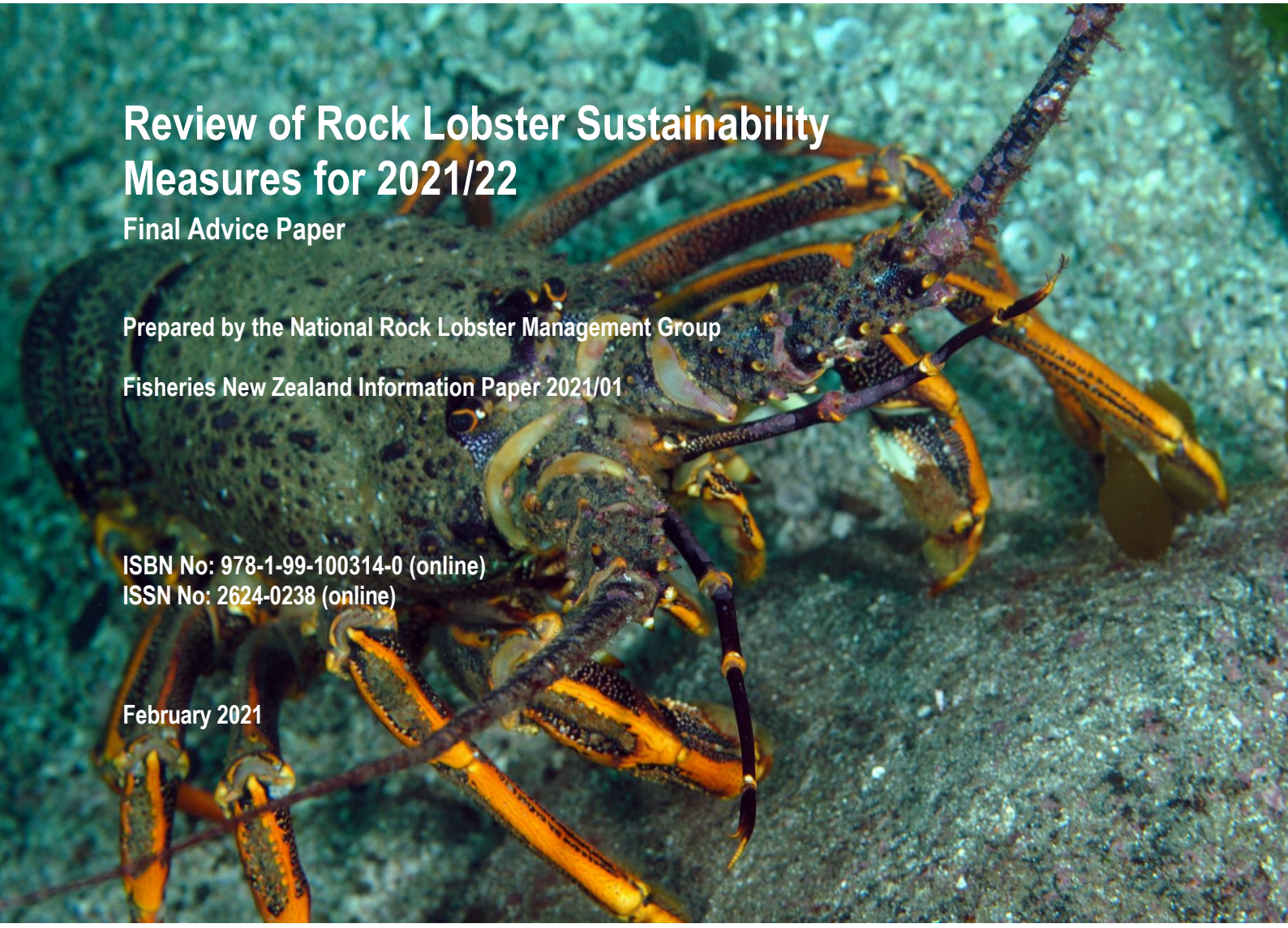
NATIONAL ROCK LOBSTER MANAGEMENT GROUP



Review of Rock Lobster Sustainability Measures for 2021/22

Final Advice Paper

Prepared by the National Rock Lobster Management Group

Fisheries New Zealand Information Paper 2021/01

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Contents

Page

1	**Rock lobster stocks being reviewed**	**1**
2	**Summary**	**2**
3	**NRLMG recommendations**	**4**
3.1	CRA 1 (Northland)	4
3.2	CRA 3 (Gisborne)	5
3.3	CRA 4 (Wellington/Hawke's Bay)	5
3.4	CRA 5 (Canterbury/Marlborough)	6
3.5	PHC 1 (all of New Zealand)	6
3.6	Other matters	7
4	**Decisions**	**8**
5	**Why are we proposing that you review the TACs, allowances and TACCs?**	**12**
6	**Background information**	**12**
6.1	Estimation of B_{MSY} reference levels	12
6.2	Digital monitoring of commercial fishing and alternative assessment approaches	13
6.3	Quota Management System	14
7	**Central statutory considerations**	**14**
8	**Input and participation, and consultation**	**18**
8.1	Input and participation of tangata whenua	18
8.2	Consultation process	19
9	**Review of the CRA 1 (Northland) red rock lobster fishery**	**23**
9.1	CRA 1 stock status	23
9.2	CRA 1 fishery overview	26
9.3	Final CRA 1 options	28
9.4	Summary of CRA 1 submissions	29
9.5	Analysis	30
10	**Review of the CRA 3 (Gisborne) red rock lobster fishery**	**32**
10.1	CRA 3 stock status	32
10.2	CRA 3 fishery overview	36
10.3	Final CRA 3 options	38
10.4	Summary of CRA 3 submissions	39
10.5	Analysis	41
11	**Review of the CRA 4 (Wellington/Hawke's Bay) red rock lobster fishery**	**43**
11.1	CRA 4 stock status	43
11.2	CRA 4 fishery overview	47
11.3	Final CRA 4 options	49
11.4	Summary of CRA 4 submissions	49
11.5	Analysis	51
12	**Review of the CRA 5 (Canterbury/Marlborough) red rock lobster fishery**	**53**
12.1	CRA 5 stock status	53
12.2	CRA 5 fishery overview	57
12.3	Final CRA 5 options	59
12.4	Summary of CRA 5 submissions	60
12.5	Analysis	61
13	**Review of the PHC 1 (all of New Zealand) packhorse rock lobster fishery**	**62**
13.1	PHC 1 stock status	62
13.2	PHC 1 fishery overview	64
13.3	Final PHC 1 options	65

13.4 Summary of PHC 1 submissions 66
13.5 Analysis 68
14 Other relevant matters 72
14.1 Deemed values 72
14.2 Proposed future consultations 72
14.3 Other management issues 74
Addendum 1 – Other statutory considerations 76
Addendum 2 – Other matters raised in submissions 78

Submissions received on the Discussion Document Available as separate document

1 Rock lobster stocks being reviewed

Red or spiny rock lobster[1]
(CRA 1, CRA 3, CRA 4, CRA 5)
Jasus edwardsii, kōura, crayfish

Packhorse rock lobster (PHC 1)
Sagmariasus verreauxi
pawharu, green rock lobster

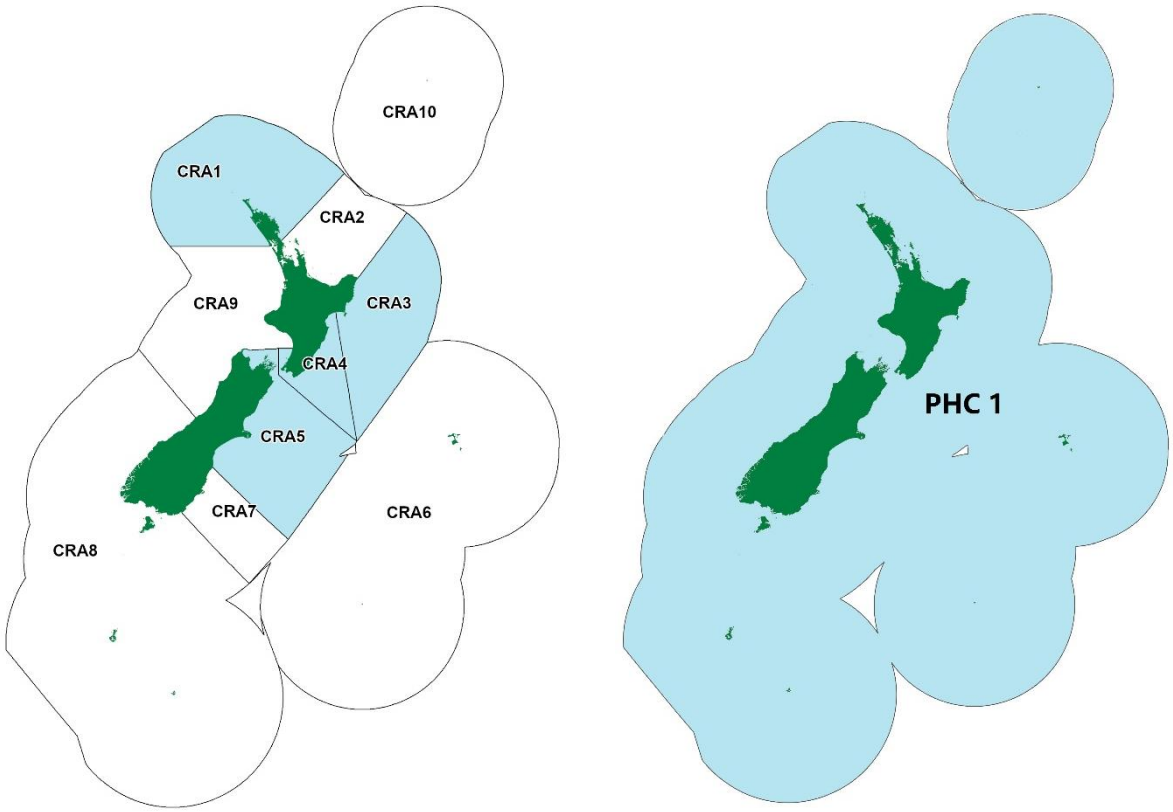

Figure 1: Map of rock lobster Quota Management Areas, showing stocks under review in blue.

Spiny (red) rock lobster
Jasus edwardsii
Dark red colour with a spiny body and tail

Packhorse lobster
Sagmariasus verreauxi
Green colour with smooth tail segments; larger size

[1] Hereafter referred to as red rock lobster.

2 Summary

1. The National Rock Lobster Management Group (NRLMG) asks you to make decisions on sustainability measures for four red rock lobster stocks and one packhorse rock lobster stock from 1 April 2021: CRA 1 (Northland), CRA 3 (Gisborne), CRA 4 (Wellington/Hawke's Bay), CRA 5 (Canterbury/Marlborough), and PHC 1 (all of New Zealand) (Figure 1).

2. Rock lobster stocks support important shared fisheries. They are considered taonga to tangata whenua, are popular recreational species, and support valuable export markets and regionally important industries. Stocks are regularly reviewed to provide for the ongoing sustainable use of the resource, reflecting a responsive management approach.

3. The NRLMG's management goal is for all rock lobster fisheries "to be managed and maintained at or above agreed reference levels, using a comprehensive approach that recognises a range of customary Māori, recreational, commercial, and environmental concerns and values".

4. The proposals presented in this paper are based on new stock assessment results from 2019 and/or 2020. Best available information indicates that CRA 3, CRA 4 and CRA 5 stocks will decline over the next four years under current catch settings Meanwhile, CRA 1 is projected to increase slightly. All four red rock lobster stocks are expected to remain well above biomass levels where a formal rebuild plan is required.

5. A new stock assessment for packhorse rock lobster suggests the stock has increased in abundance in recent years and is predicted to stay at the current biomass level under the current catch settings. Monitoring information also suggests catch rates have been increasing in recent years.

6. Table 1 provides an overview of the final proposals for each red and packhorse rock lobster stock under review. In summary, the NRLMG suggests that you:
   - Either maintain or reduce the **CRA 1** catch settings .[2]based on the results of a new rapid assessment update;
   - Reduce the **CRA 3** catch settings based on the results of a new rapid assessment update;
   - Reduce the **CRA 4** catch settings based on the results of a new stock assessment;
   - Make no change to the **CRA 5** catch settings based on the results of a new stock assessment;
   - Make no change to the Māori customary non-commercial allowances for any red rock lobster stock; and
   - Set a Total Allowable Catch (TAC) for **PHC 1** for the first time and either maintain or increase the existing Total Allowable Commercial Catch (TACC) limit.

7. There is no new stock assessment information available to suggest that TAC changes are needed for the CRA 6 (Chatham Islands), CRA 7 (Otago), CRA 8 (Southern), and CRA 9 (Taranaki/Westland) red rock lobster fisheries.

8. 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.[3] The preliminary 2020 rapid assessment update results for CRA 2 suggest abundance has increased 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.

[2] 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).

[3] 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 3, CRA 4, CRA 5, and PHC 1.
Options: *New* - added post consultation; *SA* – based on a new stock assessment, and *RA*: based on a rapid assessment update.

Stock	Option	TAC	TACC	Allowances			NRLMG support
				Māori customary	Recreational	Other mortality	
CRA 1 Northland	**Option 1.1** Status quo	203	110	20	32	41	✓ Tangata whenua, Commercial[4] & Fisheries NZ
	Option 1.2 – RA Decrease the TAC by 11%	180.5 ↓ (11%)	100 ↓ (9%)	20	29 ↓	31.5 ↓	✓ Recreational & Environmental
CRA 3 Gisborne	**Option 3.1** Status quo	351.9	222.9	20	20	89	X No support
	Option 3.2 – RA Decrease the TAC by 10%	317.5 ↓ (10%)	209.5 ↓ (6%)	20	13 ↓	75 ↓	
	Option 3.3 – RA Decrease the TAC by 14%	302 ↓ (14%)	195 ↓ (13%)	20	12 ↓	75 ↓	✓ All[4]
	Option 3.4 – RA Decrease the TAC by 19%	284 ↓ (19%)	178 ↓ (20%)	20	11 ↓	75 ↓	
CRA 4 Wellington/ Hawke's Bay	**Option 4.1** Status quo	513.8	318.8	35	85	75	X No support
	Option 4.2 – SA Decrease the TAC by 24%	388 ↓ (24%)	280 ↓ (12%)	35	40 ↓	33 ↓	✓ All[4]
	Option 4.3 – SA Decrease the TAC by 30%	361 ↓ (30%)	260 ↓ (18%)	35	33 ↓	33 ↓	
CRA 5 Canterbury/ Marlborough	**Option 5.1** Status quo	514	350	40	87	37	✓ All
	Option 5.2 – SA Decrease the TAC by 6%	484.5 ↓ (6%)	332.5 ↓ (5%)	40	75 ↓	37	
PHC 1 All of New Zealand	**Current settings**	-	**40.3**	-	-	-	
	Option P.1 - SA Set the TAC at 65.3 tonnes	65.3	40.3	10	10	5	✓ Environmental
	Option P.2 - SA Set the TAC at 79.3 tonnes	79.3	49.3 ↑ (22%)	10	15	5	✓ Recreational & Fisheries NZ
	Option P.3 - SA Set the TAC at 88 tonnes	88	58 ↑ (44%)	10	15	5	
	Option P.4 – New Set the TAC at 83 tonnes	83	58 ↑ (44%)	10	10	5	✓ Tangata whenua & Commercial

[4] NRLMG commercial and North Island tangata whenua members consider that any change to the TAC for these stocks needs to be considered in parallel with a review of management controls (such as recreational daily bag limits to manage recreational removals to the allowance). This is relevant to CRA 1 (Option 1.1), CRA 3 (Option 3.2, 3.3 and 3.4) and CRA 4 (Option 4.3).

3 NRLMG recommendations

9. The NRLMG is a national-level, multi-stakeholder group comprising representatives of tangata whenua[5], recreational and commercial fishing sectors, environmental interests, and Fisheries New Zealand. The NRLMG has acted as the primary advisor to Ministers on catch limit, regulatory and other management actions that apply to rock lobster fisheries since 1992.

10. The current membership of the NRLMG includes: 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). Fisheries New Zealand supports the group by providing the secretariat as well as scientific and fisheries management advice. The appointment of a new independent Chair of the NRLMG is underway, and is expected to be completed in April this year.[6]

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.

12. The NRLMG reached agreement on single recommendations for CRA 3 (Gisborne), CRA 4 (Wellington/Hawke's Bay), and CRA 5 (Canterbury/Marlborough), but was unable to reach consensus recommendations for CRA 1 (Northland) and PHC 1 (all of New Zealand).

3.1 CRA 1 (Northland)

13. The results of the 2020 rapid assessment update of the 2019 CRA 1 stock assessment suggested that spawning stock biomass[7] was well above the soft limit of 20%, where it is Fisheries New Zealand 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)[8]) reference level for CRA 1. Vulnerable biomass[9] was above the B_{MSY} reference level in 2020, and is projected to increase slightly over the next four years with 2020 catch levels.

14. **Tangata whenua and commercial NRLMG members, and Fisheries New Zealand** recommend that you agree to Option 1.1, which is to retain the current settings for CRA 1. They consider that the previous year's reductions to the TAC, TACC and allowances 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 now projected to increase by 2024 under the status quo according to the 2020 rapid assessment update.

15. NRLMG commercial and North Island tangata whenua members consider that the change to the TAC under Option 1.1 should be accompanied by a review of management controls to manage recreational removals to the allowance.

16. **Recreational and environmental NRLMG members** support Option 1.2, which is to decrease the TAC by 22.5 tonnes, decrease the TACC by 10 tonnes, decrease the recreational allowance by 3 tonnes, and decrease the other mortality allowance by 9.5 tonnes. Recreational and environmental members consider that further reductions to the TAC are required to increase the likelihood that the vulnerable biomass will increase.

17. Submitters were divided on whether a decrease to the CRA 1 TAC is required. Commercial submitters supported the status quo, and customary submitters supported retaining the TACC.

[5] 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).
[6] The previous Chair's term ended in 2020.
[7] Beginning of season autumn-winter spawning biomass (mature females).
[8] 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.).
[9] Beginning of season autumn-winter vulnerable biomass (legal males and females not bearing eggs).

Recreational, environmental, and public submitters generally supported Option 1.2, or a non-specified decrease to catch settings.

18. The TAC will also be reviewed again for April 2022, following further work on developing an agreed management target for CRA 1 during 2021. This would provide an opportunity to review catch settings and management controls to address any sustainability concerns.

3.2 CRA 3 (Gisborne)

19. As a result of the 2019 stock assessment, a 14% decrease to the TAC and a 13% decrease to the TACC were proposed for 1 April 2020. The previous Minister chose to retain the status quo at that time, recognising the under-catch of the TACC for the 2019/20 fishing year that was expected as a result of the impacts of the COVID-19 outbreak.

20. The results of the 2020 rapid assessment update of the 2019 CRA 3 stock assessment suggested that spawning stock biomass was well above the soft limit of 20%. There is an agreed reference level for CRA 3. Vulnerable biomass was above the reference level in 2020 and is projected to stay stable or decline slightly over the next four years at 2020 catch levels.

21. **All of the members of the NRLMG** recommend that you agree to Option 3.3, which is to decrease the TAC by 49.9 tonnes, decrease the TACC by 27.9 tonnes, decrease the recreational allowance by 8 tonnes, and decrease the other mortality allowance by 14 tonnes. The reductions to the recreational and other mortality allowances are proposed to more closely reflect the estimates used in recent assessments, and the estimate of recreational harvest from the 2017/18 National Panel Survey. This option is projected to lead to a 12-13% increase in vulnerable biomass over the next four years and is similar to the decrease in catch settings which was proposed to the Minister for 1 April 2020.

22. NRLMG commercial and North Island tangata whenua members consider that the change to the TAC under Options 3.2, 3.3 and 3.4 should be accompanied by a review of management controls to manage recreational removals to the allowance.

23. The majority of submitters agreed that a decrease to the TAC was required to support the sustainability of the CRA 3 stock. The majority supported Option 3.3, and some recreational, environmental, and public submitters supported a larger decrease under Option 3.4.

24. The TAC will also be reviewed again for April 2022, following further work on developing an agreed management target for CRA 3 during 2021. This would provide an opportunity to review catch settings and management controls to address any sustainability concerns.

25. Later this year, the NRLMG will present you with separate advice on CRA 3 management controls. This will include advice on the differential minimum legal size regime that allows commercial fishers to land male rock lobsters at or above 52 mm tail width, rather than 54 mm tail width, during June, July and August. This advice will inform the next steps and whether public consultation on regulatory amendments should be progressed.

3.3 CRA 4 (Wellington/Hawke's Bay)

26. The results of the 2020 CRA 4 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 4. Current vulnerable biomass is above this level but is projected to decline just below the reference level over the next four years with 2020 catch levels.

27. In recent years, there have been tangata whenua and stakeholder concerns with the overall productivity of the stock, and there has been majority support for a cautious management approach in this fishery. For the past two years, the status quo has been maintained despite the management procedure at the time suggesting increases to the TAC/TACC.

28. **All of the members of the NRLMG** recommend that you agree to Option 4.2, which is to decrease the TAC by 125.8 tonnes, decrease the TACC by 38.8 tonnes, decrease the

recreational allowance by 45 tonnes, and decrease the other mortality allowance by 42 tonnes. This is proposed to prevent decline in biomass and start a trajectory of increasing biomass.

29. NRLMG commercial and North Island tangata whenua members consider that the change to the TAC under Option 4.3 should be accompanied by a review of management controls to manage recreational removals to the allowance.

30. The majority of submitters agreed that a decrease in removals is required to support the sustainability of the CRA 4 stock. A number of alternative options were submitted on, but generally, all sectors supported a decrease to catch limits. Recreational sector and public submitters supported Option 4.3 or a non-specified decrease, customary sector submitters supported reducing the TAC, but maintaining the TACC, and commercial sector submitters supported Option 4.2 or the status quo.

31. The TAC will also be reviewed again from April 2022, following further work on developing an agreed management target for CRA 4 during 2021. This would provide an opportunity to adjust catch settings to address any further sustainability concerns.

3.4 CRA 5 (Canterbury/Marlborough)

32. The results of the 2020 CRA 5 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 5, and vulnerable biomass is projected to decline, but stay well above the reference level over the next four years with 2020 catch levels.

33. **All members of the NRLMG** recommend that you agree to Option 5.1, which is to retain the current settings for CRA 5.

34. Submitters were divided on whether a decrease to the CRA 5 TAC is required, with the majority of submitters supporting the status quo. Commercial and some recreational sector submitters supported the status quo, and customary sector submitters supported retaining the TACC. Recreational, environmental, and public submitters generally supported Option 5.2, or a non-specified decrease to catch settings.

35. The TAC will also be reviewed again from April 2022, following further work on developing an agreed management target for CRA 5 during 2021. This would provide an opportunity to adjust catch settings to address any sustainability concerns.

3.5 PHC 1 (all of New Zealand)

36. Packhorse rock lobster is taken mainly in the north of the North Island, including the Bay of Plenty. The results of the first successful PHC 1 stock assessment, conducted in 2020, suggested that the stock is the well above B_{MSY}, and that the MSY (calculated as the commercial catch and the recreational allowance) was 68.4 tonnes. It is projected that vulnerable stock biomass will stay constant with 2020 catch levels and decline slightly with increased catch by 2024. Under options P.2, P.3 and P.4, abundance is predicted to decline towards the B_{MSY} level.

37. The NRLMG agrees that the TACC and recreational allowance should not exceed the 68.4 tonne MSY, but members have differing opinions about the levels at which to set the TAC, TACC and recreational allowance.

38. **Environmental NRLMG members** recommend that you agree to Option P.1, which is to set the TAC at 65.3 tonnes, retain the TACC at 40.3 tonnes, set the customary Māori allowance at 10 tonnes, set the recreational allowance at 10 tonnes, and set the other mortality allowance at 5 tonnes.

39. **Recreational NRLMG members, and Fisheries New Zealand** recommend that you agree to Option P.2, which is to set the TAC at 79.3 tonnes, increase the TACC by 9 tonnes, set the customary Māori allowance at 10 tonnes, set the recreational allowance at 15 tonnes, and set

the other mortality allowance at 5 tonnes. This option would set commercial and recreational catch limits under the level of the estimated MSY.

40. **Tangata whenua and commercial NRLMG members** recommend that you agree to Option P.4, which is to set the TAC at 83 tonnes, increase the TACC by 17.7 tonnes, set the customary Māori allowance at 10 tonnes, set the recreational allowance at 10 tonnes, and set the other mortality allowance at 5 tonnes. This option would set commercial and recreational catch limits at the level of the estimated MSY, based on the estimate of recreational removals used in the model.

41. There was split support amongst submitters for the level the PHC 1 TAC, recreational allowance, and TACC should be set at. Environmental sector and public submitters generally supported Option P.1, recreational sector submitters generally supported Option P.2, commercial sector submitters generally supported options that provided for a higher TACC (either Option P.3 or Option P.4), and customary sector submitters generally supported Option P.1 with some support for Options P.3 and P.4.

3.6 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 14.3 – Other management issues*.

4 Decisions

CRA 1 (Northland)

Option 1.1 (Status quo) *(NRLMG tangata whenua and commercial members and Fisheries New Zealand 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 DvP 16/3/21

~~Agreed / Agreed as Amended / Not Agreed~~ DvP

OR

Option 1.2 *(NRLMG recreational and environmental members recommended)*

Agree to reduce the CRA 1 TAC from 203 to 180.5 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 29 tonnes;

iii. Reduce the allowance for all other sources of mortality to the stock caused by fishing from 41 to 31.5 tonnes;

iv. Reduce the CRA 1 TACC from 110 to 100 tonnes.

