess of their Annual Catch Entitlement (ACE) holdings. The purpose of the deemed value framework is to encourage commercial fishers to balance their catch with ACE. The current deemed value rates for rock lobster stocks are presented in Table 31 below.

Table 31: Standard deemed value rates ($/kg) for all 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

274. FNZ notes that the interim deemed value rate is 90% of the annual deemed value rate for all 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, 7 and 8 are set at the same rate and FNZ has found them to be operating in accordance with the Guidelines, as catch does not exceed total ACE. Therefore, there are no changes proposed to the deemed value rates of the rock lobster stocks under review for 1 April 2022.

12.2 Other management issues

357. Table 32 below sets out additional information on rock lobster management measures the NRLMG wishes to bring to your attention.

Table 32: Rock lobster management issues and NRLMG considerations (continued over the page).

Management issue	Description
B_{MSY} reference levels and management targets	B_{MSY} reference levels and management targets are key components of your catch setting decisions, and can be used to guide management action. B_{MSY} reference levels have been developed for CRA 1, 2, 3, 4, 5, 7 & 8 and packhorse lobster. However, there are currently no accepted management targets for any rock lobster stock. The estimated B_{MSY} reference levels developed to date provide guidance for the red rock lobster stocks under review, but further work needs to occur to confirm specific management targets.
The NRLMG supports calculating the B_{MSY} reference level for CRA 6 at the next full stock assessment. The NRLMG acknowledges that it is not currently possible to calculate a B_{MSY} reference level for CRA 9. The NRLMG understands the importance of work to confirm management targets for red and packhorse rock lobster fisheries, including discussions around managing different sectors to move the stock towards the target, or maintain the stock at or above these management targets. The NRLMG will commence work with tangata whenua and stakeholders to develop these targets in 2022.	
More responsive decision-making	Changes to catch settings (TACs, allowances and TACCs) and regulatory measures (such as bag limits, MLS measures, and seasonal closures) are made under different legislative mechanisms, and as a result it can take much longer (years) to implement a regulatory change than catch settings.
The NRLMG support measures to align the legislative mechanism for catch settings and regulatory changes, so that the implementation of management measures for all sectors of a fishery can be co-ordinated and come into effect in similar timeframes and management is more responsive. A Fisheries Amendment Bill is in progress to amend fisheries legislation so that decisions on recreational bag limits and legal sizes can be implemented quickly. If approved, this Bill will reduce the delay between implementing changes to TACCs and changes to bag limits.	

Management issue	Description
Recreational catch estimation	Red rock lobster is a popular recreational species to catch throughout the country. Recreational fishers are not required to report the quantities of rock lobsters they catch, other than reporting by recreational charter vessels. Recreational harvest estimates are available from periodic National Panel Surveys (NPS) and creel survey approaches, but NRLMG sector members consider that that these estimates are too infrequent (up to five years apart) and not precise enough to inform annual management decisions. The most recent NPS surveys provide good harvest estimates for large fisheries, but for fisheries like rock lobster with relatively few participants the estimates had large error bounds.
More frequent surveys, or revised approaches that are available, need to be evaluated for their cost and utility for rock lobster fisheries. Information is also needed to inform adjustment of regulatory controls to achieve the management objective. These work areas will be a focus area for the NRLMG in 2022 and will involve the relevant Fisheries Assessment Working Groups. Current projects of note include: a five-year survey of trends in recreational harvest of rock lobster using boat ramp surveys in CRA 2 (Hauraki Gulf/Bay of Plenty); and on-site surveys of boat and land-based recreational harvest of rock lobster in part of CRA 5.	
Illegal catch estimation	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 rock lobster fisheries, and can compromise stock rebuilds.
Estimating illegal take is challenging because of the nature of the activity. The NRLMG considers that information can be collected and analysed to improve those estimates so they can be taken into account in the stock assessments and can inform management and compliance responses. In 2020/21, rock lobster fisheries were an area of national priority for MPI Fisheries Compliance. The NRLMG will continue to work with MPI Fisheries Compliance in 2022 to improve illegal take estimates and reduce illegal take, incorporating improved information collected during compliance activities, and the Compliance findings from 2020/21.	
Recreational accumulation limits	For most QMAs (other than CRA 5), at present there is no effective limit on the amount of rock lobster people can have in their possession at any one time. 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 rock lobster should be applied in all QMAs. This would assist in addressing circumstances where people deliberately exceed the daily bag limit or where the bag limit is consistently taken for sale or barter. This measure would complement the other measures in place to address illegal take.
The NRLMG will continue to monitor and assess the effectiveness of the accumulation limit that was implemented in the CRA 5 on 1 July 2020. During 2022 the NRLMG will consider proposing further accumulation limits in other rock lobster QMAs and may provide advice to you.	
Telson clipping	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. The intent of telson clipping is to discourage the illegal sale of rock lobsters. Poaching and black-market activity (i.e., taking rock lobsters for sale or barter outside of commercial entitlements) is a significant issue in a number of lobster fisheries. Illegal removals slow or prevent the rebuild of fisheries, can contribute to localised depletion, and deprive legitimate users of the catch they are entitled to, and depress the catch rate they could otherwise expect. The prevalence and scale of illegal activity is unknown but in some rock lobster fisheries is assumed to be significant, and has the potential to impact on stock sustainability. The allowance made in TAC setting for illegal unreported removals can reduce the TACCs that might otherwise be set, and therefore represent a direct economic loss to New Zealand. Telson clipping provides Fishery Officers with an additional 'tool in the toolbox' to address illegal take for sale in rock lobster fisheries by:

Management issue	Description
	a) Opportunistic non-commercial fishers who sell or barter their catch for financial gain; or b) Dedicated fish thieves who conceal their activity under legitimate non-commercial fishing. Based on the Kaikōura experience, the measure should 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. Telson clipping was introduced in the CRA 2 fishery on 1 July 2020. Some NRLMG members prefer further monitoring of the effectiveness of telson clipping before its introduction in further areas of the fishery. Other NRLMG members support the adoption of telson clipping nationally for recreationally caught lobsters by amendment to regulations for all QMAs.
The NRLMG will continue to monitor and assess the effectiveness of the telson clipping measure that was implemented in CRA 2 and CRA 5 on 1 July 2020. During 2022, the NRLMG will consider proposing telson clipping in other rock lobster QMAs and may provide advice to you.	
Recreational charter vessel industry	Amateur charter-fishing vessels (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.
The NRLMG supports better management of ACV fishing overall, and improvements to the reporting regime. In 2022, the NRLMG will work to provide advice to the Minister on how to better manage the recreational ACV sector.	

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Addendum 1 – Other matters raised in submissions

The following matters were raised in submissions that did not relate to the proposed sustainability measures discussed in this paper:

Topic	Submitter	NRLMG Response
Non-commercial removals		
Estimating and effectively managing recreational harvest	NZ RLIC, Leigh Lobster & Associates Ltd, Te Ohu Kaimoana, Gisborne Fisheries, Lee Fish Ltd, Bruce Sanderson, NZ Red Holdings Ltd, Glen Coulston, CRA 8 RLIA	NRLMG tangata whenua, recreational and commercial sector members are concerned about the timeliness and substantial uncertainty of recreational harvest estimates from rock lobster fisheries as a basis for fisheries management decisions. They consider that the need for reliable and credible recreational harvest data is particularly important in areas where the level of recreational fishing and diving activity are higher. Commercial sector members further note it has been demonstrated that poor information poses risks to stocks. They consider that there is an urgent need to consider other assessment approaches, and delays in adjustment to recreational management controls need to be addressed. CRA 8 RLIA suggested that you direct Fisheries New Zealand to address this matter in your decision letter. The most recent National Panel Survey was carried out for the 2017/18 year. Fisheries New Zealand invests a considerable amount of its fisheries research budget into obtaining recreational harvest estimates for key fishstocks. This matter has been identified as a priority matter to be addressed by the NRLMG in 2022.
Estimating and effectively constraining illegal harvest	NZ RLIC, Terence Brocx , Ngatiwai Trust Board, Te Ohu Kaimoana, CRA 8 RLIA	Accurately identifying and effectively constraining and reducing illegal take of rock lobster is a matter of high priority for the NRLMG. It is considered that the estimates of illegal take are inaccurate, and may be compromising the accuracy of stock assessments, the appropriate setting of catch limits, and the sustainable utilisation of rock lobster fisheries. Fisheries New Zealand notes that estimating illegal removals is inherently difficult, as by its nature it is hard to detect. This matter has been identified as a priority matter to be explored by the NRLMG in 2022.
Requiring recreational catch reporting via an app	Fiordland Marine Guardians, Terence Brocx	Fisheries New Zealand continues to review and develop methodologies for estimating amateur harvest via the Marine Amateur Fisheries Working Group (MAFWG). Fisheries New Zealand is currently investigating the viability of self-reporting of catch via an app for certain species in the South Island alongside the recreational body Fish Mainland. Depending on the results of this work, the Fisheries New Zealand may consider proposing a wider scale project.
Regulatory measures		
Recreational accumulation limit and telson clipping	NZ RLIC	NZ RLIC recommends that the work programme for the NRLMG should include the application of an accumulation limit and associated 'bag and tag' conditions on all management areas. It also recommends that the NRLMG should advise you to adopt telson clipping for recreationally caught lobsters across New Zealand. These measures would complement the other measures in place to address illegal take nationally. The NRLMG will continue to monitor and assess the effectiveness of the telson clipping measures that were implemented in CRA 2 and CRA 5, and the accumulation limit measure that was implemented in CRA 5, on 1 July 2020. These matters will be explored by the NRLMG in 2022.
Better management of amateur charter-fishing vessels (ACVs) and use of ACV data	Fiordland Marine Guardians, NZ RLIC	NZ RLIC consider that steps need to be taken to better manage amateur charter vessel fishing overall and its expansion and the consequent increase in take. They suggest that the NRLMG must have a focus on providing advice to you in 2022 to better manage the amateur charter vessel sector.