~~Agreed / Agreed as Amended / Not Agreed~~ DvP

CRA 3 (Gisborne)

Option 3.1 (Status quo)

Agree to retain the CRA 3 TAC at 351.9 tonnes and within the TAC:

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

ii. Retain the allowance of 20 tonnes for recreational fishing interests;

iii. Retain the allowance of 89 tonnes for all other sources of mortality to the stock caused by fishing;

iv. Retain the CRA 3 TACC at 222.9 tonnes.

~~Agreed / Agreed as Amended / Not Agreed~~ DvP

Not agreed

OR

Option 3.2

Agree to reduce the CRA 3 TAC from 351.9 to 317.5 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 20 to 13 tonnes;

iii. Reduce the allowance for all other sources of mortality to the stock caused by fishing from 89 to 75 tonnes;

iv. Reduce the CRA 3 TACC from 222.9 to 209.5 tonnes.

Not agreed.

~~Agreed / Agreed as Amended / Not Agreed~~ DvP

OR

Option 3.3 *(NRLMG recommended, including Fisheries New Zealand)*

Agree to reduce the CRA 3 TAC from 351.9 to 302 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 20 to 12 tonnes;

iii. Reduce the allowance for all other sources of mortality to the stock caused by fishing from 89 to 75 tonnes;

iv. Reduce the CRA 3 TACC from 222.9 to 195 tonnes.

Agreed / ~~Agreed as Amended / Not Agreed~~

OR

Option 3.4

Agree to reduce the CRA 3 TAC from 351.9 to 284 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 20 to 11 tonnes;

iii. Reduce the allowance for all other sources of mortality to the stock caused by fishing from 89 to 75 tonnes;

iv. Reduce the CRA 3 TACC from 222.9 to 178 tonnes.

~~Agreed / Agreed as Amended~~ / Not Agreed

CRA 4 (Wellington/Hawke's Bay)

Option 4.1 (Status quo)

Agree to retain the CRA 4 TAC at 513.8 tonnes and within the TAC:

i. Retain the allowance of 35 tonnes for Māori customary non-commercial fishing interests;

ii. Retain the allowance of 85 tonnes for recreational fishing interests;

iii. Retain the allowance of 75 tonnes for all other sources of mortality to the stock caused by fishing;

iv. Retain the CRA 4 TACC at 318.8 tonnes.

~~Agreed / Agreed as Amended~~ / Not Agreed

OR

Option 4.2 *(NRLMG recommended, including Fisheries New Zealand)*

Agree to reduce the CRA 4 TAC from 513.8 to 388 tonnes and within the TAC:

i. Retain the allowance of 35 tonnes for Māori customary non-commercial fishing interests;

ii. Reduce the allowance for recreational fishing interests from 85 to 40 tonnes;

iii. Reduce the allowance for all other sources of mortality to the stock caused by fishing from 75 to 33 tonnes;

iv. Reduce the CRA 4 TACC from 318.8 to 280 tonnes.

Agreed

~~Agreed / Agreed as Amended~~ / Not Agreed

OR

Option 4.3

Agree to reduce the CRA 4 TAC from 513.8 to 361 tonnes and within the TAC:

i. Retain the allowance of 35 tonnes for Māori customary non-commercial fishing interests;

ii. Reduce the allowance for recreational fishing interests from 85 to 33 tonnes;

iii. Reduce the allowance for all other sources of mortality to the stock caused by fishing from 75 to 33 tonnes;

iv. Reduce the CRA 4 TACC from 318.8 to 260 tonnes.

~~Agreed / Agreed as Amended~~ / Not Agreed

CRA 5 (Canterbury/Marlborough)

Option 5.1 (Status quo) *(NRLMG recommended, including Fisheries New Zealand)*

Agree to retain the CRA 5 TAC at 514 tonnes and within the TAC:

i. Retain the allowance of 40 tonnes for Māori customary non-commercial fishing interests;

ii. Retain the allowance of 87 tonnes for recreational fishing interests;

iii. Retain the allowance of 37 tonnes for all other sources of mortality to the stock caused by fishing;

iv. Retain the CRA 5 TACC at 350 tonnes.

Agreed / ~~Agreed as Amended / Not Agreed~~

OR

Option 5.2

Agree to reduce the CRA 5 TAC from 514 to 484.5 tonnes and within the TAC:

i. Retain the allowance of 40 tonnes for Māori customary non-commercial fishing interests;

ii. Reduce the allowance for recreational fishing interests from 87 to 75 tonnes;

iii. Retain the allowance of 37 tonnes for all other sources of mortality to the stock caused by fishing;

iv. Reduce the CRA 5 TACC from 350 to 332.5 tonnes.

~~Agreed / Agreed as Amended~~ / Not Agreed

PHC 1 (all of New Zealand)

Option P.1 *(NRLMG environmental members recommended)*

Agree to set the PHC 1 TAC at 65.3 tonnes and within the TAC:

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

ii. Set the allowance of 10 tonnes for recreational fishing interests;

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

iv. Retain the PHC 1 TACC at 40.3 tonnes.

~~Agreed / Agreed as Amended~~ / Not Agreed

OR

Option P.2 *(NRLMG recreational members and Fisheries New Zealand recommended)*

Agree to set the PHC 1 TAC at 79.3 tonnes and within the TAC:

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

ii. Set the allowance of 15 tonnes for recreational fishing interests;

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

iv. Increase the PHC 1 TACC from 40.3 to 49.3 tonnes.

Agreed

~~Agreed / Agreed as Amended / Not Agreed~~

OR

Option P.3

Agree to set the PHC 1 TAC at 88 tonnes and within the TAC:

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

ii. Set the allowance of 15 tonnes for recreational fishing interests;

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

iv. Increase the PHC 1 TACC from 40.3 to 58 tonnes.

~~**Agreed / Agreed as Amended /** **Not Agreed**~~

OR

Option P.4 *(NRLMG tangata whenua and customary members recommended)*

Agree to set the PHC 1 TAC at 83 tonnes and within the TAC:

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

ii. Set the allowance of 10 tonnes for recreational fishing interests;

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

iv. Increase the PHC 1 TACC from 40.3 to 58 tonnes.

~~**Agreed / Agreed as Amended**~~ **/ Not Agreed**

Hon David Parker
Minister for Oceans and Fisheries

5 / 3 / 2021

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

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

44. Every year the NRLMG considers the results from stock assessments or rapid assessment updates (and previously considered 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 some rock lobster populations can fluctuate in response to changes in the environment which can affect recruitment, abundance, and availability.

45. Full scientific assessments of all rock lobster stocks except CRA 9 (Westland/Taranaki) 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.

46. New stock assessments were carried out for CRA 1 and CRA 3 in late 2019, and for CRA 4, CRA 5, and PHC 1 in 2020. Rapid assessment updates were conducted for CRA 1 and CRA 3 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 Estimation of B_{MSY} reference levels

47. For red rock lobster, research to determine the biomass level that can produce the maximum sustainable yield (MSY) has been undertaken over the last two years. These new B_{MSY} reference levels are tailored to the biological and fishery characteristics of each red 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 Fisheries New Zealand's Harvest Strategy Standard and therefore represent an interim management target. [10]

48. B_{MSY} reference levels for CRA 1, CRA 3, CRA 4 and CRA 5 were accepted by the Rock Lobster Fisheries Assessment Working Group in February 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 B_{MSY} reference level results are new information that was not available at the time of public consultation. The NRLMG notes that the estimated B_{MSY} reference levels provide some guidance for the red rock lobster stocks under review, but that further work needs to occur, including stakeholder engagement, to confirm management targets for all rock lobster stocks.[11] 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 red rock lobster fishery.

49. Work to determine management targets for red rock lobster will commence in 2021 and is intended to inform future reviews of catch settings. Further work will also be carried out on exploring biomass reference levels for additional red rock lobster stocks in 2021.

50. For packhorse rock lobster, MSY (and the biomass that can produce it, B_{MSY}) was calculated for the first time in 2020, using a biomass dynamics model.

[10] For an overview of the Harvest Strategy Standard, see the decision document for the other stocks being reviewed as part of the 1 April 2021 sustainability round, titled "Review of Sustainability Measures for the 2021 April round".
[11] Environmental NRLMG members note concerns that the B_{MSY} reference level work has not adequately considered other environmental factors affecting the stock or ecosystem services or the considerations in the environmental principles in the Act.

51. Table 2 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 2: Summary of key stock model outputs that are discussed for each stock in this document.

Model outputs	Description	Stock				
		CRA 1	CRA 3	CRA 4	CRA 5	PHC 1
Vulnerable biomass	Beginning of season autumn-winter vulnerable biomass (legal males and females not bearing eggs)	✓	✓	✓	✓	✓
Spawning biomass	Beginning of season autumn-winter spawning biomass (mature females)	✓	✓	✓	✓	**x**
Total biomass	Beginning of season autumn-winter total biomass (all males and females)	✓	✓	✓	✓	**x**
B_{MSY}	Biomass that can produce the maximum sustainable yield (MSY)	✓	✓	✓	✓	✓

6.2 Digital monitoring of commercial fishing and alternative assessment approaches

52. Electronic reporting of catch and effort information was implemented in New Zealand's commercial fisheries during 2019. In 2020, the Rock Lobster Fisheries Assessment Working Group reviewed the data from the first year of electronic reporting (1 April 2019 to 31 March 2020), by comparing these data with those generated from the previous paper reporting system. The Working Group concluded that commercial catch rates (CPUE) estimated under the new electronic reporting system were likely to differ from CPUE estimated under the paper form system. The reasons for this appear to include data being collected on a different spatial and temporal scale, new reporting codes and some issues with operators incorrectly interpreting the new reporting requirements. The New Zealand Rock Lobster Industry Council (NZ RLIC) has initiated a project to address the operator reporting issues.

53. Up until April 2020, management procedures were used in most rock lobster stocks between full assessment years. Management procedures set out pre-agreed management actions that would be taken in response to changes in CPUE, an indicator of relative rock lobster abundance. Management procedures were designed to adjust the TAC in a responsive manner to maintain the stock at or above a level that could produce the maximum sustainable yield.

54. Management procedures were used in most rock lobster stocks for varying periods. The oldest example of management procedures is in CRA 7 and CRA 8, where they were used from 1996 to 2020 to guide TAC adjustments, first to rebuild the stocks and then to maintain them above reference levels with high probability.

55. 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. Work will be undertaken in 2021 to explore the development of a new type of management procedure informed by rapid assessment updates to guide your TAC decisions.

56. In 2020, preliminary rapid assessment updates were conducted for CRA 1, CRA 2 and CRA 3 for the first time. These 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 in between full stock assessment years.

57. The Rock Lobster Fisheries Assessment Working Group will continue to develop the rapid assessment update approach. It is intended to produce rapid update assessments for CRA 1, 2, 3, 4, 5 and 6 in late 2021, in addition to new full stock assessments for CRA 7 & CRA 8.

6.3 Quota Management System

58. Within New Zealand, both red and packhorse 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.

7 Central statutory considerations

59. Table 3 provides an overview of your central statutory considerations for varying TACs and TACCs under the Act. Details of your other statutory considerations are provided in Addendum 1.

Table 3: Information on your key requirements when making decisions under the Act. NRLMG comments are highlighted in blue.

Decisions you may make	Requirements – things you must do when making decisions
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.
	Red and packhorse 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 landed from red rock lobster potting were analysed for the period from 1989 to 2003. Non-rock lobster catch landed ranged from 2 to 11% of the estimated catches only; however, it is likely that not all bycatch is reported (only the top five species were required to be reported up to 2019). The most frequently reported incidental species caught were, in decreasing order of catch across all stocks: octopus, conger eel, blue cod, trumpeter, sea perch, red cod, butterfish and leatherjackets. 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. Recruitment to red rock lobster stocks is highly variable and this was taken into account during the development of options discussed in this paper. Red and packhorse rock lobsters have a long larval life, swimming and drifting in the ocean for 8-24 months. This means that larvae hatched in one area may be retained in that area by local eddy systems, carried to other areas by currents, or lost to New Zealand entirely. For most areas, larvae may originate a considerable distance from the settlement site. The number of 'puerulus', the final 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

Decisions you may make	Requirements – things you must do when making decisions
	(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. that apply to the coastal marine area and are considered by you to be relevant.
	On behalf of the NRLMG, Fisheries New Zealand has assessed the matter and is not aware of any policy statements, plans or strategies that contain matters of direct relevance to the stocks being reviewed, and that the broad objective of these proposals to ensure the sustainability of fish stocks is in keeping with the general intent of such documents. The PHC 1 fishery intersects with the Hauraki Gulf Marine Park. The options presented in this paper to set the TAC and allowances and increase the TACC, to allow for the sustainable utilisation of this fishery, are consistent with the relevant sections of the Hauraki Gulf Marine Park Act. The CRA 1, 3, 4, and 5 fisheries do not intersect with the Hauraki Gulf Marine Park; therefore, there are no relevant considerations for these stocks under the Act. On behalf of the NRLMG, Fisheries New Zealand has assessed the matter and is not aware of any specific matters in the regulations made under the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012 that are relevant to the TAC proposals set out in this paper. There are numerous applications that have been made under section 91 of the Marine and Coastal Area (Takutai Moana) Act 2011 and the majority of these are still being processed.
	(2A) before setting or varying any sustainability measure, take into account: (a) any conservation or fisheries services; and (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:

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

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.

Packhorse rock lobster in New Zealand is believed to be a single stock, with potential linkages to and similarities with the Australian population. They have a long larval phase similar to red rock lobster. Packhorse rock lobsters form spawning aggregations in the far north of the North Island from October each year, and larvae are carried by currents to settle further south, before the adults then migrate north against the current back to the spawning grounds.

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. This method is considered to have very little direct effect on non-target species and benthic species. The most frequently reported incidental species caught via commercial rock lobster potting, in decreasing order of catch across all stocks are: octopus, conger eel, blue cod, trumpeter, sea perch, red cod, butterfish and leatherjackets. This is based on an analysis of estimated incidental catches for the period 1989 to 2003.

Rock lobsters feed on a wide range of small shellfish, crabs, starfish and kina, depending on local availability. Predation on red rock lobsters is known from octopus, blue cod, groper, southern dogfish, rig, and seals. Predation on packhorse rock lobsters is known from octopus.

Sea urchin barrens

Some published literature suggests that decreased predation from large reef predators such as rock lobsters, snapper and other fishes is responsible for population increases in sea urchins and destruction of kelp forests. This hypothesis is controversial and the literature equivocal. There is research suggesting that on some rocky reefs in the north of New Zealand, recovery of predators such as rock lobsters and snapper inside marine reserves has led to the recovery of macro-algal habitat through predation on urchins. However, there is also contradictory evidence. Sea urchin populations are affected by factors other than predation, such as diseases and temperature effects on recruitment. In other parts of New Zealand, environmental and climatic influences, species' demographics, and catchment-derived sedimentation are generally more important.

Decisions you may make	Requirements – things you must do when making decisions
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. 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 sectors based on best available information. Having set or varied the TAC you in effect apportion it between the relevant interests.[12] The Courts have in a number of cases considered what is involved in allowing for non-commercial interests. In Snapper 1[13] 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 in Kahawai[14] endorsed this approach 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.[15] 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.[16] 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.[17]	

[12] New Zealand Fishing Industry Association (Inc) v Minister of Fisheries CA 82/97, 22 July 1997 ("Snapper 1").
[13] Snapper 1, p 17.
[14] New Zealand Recreational Fishing Council Inc v Sanford Limited [2009] NZSC 54 ("Kahawai")
[15] Kahawai [55]
[16] Kahawai [56]
[17] Kahawai [61]

Decisions you may make	Requirements – things you must do when making decisions
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.[18] **Mātaitai reserves** There are a number of mātaitai reserves and temporary closures that fall within each of the red rock lobster stocks under review, including: a) CRA 1 – Te Puna Mātaitai, Maunganui Bay temporary closure, and Marsden Bank and Mair Bank temporary closure; b) CRA 3 – Te Hoe Mātaitai, Horokaka Mātaitai, Toka Tamure Mātaitai, and Hakihea Mātaitai; c) CRA 4 – Moremore Mātaitai (a & b); d) CRA 5 – Te Waha o te Marangai Mātaitai; Mangamaunu Mātaitai, Oaro Mātaitai, Rapaki Mātaitai, Whakaraupō Mātaitai, Koukourarata Mātaitai, Te Kaio Mātaitai, Te Ahi Tarakihi Mātaitai, and Tuhawaiki Mātaitai. As the packhorse rock lobster stock (PHC 1) covers all of New Zealand, consideration of all the mātaitai reserves and temporary closures must be taken into account. The NRLMG notes the proposals in this document are unlikely to limit the ability to take red or packhorse rock lobsters for customary purposes or have an effect on the mātaitai reserves in each area. As the proposals are intended to ensure red or packhorse rock lobster stocks are maintained at sustainable levels, they may increase abundance of these species in these areas.	

8 Input and participation, and consultation

60. Statutory requirements for, and principles of, consultation are discussed further in the decision document for the other stocks being reviewed as part of the 1 April 2021 sustainability round, titled “Review of Sustainability Measures for the 2021 April round”.

8.1 Input and participation of tangata whenua

61. Tāngata Tiaki/Kaitiaki exercise kaitiakitanga[19] on behalf of their iwi or hapū. Collectively, Iwi Fisheries Forums and Forum Fisheries Plans provide a view of the objectives and outcomes iwi seek from the management of their fishery interests and can provide an indication of how iwi exercise kaitiakitanga over fisheries resources. Iwi views from Forum meetings and submissions received from iwi can also provide information on kaitiakitanga.

62. Te Waka a Māui me Ōna Toka Iwi Forum (South Island), Te Hiku o te Ika Fisheries Forum (Far North), Mid-North Iwi Fisheries Forum, Te Taihauauru Iwi Fisheries Forum (Taranaki/ Wanganui) and the Mai Paritu tae atu ki Turakirae Iwi Fisheries Forum (Hawke’s Bay/Wairarapa) were provided with an overview of rock lobster stocks that were likely to be reviewed as part of the April 2021 sustainability round.

63. Specific consultation options were not available for consideration at most of the Forum meetings in November 2020. No significant concerns were expressed with the proposal to review these stocks (potentially decreasing the TAC for CRA 1, 3, 4 & 5, and setting the TAC and potentially increasing the TACC for PHC 1), apart from the Mid-North Iwi Fisheries Forum, which does not support increases to any TACCs in its rohe moana. The Te Hiku o te Ika and the Mid-North Iwi Fisheries Forums expressed support for a decrease to the CRA 1 TAC, to ensure that the fishery can continue to support local communities. Both the Te Hiku o Te Ika and Mid-North Iwi Fisheries Forum supported a review of the PHC 1 Quota Management Area

[18] Kahawai [65]
[19] 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.

(QMA) boundaries, to separate out the northern part of the QMA where most catch is taken. The Mai Paritu tae atu ki Turakirae Iwi Fisheries Forum noted that the Mahia part of the CRA 3 fishery (statistical area 911) is performing well and supported exploring different management initiatives for Mahia in comparison to the rest of CRA 3.

64. Fisheries New Zealand discussed the consultation options for PHC 1 with the Mai i nga Kuri a Wharei ki Tihirau Iwi Fisheries Forum in early February 2021. The Forum noted that it considers red and packhorse rock lobster as the same resource, and considered that PHC 1 should be managed conservatively in light of its concerns with the stock status of CRA 2. The Forum did not support a specific option, and supported a customary allowance being set.

65. Additional input and participation of tangata whenua is provided through the NRLMG. A Te Waka a Māui me Ōna Toka Iwi Forum representative is a member of the NRLMG, who directly inputs into decision-making on behalf of South Island tangata whenua. A representative of Te Ohu Kaimoana is also is a member of the NRLMG, who supports relevant iwi to provide feedback on rock lobster proposals each year.

66. The effect of these proposals on mātaitai reserves and temporary closures that fall within the red and packhorse rock lobster stocks being reviewed is considered in Table 3 above.

67. The NRLMG considers that the options presented in this document will contribute towards maintaining kaitiakitanga of tangata whenua.

8.2 Consultation process

68. Fisheries New Zealand and the NRLMG consulted on the rock lobster sustainability proposals from 15 December 2020 to 5 February 2021. A standard consultation process was followed, consisting of posting the consultation document on the Fisheries New Zealand website and alerting stakeholders to the consultation through a media release, social media posts, and email notifications.

69. A total of 64 submissions were received from various organisations, groups, and individuals, with some submitters submitting on multiple stocks.

70. Submissions received and considered by the NRLMG are set out in Table 4 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 2 – Other matters raised in submissions*. 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 2021 Sustainability Round: Part 1 of 2"* has been provided to your office.

Table 4: Written submissions received on the rock lobster consultation options for the 1 April 2021 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 3 (Gisborne)					CRA 4 (Wellington/ Hawke's Bay)				CRA 5 (Canterbury/ Marlborough)			PHC 1 (all of New Zealand)			
		1.1 status quo	1.2	Other	3.1 status quo	3.2	3.3	3.4	Other	4.1 status quo	4.2	4.3	Other	5.1 status quo	5.2	Other	P.1	P.2	P.3	Other
cus	Iwi Collective Partnership (ICP)			✓			✓						✓						✓	
cus	Nga Rohe Moana o Nga Hapu o Ngati Porou Co-ordination Group (Ngāti Porou Co-ordination Group)						✓													
cus	Ngarangi Walker							✓									✓			
cus	Ngatiwai Fisheries Ltd and Ngati Wai Holdings (Ngati Wai Fisheries)			✓																✓
cus	Te Arawa Fisheries			✓			✓						✓						✓	
cus	Te Ohu Kaimoana			✓			✓						✓			✓				✓
cus	Justin Tibble							✓									✓			
cus	Wakatū Incorporation (Wakatū Inc)									✓										
cus	Whanau Hapu o Te Aitanga a Mate, Te Aowera, me Te Whanau a Hinekehu Takutai Kaitiaki Trust (Kaitiaki Trust)							✓									✓			
rec	Geoff Harding															✓				
rec	Blair Hopkins													✓						
rec	Joint recreational submitters (New Zealand Sport Fishing Council, LegaSea, and NZ Underwater Association)		✓						✓				✓		✓			✓		
rec	NZ Recreational Fishing Council (NZRFC)		✓					✓					✓			✓	✓			
rec	Philip Strang			✓					✓				✓			✓				✓
rec	Simon Depree										✓									
env	Auckland Conservation Board		✓														✓			
env	Environmental Conservation Organisations of NZ (ECO)		✓					✓				✓			✓		✓			

Sector	Submitter	Option Supported																		
		CRA 1 (Northland)			CRA 3 (Gisborne)					CRA 4 (Wellington/ Hawke's Bay)				CRA 5 (Canterbury/ Marlborough)			PHC 1 (all of New Zealand)			
		1.1 status quo	1.2	Other	3.1 status quo	3.2	3.3	3.4	Other	4.1 status quo	4.2	4.3	Other	5.1 status quo	5.2	Other	P.1	P.2	P.3	Other
env	Forest & Bird		✓					✓				✓			✓		✓			
env	Prof Andrew Jeffs			✓					✓											✓
com	Geoffrey William and Kim Lesley Basher													✓						
com	Mark Baxter													✓						
com	Richard Baxter													✓						
com	Ken Bolt									✓										
com	Dennis Burkhart													✓						
com	Trevor Burkhart													✓						
com	Burkhart Fisheries Ltd													✓						
com	Peter Cleall													✓						
com	Richard James Cleall													✓						
com	CRA 1 Rock Lobster Industry Association (CRAMAC 1)	✓																	✓	
com	CRA 2 Rock Lobster Management Company Ltd (CRAMAC 2)																		✓	
com	CRA 4 Rock Lobster Industry Association (CRAMAC 4)										✓									
com	Canterbury Marlborough Rock Lobster Industry Association (CRAMAC 5)													✓						
com	Alan Dawn	✓																	✓	
com	Gregg Fishing Ltd													✓						
com	Gordon Halley						✓													
com	Jak Reader Fishing Ltd													✓						
com	Lanfar Holdings (no4) Ltd													✓						
com	Lee Fish Ltd	✓																	✓	
com	Legacy Fishing Ltd													✓						
com	LJBaxter Holdings Ltd													✓						
com	NZ Red Holdings Ltd (NZ Red)	✓																	✓	
com	NZ Rock Lobster Industry Council (NZ RLIC)	✓					✓				✓			✓						✓

Sector	Submitter	Option Supported																		
		CRA 1 (Northland)			CRA 3 (Gisborne)					CRA 4 (Wellington/ Hawke's Bay)				CRA 5 (Canterbury/ Marlborough)			PHC 1 (all of New Zealand)			
		1.1 status quo	1.2	Other	3.1 status quo	3.2	3.3	3.4	Other	4.1 status quo	4.2	4.3	Other	5.1 status quo	5.2	Other	P.1	P.2	P.3	Other
com	Reader Fishing Ltd													✓						
com	Jamie Reinke													✓						
com	Paul Reinke													✓						
com	Fay Reinke													✓						
com	Robbie and Lynda Matthews Family Trust	✓																		
com	Shona Marie Trust										✓									
com	Splashzone Marine Ltd			✓					✓				✓							
com	Tairawhiti Rock Lobster Industry Association (TRLIA)						✓													
com	V2C Fishing													✓						
com	Geoff and Paula Price									✓										
com	Perak Fishing Co LTD													✓						
com	Norman Byrne and Robert Lovell	✓																		
com	Murray and Helen Vanstone													✓						
com	David Wood									✓										
pub	Mike Currie		✓					✓				✓			✓		✓			
pub	Damian Green								✓											
pub	Patrick John Keenan											✓								
pub	Daniel Mladek			✓					✓				✓			✓				✓
pub	Alex Flavell-Johnson			✓					✓				✓			✓				✓
pub	Craig Murphy		✓					✓				✓			✓		✓			
pub	John Skeates			✓																
pub	Caspian Smith		✓					✓				✓			✓		✓			

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

9.1 CRA 1 stock status

71. A new CRA 1 stock assessment was conducted in 2019, and a rapid assessment update was performed in 2020.

Summary of 2019 stock assessment results

72. 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 Fisheries New Zealand 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.

73. 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 2020 rapid assessment update

74. The results of the 2020 rapid assessment update suggest that CRA 1 vulnerable biomass is 15% of the unfished level. Over the next four years, with 2020 catch levels and recent recruitment, CRA 1 vulnerable biomass is projected to increase relative to 2020 levels (an increase of 7%) to 16.5% of the unfished level (Figure 2).

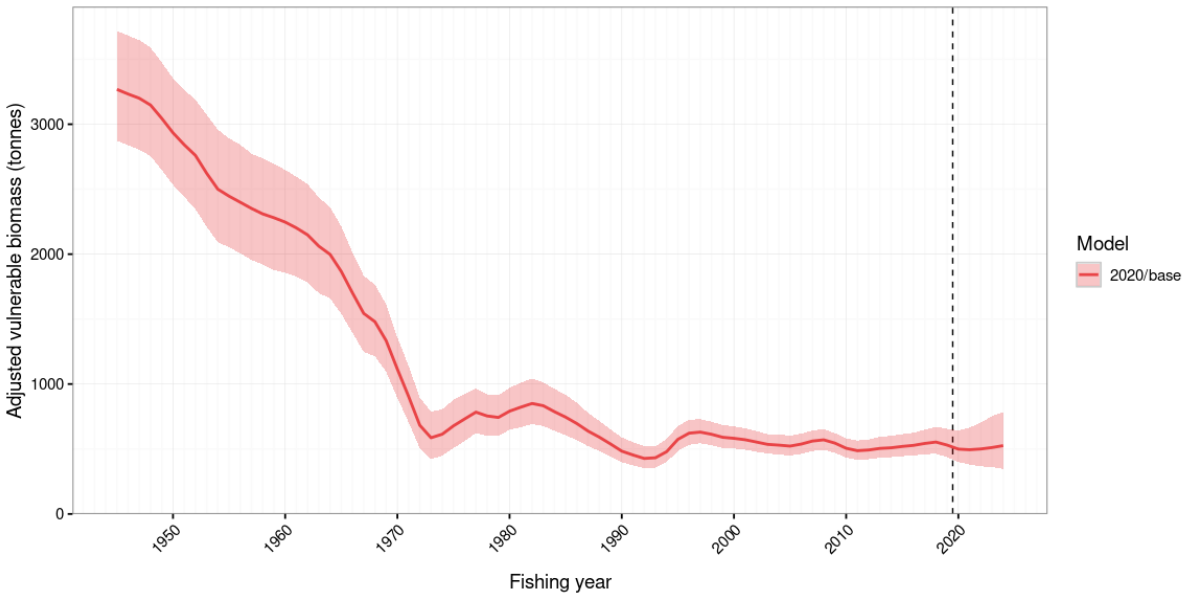

Figure 2: CRA 1 vulnerable biomass trajectories from the 2020 rapid assessment update. The solid line represents the median and the shaded region represents the 5% and 95% quantiles.

75. The rapid assessment results suggest that CRA 1 spawning biomass is 38% of unfished levels. Spawning biomass is expected to increase relative to 2020 levels, to remain well above the soft limit of 20% where a formal, time constrained rebuilding plan is required (Figure 3.)

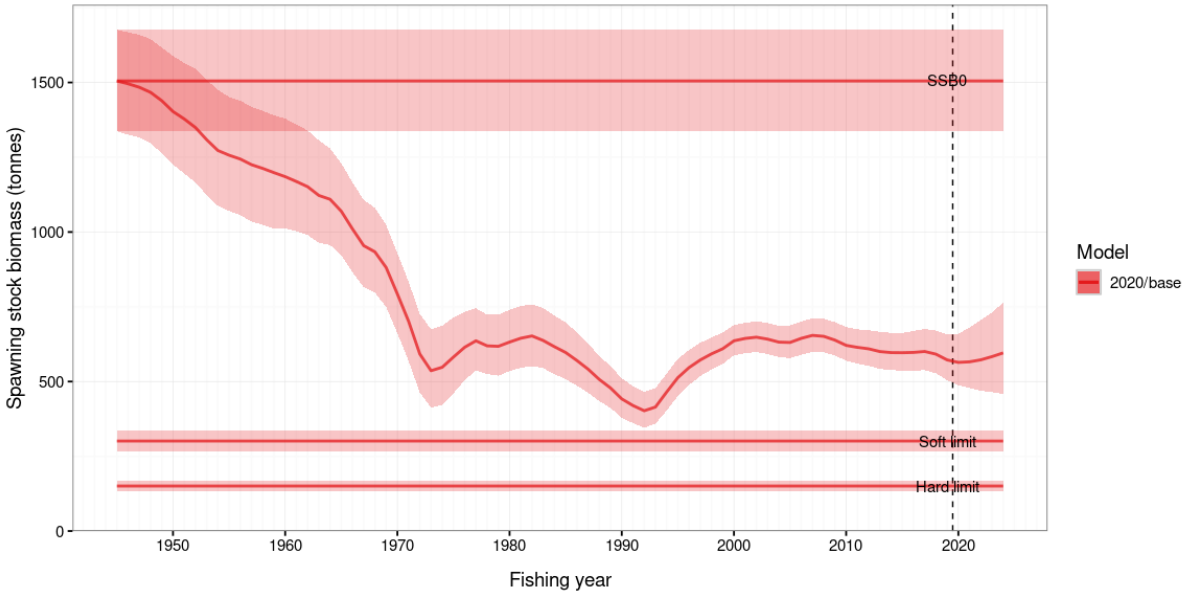

Figure 3: CRA 1 spawning biomass (SSB) trajectories from the 2020 rapid assessment update, including the soft limit (20% SSB_0)[20], and the hard limit (10% SSB_0)[21]. The solid line represents the median and the shaded region represents the 5% and 95% quantiles.

76. Table 5 provides further results of the 2020 rapid assessment update in terms of vulnerable, total and spawning stock biomass, with the uncertainties in the results also shown. For example, with 2020 catch levels, vulnerable biomass in 2024 could be at 16.5% (or 0.165) of unfished levels (median result), with a range between 10% (or 0.100) and 25.4% (or 0.254) of unfished levels (5% and 95% quantiles).

Table 5: Median results from the 2020 CRA 1 rapid assessment update. 5% and 95% quantiles are provided to show the uncertainty of the biomass ratios.[22] (continued over the page)

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_{2020} / B_0	0.117	0.152	0.203	Vulnerable biomass in 2020 was 15% of unfished levels
B_{2024} / B_0	0.100	0.165	0.254	Vulnerable biomass in 2024 will be 17% of unfished levels
B_{2024} / B_{2020}	0.749	1.067 ↑	1.500	Vulnerable biomass in 2024 will be 107% of 2020 levels (an increase of 7%)
Total biomass (Btot) – Beginning of season autumn-winter total biomass (all males and females)				
$Btot_{2020}$ / $Btot_0$	0.206	0.251	0.311	Total biomass in 2020 was 25% of unfished levels
$Btot_{2024}$ / $Btot_0$	0.191	0.264	0.362	Total biomass in 2024 will be 26% of unfished levels
$Btot_{2024}$ / $Btot_{2020}$	0.868	1.052 ↑	1.288	Total biomass in 2024 will be 105% of 2020 levels (an increase of 5%)

[20] The soft limit is 20% of the unfished spawning biomass; the level at which it is Fisheries New Zealand policy to implement a formal, time-constrained rebuilding plan.
[21] The hard limit is 10% of the unfished spawning biomass level; the level at which it is Fisheries New Zealand policy to consider closing the fishery.
[22] 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.

Performance indicators	5% quantile	Median	95% quantile	Interpretation of the median results
Spawning stock biomass (SSB) – Beginning of season autumn-winter spawning biomass (mature females)				
SSB_{2020} / SSB_0	0.321	0.376	0.442	Spawning biomass in 2020 was 38% of unfished levels
SSB_{2024} / SSB_{2020}	0.875	1.047 ↑	1.247	Spawning biomass in 2024 will be 105% of 2020 levels (an increase of 5%)
Probabilities				
$P(B_{2024}>B_{2020})$		0.632		63% probability that 2024 vulnerable biomass will be greater than 2020 levels
$P(Btot_{2024}>Btot_{2020})$		0.660		66% probability that 2024 total biomass will be greater than 2020 levels
$P(SSB_{2024}>SSB_{2020})$		0.653		65% probability that 2024 spawning biomass will be greater than 2020 levels

77. A rapid assessment update will be conducted for CRA 1 in 2021 and will provide an opportunity to consider a review of the catch settings for April 2022.

B_{MSY} reference level

78. The B_{MSY} reference level was calculated based on the 2019 CRA 1 stock assessment as a vulnerable biomass level of 454.38 tonnes. The results, given in Figure 4 and Table 6 below, suggest that vulnerable biomass was above the reference level (green line) in both 2018 (with a 74% probability, based on the 2019 stock assessment) and 2020 (based on the 2020 rapid assessment update). As CRA 1 vulnerable biomass is predicted to increase by 7% from 2020 to 2024, it may increase further above the B_{MSY} reference level.

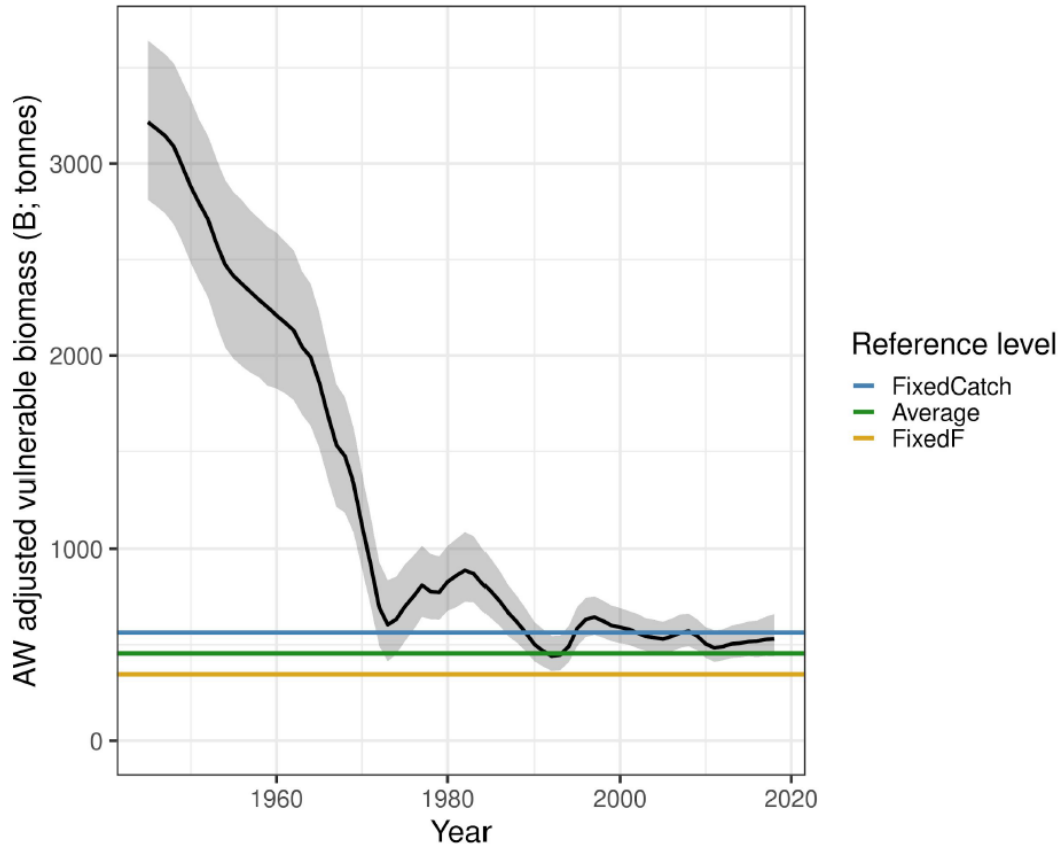

Figure 4: CRA 1 vulnerable biomass from the 2019 stock assessment, showing the B_{MSY} reference level (green line), which is the average of the fixed catch (blue line) and fixed fishing mortality (*F*) (yellow line) levels that maximise catch while meeting risk constraints.

79. Table 6 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 2020 could be at 499 tonnes (median result), with a range of 401 tonnes and 635 tonnes (5% and 95% quantiles).

Table 6: B_{MSY} reference level results for CRA 1, and estimated vulnerable biomass level in 2020 (B_{2020}) from the 2020 rapid assessment update. 5% and 95% quantiles are provided to show the uncertainty of the B_{2020} estimate.

Vulnerable biomass (tonnes)	5% quantile	Median	95% quantile	Interpretation of the median results
B_R, reference level (tonnes)		454.38		The vulnerable biomass that can produce MSY is 454.38 tonnes
Probability B_{2018} greater than B_R		0.737		74% probability that vulnerable biomass in 2018 was greater than the B_{MSY} reference level
B_{2020}	401	499	635	Vulnerable biomass in 2020 was 499 tonnes
B_{2020} / B_R		1.098		Vulnerable biomass in 2020 was 1.10 times (110%) the reference level

9.2 CRA 1 fishery overview

Māori customary fishing

80. Information on CRA 1 (Northland) customary Māori catches is available under the Fisheries (Kaimoana) Regulations 1998, and regulation 50 of the Fisheries (Amateur Fishing) Regulations 2013. In the last five years, approximately 18 kg and two bins (weight unspecified) of rock lobsters 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.

81. An estimate of 10 tonnes was used in the 2019 CRA 1 stock assessment model to represent customary catches.

Recreational fishing

82. 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 the 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 take place in CRA 1) (Figure 5)[23].

83. The 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 was 15.9 tonnes (±14.7 tonnes).

84. The COVID-19 outbreak will have reduced recreational participation and catch over the lockdown period(s) in 2020.

[23] 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).

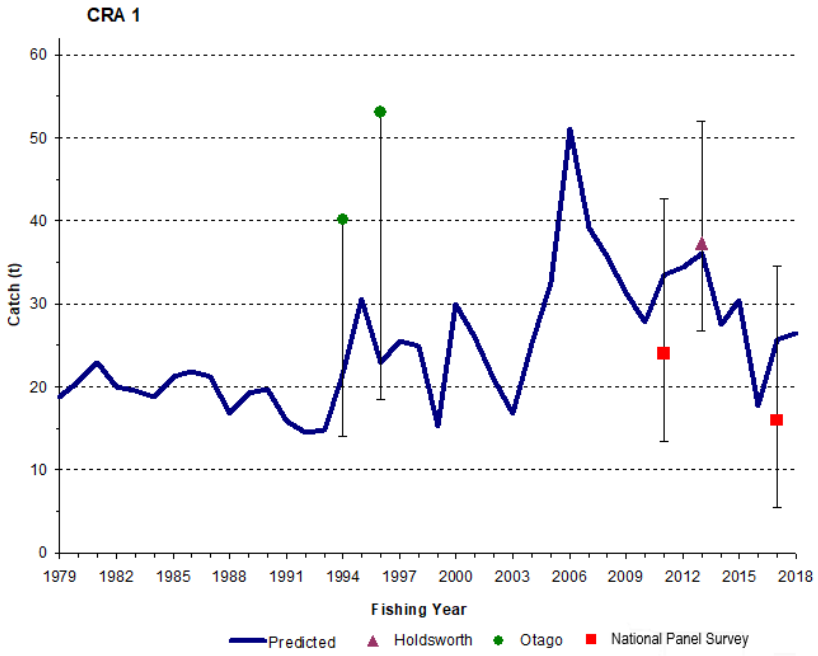

Figure 5: CRA 1 recreational catch trajectory for the 2019 CRA 1 stock assessment (error bars are ±2 standard errors, with the upper bounds of the Otago University survey estimates suppressed).

Other mortality

85. In the 2019 CRA 1 stock assessment, the Rock Lobster Fisheries Assessment 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 6). Before 1980, export discrepancies (the difference between reported catch totals and total exported weight) were used to estimate illegal catch. For the 2018/19 fishing year, while uncertain, the illegal catch estimate assumed for the model was approximately 38 tonnes.

86. 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.

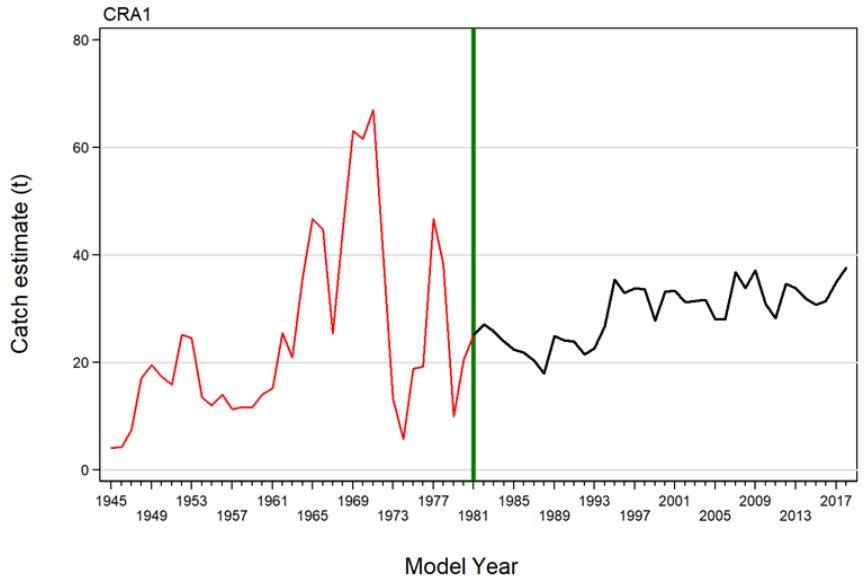

Figure 6: CRA 1 illegal catch trajectory assumed for the 2019 CRA 1 stock assessment[24].

[24] The vertical green line refers to when a new approach to estimating illegal catch was applied in 1981.

Commercial fishing

87. CRA 1 commercial landings have remained at or near the TACC since the early 1990s (Figure 7). 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 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.

88. The current asset value of the CRA 1 fishery is estimated to be approximately $114 million based on the current TACC and the average quota share prices for the last five years. The average CRA 1 Annual Catch Entitlement (ACE) value (the earnings quota owners receive when selling their ACE) over the last five years was $40,233 per tonne.

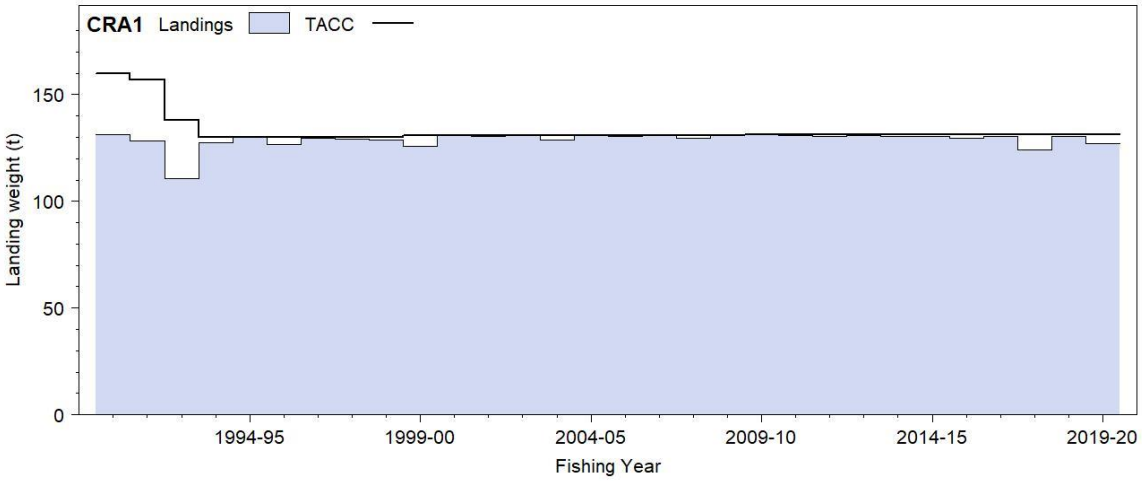

Figure 7: CRA 1 commercial landings and the TACCs from 1990 to 2020.

9.3 Final CRA 1 options

89. Table 7 shows the final options proposed for CRA 1 (Northland), which are the same as the consultation options. The results from the 2020 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. Vulnerable biomass was above the reference level in 2020, and is projected to increase under current catch levels over the next four years.

Table 7: TAC, allowance and TACC final proposals (in tonnes) for CRA 1 from 1 April 2021. Blue shading shows the change proposals.

Stock	Option	TAC	TACC	Allowances			NRLMG support
				Māori customary	Recreational	Other mortality	
CRA 1 Northland	**Option 1.1** Status quo	203	110	20	32	41	✓ Tangata whenua, Commercial & Fisheries NZ
	Option 1.2 – Decrease the TAC by 11%	180.5 ↓ (11%)	100 ↓ (9%)	20	29 ↓	31.5 ↓	✓ Recreational & Environmental

90. The NRLMG did not reach consensus on the 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 increase needed in the short term.

91. NRLMG tangata whenua and commercial members and Fisheries New Zealand recommend that you agree to Option 1.1 (status quo) because the stock assessment projections suggest

that the previous year's reductions to the TAC, TACC and allowances were sufficient to halt the decline in biomass and provide for an increase in vulnerable and spawning biomass by 2024. Further adjustments to the TAC can be considered when an agreed management target is confirmed.

92. NRLMG recreational and environmental members support Option 1.2 because they consider that further reductions to the TAC are required to increase the likelihood that the vulnerable biomass will increase across all areas in CRA 1.

93. 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 commence determining management targets for each red rock lobster fishery in 2021, which could be used to inform future reviews of review of catch settings and management controls.

9.4 Summary of CRA 1 submissions

94. Twenty-five submissions were received for CRA 1.

Support for Option 1.1 (status quo)

95. NZ RLIC, CRA 1 Rock Lobster Industry Association Inc (CRAMAC 1), Lee Fish Ltd, R and L Matthews Family Trust, NZ Red, A. Dawn and N. Byrne & R. Lovell, all supported Option 1.1. These submissions noted that the 2020 rapid assessment update and projections showed the 2020 TAC reduction will provide for an increase in CRA 1 biomass. The annual rapid assessment updates, and preferably a new management procedure, can be used to inform whether further management actions are required.

96. NZ RLIC and CRAMAC 1 submitted that further TAC reductions would have an unnecessary economic impact, considering the stock is assessed to be above the reference level and the ability to use rapid assessment updates to review progress on an annual basis.

97. 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.

98. Lee Fish Ltd, NZ Red and R and L Matthews Family Trust submitted that the 2020 rapid assessment update shows last years' TAC reduction has been effective in reversing the decline in biomass and any further decrease to the TAC is unnecessary. Lee Fish Ltd noted that there will be further financial impact if the TAC is decreased again. NZ Red requested that the fishery is given more time to show the effectiveness of last years' TAC reduction.

Support for Option 1.2

99. Joint recreational submitters, NZRFC, ECO, Forest & Bird, Auckland Conservation Board, and three individuals (C. Murphy, C. Smith, and M. Currie) all support Option 1.2. These submitters generally supported the need for increased abundance in the fishery.

100. The joint recreational submitters noted they do not consider the projection of vulnerable biomass of around 17% of the unfished biomass in 2024 to be an acceptable level of increased abundance as it is an important shared fishery.

101. NZRFC submitted that the fishery is not yet increasing sufficiently in abundance and considered that the 2020 TAC reduction may have been insufficient to halt a decline in abundance in this fishery.

102. ECO noted the need to take a precautionary approach to fisheries management and that rock lobster has an important ecological role as well as being an important shared fishery. ECO raised concerns that current vulnerable and total biomass levels are low, and that the rapid assessment projection using current caches only shows a small increase. They considered a small catch reduction under Option 1.2 is required to increase vulnerable biomass.

Other comments

103. Te Ohu Kaimoana, ICP, Ngati Wai Fisheries and Te Arawa Fisheries supported an alternative option, where the TAC was reduced to 190.5 tonnes, the TACC was maintained at 110 tonnes, the customary allowance was maintained at 20 tonnes, the recreational allowance was decreased to 29 tonnes, and the other mortality allowance was decreased to 31.5 tonnes. Te Ohu and Ngati Wai Fisheries supported waiting a year to allow the TAC decrease from 1 April 2020 to be reflected in the fishery, which will not compromise the sustainability of the stock. Te Ohu noted that the reference level work (now complete) and a rapid assessment update in 2021 may be used to review the stock and provide guidance on whether further management action is required.

104. Te Ohu Kaimoana also provided their policy on how the TAC should be allocated when adjusting the TAC so as to not undermine Māori rangatiratanga. This is discussed further in the decision document for the other stocks being reviewed as part of the 1 April 2021 sustainability round, titled "Review of Sustainability Measures for the 2021 April round".