Topic	Submitter	NRLMG Response
Reducing the daily recreational bag limit for red rock lobster (such as CRA 1)	Terence Brocx	The NRLMG is not currently proposing to review the daily bag limit for any CRA stocks. A reduction to recreational bag limits will be considered in the future if required to manage catch (on average) to the allowance. As noted above, if you decide to reduce the recreational allowance for CRA 1, the NRLMG will provide you with subsequent advice on reducing the daily recreational bag limit for CRA 1.
Reducing the daily recreational bag limit for packhorse rock lobster to two	Terence Brocx	The NRLMG is not currently proposing to review the daily bag limit for PHC 1. A reduction to the PHC 1 recreational bag limits will be considered in the future if required to manage catch (on average) to the allowance.
Increasing the CRA 1 minimum legal size	Luke Williamson	The NRLMG is not currently proposing to review the minimum legal size for CRA 1.
Revoke the CRA 3, 7 & 8 differential minimum legal sizes	Joint recreational submitters, ECO	Fisheries New Zealand is not proposing to review the differential minimum legal sizes in CRA 7 and CRA 8 at this time. It supports the NRLMG's review of the CRA 3 management controls, including the differential minimum legal size, which is currently in progress. The NRLMG will be providing advice to you in the coming months regarding the review of the CRA 3 minimum legal size.
Seasonal ban when species are spawning	Richard Potter	The NRLMG is not proposing a ban on fishing rock lobster during the spawning season. The NRLMG notes that there is already regulatory protection for spawning females – berried (egg-bearing) females must be returned to the water.
Collecting information that would allow separate assessment and management of East Northland	Joint recreational submitters	The CRA 1 industry will continue to collect catch and biological information from commercial fishers via catch sampling and logbooks. The next CRA 1 stock assessment will investigate whether it is possible to determine East Northland specific trends. Separate management of East Northland is not currently being considered, but may be considered in future depending on tangata whenua and stakeholder views and available information.
Ecological information		
Ecosystem based management of CRA stocks and the ecological role of rock lobsters	ECO, Prof Andrew Jeffs, Ryan Welsh, MTSCT, Forest & Bird	Fisheries New Zealand is continuing to develop its pathway towards ecosystem-based fisheries management, including consideration of the ecological role of rock lobsters.
Development of consultation options and final advice		
Better disclosure of information gaps	Forest & Bird	The NRLMG will continue to note uncertainty in information, or the lack thereof, where relevant in consultation and final advice papers.
An allocation policy is needed to guide advice provided under s 21 of the Act	NZ RLIC	Fisheries New Zealand notes that the development of allocation policy is not a new issue. An allocation policy would be extremely challenging to develop.
Digital monitoring		
Electronic reporting requirements are excessive and are creating issues with collecting essential information	NZ RLIC	Fisheries New Zealand will continue to work with industry and Fisheries Compliance to determine any changes to the electronic reporting system that are appropriate.
Requiring the landing of live QMS finfish caught in pots	NZ RLIC	NZ RLIC notes this is problematic because the fish are better returned to the sea and there is no ACE available. Fisheries New Zealand and Fisheries Policy will continue to engage with industry when determining further advice on the Landings and Discards Policy.

Addendum 2 – Stock projections for CRA 7 & 8

The following catch projections were generated for the CRA 7 & 8 stock assessment in 2021. Under current catches, the combined CRA 7 & 8 vulnerable biomass is projected to increase (red line). Reducing catches by 10% and 20% is projected to increase the biomass further (green and brown lines, respectively). Increasing the catch by 10% (blue line) is projected to result in an increase to the vulnerable biomass that is smaller than the status quo. Increasing the catch by 20% (purple line) is projected to result in biomass decreasing slightly, to a similar level to the 2020 biomass level.