105. The joint recreational submitters are concerned that much of the commercial fishing effort has shifted to statistical areas 901 (Three Kings) and 939 (northwest coast) where catch rates are higher, and less catch has been taken from East Northland (903 and 904) where catch rates are lower. The submitters consider that this could be impacting the stock assessment and overstating the current biomass level because CPUE from these areas is not a true reflection of stock abundance across all of CRA 1.

106. Mr Mladek did not support any quota increase and raised concerns about other sources of mortality from commercial and recreational fishing. Mr Strang and Mr Flavell-Johnson supported a non-specified decrease for all stocks being reviewed.

107. Mr Murphy considered that allowances should not necessarily be increased because abundance has increased, given that abundance fluctuates over time.

108. Mr Currie supported decreases to all recreational allowances, or at minimum, retaining the status quo for conservation and sustainability reasons, but did not indicate support for a specific option.

109. Splashzone Ltd noted that the CRA 1 fishery is fishing well and catches have increased in the last two seasons. Another submitter (Mr Dawn) noted that anecdotal information from fishers show the CPUE is within its normal range.

110. Forest & Bird was concerned at the absence (at the time of consultation) of a B_{MSY} reference level for CRA 1, CRA 3, CRA 4, and CRA 5.

111. Mr Skeates supported a larger decrease to the TACC than was proposed, and no change to the recreational allowance. Mr Skeates did not specify what he wished the TACC to be reduced to.

112. Forest & Bird, the Auckland Conservation Board, Prof A. Jeffs, and C. Smith raised concerns with how the impacts of rock lobster fishing on the environment are being managed and mitigated. These submitters were concerned that the proposed options do not adequately deal with adverse effects of lobster fishing on the marine environment, specifically trophic cascades leading to sea urchin barrens (refer to Table 3 in *Section 5 – Central statutory considerations* above and in *Addendum 2 – Other matters raised in submissions* below). Another submitter (Mr Murphy) provided anecdotal experience that where rock lobster populations have been fished out completely, kina barrens have formed and altered the ecosystem.

9.5 Analysis

113. The CRA 1 B_{MSY} reference biomass level (the vulnerable biomass level that can produce MSY) has been calculated at 454.38 tonnes. The best available information suggests that CRA 1 vulnerable biomass is above (1.1 times) the B_{MSY} reference level and will increase slightly

under current catch levels by 2024. Spawning biomass is projected to increase and remain above the soft limit in 2024.

Varying the TAC

114. Under Option 1.1 (status quo), the CRA 1 TAC would stay at its current level of 203 tonnes from 1 April 2021. This option acknowledges the TAC decrease from 1 April 2020, and that the stock may not yet have had sufficient time to respond to this decrease. Under this option, vulnerable biomass is projected to increase by 7% over the next four years, and spawning biomass is predicted to increase by 5% to remain well above the soft limit of 20%.

115. Under Option 1.2 (11% TAC decrease), the CRA 1 TAC would be decreased by 22.5 tonnes from 203 tonnes to 180.5 tonnes. This decrease is proposed to improve the likelihood that CRA 1 vulnerable biomass will increase from current levels in the next four years.

Varying allowances and the TACC

116. Table 8 provides a summary of information on current non-commercial allowances for CRA 1 (Northland) and stock assessment assumptions of non-commercial catch.

Table 8: 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.	38 illegal + 2.4 handling mortality.	81.9
Non-commercial catch assumptions for the 2020 rapid assessment update	10	Assumed to vary with biomass. Estimated at 28.3 for 2019.	29.2 illegal + 2.3 handling mortality.	69.8

Māori customary fishing

117. No change is proposed to the 20 tonne customary Māori allowance for CRA 1. 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 allocated for customary Māori interests. No specific feedback on the customary allowance was received from the Iwi Fisheries Forums in CRA 1.

Recreational fishing

118. Under Option 1.1 (status quo), no change is proposed to the 32 tonne recreational allowance for CRA 1, which was reduced from 50 to 32 tonnes for 1 April 2020. While noting the incompleteness and 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 2020 rapid assessment used a model input of 28.3 tonnes for CRA 1 recreational catch.

119. Under Option 1.2 it is proposed that the recreational allowance be reduced to 29 tonnes to more closely reflect the estimate of recreational harvest used in the 2020 CRA 1 rapid assessment update. This is proposed in parallel with a reduction to the TACC proposed for a successive year.

120. You are not being asked to make a decision on any change to the recreational daily bag limit. As part of public consultations on catch settings for CRA 1, the NRLMG sought feedback on whether a change to CRA 1 recreational management controls should be considered. This approach reflects the shared nature of this fishery and that all fishing interests should contribute

to the rebuild of the stock. Recreational catch is assumed to vary with abundance in the stock assessment model and was the recreational allowance was reduced by 36% (18 tonnes) in 2020. Recreational NRLMG members are concerned that recreational controls, once reduced, cannot generally go up without further management controls being proposed.

121. As recreational catch is likely to increase under both Option 1.1 and 1.2 as stock abundance increases, commercial and North Island tangata whenua members of the NRLMG suggest that consideration needs to be given to initiating a process for bag limit reductions to constrain recreational catch to the allowance. Recreational members do not consider that these controls necessary at this time, as recreational catch is likely to be within the proposed allowance.

122.

Other mortality

123. Under Option 1.1 (status quo), no change is proposed to the 41 tonne CRA 1 allowance for other sources of mortality caused by fishing (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.

124. Under Option 1.2 it is proposed that the allowance for other sources of mortality caused by fishing be reduced to 31.5 tonnes. This is to more closely reflect the estimate of illegal harvest used in the 2020 CRA 1 rapid assessment update, which used a model input of 31.5 tonnes to represent this mortality.

Total Allowable Commercial Catch

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

126. Under Option 1.2 (9% TACC decrease), the CRA 1 TACC would be decreased to 100 tonnes. The proposed 10 tonne TACC decrease has the potential to result in a loss of annual revenue alone to the catching sector of approximately $858,000 (based on 2020/21 average port price information of $85.84 per kg). This reduction will significantly impact on the 13 vessels involved and compound the costs of the 2020 TACC reduction and the adverse COVID-19 related financial impacts. CRAMAC 1 notes that associated servicing and support businesses will also be affected, particularly in smaller coastal towns and communities.

10 Review of the CRA 3 (Gisborne) red rock lobster fishery

10.1 CRA 3 stock status

127. A new CRA 3 stock assessment was conducted in 2019, and a rapid assessment update was performed in 2020.

128. The CRA 3 stock assessment model has two base cases (accepted models) used to assess the stock. The two base case models differ in what tagging data they use to estimate growth rates. The r1_qdrift model removes all tags at liberty for less than a year (i.e., higher growth rates), while the r2_qdrift model includes all tag-recapture data (i.e., lower growth rates). The Rock Lobster Fisheries Assessment Working Group agreed to use both models as base cases. Therefore, the range of results reported for CRA 3 reflects the results from both models. This applies to both the 2019 stock assessment and the 2020 rapid assessment update.

Summary of 2019 stock assessment results

129. The 2019 stock assessment results suggested that vulnerable biomass was 18-19% of the unfished level and total biomass was between 52 and 61% of the unfished level. Spawning biomass in 2019 was 80% of the unfished level, well above the soft limit of 20% where it is Fisheries New Zealand policy to implement a formal, time-constrained rebuilding plan. The projections from that model estimated that, over the next five years with 2019 catch levels and

recent recruitment, vulnerable biomass will decline, and total biomass and spawning biomass will remain about the same.

130. As a result of the 2019 stock assessment, a 14% decrease to the TAC and a 13% decrease to the TACC were proposed for 1 April 2020. The previous Minister chose to retain the status quo at that time, recognising the under-catch that had occurred in the 2019/20 fishing year.

Summary of the 2020 rapid assessment update

131. The results of the 2020 rapid assessment update suggest that CRA 3 vulnerable biomass is 14 to 15% of the unfished level. Over the next four years, with 2020 catch levels[25] and recent recruitment, CRA 3 vulnerable biomass is projected to be maintained or decrease slightly relative to 2020 levels (a decrease of 0-4%) (Figure 8).

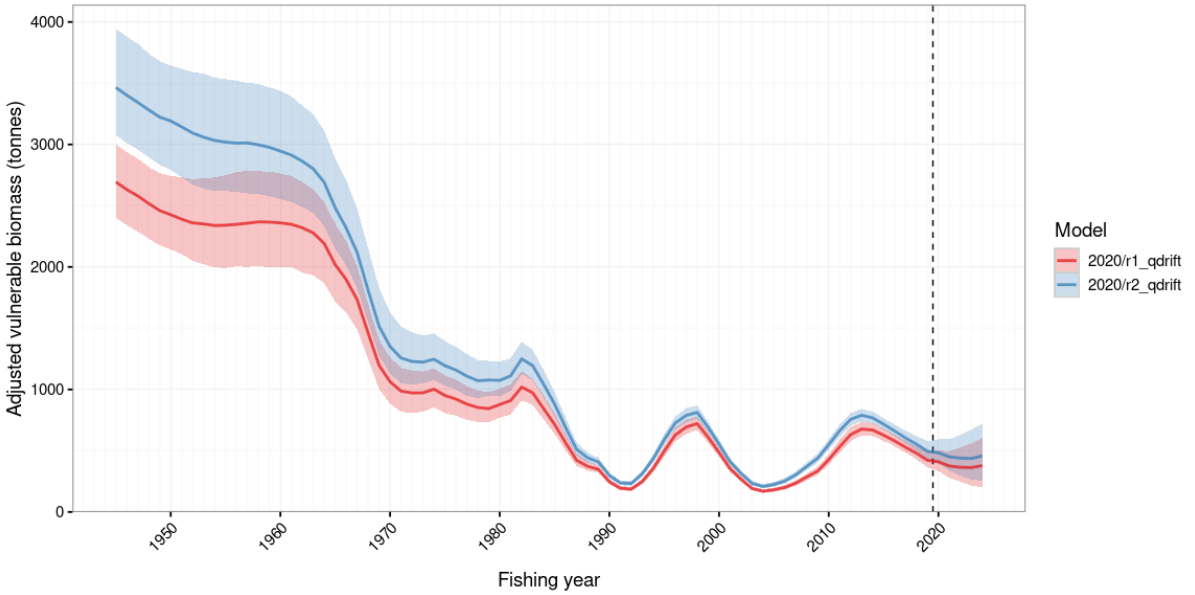

Figure 8: CRA 3 vulnerable biomass trajectories from 2020 rapid assessment update (red and blue lines)[26]. The solid line represents the median and the shaded region represents the 5% and 95% quantiles.

132. The rapid assessment results suggest that CRA 3 spawning biomass is 77 to 78% of unfished levels. Over the next four years, spawning biomass is expected to decrease slightly relative to 2020 levels (3-4%), to remain well above the soft limit of 20% where a formal, time constrained rebuilding plan is required (Figure 9.)

[25] CRA 3 commercial catch was assumed to be 244.2 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 222.9 tonnes (the 2020 TACC) from 2021-2024

[26] Two different base case stock assessments were used for CRA 3: **r1** uses tagging information for lobsters at liberty for longer than 365 days (i.e. higher growth rates); and, **r2** uses all tagging information (i.e. lower growth rates).

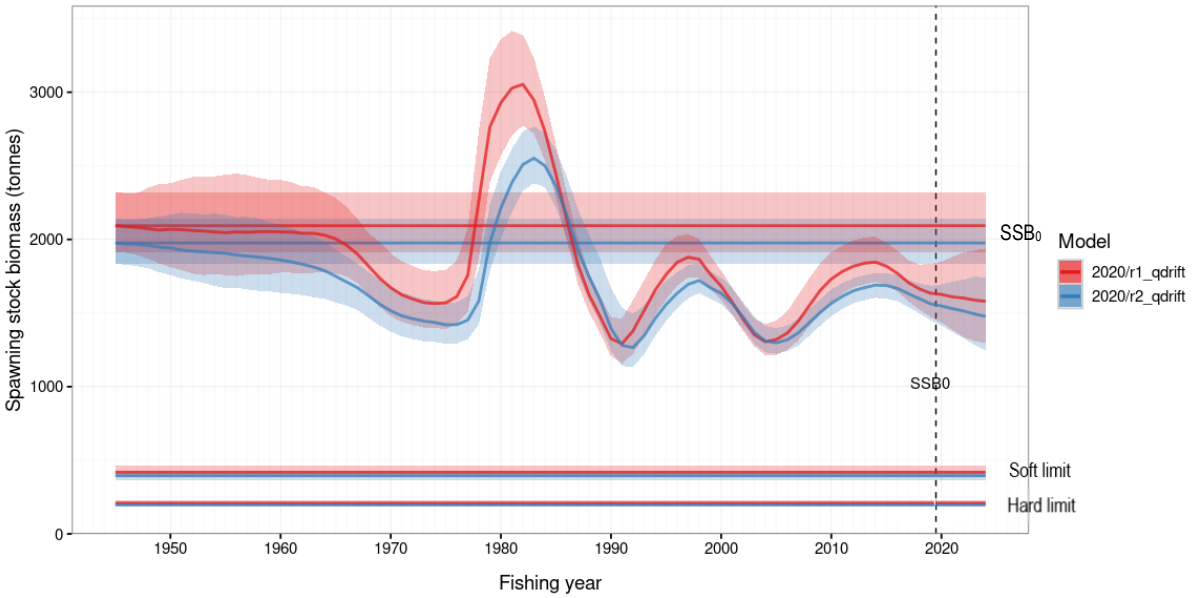

Figure 9: CRA 3 spawning biomass (SSB) trajectories from the 2020 rapid assessment update (red and blue lines), including the unfished spawning biomass level (SSB_0), the soft limit (20% SSB_0)[27], and the hard limit (10% SSB_0)[28]. The solid line represents the median and the shaded region represents the 5% and 95% quantiles.

133. Table 9 provides further results of the 2020 rapid assessment update in terms of vulnerable, total and spawning stock biomass, with the uncertainties in the results also shown. For example, with 2020 catch levels, vulnerable biomass in 2024 could be at 14.0-14.7% (or 0.140-0.147) of unfished levels (median result), with a range of 7.3-7.5% (or 0.073-0.75) and 22.9-24.6%% (or 0.229-0.246) of unfished levels (5% and 95% quantiles).

Table 9: Median results from the 2020 CRA 3 rapid assessment update. 5% and 95% quantiles are provided to show the uncertainty of the biomass ratios. The range in the figures relates to the two different base case stock assessment models that were used for CRA 3 (continued over the page).

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_{2020} / B_0	0.109 to 0.122	0.139 to 0.153	0.18 to 0.19	Vulnerable biomass in 2020 was 14 to 15% of unfished levels
B_{2024} / B_0	0.073 to 0.075	0.140 to 0.147	0.229 to 0.246	Vulnerable biomass in 2024 will be 14 to 15% of unfished levels
B_{2024} / B_{2020}	0.526 to 0.592	0.962 to 0.999 ↓	1.511 to 1.519	Vulnerable biomass in 2024 will be 96 to 100% of 2020 levels (a decrease of 0-4%)
Total biomass (Btot) – Beginning of season autumn-winter total biomass (all males and females)				
$Btot_{2020}$ / $Btot_0$	0.406 to 0.472	0.476 to 0.557	0.556 to 0.663	Total biomass in 2020 was 48 to 56% of unfished levels
$Btot_{2024}$ / $Btot_0$	0.369 to 0.435	0.468 to 0.551	0.592 to 0.702	Total biomass in 2020 will be 47 to 55% of unfished levels
$Btot_{2024}$ / $Btot_{2020}$	0.859 to 0.861	0.959 to 0.968 ↓	1.138 to 1.150	Total biomass in 2024 will be 96 to 97% of 2020 levels (a decrease of 3-4%)

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

Performance indicators	5% quantile	Median	95% quantile	Interpretation of the median results
Spawning stock biomass (SSB) – Beginning of season autumn-winter spawning biomass (mature females)				
SSB_{2020} / SSB_0	0.689 to 0.713	0.773 to 0.781	0.861 to 0.873	Spawning biomass in 2020 was 77 to 78% of unfished levels
SSB_{2024} / SSB_0	0.618 to 0.634	0.749 to 0.754	0.882 to 0.910	Spawning biomass in 2024 will be 75% of unfished levels
SSB_{2024} / SSB_{2020}	0.859 to 0.861	0.959 to 0.968 ↓	1.070 to 1.095	Spawning biomass in 2024 will be 96 to 97% of 2020 levels (a decrease of 3-4%)
Probabilities				
$P(B_{2024}>B_{2020})$		0.443 to 0.498		44-50% probability that 2024 vulnerable biomass will be greater than 2020 levels
$P(Btot_{2024}>Btot_{2020})$		0.418 to 0.427		42-43% probability that 2024 total biomass will be greater than 2020 levels
$P(SSB_{2024}>SSB_{2020})$		0.262 to 0.341		26-34% probability that 2024 spawning biomass will be greater than 2020 levels

B_{MSY} reference level

134. The B_{MSY} reference level was calculated based on the 2019 CRA 3 stock assessment as a vulnerable biomass level of 454.38 tonnes. The results, given in Figure 10 and Table 10 below, suggest that vulnerable biomass was above the reference level (green line) in both 2018 (with a 100% probability, based on the 2019 stock assessment) and 2020 (based on the 2020 rapid assessment update). As CRA 3 vulnerable biomass is predicted to stay stable or decline slightly (0-4%) from 2020 to 2024, it will likely stay above the B_{MSY} reference level over that period.

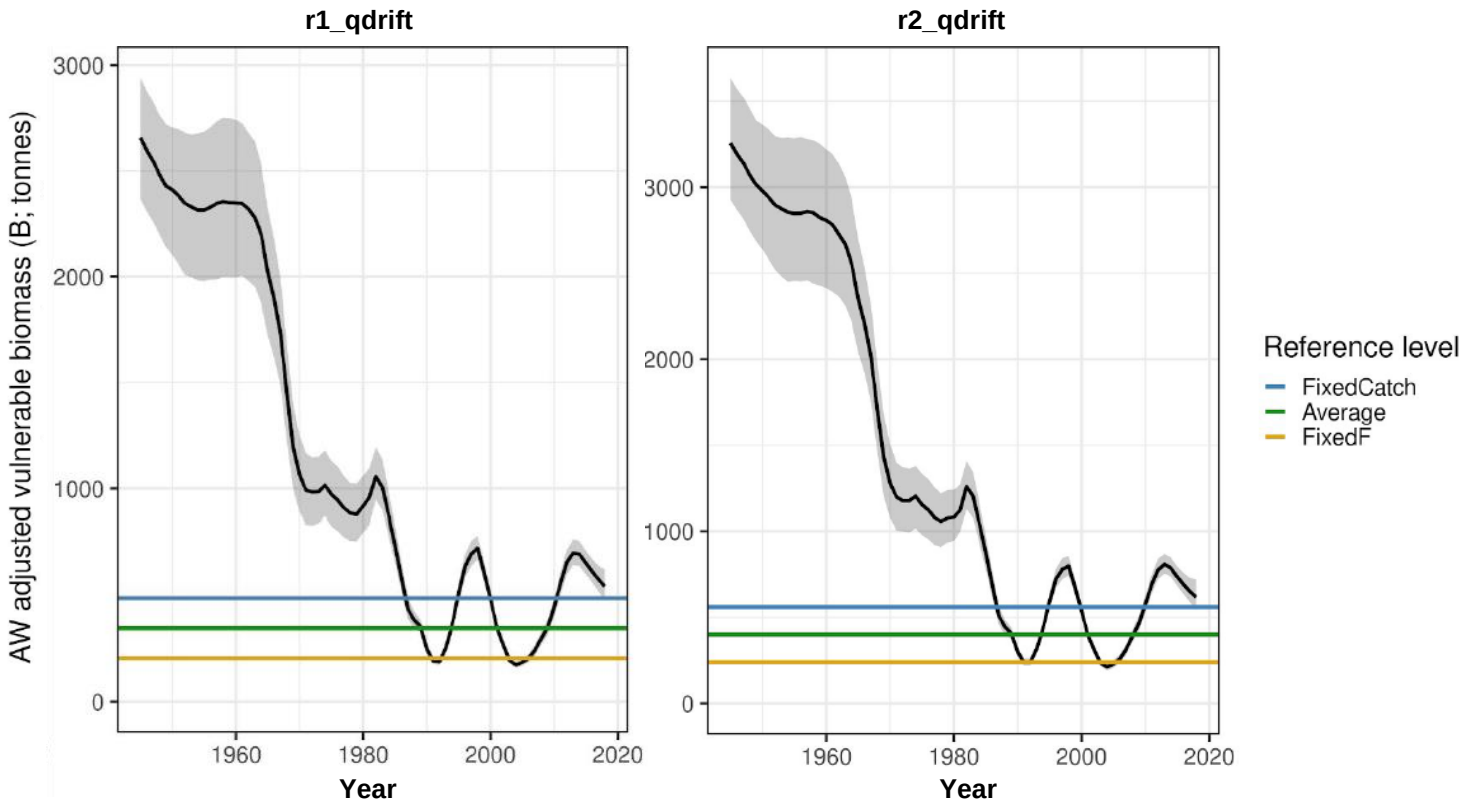

Figure 10: CRA 3 vulnerable biomass from the 2019 stock assessment, showing the B_{MSY} reference level (green line), which is the average of the fixed catch (blue line) and fixed fishing mortality (*F*) (yellow line) levels that maximise catch while meeting risk constraints for the two base case CRA 3 stock assessment models.

135. Table 10 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 2020 could be 410-484 tonnes (median result), with a range of 333-396 tonnes and 500-593 tonnes (5% and 95% quantiles).

Table 10: B_{MSY} reference level results for CRA 3, and estimated vulnerable biomass level in 2020 (B_{2020}) from the 2020 rapid assessment update. 5% and 95% quantiles are provided to show the uncertainty of the B_{2020} estimate.

Vulnerable biomass (tonnes)	5% quantile	Median	95% quantile	Interpretation of the median results
B_R, reference level (tonnes)		**346.811 to 399.916**		The vulnerable biomass that can produce MSY is 346.8 to 399.9 tonnes
Probability B_{2018} greater than B_R		0.998 to 0.999		100% probability that vulnerable biomass in 2018 was greater than the B_{MSY} reference level
B_{2020}	333 to 396	410 to 484	500 to 593	Vulnerable biomass in 2020 was 410 to 484 tonnes
B_{2020} / B_R		1.182 to 1.210		Vulnerable biomass in 2020 was 1.18 to 1.21 times (118-121%) the reference level

136. The 2019 stock assessment and 2020 rapid assessment also split CRA 3 into two separate sub-areas – Region 1: East Cape/statistical area 909 + Gisborne/statistical 910; and, Region 2: Mahia/statistical area 911. Both regions were at or above their respective B_{MSY} reference levels in 2018 and 2020.[29] The 2020 rapid assessment suggests the two regions of CRA 3 will behave differently over the next four years:

    a. Region 1 is predicted to increase in abundance. Vulnerable biomass in 2024 will be 146 to 155% of 2020 levels (an increase of 46 to 55%);

    b. Region 2 is predicted to decrease in abundance. Vulnerable biomass in 2024 could decline by 24 to 31% of 2020 levels.

137. These predictions assume the distribution of catch between the two regions in 2019/20 is maintained over this period and do not take into account any potential change in distribution of catch or ACE between the regions.

138. Another rapid assessment update will be conducted for CRA 3 in 2021 and will provide an opportunity to consider a review of catch settings and management controls for April 2022.

10.2 CRA 3 fishery overview

Māori customary fishing

139. Information on CRA 3 (Gisborne) customary Māori catches is available under the Fisheries (Kaimoana) Regulations 1998, and regulation 50 of the Fisheries (Amateur Fishing) Regulations 2013. In the last five years, approximately 4,600 rock lobsters were reported as customary harvest from CRA 3 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.

140. An estimate of 20 tonnes was used in the 2019 CRA 3 stock assessment model to represent customary catches.

[29] Region 1 has a B_{MSY} reference level of 235.55 to 264.17 tonnes, and 2018 vulnerable biomass was above this reference level with a 100% probability. Median vulnerable biomass for region 1 in 2020 was 226 to 269 tonnes (at the B_{MSY} reference level). Region 2 has a B_{MSY} reference level of 111.26 to 135.75 tonnes, and 2018 vulnerable biomass was above this reference level with a 100% probability. Median vulnerable biomass for region 2 in 2020 was 182 to 212 tonnes (above the B_{MSY} reference level).

Recreational fishing

141. For the 2019 CRA 3 stock assessment, recreational catch estimates from the 1994 and 1996 Otago University surveys and the 2011/12 and 2017/18 National Panel Surveys were used to construct a recreational catch trajectory, by assuming that recreational catch was proportional to the CRA 3 abundance, estimated from trends in spring-summer commercial CPUE (Figure 11).

142. The stock assessment model estimate of CRA 3 recreational catch was approximately 11 tonnes for 2018. The 2017/18 National Panel Survey estimate of CRA 3 recreational catch was 12.2 tonnes (± 6.2 tonnes).

143. The COVID-19 outbreak will have reduced recreational participation and catch over the lockdown period in 2020.

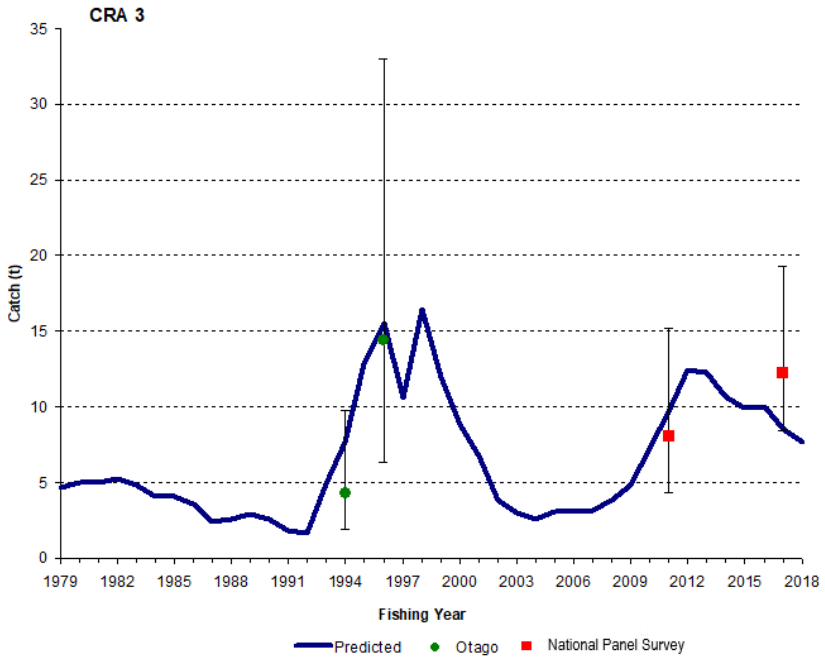

Figure 11: CRA 3 recreational catch trajectory for the 2019 CRA 3 stock assessment (error bars are ±2 standard errors).

Other mortality

144. In the 2019 stock assessment, the Rock Lobster Fisheries Assessment Working Group agreed to use a fixed percentage of 20% of the total commercial catch each year from 1981 to 2018 to represent illegal take (Figure 12). The Working Group did not scale the catch proportionately to commercial CPUE over the same period, because this approach led to large and unrealistic illegal catch estimates, especially for the mid-1990s and 2012-14. A constant average of illegal take, although uncertain, was assumed from 1981 (Figure 12, horizontal black line). Before 1980, export discrepancies (the difference between reported catch totals and total exported weight) were used to estimate illegal catch. For the 2018/19 fishing year, while uncertain, the illegal catch estimate assumed for the model was approximately 61 tonnes.

145. The CRA 3 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 approximately 10 tonnes for 2018.

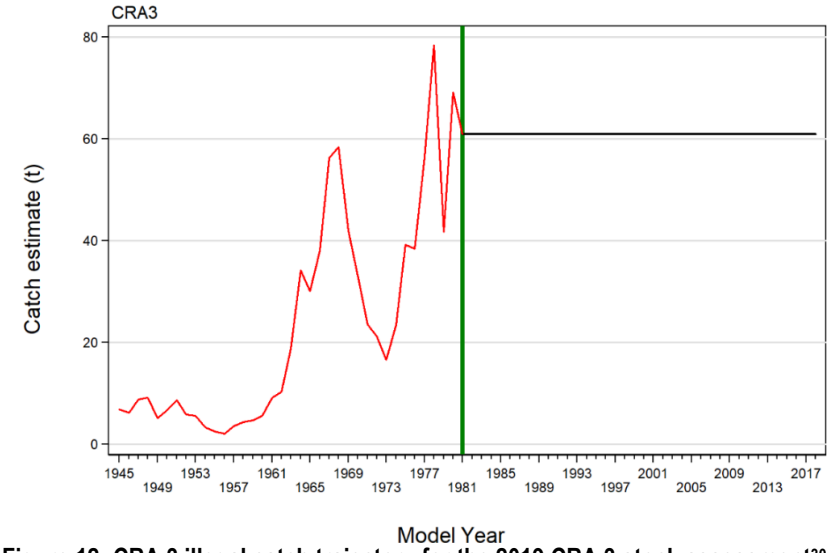

Figure 12: CRA 3 illegal catch trajectory for the 2019 CRA 3 stock assessment[30].

Commercial fishing

146. Annual landings and the TACC for CRA 3 since 1990 are shown in Figure 13.

147. In 2003 and 2004, the CRA 3 TACC was substantially under-caught because of voluntary ACE shelving by the CRA 3 industry, which was informed by a management procedure. Between 2009 and 2019 formally adopted CRA 3 management procedures were used to annually review the TACC to ensure that catches reflected available abundance. The COVID-19 outbreak, particularly the effective closure of the Chinese market for a period coupled with low prices for exports, contributed to an under-catch of the CRA 3 TACC in 2019/20 of 34 tonnes (Figure 13).

148. The current asset value of the CRA 3 fishery is estimated to be approximately $212 million based on the current TACC and the average quota share prices for the last five years. The average CRA 3 ACE value (the earnings quota owners receive when selling their ACE) over the last five years was $51,358 per tonne.

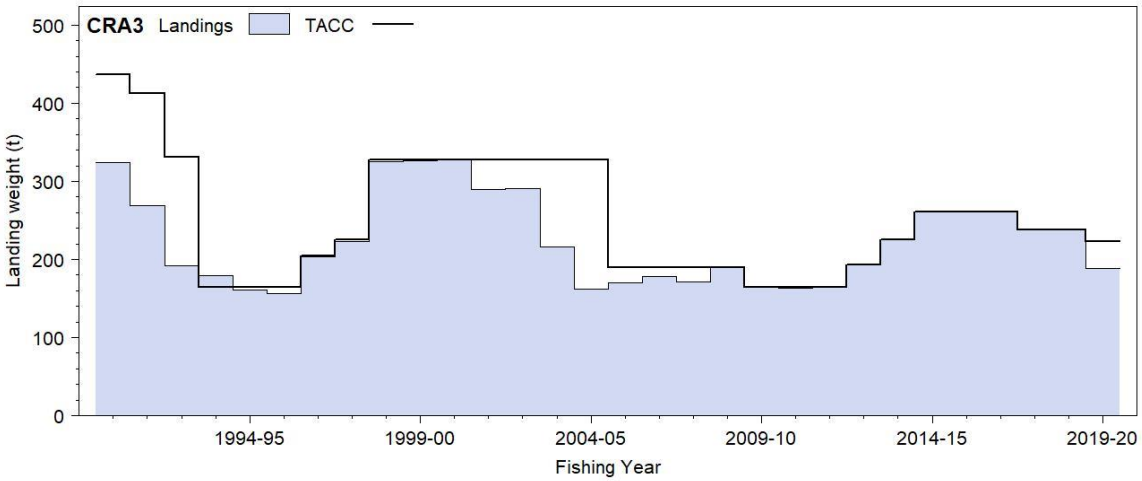

Figure 13: CRA 3 commercial landings and the TACCs from 1990 to 2020.

10.3 Final CRA 3 options

149. Table 11 shows the final options proposed for CRA 3, which are the same as the consultation options. The results from the 2019 CRA 3 stock assessment and its 2020 rapid assessment

[30] The vertical green line refers to when a new approach to estimating illegal catch was applied in 1981.

update have been used to inform the options for varying the TAC. There is an agreed B_{MSY} reference level for CRA 3. Vulnerable biomass was above the reference level in 2020 and is projected to stay stable or decline slightly under current catch levels over the next four years.

150. The NRLMG, including Fisheries New Zealand, recommends that you agree to Option 3.3.

Table 11: TAC, allowance and TACC final proposals (in tonnes) for CRA 3 from 1 April 2021. Blue shading shows the change proposals.

Stock	Option	TAC	TACC	Allowances			NRLMG support
				Māori customary	Recreational	Other mortality	
CRA 3 Gisborne	**Option 3.1** Status quo	351.9	222.9	20	20	89	X No support
	Option 3.2 – Decrease the TAC by 10%	317.5 ↓ (10%)	209.5 ↓ (6%)	20	13 ↓	75 ↓	
	Option 3.3 – Decrease the TAC by 14%	302 ↓ (14%)	195 ↓ (13%)	20	12 ↓	75 ↓	✓ All
	Option 3.4 – Decrease the TAC by 19%	284 ↓ (19%)	178 ↓ (20%)	20	11 ↓	75 ↓	

10.4 Summary of CRA 3 submissions

151. Twenty-three submissions were received for CRA 3.

Support for Option 3.1 (status quo)

152. No submissions received were in support of the status quo.

Support for Option 3.2

153. No submissions received were in support of Option 3.2.

Support for Option 3.3

154. Te Ohu Kaimoana, Ngāti Porou Co-ordination Group, Te Arawa Fisheries, ICP, Kaitiaki Trust, NZ RLIC, TRLIA, and joint recreational submitters, and one individual (G. Halley) all supported Option 3.3.

155. NZ RLIC and TRLIA support Option 3.3 which will provide for a 12-13% increase to the vulnerable biomass over the next four years. The submitters consider that given the level of biomass increase projected to be achieved with this option, greater reductions and more severe financial hardship are unnecessary. They note that the annual rapid assessments will allow monitoring of biomass changes in the fishery.

156. TRLIA supports maintaining a conservative approach to managing the fishery and noted Option 3.3 is projected to achieve an increase in vulnerable biomass and supporting a healthy, sustainable fishery. They are committed to maintaining their investment in voluntary and industry-funded logbooks, observer catch sampling and tag recapture programmes to ensure the best possible data is available to support management decisions.

157. Te Ohu Kaimoana supported Option 3.3, noting this was the Iwi-endorsed option in last years' review of CRA 3. Both Te Arawa Fisheries and ICP's support for Option 3.3 is consistent with their response on last years' CRA 3 review, which was not chosen by the Minister at the time.

158. Similarly, the Kaitiaki Trust, Ngarangi Walker and J. Tibble's support for a 14% TAC decrease last year was not chosen by the previous Minister, and as such they support Option 3.3.

159. The Ngāti Porou Co-ordination Group considered that Option 3.3 strikes the right balance of rebuilding stock abundance and managing the economic impacts of a reduced TACC.

Support for Option 3.4

160. NZRFC, ECO, Forest & Bird, and three individuals (M. Currie, C. Smith, and C. Murphy) supported Option 3.4.

161. The NZRFC submitted that the current decline in biomass can be attributed to poor commercial fishing practices associated with the differential MLS for autumn/winter (refer to *Section 14.2 – Proposed future consultations*). They considered the sustainability of the fishery should be considered above the economic impacts of reducing the TACC, and considered that commercial fishermen have caused the decline.

162. ECO expressed their concern that the current vulnerable biomass is very low and the current projection shows a small decrease at current catches, while noting that the uncertainty in these projections is high. They note the spawning stock is also projected to decline and all biomass probabilities that were estimated show a decline in the stock to 2024. Therefore, they support a significant reduction in the TAC to increase the vulnerable biomass, reduce other mortality, and increase catch rates.

163. Forest & Bird supported Option 3.4 on the basis that CPUE is not a reliable population measure and because the overfishing of rock lobster can lead to wider ecosystem effects such as the spread of kina barrens.

Other comments

164. Joint recreational submitters supported an alternative option, where the TAC was reduced to 305 tonnes, the TACC was reduced to 195 tonnes, the customary allowance was maintained at 20 tonnes, the recreational allowance was decreased to 15 tonnes, and the other mortality allowance was decreased to 75 tonnes. The modified recreational allowance was suggested to incorporate the most recent estimate of 3 tonnes of recreational take on commercial vessels under section 111 of the Act. It has since been clarified that section 111 take is included in the recreational catch estimate in the stock assessment model.

165. Joint recreational submitters did not support maintaining the stock at or below 14% or 15% vulnerable biomass as it is a fishery that predominately catches male lobsters. They noted the important ecological role of rock lobsters and referenced a survey which showed a marked difference in the size of male lobster inside and outside a marine reserve in the CRA 3 area.

166. Forest & Bird was concerned at the absence (at the time of consultation) of a B_{MSY} reference level for CRA 1, CRA 3, CRA 4, and CRA 5.

167. The Kaitiaki Trust, N. Walker, and Mr Tibble stressed the importance of koura for their hapū, who have managed the fishery to ensure they have customary access to the resource in their kapata kai/ gathering sites. The Kaitiaki Trust expressed interest in being involved in future work into understanding, mitigating, and reducing land-based and environmental impacts on the marine environment; as well as greater involvement in catch reporting and illegal take in their rohe moana.

168. NZ RLIC commented that the TACC reduction and the adjustments to the allowance for other mortality will need to be supported by a reduction in the recreational allowance to 12 tonnes.

169. Mr Mladek did not support any quota increasing and raised concerns about other sources of mortality from commercial and recreational fishing. Mr Strang and Mr Flavell-Johnson supported a non-specified decrease for all stocks being reviewed.

170. Mr Murphy considered that allowances should not necessarily be increased because abundance has increased, given that abundance fluctuates over time.

171. Mr Currie supported decreases to all recreational allowances, or at minimum retaining the status quo, for conservation and sustainability reasons. Mr Currie did not specify what he wished the recreational allowance to be reduced to.

172. Splashzone Ltd noted that the CRA 3 fishery is steady and has been for the past decade.

173. Prof A. Jeffs raised concerns with how the impacts of rock lobster fishing on the environment are being managed and mitigated. Prof Jeffs is concerned that the proposed options do not adequately deal with adverse effects of lobster fishing on the marine environment, specifically trophic cascades leading to sea urchin barrens (refer to Table 3 in *Section 5 – Central statutory considerations* above and in *Addendum 2 – Other matters raised in submissions* below). Another submitter (Mr Murphy) provided anecdotal experience that where rock lobster populations have been fished out completely, kina barrens have formed and altered the ecosystem.

10.5 Analysis

174. The CRA 3 vulnerable biomass level that can produce MSY has been calculated at 454.38 tonnes. The best available information suggests that CRA 3 vulnerable biomass is above (1.2 to 1.8 times) the B_{MSY} reference level and will be maintained or decrease slightly relative to 2020 levels under current catch levels over the next four years. Spawning biomass is projected to decrease and remain well above the soft limit in 2024.

Varying the TAC

175. Under Option 3.1 (status quo), the CRA 3 TAC would stay at its current level of 351.9 tonnes from 1 April 2021. Maintaining the TAC is predicted to result in CRA 3 vulnerable biomass declining by 0-4% over the next four years. Spawning biomass is less vulnerable to fishing and is predicted to decrease slightly (3-4%) and remain well above the soft limit of 20%.

176. Under Option 3.2 (10% TAC decrease), the CRA 3 TAC would be decreased by 34.4 tonnes from 351.9 tonnes to 317.5 tonnes. This option is proposed to increase the CRA 3 vulnerable biomass, while noting different patterns of abundance in some areas of the fishery. Vulnerable biomass is predicted to increase by 4-6% from 2020 levels over the next four years. Spawning biomass is predicted to decrease slightly from 2020 levels under this option (by 2-3%) and remain well above the soft limit of 20%.

177. Under Option 3.3 (14% TAC decrease), the CRA 3 TAC would be decreased by 49.9 tonnes from 351.9 to 302 tonnes. This decrease is proposed to increase CRA 3 vulnerable biomass. Vulnerable biomass is predicted to increase by 12-13% from 2020 levels over the next four years. Spawning biomass is predicted to decrease slightly from 2020 levels under this option (by 2-3%) and remain well above the soft limit of 20%. This option is similar to the option that was consulted on for CRA 3 for the 2020/21 fishing year.

178. Under Option 3.4 (19% TAC decrease), the CRA 3 TAC would be decreased by 67.9 tonnes from 351.9 tonnes to 284 tonnes. This option is proposed to give a greater likelihood of an increase to CRA 3 biomass. Vulnerable biomass is predicted to increase by 21-22% from 2020 levels over the next four years. Spawning biomass is predicted to decrease slightly from 2020 levels under this option (by 1-2%) and remain well above the soft limit of 20%.

Varying allowances and the TACC

179. Table 12 provides a summary of information on current non-commercial allowances for CRA 3 (Gisborne) and stock assessment assumptions of non-commercial catch.

Table 12: Current CRA 3 allowances and model assumptions of non-commercial catches (in tonnes).

CRA 3 (Gisborne)	Customary Māori	Recreational	Other mortality	Total
Current allowances	20	20	89	129
Non-commercial catch assumptions for the 2019 stock assessment	20	Assumed to vary with biomass. Estimated at 10.7 for 2018.	60.9 illegal + 9.6-9.9 handling mortality.	101.2-101.5
Non-commercial catch assumptions for the 2020 rapid assessment update	20	Assumed to vary with biomass. Estimated at 11.8 for 2019.	60.2 illegal + 14.6 handling mortality.	106.6

Māori customary fishing

180. No change is proposed to the 20 tonne customary Māori allowance for CRA 3. While noting the incompleteness and uncertainty in the CRA 3 customary harvest information, it is assumed that current harvest is within the 20 tonne allowance allocated for customary Māori interests. No specific feedback on the customary allowance was received from the Iwi Fisheries Forum in CRA 3.

Recreational fishing

181. Under Option 3.1 (status quo), no change is proposed to the 20 tonne recreational allowance for CRA 3. Noting the uncertainty and periodic nature of the CRA 3 recreational harvest information, it is assumed that current harvest is within the 20 tonne allowance. The 2020 rapid assessment used a model input of 11.8 tonnes for CRA 3 recreational catch. The 2017/18 NPS survey estimated recreational catch at 12 tonnes with 95% bounds of 6 -18 tonnes.

182. Under the remaining options (Option 3.2, Option 3.3 and Option 3.4) it is proposed that the recreational allowance be reduced to 13, 12 and 11 tonnes respectively. These allowances are proposed to more closely reflect the estimates of recreational harvest used in recent assessments and from the 2017/18 National Panel Survey. This is proposed in parallel with a reduction to the TACC, while noting the allowance for recreational fishing does not constrain harvest. You are not being asked to make a decision on any change to the recreational daily bag limit.

183. The NRLMG sought feedback on whether a change to CRA 3 recreational management controls should be considered. This approach reflects the shared nature of this fishery and that all fishing interests should contribute to the rebuild of the stock.

184. Under Option 3.2, 3.3 and 3.4 it is expected that vulnerable biomass will increase. As recreational catch is likely to increase under these options as stock abundance increases, some members of the NRLMG suggest that consideration needs to be given to initiating a process for bag limit reductions to constrain recreational catch to the allowance. Recreational members do not consider that these controls necessary at this time, as recreational catch is likely to be within the proposed allowance.

Other mortality

185. Under all options, except the status quo, it is proposed that the 89 tonne CRA 3 allowance for other sources of mortality caused by fishing (i.e. illegal catch and handling mortality) be reduced to 75 tonnes, to reflect the model estimates used in the stock assessment. The 2020 rapid assessment used a model input of 74.8 tonnes to represent this mortality.

Total Allowable Commercial Catch

186. Under Option 3.1 (status quo), the CRA 3 TACC would stay at its current level of 222.9 tonnes. This option would maintain the current commercial utilisation opportunities but would likely lead to a slight decline in biomass.

187. Under Option 3.2 (6% TACC decrease), the CRA 3 TACC would be decreased to 209.5 tonnes. The proposed 13.4 tonne TACC decrease has the potential to result in a loss of annual revenue alone to the catching sector of approximately $1.15 million (based on 2020/21 average port price information of $85.84 per kg).

188. Under Option 3.3 (13% TACC decrease), the CRA 3 TACC would be decreased to 195 tonnes. The proposed 27.9 tonne TACC decrease has the potential to result in a loss of annual revenue alone to the catching sector of approximately $2.39 million (based on 2020/21 average port price information of $85.84 per kg). This reduction will significantly impact on the 25 vessels involved and compound the economic losses related to COVID-19 in 2020.

189. Under Option 3.4 (20% TACC decrease), the CRA 3 TACC would be decreased to 178 tonnes. The proposed 44.9 tonne TACC decrease has the potential to result in a loss of annual revenue alone to the catching sector of approximately $3.85 million (based on 2020/21 average port price information of $85.84 per kg). TRLIA reinforces these estimates of financial impact, noting that associated servicing and support businesses will also be affected, particularly in smaller coastal town communities. TRLIA also notes that as a result of COVID-19, 12.6 tonnes of ACE was unable to be caught and sold in 2019/20, with a loss in revenue of approximately $1.1 million.

Other matters – CRA 3 differential minimum legal size review

190. The NRLMG is currently reviewing the minimum legal size regime for red rock lobster in CRA 3. See *Section 14 – Other relevant matters* for more information on this matter.

11 Review of the CRA 4 (Wellington/Hawke's Bay) red rock lobster fishery

11.1 CRA 4 stock status

191. In recent years, there have been tangata whenua and stakeholder concerns with the overall productivity of the CRA 4 stock, and majority support for a cautious management approach in this fishery.[31] A new stock assessment was conducted for CRA 4 in 2020.

192. The assessment results are summarised in Figures 14 and 15 and Table 13. They suggest that the 2020 vulnerable biomass is 13% of the unfished level, and total biomass is 39% of the unfished level. Spawning biomass in 2020 was 48% of the unfished level, well above the soft limit of 20% where it is Fisheries New Zealand policy to implement a formal, time-constrained rebuilding plan.

[31] In 2019, the previous Minister of Fisheries, Hon Stuart Nash, decided not to increase the TAC by 8.6% for 1 April 2019, because he considered it was "in the best interest for the long-term sustainable utilisation of the stock". In 2020, Minister Nash again chose to retain the status quo for 1 April 2020 (as supported by the NRLMG) despite the same management procedure suggesting a 17% increase to the TAC. There were widespread concerns that CRA 4 is a variable fishery, and that the proposed increase may not be able to be supported by the fishery.

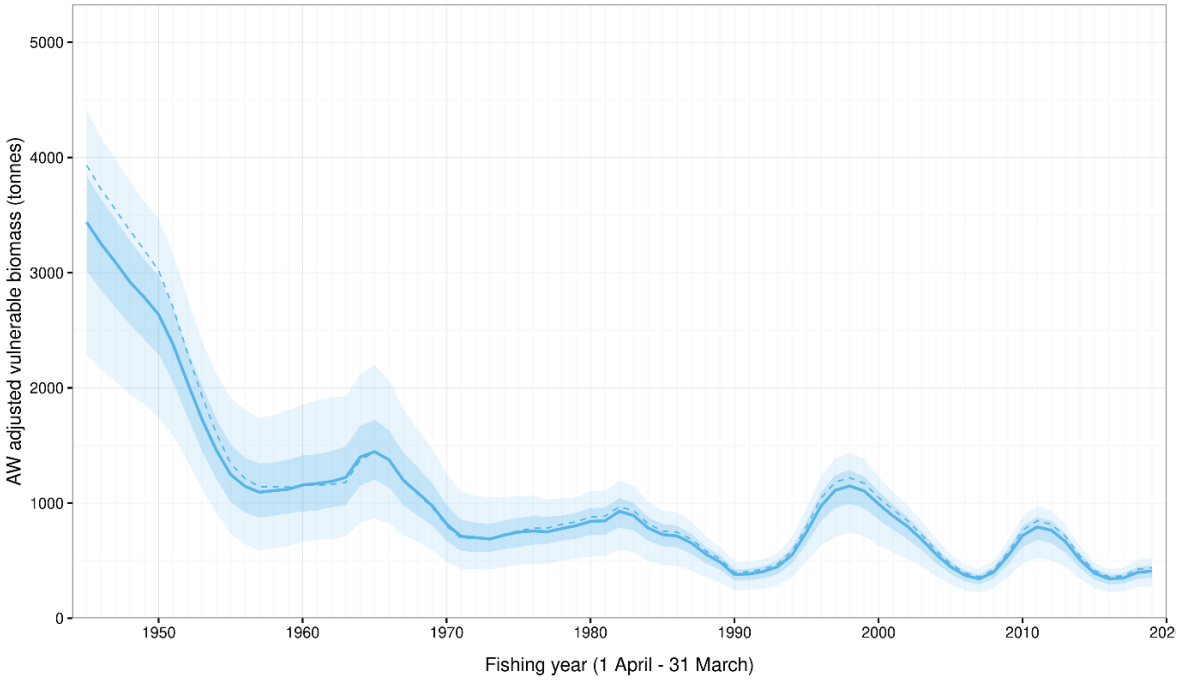

Figure 14: CRA 4 vulnerable biomass trajectory from the 2020 CRA 4 stock assessment. The solid line indicates the median, and the dashed line indicates the MAP (maximum a posteriori) estimate.[32]

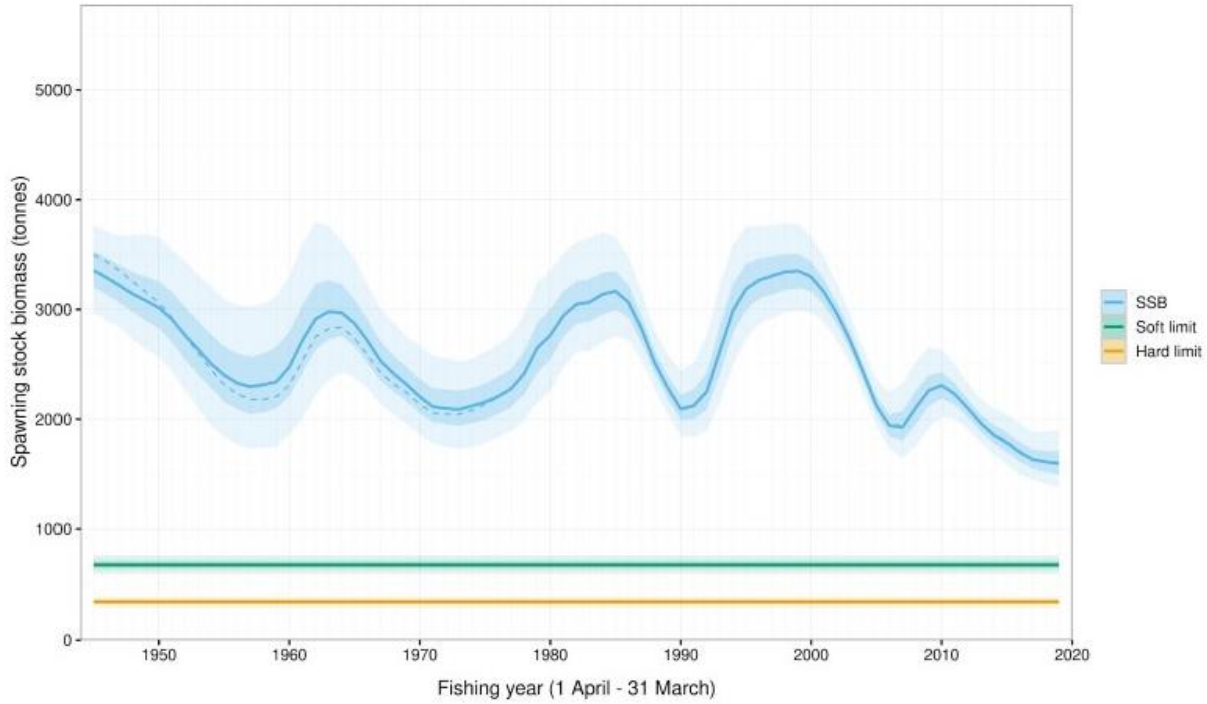

Figure 15: CRA 4 spawning biomass (SSB) trajectory from the 2020 CRA 4 stock assessment, including the soft limit (20% SSB_0)[33], and the hard limit (10% SSB_0)[34]. The solid line indicates the median, and the dashed line indicates the MAP (maximum a posteriori) estimate.