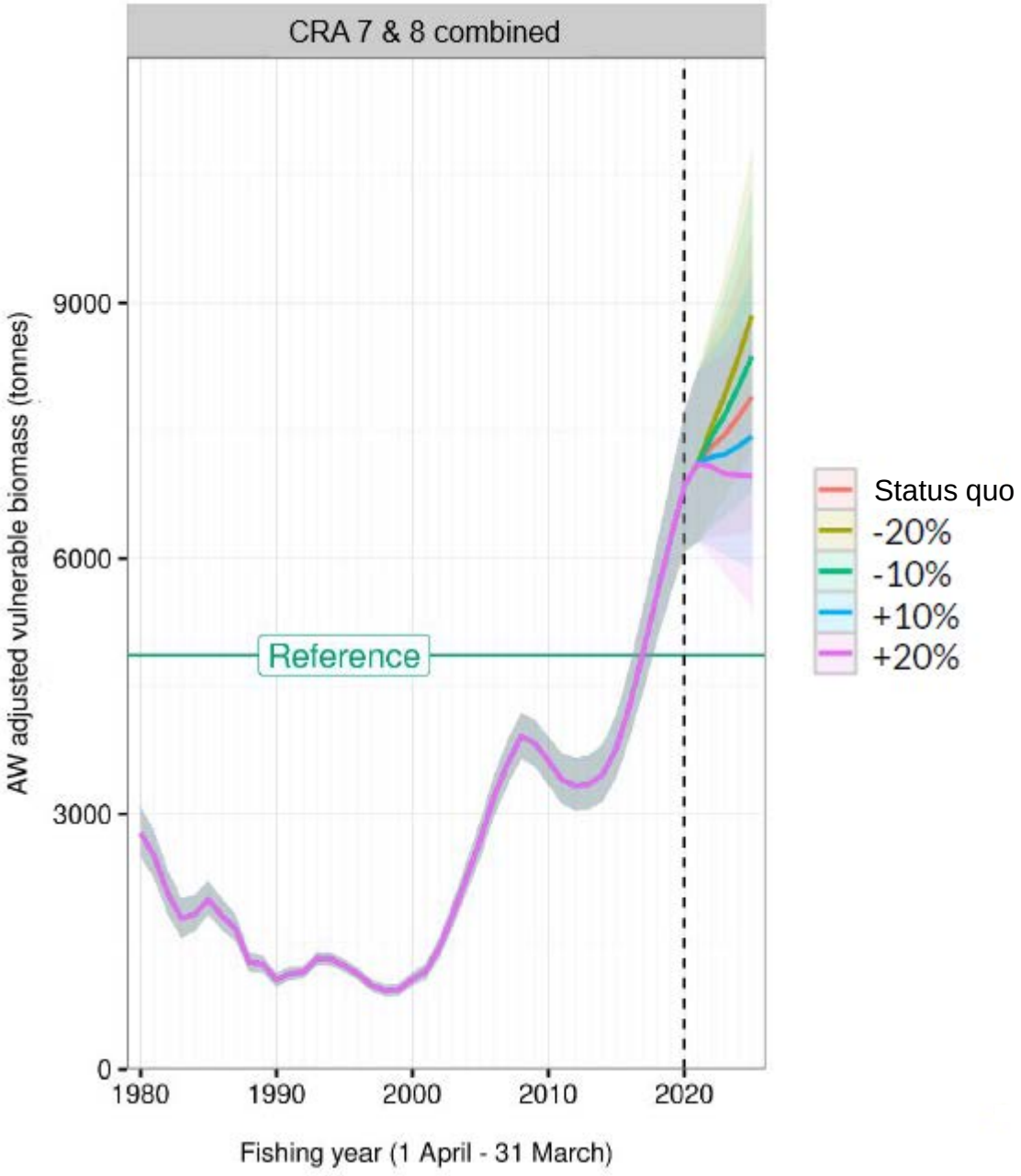

Figure A1: Projections of CRA 7 & 8 combined autumn/winter (AW) adjusted vulnerable biomass over the next four years at a range of catch levels (catch reductions and increases apply to the TACC and 2020 non-commercial catches): no change (red), +10% (blue), +20% (purple), -10% (green) and -20% (brown). The solid lines represent the median and the shaded region represents the 90% credible interval. The horizontal green line shows the B_{MSY} reference level.

Submissions received on the Discussion Document

Should you wish to view any submissions received on rock lobster proposals, a full copy of the rock lobster submissions, titled "*Public Submissions received for the April 2022 Sustainability Round"* has been provided to your office.