[32] The maximum a posteriori (MAP) probability estimate is an estimate of the spawning stock biomass based on historical and current data and prior knowledge.
[33] The soft limit is 20% of the unfished spawning biomass; the level at which it is Fisheries New Zealand policy to implement a formal, time-constrained rebuilding plan.
[34] The hard limit is 10% of the unfished spawning biomass level; the level at which it is Fisheries New Zealand policy to consider closing the fishery.

193. Table 13 provides further results of the 2020 stock assessment in terms of vulnerable, total and spawning stock biomass, with the uncertainties in the results also shown. For example, with 2020 catch levels[35] and recent recruitment, vulnerable biomass in 2024 could be at 10.7% (or 0.107) of unfished levels (median result), with a range of 4.0% (or 0.040) and 19.8% (or 0.198) of unfished levels (5% and 95% quantiles).

194. At 2020 catch levels, total biomass is projected to decrease to 37% of the unfished level, and spawning biomass is projected to decline slightly to 46% of the unfished level.

Table 13: Median results from the 2020 CRA 4 stock assessment. 5% and 95% quantiles are provided for the performance indicators 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/females without eggs)				
B_{2020} / B_0	0.100	0.126	0.163	Vulnerable biomass in 2020 was 13% of unfished levels
B_{2024} / B_0	0.040	0.107	0.198	Vulnerable biomass in 2024 will be 11% of unfished levels
B_{2024} / B_{2020}	0.380	0.847 ↓	1.470	Vulnerable biomass in 2024 will be 85% of 2020 levels (a decrease of 15%)
Total biomass (Btot) – Beginning of season autumn-winter total biomass (all males and females)				
$Btot_{2020}$ / $Btot_0$	0.310	0.388	0.490	Total biomass in 2020 was 39% of unfished levels
$Btot_{2024}$ / $Btot_0$	0.258	0.365	0.507	Total biomass in 2024 will be 37% of unfished levels
$Btot_{2024}$ / $Btot_{2020}$	0.760	0.944 ↓	1.172	Total biomass in 2024 will decline to 94% of 2020 levels (a decrease of 6%)
Spawning stock biomass (SSB) – Beginning of season autumn-winter spawning stock biomass (mature females)				
SSB_{2020} / SSB_0	0.410	0.477	0.562	Spawning biomass in 2020 was 48% of unfished levels
SSB_{2024} / SSB_0	0.330	0.458	0.607	Spawning biomass in 2024 will be 46% of unfished levels
SSB_{2024} / SSB_{2020}	0.770	0.953 ↓	1.156	Spawning biomass in 2024 will decline to 95% of 2020 levels (a decrease of 5%)
Probabilities				
$P(B_{2024}>B_{2020})$		0.299		30% probability that 2024 vulnerable biomass will be greater than 2020 levels
$P(Btot_{2024}>Btot_{2020})$		0.329		33% probability that 2024 total biomass will be greater than 2020 levels
$P(SSB_{2024}>SSB_{2020})$		0.333		33% probability that 2024 spawning biomass will be greater than 2020 levels

B_{MSY} reference level

195. The B_{MSY} reference level was calculated based on the 2020 CRA 4 stock assessment as a vulnerable biomass level of 389.08 tonnes. The results, given in Figure 16 and Table 14 below, suggest that vulnerable biomass was above the reference level (the green line) in both 2019 (with a 70% probability) and 2020, but is projected to decline to slightly below the B_{MSY} reference level (95% of the B_{MSY} reference level) by 2024.

[35] CRA 4 commercial catch was assumed to be 350.6 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 318.8 tonnes (the 2020 TACC) from 2021-2024.

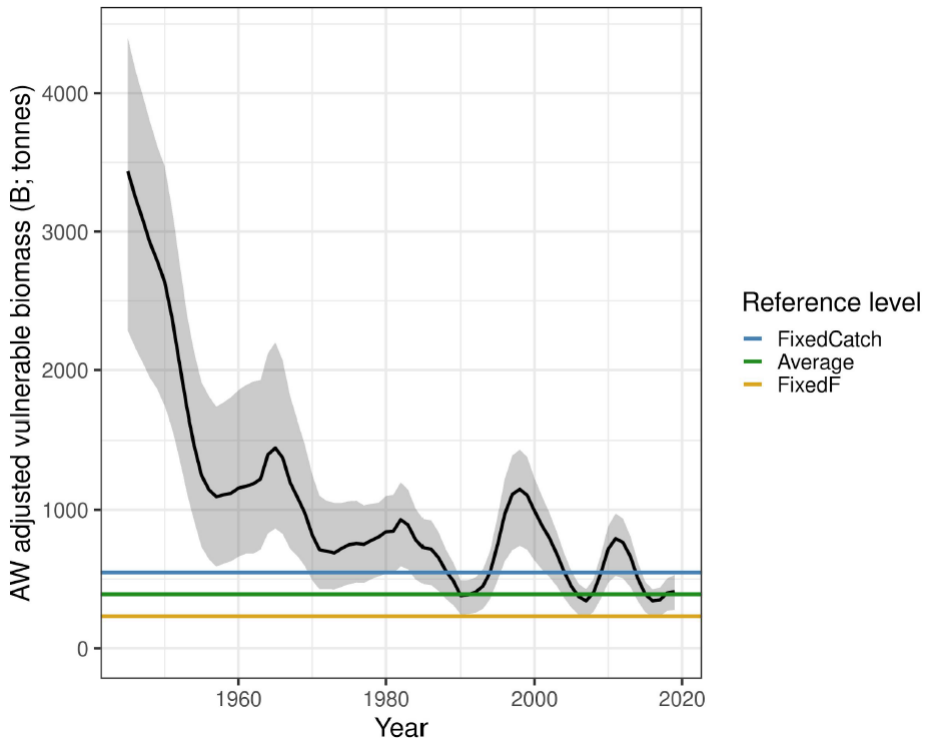

Figure 16: CRA 4 vulnerable biomass from the 2020 stock assessment, showing the B_{MSY} reference level (green line), which is the average of the fixed catch (blue line) and fixed fishing mortality (*F*) (yellow line) levels that maximise catch while meeting risk constraints.

196. Table 14 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 2020 is estimated to be at 433.2 tonnes (median result), with a range of 282.9 tonnes and 575.7 tonnes (5% and 95% quantiles).

Table 14: B_{MSY} reference level results for CRA 4, and estimated vulnerable biomass level in 2020 from the 2020 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)		**389.08**		The vulnerable biomass that can produce MSY is 454.38 tonnes
Probability B_{2019} greater than B_R		0.695		70% probability that vulnerable biomass in 2019 was greater than the B_{MSY} reference level
B_{2020}	282.9	433.2	575.7	Vulnerable biomass in 2020 was 433.2 tonnes
B_{2020} / B_R		1.113		Vulnerable biomass in 2020 was 1.11 times (111%) the reference level
B_{2024}	140.8	367.5	692.5	Vulnerable biomass in 2024 will be 367.5 tonnes
B_{2024} / B_R		0.945		Vulnerable biomass in 2024 will be 0.95 times (95%) the reference level

197. A rapid assessment update will be conducted for CRA 4 in 2021 and will provide an opportunity to consider a review of the catch settings and management controls for April 2022.

11.2 CRA 4 fishery overview

Māori customary fishing

198. Information on CRA 4 (Wellington/Hawke's Bay) customary Māori catches is available under the Fisheries (Kaimoana) Regulations 1998, and regulation 50 of the Fisheries (Amateur Fishing) Regulations 2013. In the last five years, approximately 500 rock lobsters were reported as customary harvest from CRA 4 on average each year. This information is considered incomplete, because customary catch that occurs under the Amateur Regulations for the purposes of hui and tangi is not required to be reported.

199. An estimate of 20 tonnes was used in the 2020 CRA 4 stock assessment model to represent customary catches.

Recreational fishing

200. For the 2020 CRA 4 stock assessment, recreational catch estimates from the 1994 and 1996 Otago University surveys and the 2011/12 and 2017/18 National Panel Surveys were used to construct a recreational catch trajectory, by assuming that recreational catch was proportional to the CRA 4 abundance, estimated from trends in spring-summer commercial CPUE (Figure 17). In 2019, the model estimate of CRA 4 recreational catch was 39.6 tonnes. The 2017/18 National Panel Survey estimate of CRA 4 recreational catch was 41.4 tonnes (±18.7 tonnes).

201. The COVID-19 outbreak will have reduced recreational participation and catch over the lockdown period in 2020.

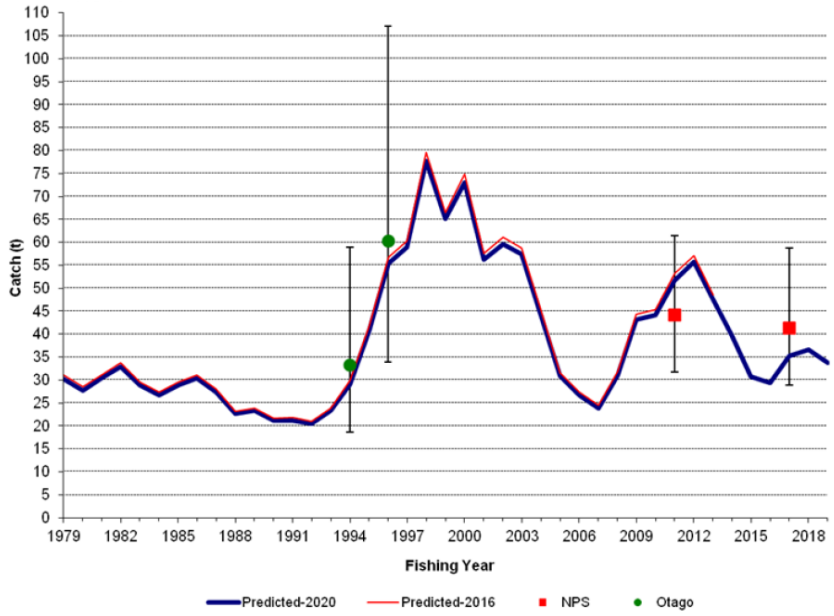

Figure 17: CRA 4 recreational catch trajectory (tonnes) for the 2020 CRA 4 stock assessment model (error bars are ±2 standard errors).

Other mortality

202. In the 2020 CRA 4 stock assessment, the Rock Lobster Fisheries Assessment Working Group used 10% of the total commercial catch summed from 1945-1989, and 5% of the total commercial catch summed from 1990-2019 to represent illegal take. The Working Group also scaled the catch proportionately to commercial CPUE for each year after 1979, to suggest illegal take could vary with available abundance. For the 2019/20 fishing year, while uncertain the illegal take estimate assumed for the model was 18.7 tonnes.

203. The CRA 4 assessment also assumed that handling mortality was 10% of returned lobsters until 1990, and then 5% thereafter (Figure 18). The model estimate of handling mortality was 14.1 tonnes for 2019.

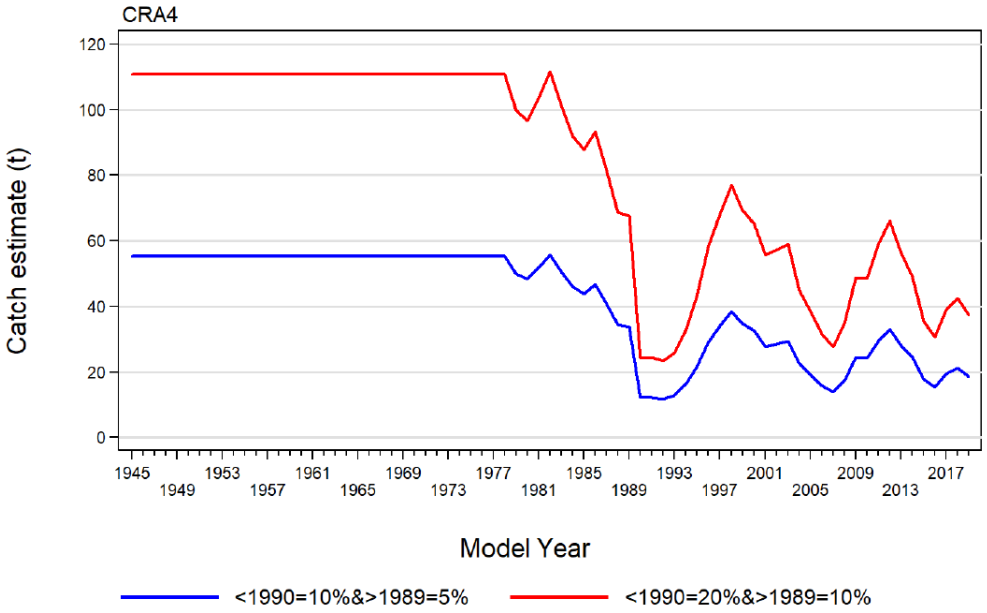

Figure 18: CRA 4 illegal catch trajectory for the 2020 CRA 4 stock assessment (blue line) and the sensitivity (red line).

Commercial fishing

204. Annual landings and the TACC for CRA 4 (Wellington/Hawke's Bay) since 1990 are shown in Figure 19.

205. In 2007 and 2008, the CRA 4 TACC was substantially under-caught because industry used a voluntary management procedure to guide ACE shelving (Figure 19). Between 2012 and 2019 formally adopted CRA 4 management procedures were used to review the TACC annually to ensure catches reflected available abundance. The operation of the management procedure resulted in a substantial TACC reduction for 1 April 2017 from 397 tonnes to 289 tonnes, and a small TACC increase followed for 1 April 2018 from 289 tonnes to 318.8 tonnes. Since this time, no change (for various reasons) has been made to the TACC even though the management procedure suggested increases.

206. The COVID-19 outbreak, particularly the effective closure of the Chinese market for a period coupled with low prices for exports contributed to an under-catch of the CRA 4 TACC in 2019/20 (Figure 19).

207. The current asset value of the CRA 4 fishery is estimated to be over $320 million based on the current TACC and the average quota share prices for the last five years. The average CRA 4 ACE value (the earnings quota owners receive when selling their ACE) over the last five years was $48,503 per tonne.

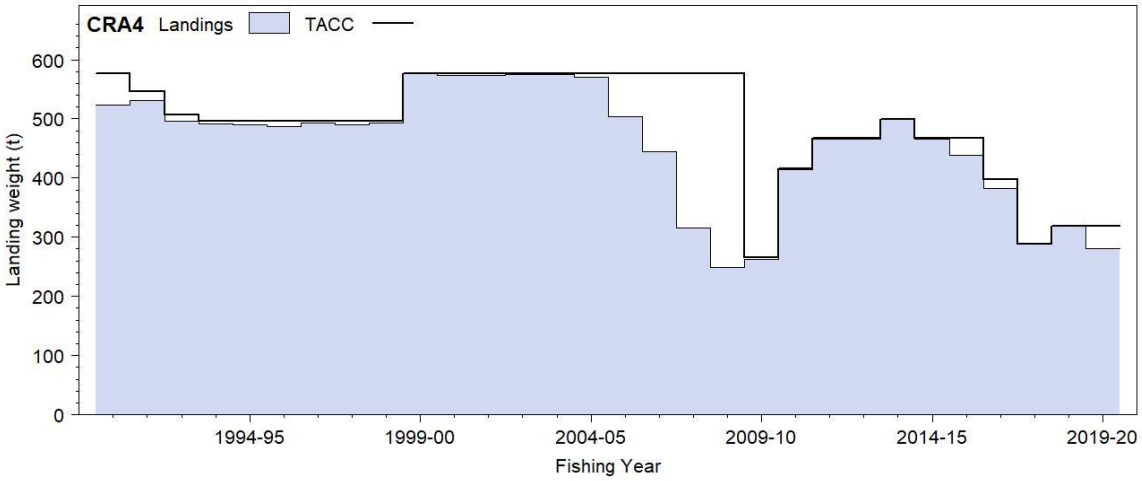

Figure 19: CRA 4 commercial landings and TACCs from 1990 to 2020.

11.3 Final CRA 4 options

208. Table 15 shows the final options proposed for CRA 4 (Wellington/Hawke's Bay), which are the same as the consultation options. The results from the new CRA 4 stock assessment have been used to guide the options for varying the TAC. There is an agreed B_{MSY} reference level for CRA 4, and vulnerable biomass is projected to decline just below the reference level under current catch levels over the next four years.

209. The NRLMG, including Fisheries New Zealand, recommends that you agree to Option 4.2.

Table 15: TAC, allowance and TACC final proposals (in tonnes) for CRA 4 from 1 April 2021. Blue shading shows the change proposals

Stock	Option	TAC	TACC	Allowances			NRLMG support
				Māori customary	Recreational	Other mortality	
CRA 4 Wellington/ Hawke's Bay	**Option 4.1** Status quo	513.8	318.8	35	85	75	X No support
	Option 4.2 – SA Decrease the TAC by 24%	388 ↓ (24%)	280 ↓ (12%)	35	40 ↓	33 ↓	✓ All
	Option 4.3 – SA Decrease the TAC by 30%	361 ↓ (30%)	260 ↓ (18%)	35	33 ↓	33 ↓	

11.4 Summary of CRA 4 submissions

210. Twenty-three submissions were received for CRA 4.

Support for Option 4.1 (status quo)

211. Three individual submissions (K. Bolt, D. Wood, and G. & P. Price) supported retaining the status quo and noted a recent improvement in rock lobster abundance, with Mr Wood noting that catches in Cook Strait and the Wairarapa are good.

212. Wakatū Inc did not have confidence in the decline in biomass predicted by the 2020 stock assessment, believing that it was based on a period of pressure on the fishery in 2019/20, and noting that anecdotal evidence from fishers suggests stock abundance is improving. Wakatū Inc supported retaining the status quo until future assessments can be conducted with recent fishery data.

Support for Option 4.2

213. NZ RLIC, CRAMAC 4, Shona Marie Trust and S. Depree supported Option 4.2. NZ RLIC noted that improvements in abundance and catch rates in the fishery since March 2020, including recent logbook data, were not able to be considered in the stock assessment. This information gives some confidence that the TACC reduction supported will allow a rebuild of the fishery. NZ RLIC noted that a rapid assessment update in 2021 may be used to confirm the recent improvement in the stock and provide guidance on whether further management action is required. The development of agreed management targets and a revised management procedure are also important to guide and provide certainty to support future management decisions.

214. CRAMAC 4 is committed to maintaining their investment in voluntary and industry-funded logbooks, observer catch sampling and tag recapture programmes to ensure the best possible data is available to support future management decisions

215. Te Ohu noted that Ngāti Kahungunu support Option 4.2. Ngāti Kahungunu confirmed their support for Option 4.2 with Fisheries New Zealand.

Support for Option 4.3

216. ECO and Forest & Bird and four individuals (M. Currie, P. J. Keenan, C. Smith, and C. Murphy) supported Option 4.3. These submitters generally supported the need for increased abundance in the fishery.

217. Forest & Bird supported Option 4.3 on the basis that CPUE is not a reliable population measure and because the overfishing of rock lobster can lead to wider ecosystem effects such as the spread of kina barrens. Forest & Bird was concerned at the absence (at the time of consultation) of a B_{MSY} reference level for CRA 1, CRA 3, CRA 4, and CRA 5.

218. ECO expressed their concern that the current vulnerable biomass is very low and the current projection shows a decrease at current catches, while noting that the uncertainty in these projections is high. They note the spawning stock is at a historically low point and also projected to decline and all biomass probabilities that were estimated show a decline in the stock to 2024. Therefore, they support a significant reduction in the TAC to increase the vulnerable biomass, reduce other mortality, and increase catch rates.

Other comments

219. Te Ohu Kaimoana, ICP and Te Arawa Fisheries supported an alternative option, where the TAC was reduced to 426.8 tonnes, the TACC was maintained at 318.8 tonnes, the customary allowance was maintained at 35 tonnes, the recreational allowance was decreased to 40 tonnes, and the other mortality allowance was decreased to 33 tonnes. Te Ohu notes that the CRA 4 fishery is changeable and that there are differing reports of good and bad fishing. Te Ohu supported maintaining the current TACC, updating the recreational and other mortality allowances to reflect best available information, and considering a review of the fishery after the CRA 4 rapid assessment update in 2022 using an agreed biomass reference level.

220. Joint recreational submitters supported a decrease to the TAC to increase the abundance of the CRA 4 stock, with a review of the fishery after the CRA 4 rapid assessment update in 2022. Joint recreational submitters supported an alternative option, where the TAC was reduced to 393 tonnes, the TACC was reduced to 280 tonnes, the customary allowance was maintained at 35 tonnes, the recreational allowance was decreased to 45 tonnes, and the other mortality allowance was decreased to 33 tonnes. The modified recreational allowance was suggested to incorporate the most recent estimate of 4.4 tonnes of recreational take on commercial vessels under section 111 of the Act. It has since been clarified that section 111 take is included in the recreational catch estimate in the stock assessment model.

221. NZRFC support a precautionary management approach given low levels of recent recruitment, and (at the time of consultation) the lack of a biomass reference level. NZRFC believe there is no evidence to justify reducing the other mortality allowance, and supports an alternative

option, where the TAC was reduced to 430 tonnes, the TACC was reduced to 280 tonnes, the customary allowance was maintained at 35 tonnes, the recreational allowance was decreased to 40 tonnes, and the other mortality allowance was maintained at 75 tonnes. NZRFC also raised concerns that the practice of moving ACE between non-performing to performing statistical areas within a season has not been reviewed by the Rock Lobster Fisheries Assessment Working Group or considered by the NRLMG.

222. Splashzone Limited noted that the CRA 4 fishery is improving dramatically and did not support a decrease to catch limits.

223. Two individuals (A. Flavell-Johnson and P. Strang) supported a decrease to the TAC or catch limits across all stock limits being reviewed, but did not specify what they wished the TAC or catch limits to be reduced to.

224. An individual (D. Mladek) did not support any quota increasing and raised concerns about other sources of mortality from commercial and recreational fishing.

225. Mr Keenan noted that the number of recreational divers has increased, that rock lobster is a popular species to catch, and that marine life, including rock lobster, has decreased over the last ten years. Mr Keenan considered that the commercial catch limit and recreational allowance should both be decreased to ensure long-term sustainability, but did not specify an option.

11.5 Analysis

226. The CRA 4 vulnerable biomass level that can produce MSY has been calculated at 389.08 tonnes. The best available information suggests that CRA 4 vulnerable biomass is above (1.1 times) the B_{MSY} reference level, and will decrease to slightly below (0.95 times) the B_{MSY} reference level under current catch levels over the next four years. Spawning biomass is projected to decrease but remain above the soft limit in 2024.

Varying the TAC

227. Under Option 4.1 (status quo), the CRA 4 TAC would stay at its current level of 513.8 tonnes from 1 April 2021. Maintaining the TAC is predicted to result in CRA 4 vulnerable biomass declining by 15% over the next four years. Spawning biomass is predicted to decrease slightly (5%) and remain well above the soft limit of 20%. This could result in decreased abundance in the CRA 4 fishery, with decreased non-commercial catches and lower catch rates for all sectors.

228. Under Option 4.2 (24% TAC decrease), the CRA 4 TAC would be reduced by 125.8 tonnes from 513.8 to 388 tonnes. The proposed TAC decrease is estimated to improve the likelihood that the stock biomass increases. Vulnerable biomass is predicted to increase slightly (1%) from 2020 levels over the next four years under this option. Spawning biomass is predicted to decrease slightly from 2020 levels under this option (2%) and remain well above the soft limit of 20%.

229. Under Option 4.3 (30% TAC decrease), the CRA 4 TAC would be reduced by 152.8 tonnes from 513.8 to 361 tonnes. In comparison to Option 4.2, the proposed TAC decrease is expected to provide greater likelihood that vulnerable biomass will increase from current levels.

Varying allowances and the TACC

230. Table 16 provides a summary of information on current non-commercial allowances for CRA 4 (Wellington/Hawke's Bay) and stock assessment assumptions of non-commercial catch.

Table 16: Current CRA 4 allowances and model assumptions of non-commercial catches (in tonnes).

CRA 4 (Wellington/Hawke's Bay)	Customary Māori	Recreational	Other mortality	Total
Current allowances	35	85	75	195
Non-commercial catch assumptions for the 2020 stock assessment	20	Assumed to vary with biomass. Estimated at 39.6 for 2019.	18.7 illegal + 14.1 handling mortality.	92.4

Māori customary fishing

231. No change is proposed to the 35 tonne CRA 4 customary Māori allowance. While noting the incompleteness and uncertainty in the CRA 4 customary harvest information, it is assumed that current harvest is well within the 35 tonne allowance for customary Māori interests at this time. No specific feedback on the customary allowance was received from the Iwi Fisheries Forums in CRA 4.

Recreational fishing

232. Under Option 4.1 (status quo), no change would be made to the 85 tonne recreational allowance for CRA 4. This allowance was set in 1999 based on best available information at the time. Recent recreational catch estimates from the 2017/18 National Panel Survey, and stock assessment assumptions of recreational catch suggest that the current CRA 4 recreational catch is likely to be around half the current allowance. While the extent to which CRA 4 recreational harvest may have decreased in recent years is uncertain, these estimates suggest that current recreational catch is around 40 tonnes and within the current allowance of 85 tonnes.

233. Under Option 4.2 it is proposed that the recreational allowance is reduced to 40 tonnes. This allowance is proposed to more closely reflect the estimates of recreational harvest used in recent assessments and from the 2017/18 National Panel Survey. This is while noting the allowance for recreational fishing does not constrain harvest. You are not being asked to make a decision on any change to the recreational daily bag limit.

234. Under Option 4.3 it is proposed that the recreational allowance is reduced below current estimates of harvest to 33 tonnes. This is proposed in parallel with the level of reduction proposed on commercial catch.

235. The NRLMG sought feedback on whether a change to CRA 4 recreational management controls should be considered. This approach reflects the shared nature of this fishery and that all fishing interests should contribute to the rebuild of the stock

236. Under Option 4.3 it is expected that vulnerable biomass will increase. As recreational catch is likely to increase under these options as stock abundance increases, some members of the NRLMG suggest that consideration needs to be given to initiating a process for bag limit reductions to constrain recreational catch to the allowance. Recreational members do not consider that these controls necessary at this time, as recreational catch is likely to be within the proposed allowance.

Other mortality

237. Under all options, except the status quo, it is proposed that the 75 tonne CRA 4 allowance for other sources of mortality caused by fishing (i.e. illegal catch and handling mortality) be reduced to 33 tonnes, to reflect the model estimates used in the stock assessment.

Total Allowable Commercial Catch

238. Under Option 4.1 (status quo), the CRA 4 TACC would stay at its current level of 318.8 tonnes. This option would maintain the current commercial utilisation opportunities but would likely lead to a decline in biomass.

239. Under Option 4.2 (12% TACC decrease), the CRA 4 TACC would be decreased to 280 tonnes. The proposed 38.8 tonne TACC decrease has the potential to result in a loss of annual revenue alone to the catching sector of approximately $3.33 million (based on 2020/21 average port price information of $85.84 per kg). This reduction will impact on the 36 vessels involved and compound the economic losses related to COVID-19 in 2020.

240. Under Option 4.3 (18% TACC decrease), the CRA 4 TACC would be reduced to 260 tonnes. The proposed 58.8 tonne TACC decrease has the potential to result in a decrease of annual revenue alone to the catching sector of approximately $5.05 million (based on 2020/21 average port price information of $85.84 per kg).

241. CRAMAC 4 reinforces these estimates of financial impact, noting that associated servicing and support businesses will also be affected, particularly in smaller coastal town communities. CRAMAC 4 also note that as a result of COVID-19, 6.7 tonnes of ACE was unable to be caught and sold in 2019/20, with a loss in revenue of approximately $0.5 million.

12 Review of the CRA 5 (Canterbury/Marlborough) red rock lobster fishery

12.1 CRA 5 stock status

242. A new stock assessment was conducted for CRA 5 in 2020.

243. The assessment results are summarised in Figures 20 and 21 and Table 17 below. They suggest that, for the entire CRA 5 fishery, 2020 vulnerable biomass is 42% of the unfished level, and total biomass is 60% of the unfished level. Spawning biomass in 2020 was 71% of the unfished level, well above the soft limit of 20% where it is Fisheries New Zealand policy to implement a formal, time-constrained rebuilding plan.

244. The 2020 stock assessment also split CRA 5 into two separate sub-areas, with Figures 20 and 21 showing vulnerable biomass and spawning biomass for:

- Region 1: Kaikōura/statistical area 917 + Christchurch/statistical area 918 + Ashburton-Timaru/statistical 919; and,
- Region 2: Ward/statistical area 916 + Marlborough Sounds/statistical area 933 + Nelson/statistical area 932.

245. Region 1 has the larger vulnerable and spawning biomass, about four times the size of region 2.

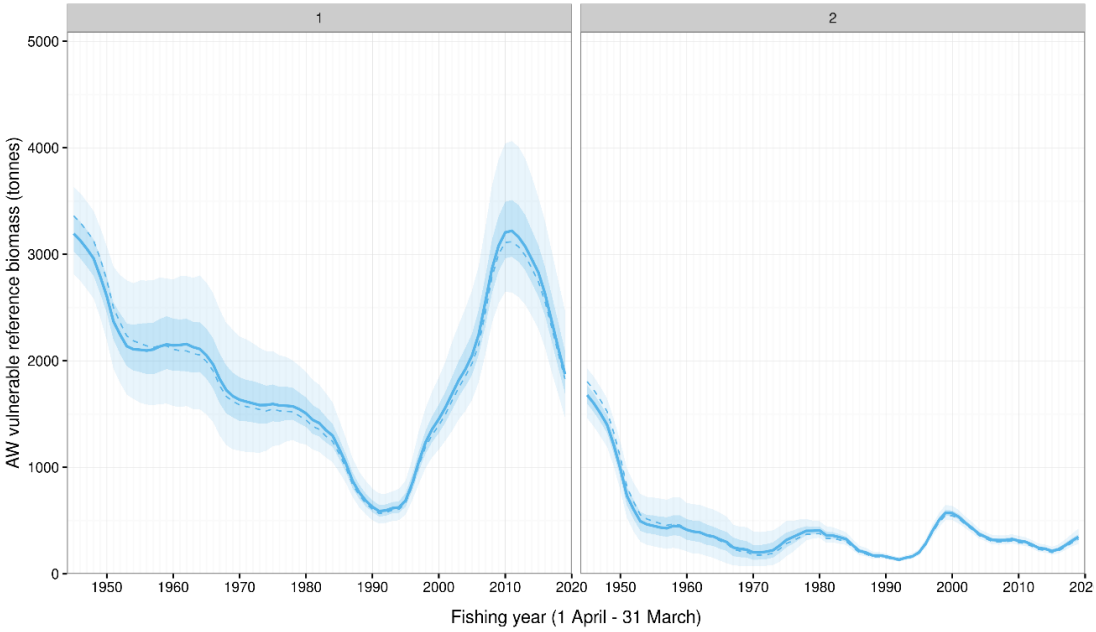

Figure 20: CRA 5 vulnerable biomass trajectory for Region 1 and Region 2 from the 2020 CRA 5 stock assessment. The solid line indicates the median, and the dashed line indicates the MAP (maximum a posteriori) estimate.

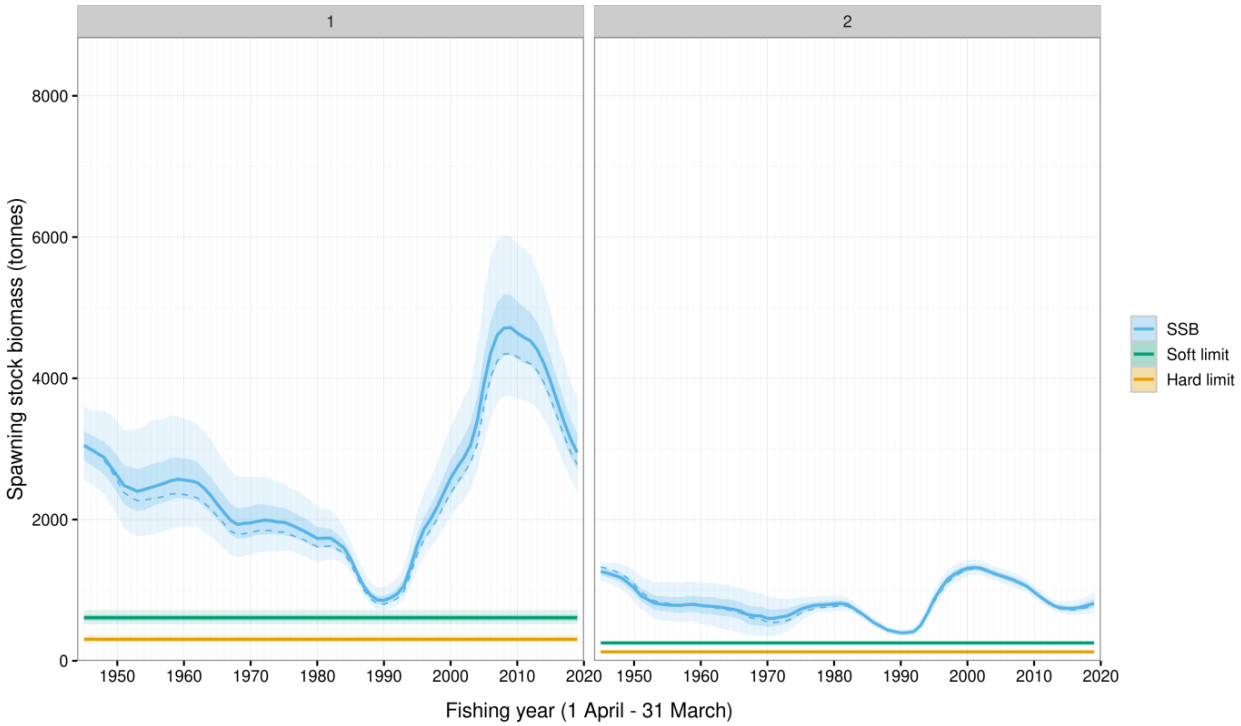

Figure 21: CRA 5 spawning biomass (SSB) trajectory for Region 1 and Region 2 from the 2020 CRA 5 stock assessment, including the soft limit (20% SSB_0)[36], and the hard limit (10% SSB_0).[37] The solid line indicates the median, and the dashed line indicates the MAP (maximum a posteriori) estimate.

246. Table 17 provides further results of the 2020 stock assessment in terms of vulnerable, total and spawning stock biomass, with uncertainties in the results also shown.

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

247. Over the next four years, with 2020 catch levels[38] and recent recruitment, vulnerable biomass, total biomass, and spawning biomass for the entire CRA 5 area are all projected to decline in comparison to current levels but not to levels that would require a formal, time-constrained rebuilding plan. The biggest change is in vulnerable biomass which is projected to decline to 27.3% (or 0.273) of unfished levels by 2024, with a range of 18.8% (or 0.188) and 39.7% (or 0.397) (5% and 95% quantiles). There is currently about a 4% probability that the overall CRA 5 vulnerable biomass will increase by 2024 and a 16% probability that spawning stock biomass will increase.

Table 17: Median results from the 2020 CRA 5 stock assessment. 5% and 95% quantiles are provided for the performance indicators 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/females without eggs)				
B_{2020} / B_0	0.340	0.418	0.521	Vulnerable biomass in 2020 was 42% of unfished levels
B_{2024} / B_0	0.188	0.273	0.397	Vulnerable biomass in 2024 will be 27% of unfished levels
B_{2024} / B_{2020}	0.497	0.657 ↓	0.829	Vulnerable biomass in 2024 will be 66% of 2020 levels (a decrease of 34%)
Total biomass (Btot) – Beginning of season autumn-winter total biomass (all males and females)				
$Btot_{2020}$ / $Btot_0$	0.525	0.603	0.720	Total biomass in 2020 was 60% of unfished levels
$Btot_{2024}$ / $Btot_0$	0.430	0.532	0.671	Total biomass in 2024 will be 53% of unfished levels
$Btot_{2024}$ / $Btot_{2020}$	0.783	0.877 ↓	0.995	Total biomass levels will be 88% of 2020 levels (a decrease of 12%)
Spawning stock biomass (SSB) – Beginning of season autumn-winter spawning stock biomass (mature females)				
SSB_{2020} / SSB_0	0.641	0.711	0.810	Spawning biomass in 2020 was 71% of unfished levels
SSB_{2024} / SSB_0	0.565	0.666	0.800	Spawning biomass in 2024 will be 67% of unfished levels
SSB_{2024} / SSB_{2020}	0.850	0.937 ↓	1.045	Spawning biomass in 2024 will be 94% of 2020 levels (a decrease of 6%)
Probabilities				
$P(B_{2024}>B_{2020})$		0.002		Less than a 1% probability that 2024 vulnerable biomass will be greater than 2020 levels
$P(Btot_{2024}>Btot_{2020})$		0.043		4% probability that 2024 total biomass will be greater than 2020 levels
$P(SSB_{2024}>SSB_{2020})$		0.155		16% probability that 2024 spawning biomass will be greater than 2020 levels

B_{MSY} reference level

248. The B_{MSY} reference level was calculated based on the 2020 CRA 5 stock assessment as a vulnerable biomass level of 671.19 tonnes. The results, given in Figure 22 and Table 18 below, suggest that vulnerable biomass was above the reference level (the green line) in both 2019 (with a 100% probability) and 2020 (3.03 times the B_{MSY} reference level), and is projected to decline but stay well above the B_{MSY} reference level (1.98 times the B_{MSY} reference level) under current catch levels by 2024.

[38] CRA 5 commercial catch was assumed to be 363.8 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 350 tonnes (the 2020 TACC) from 2021-2024.

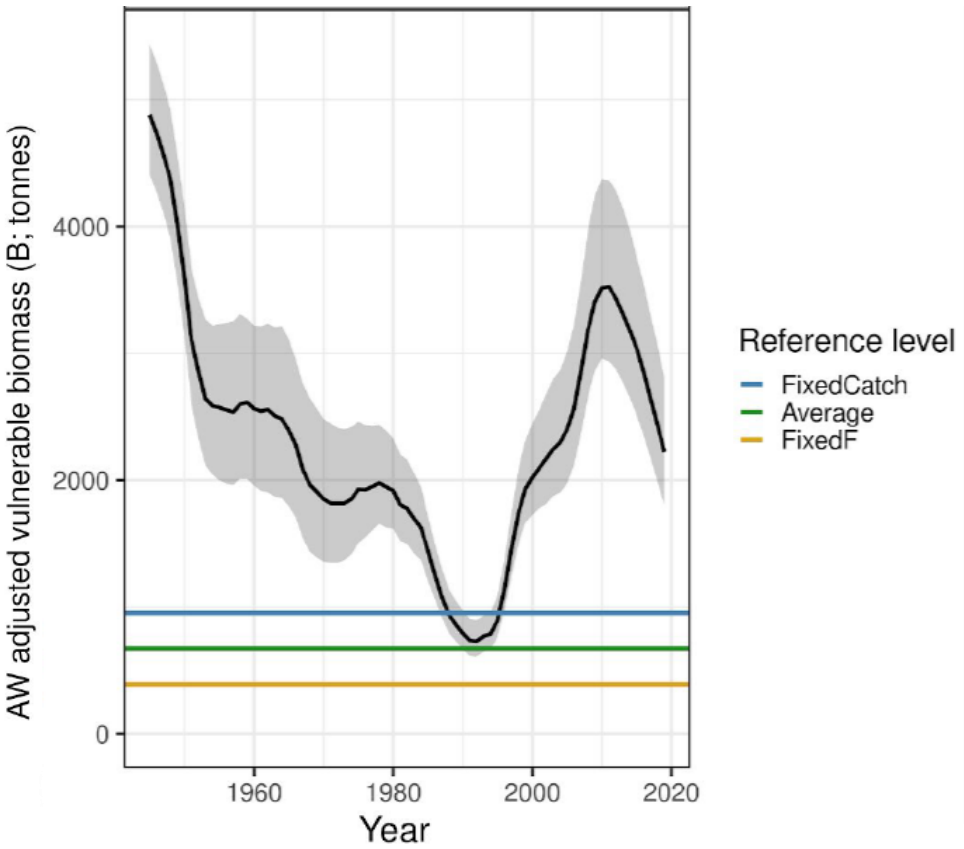

Figure 22: CRA 5 vulnerable biomass from the 2020 stock assessment, showing the B_{MSY} reference level (green line), which is the average of the fixed catch (blue line) and fixed fishing mortality (*F*) (yellow line) levels that maximise catch while meeting risk constraints.

249. Table 18 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 2020 was estimated to be at 2031 tonnes (median result), with a range of 1632 tonnes and 2604 tonnes (5% and 95% quantiles).

Table 18: B_{MSY} reference level results for CRA 5, and estimated vulnerable biomass level in 2020 from the 2020 rapid assessment update. 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)		**671.189**		The vulnerable biomass that can produce MSY is 671.189 tonnes
Probability B_{2019} greater than B_R		1.00		100% probability that vulnerable biomass in 2019 was greater than the B_{MSY} reference level
B_{2020}	1632	2031	2604	Vulnerable biomass in 2020 was 2031 tonnes
B_{2020} / B_R		3.026		Vulnerable biomass in 2020 was 3.03 times (303%) the reference level
B_{2024}	886	1331	1975	Vulnerable biomass in 2024 will be 1331 tonnes
B_{2024} / B_R		1.983		Vulnerable biomass in 2024 will be 1.98 times (198%) the reference level

250. In addition, assuming catches used for each region will remain unchanged, the 2020 stock assessment suggests the two sub-regions of CRA 5 will behave differently over the next four years.

251. The larger Region 1 (Kaikōura and south) is predicted to decrease in abundance. This decline started well before the earthquakes in 2016. Vulnerable biomass is projected to decrease from 52% of unfished levels in 2020 to 26% of unfished levels in 2024, but stay well above (1.74 times) the B_{MSY} reference level.[39]

252. The smaller Region 2 (Ward and top of the South Island) is predicted to increase in abundance. Vulnerable biomass is projected to increase from 23% of unfished levels in 2020 to 29% of unfished levels in 2024, and stay well above (2.53 times) the B_{MSY} reference level.[40]

253. These predictions assume distribution of catch between the two regions in 2019/20 is maintained over this period and do not take into account any change in distribution of ACE between the regions. Catch in the Ward area of Region 2 has been impeded by the ability to launch vessels and access the fishery since the earthquake in November 2016. Industry is taking steps to address this issue.

254. A rapid assessment update will be conducted for CRA 5 in 2021 and will provide an opportunity to consider a review of the catch settings and management controls for April 2022.

12.2 CRA 5 fishery overview

Māori customary fishing

255. In the last five years, approximately 2,500 rock lobsters were reported as customary harvest from CRA 5 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 from the Clarence River north is not required to be reported.

256. An estimate of 10 tonnes was used in the 2020 CRA 5 stock assessment model to represent customary catches.

Recreational fishing

257. For the 2020 CRA 5 stock assessment, recreational catch estimates from the 1994 and 1996 Otago University surveys and an inflated estimate from the 2011/12 National Panel Survey[41] were used to construct a recreational catch trajectory. It was assumed that recreational catch was proportional to the spring-summer abundance, estimated from trends in commercial CPUE in statistical area 917 (Figure 23). In 2019, the model estimate of CRA 5 recreational catch was 74.6 tonnes.

258. The COVID-19 outbreak will have reduced participation and catch over the lockdown period in 2020.

[39] Region 1 has a B_{MSY} reference level of 475.76 tonnes, and 2019 vulnerable biomass was above this reference level with a 100% probability. The median vulnerable biomass for region 1 in 2020 was 1650 tonnes (3.47 times the B_{MSY} reference level) and is projected to decline to 827.3 tonnes (1.74 times the B_{MSY} reference level) over the next four years under current catch levels.

[40] Region 2 has a B_{MSY} reference level of 195.43 tonnes, and 2019 vulnerable biomass was above this reference level with a 100% probability. The median vulnerable biomass for region 2 in 2020 was 382.2 tonnes (1.96 times the B_{MSY} reference level) and is projected to increase to 495 tonnes (2.53 times the B_{MSY} reference level) over the next four years under current catch levels.

[41] The 2011/12 National Panel Survey (NPS) estimate was inflated because there were no logbooks in Kaikōura, and the estimate was considered an underestimate of the recreational catch in the region. The 2017/18 NPS estimate of CRA 5 recreational catch was 41 tonnes (± 17 tonnes). It was not used in the 2020 CRA 5 stock assessment because of uncertainty in catch associated with the 2016 Kaikōura earthquakes.

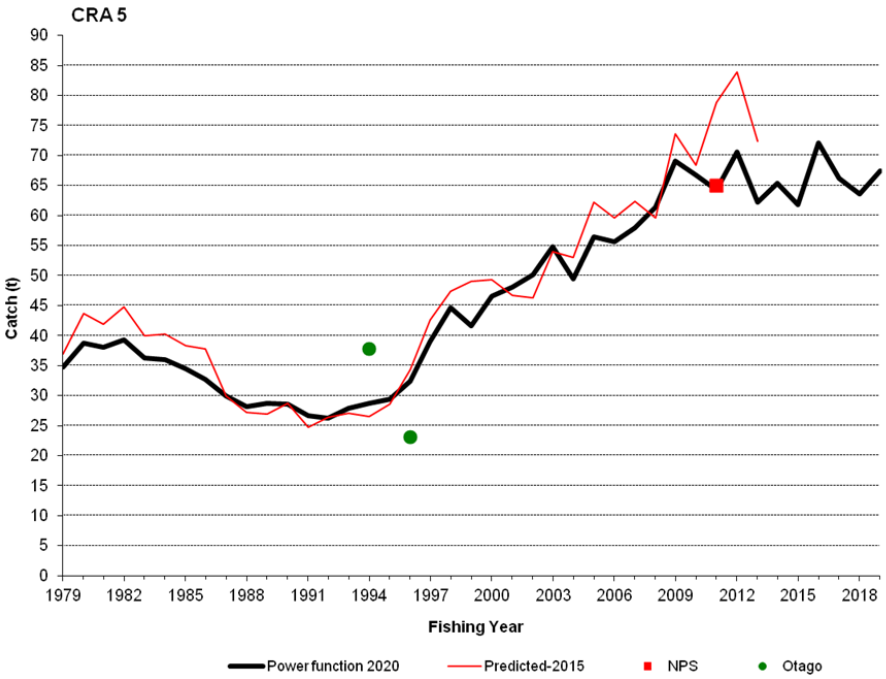

Figure 23: CRA 5 recreational catch trajectory (tonnes) for the 2020 CRA 5 stock assessment model.

Other mortality

259. In the 2020 CRA 5 stock assessment, the Rock Lobster Fisheries Assessment Working Group used 10% of the total commercial catch summed from 1945-1989, and 5% of the total commercial catch summed from 1990-2019 to estimate illegal take. The Working Group also scaled the catch proportionately to commercial CPUE for each year after 1979, to suggest illegal take could vary with available abundance. For the 2019/20 fishing year, while uncertain, the illegal take estimate assumed for the model was 23.4 tonnes.

260. The CRA 5 assessment also assumed that handling mortality was 10% of returned lobsters until 1990, and then 5% thereafter (Figure 24). The model estimate of handling mortality was 14.9 tonnes for 2019.

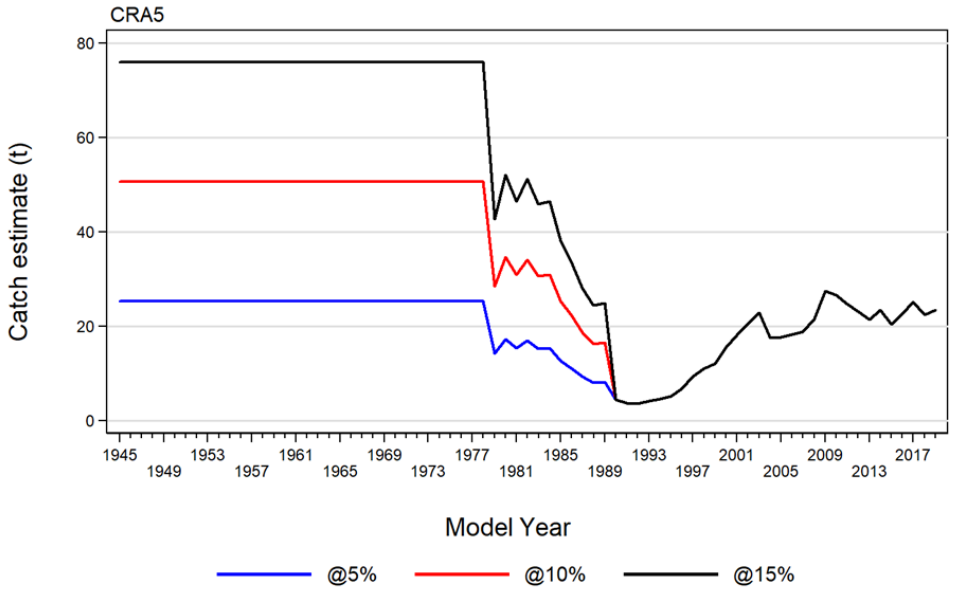

Figure 24: CRA 5 illegal catch trajectory for the 2020 CRA 5 stock assessment. The red line shows the illegal catch trajectory that was used prior to 1990 as the base case in the 2020 stock assessment.

Commercial fishing

261. Annual landings and the TACC for CRA 5 (Canterbury/Marlborough) since 1990 are shown in Figure 25.

262. The CRA 5 TACC has been constant since it was last increased in 1999, and it has been fully caught or almost fully caught every year (Figure 25). Between 2012 and 2019, formally adopted CRA 5 management procedures were used to review the TACC annually to ensure catches reflected available abundance. No change was proposed to the TACC as a result of the operation of the management procedures. The COVID-19 outbreak, particularly the effective closure of the Chinese market for a period coupled with low prices for exports, contributed to an under-catch of the CRA 5 TACC in 2019/20 (Figure 25).

263. The current asset value of the CRA 5 fishery is estimated to be over $354 million based on the current TACC and the average quota share prices over the last five years. The average CRA 5 ACE value (the earnings quota owners receive when selling their ACE) for the last five years was $44,626 per tonne.

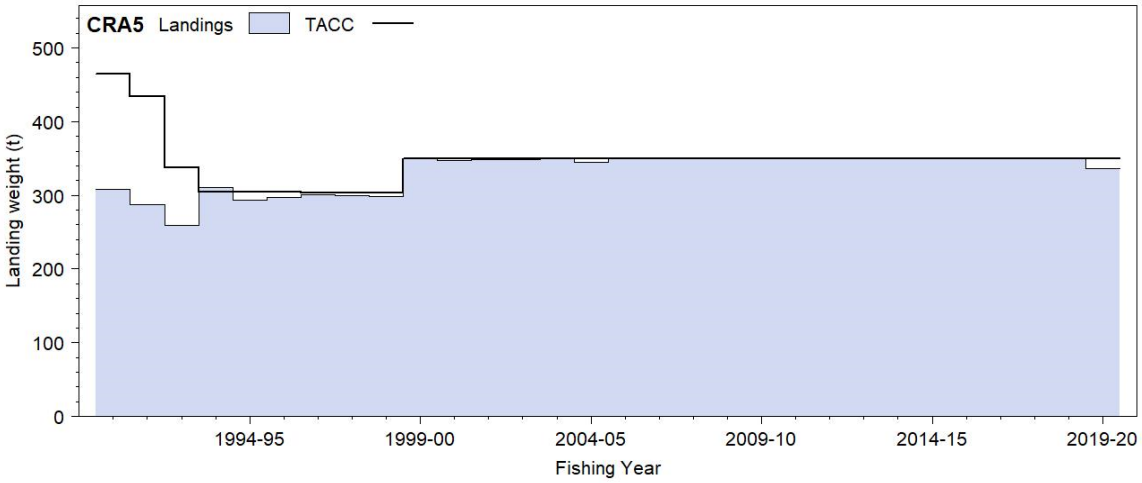

Figure 25: CRA 5 commercial landings and TACCs from 1990 to 2020.

12.3 Final CRA 5 options

264. Table 19 shows the final options proposed for CRA 5 (Canterbury/Marlborough), which are the same as the consultation options. The results from the new CRA 5 stock assessment have been used to guide the options for varying the TAC. There is an agreed B_{MSY} reference level for CRA 5, and vulnerable biomass is projected to stay well above the reference level for Option 5.1 over the next four years. As Option 5.2 decreases the TAC, it is also expected that vulnerable biomass would stay above the reference level for this option over the next four years.

265. The NRLMG, including Fisheries New Zealand, recommends that you agree to Option 5.1 (status quo).

Table 19: TAC, allowance and TACC final proposals (in tonnes) for CRA 5 from 1 April 2021. Blue shading shows the change proposals.

Stock	Option	TAC	TACC	Allowances			NRLMG support
				Māori customary	Recreational	Other mortality	
CRA 5 Canterbury/ Marlborough	**Option 5.1** Status quo	514	350	40	87	37	✓ All
	Option 5.2 – Decrease the TAC by 6%	484.5 ↓ (6%)	332.5 ↓ (5%)	40	75 ↓	37	

12.4 Summary of CRA 5 submissions

266. Thirty-five submissions were received for CRA 5.

Support for Option 5.1 (status quo)

267. NZ RLIC, CRAMAC 5, Burkhart Fisheries Ltd, Gregg Fishing Ltd, Jak Reader Fishing Ltd, Lanfar Holdings, Legacy Fishing Ltd, LJBaxter Quota Holdings Ltd, Reader Fishing Ltd, V2C Fishing, G. William & K. L. Basher, M. & H. Vanstone, Perak Fishing Co Ltd, and ten individuals (M. Baxter, R. Baxter, D. Burkhart, T. Burkhart, P. Cleall, R. J. Cleall, B. Hopkins, J. Reinke, F. Reinke and P. Reinke) supported retaining the status quo for CRA 5.

268. NZ RLIC noted that as the stock is overall in comparatively good state with comparatively high vulnerable biomass, and is and will remain well above the reference level, amending the TAC is not necessary at this time. A substantial part of Statistical Area 916 has been much less accessible since the 2016 earthquake. In effect this area has not been available to contribute to the assessment of fishery biomass, meaning the assessment is somewhat conservative.

269. A number of commercial operators noted that CRA 5 biomass appears to be increasing, with a number of anecdotal reports of improved fishing in northern areas of CRA 5. NZ RLIC noted that a rapid assessment update in 2021 can be used to provide guidance on whether further management action is required. The development of a revised management procedure and a confirmed management target are also important to guide and provide certainty to support management decisions.

270. CRAMAC 5 is committed to maintaining their investment in voluntary and industry-funded logbooks, observer catch sampling and tag recapture programmes to ensure the best possible data is available to support future management decisions.

Support for Option 5.2

271. Joint recreational submitters, ECO, Forest & Bird, and three individuals (M. Currie, C. Smith and C. Murphy), supported Option 5.2.

272. Joint recreational submitters supported Option 5.2, noting reducing the TAC is a precautionary approach that will only be effective if reductions in catch come from areas with low recruitment or high fishing pressure.

273. Forest & Bird supported Option 5.2 on the basis that CPUE is not a reliable population measure and because the overfishing of rock lobster can lead to wider ecosystem effects such as the spread of kina barrens (refer to Table 3 in *Section 5 – Central statutory considerations* above and in *Addendum 2 – Other matters raised in submissions* below). Forest & Bird was concerned at the absence (at the time of consultation) of a B_{MSY} reference level for CRA 1, CRA 3, CRA 4, and CRA 5.

274. ECO expressed their concern that the current projection shows a decrease in vulnerable biomass at current catches. They note the spawning stock is also projected to decline and all biomass probabilities that were estimated show a decline in the stock to 2024. Therefore, they support a small reduction in the TAC to increase the vulnerable biomass.

275. An individual (M. Currie) also supported decreasing all recreational allowances, or at minimum retaining the status quo, for conservation and sustainability reasons. Mr Currie did not specify what he wished the recreational allowance to be reduced to.

276. Te Ohu Kaimoana noted that Ngāti Apa ki te Rā Tō support Option 5.2.

Other comments

277. Te Ohu Kaimoana supported an alternative option, where the TAC was reduced to 502 tonnes, the TACC was maintained at 350 tonnes, the customary allowance was maintained at 40 tonnes, the recreational allowance was decreased to 75 tonnes, and the other mortality

allowance was maintained at 33 tonnes. Te Ohu noted that while the CRA 5 fishery is projected to decline, vulnerable biomass is projected to remain above the B_{MSY} reference level, and spawning biomass will remain well above the soft limit.

278. NZRFC submitted that any decrease to recreational allowance should be proportional to the decrease in the TACC, and supports an alternative option, where the TAC was reduced to 491.5 tonnes, the TACC was reduced to 332.5 tonnes, the customary allowance was maintained at 40 tonnes, the recreational allowance was decreased to 82 tonnes, and the other mortality allowance was maintained at 37 tonnes.

279. NZ RLIC raised concerns that the inability to incorporate recent commercial catch per unit effort data since the transition to electronic reporting data means the assessment was unable to consider recent improvements in the performance of the fishery.

280. An individual (P. Strang) supported a decrease to catch limits across all stocks being reviewed, but noted that rock lobster stocks in Canterbury are in good health, and considered that area-specific management actions would be more appropriate than reducing catch limits across the whole CRA 5 QMA. Mr Strang suggested that the status quo, reduced catch limits, and area closures could be applied where relevant at a sub-QMA level.

281. An individual (D. Mladek) did not support any quota increasing and raised concerns about other sources of mortality from commercial and recreational fishing. Another individual (A. Flavell-Johnson) supported a non-specified decrease to the TAC.

282. An individual (G. Harding) considered that recreational fishing effort has not increased in CRA 5, citing weather restrictions, recent blue cod recreational bag limit reductions, and method switching from SCUBA to free-diving. Mr Harding did not submit on a particular option, but provided anecdotal evidence that abundance of legal size and juvenile rock lobster has increased.

283. Joint recreational submitters, NZ RLIC, Lanfar Holdings, Legacy Fishing Ltd, and an individual (D. Burkhart) supported using the rapid assessment update in 2021 to review the catch settings of the fishery in 2022 if necessary.

12.5 Analysis

284. The CRA 5 vulnerable biomass level that can produce MSY has been calculated at 671.19 tonnes. The best available information suggests that CRA 5 vulnerable biomass was above the B_{MSY} reference level in 2019 and 2020, and is projected to decline but remain well above the B_{MSY} reference level (approximately 1.98 times the B_{MSY} reference level) in 2024. Spawning biomass is projected to decline but remain well above the soft limit in 2024.

Varying the TAC

285. Under Option 5.1 (status quo), the CRA 5 TAC would stay at its current level of 514 tonnes from 1 April 2021. Maintaining the TAC is predicted to result in CRA 5 vulnerable biomass declining by 34% over the next four years to 27% of unfished levels. Vulnerable biomass is at relatively high levels currently compared to some other stocks. Spawning biomass is predicted to decrease by 6% and remain well above the soft limit of 20%.

286. Under Option 5.2 (6% TAC decrease), the CRA 5 TAC would be reduced by 29.5 tonnes from 514 to 484.5 tonnes. In comparison to the status quo, the proposed TAC decrease is estimated to increase the likelihood that the stock biomass increases.

Varying allowances and the TACC

287. Table 20 provides a summary of information on current non-commercial allowances for CRA 5 (Canterbury/Marlborough) and stock assessment assumptions of non-commercial catch.

Table 20: Current CRA 5 allowances and model assumptions of non-commercial catches (in tonnes).

CRA 5 (Canterbury/Marlborough)	Customary Māori	Recreational	Other mortality	Total
Current allowances	40	87	37	164
Non-commercial catch assumptions for the 2020 stock assessment	20	Assumed to vary with biomass. Estimated at 74.6 for 2019.	23.4 illegal + 14.9 handling mortality.	132.9

Māori customary fishing

288. No change is proposed to the 40 tonne customary Māori allowance for CRA 5. While noting the incompleteness and uncertainty in the northern CRA 5 customary harvest information, it is assumed that current harvest is well within the 40 tonne allowance for customary Māori interests at this time. No specific feedback on the customary allowance was received from the Iwi Fisheries Forum in CRA 5.

Recreational fishing

289. Under Option 5.1 (status quo), no change is proposed to the 87 tonne recreational allowance for CRA 5. Noting the incompleteness and uncertainty in the CRA 5 recreational harvest information, it is assumed that current harvest is within the 87 tonne allowance.

290. Under Option 5.2 it is proposed that the recreational allowance is reduced to 75 tonnes to reflect the model estimates used in the 2020 stock assessment. The allowance for recreational fishing does not constrain harvest and it is not proposed that the recreational daily bag limit is decreased at this time.

Other mortality

291. No change is proposed to the 37 tonne allowance for other sources of mortality caused by fishing for CRA 5. While noting the incompleteness and uncertainty in the CRA 5 illegal take information, it is assumed that current illegal take and handling mortality is near the 37 tonne allowance.

Total Allowable Commercial Catch

292. Under Option 5.1 (status quo), the CRA 5 TACC would stay at its current level of 350 tonnes. This option would maintain the current commercial utilisation opportunities but would likely lead to a decline in biomass.

293. Under Option 5.2 (5% TACC decrease), the CRA 5 TACC would be reduced to 332.5 tonnes. The proposed 17.5 tonne TACC decrease has the potential to result in a decrease of annual revenue to the catching sector alone of approximately $1.5 million (based on 2020/21 average port price information of $85.84 per kg). These costs to the 32 vessels involved would be in addition to the financial impacts of COVID-19 in 2020.

294. Legacy Fishing Ltd estimated the true current market asset value of the CRA 5 fishery at over $500 million, and Option 5.2 could decrease this by approximately $25 million.

13 Review of the PHC 1 (all of New Zealand) packhorse rock lobster fishery

13.1 PHC 1 stock status

295. The packhorse rock lobster (*Sagmariasus verreauxi;* pawharu, kōura) is taken mainly in the north of the North Island, including the Bay of Plenty. Packhorse rock lobsters are the biggest

rock lobsters in the world and grow to a much larger size than red rock lobsters. They have different shell colouration and shape, with a green shell with less prominent spines and smooth tail segments.

296. The first successful stock assessment was conducted for PHC 1 in 2020. Length-structured stock assessment models are conducted for red rock lobster, but this was not possible for packhorse due to lack of data on length frequency and growth rates. Instead, a less complex biomass dynamics model based on historical commercial and recreational catches and a time series of CPUE was used.

297. The assessment results are summarised in Figure 26 and Table 21. Overall, the assessment suggests that since a period of overfishing in the 1960s and 1970s, lower catches and increased recruitment or productivity of the stock in recent years has rebuilt the PHC 1 stock to near estimates of historical biomass (Figure 26).

298. The PHC 1 stock assessment estimated B_{MSY} at 309.6 tonnes, and MSY at 68.4 tonnes. This estimate of MSY is based on commercial catches plus an assumed level of recreational catch of 10 tonnes. No customary or illegal catch was modelled in the stock assessment and is therefore not included in the estimate of MSY. The assessment results suggest the 2019 vulnerable biomass is well above B_{MSY} (about 165% of B_{MSY}).

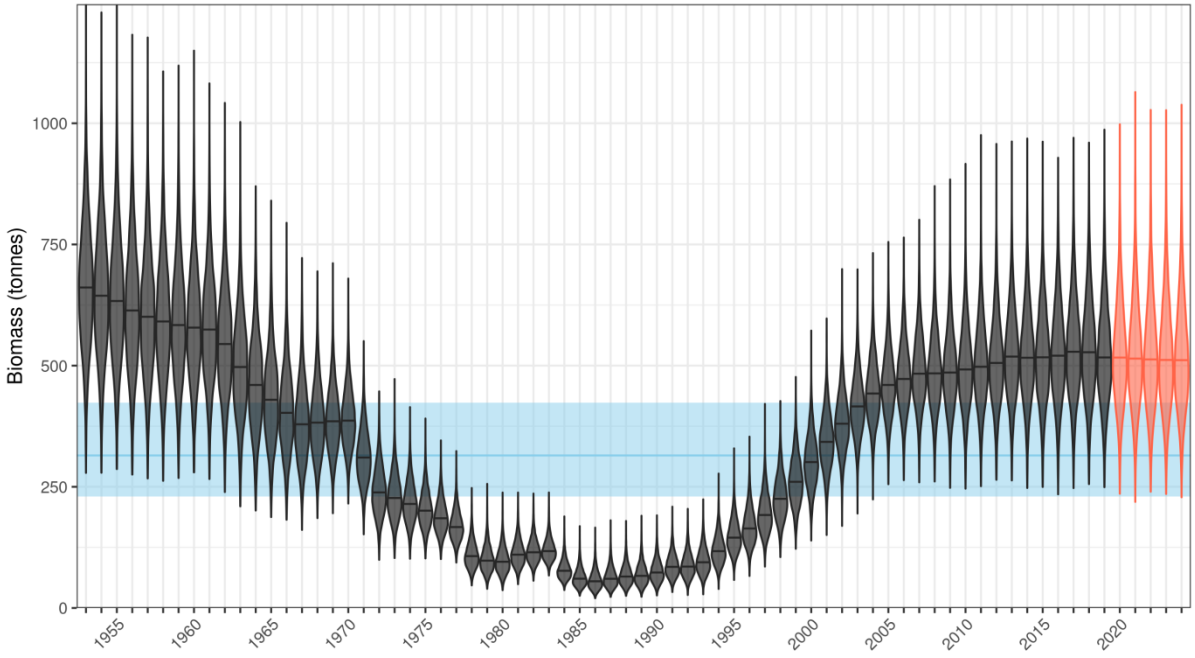

Figure 26: PHC 1 vulnerable biomass (black), including a five-year projection at current catches (red) from 2020. The blue line is the median and 90% credible interval of B_{MSY}.

299. Over the next four years, with 2020 catch levels and recent levels of recruitment and growth, vulnerable biomass is projected to stay constant relative to the unfished level, and is projected to be at about 163% of B_{MSY} (Table 21).

300. The median results of the stock assessment suggest that over the next four years, with 2020 catch levels and recent levels of recruitment and other life history parameters, PHC 1 vulnerable biomass is projected to decrease slightly relative to 2020 levels (Table 21). There are uncertainties associated with these estimates, as shown in Table 21. For example, with 2020 catch levels, vulnerable biomass in 2024 could be at 78.8% (or 0.788) of unfished levels (median result), with a range of 63.4% (or 0.634) and 94.1% (or 0.941) of unfished levels (5% and 95% quantiles).

Table 21: Median results from the 2020 PHC 1 stock assessment. 5% and 95% quantiles are provided for the performance indicators to show the spread and uncertainty of the data. NC: No change.

Performance indicators	5% quantile	Median	95% quantile	Interpretation of the median results
Vulnerable biomass (B) – Beginning of season autumn-winter vulnerable biomass (legal males/females without eggs)				
B_{2019} / B_0	0.660	0.793	0.928	Vulnerable biomass in 2019 was 79% of unfished levels
B_{2024} / B_0	0.634	0.788 NC	0.941	Vulnerable biomass in 2024 will be 79% of unfished levels
B_{2019} / B_{MSY}		1.648		Vulnerable biomass in 2019 was 165% of B_{MSY}
B_{2024} / B_{MSY}	1.347	1.628 ↓	1.949	Vulnerable biomass in 2024 will be 163% of B_{MSY} (a small decrease of 2%)
Probabilities				
$P(B_{2024}>B_{2019})$		0.467		47% probability that 2024 vulnerable biomass will be greater than 2019 levels

13.2 PHC 1 fishery overview

Māori customary fishing

301. Fisheries New Zealand holds limited reports of customary harvest from PHC 1. The harvest is thought to be low. Fisheries New Zealand notes that the Mai i nga Kuri a Wharei ki Tihirau Iwi Fisheries Forum indicated that tangata whenua tend to combine red rock lobster and packhorse rock lobster when reporting customary catch.

302. The 2020 PHC 1 stock assessment did not estimate customary catch.

Recreational fishing

303. For the 2020 PHC 1 stock assessment, recreational catch estimates from 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 estimate.[42] The 2011/12 National Panel Survey estimated a recreational packhorse rock lobster catch of 9.84 tonnes. The Holdsworth survey estimated recreational packhorse rock lobster catch for east Northland only (Rangiputa to Mangawhai) at 4.9 tonnes (± 1.5 tonnes) in 2013/14. This figure was doubled to estimate catch for the whole area where packhorse rock lobster is commonly caught, to give an estimate of 10 tonnes at that time.

304. The recreational catch estimate for packhorse rock lobster from the 2017/18 National Panel Survey of 28.66 tonnes (± 43.8 tonnes) was considered unrealistically high, particularly since commercial catch for the same year was 40.1 tonnes.

305. An estimate of 10 tonnes from 1979 to 2019 was used in the 2020 PHC 1 stock assessment model to represent the annual average recreational catch. Actual annual catch over that time is likely to have varied with availability and abundance, but for this stock assessment model an average catch was accepted.

306. There is evidence from commercial and recreational fishers that PHC catch has increased in the Bay of Plenty and outer Hauraki Gulf where previously they were relatively rare.

307. The effect of the COVID-19 outbreak on recreational fishing in 2019/20 is unknown, but it is likely to have reduced participation and catch over the lockdown periods in 2020.

[42] The National Panel Surveys occurred over an October fishing year (October to September), and the Holdsworth Survey occurred over an April fishing year (April to March).

Other mortality

308. Estimates of illegal take and handling-related mortality are not currently available for PHC 1 but are thought to be low.

Commercial fishing

309. Commercial packhorse rock lobster landings are modest compared with red rock lobsters. Packhorse rock lobster is mainly taken commercially along the north and east coasts of the North Island, including the Bay of Plenty. Packhorse rock lobster is predominately taken from October to April, targeting spawning aggregations which form from October to January. About half of packhorse rock lobster have been taken as a target, with the remainder as bycatch in the red rock lobster fishery.

310. Annual landings and the TACC for PHC 1 since 1990 are shown in Figure 27.

311. The current PHC 1 TACC (40.3 tonnes) was set conservatively due to the low catches in the early 1990s. The PHC 1 TACC was first set to 30 tonnes in 1990. It was increased to 40.3 tonnes in 1992 due to quota appeals and has remained unchanged since. The TACC was initially under-caught, with catch trends steadily increasing from 2001/02, and has been fully caught or almost fully caught every year since 2013/14 (Figure 27). Monitoring information also suggests catch rates have been rapidly increasing in recent years.

312. The current asset value of the PHC 1 fishery is estimated to be over $3.24 million based on the current TACC and the 2011/12 fishing year average quota share price. This estimate is considered to be very low because of a lack of quota trading information. The average PHC 1 ACE value (the earnings quota owners receive when selling their ACE) over the last five years was $26,552 per tonne.

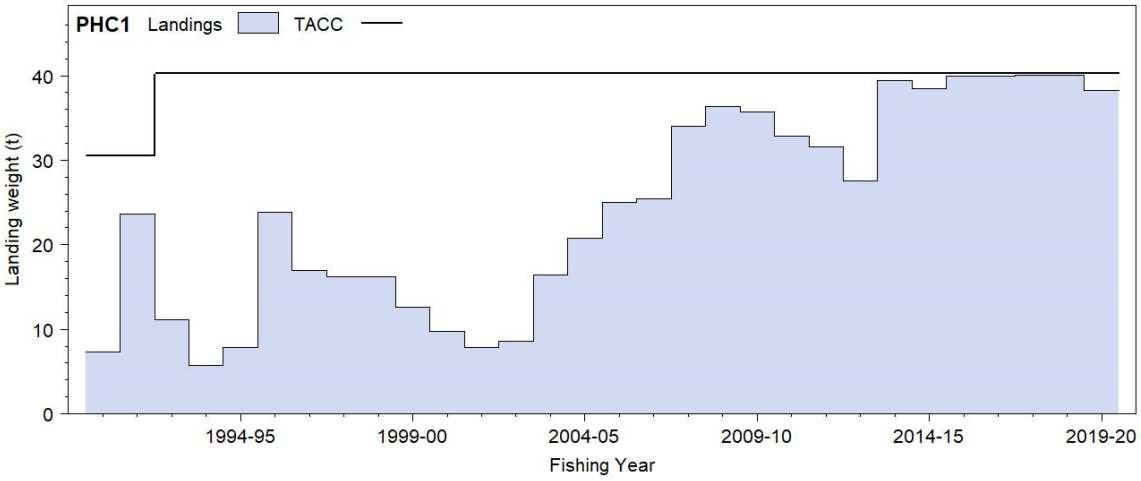

Figure 27: PHC 1 commercial landings and TACCs from 1990 to 2020.

13.3 Final PHC 1 options

313. Table 22 shows the final options proposed for PHC 1 (all of New Zealand). Options P.1, P.2 and P.3 were consulted on, and an additional option, Option P.4, has been added following consultation. The results from the new PHC 1 stock assessment have been used to guide the options for setting the TAC.

Table 22: TAC, allowance and TACC final proposals (in tonnes) for PHC 1 from 1 April 2021. Blue shading shows the change proposals.

Stock	Option	TAC	TACC	Allowances			NRLMG support
				Māori customary	Recreational	Other mortality	
PHC 1 All of New Zealand	**Current settings**	-	**40.3**	-	-	-	
	Option P.1 - Set the TAC at 65.3 tonnes	65.3	40.3	10	10	5	✓ Environmental
	Option P.2 - Set the TAC at 79.3 tonnes	79.3	49.3 ↑ (22%)	10	15	5	✓ Recreational & Fisheries NZ
	Option P.3 - Set the TAC at 88 tonnes	88	58 ↑ (44%)	10	15	5	
	Option P.4 – New Set the TAC at 83 tonnes	83	58 ↑ (44%)	10	10	5	✓ Tangata whenua & Commercial

314. The NRLMG did not reach consensus on the preferred option for PHC 1. The NRLMG agrees that the customary Māori allowance should be set at 10 tonnes and the other mortality allowance should be set at 5 tonnes. The NRLMG agrees that the TACC and recreational allowance should not exceed the 68.4 tonne MSY, but members have differing opinions about the levels at which to set the TAC, TACC and recreational allowance.

315. NRLMG environmental members support Option P.1 because they consider that a precautionary approach is needed to maintain the vulnerable biomass and to reflect the uncertainty in the stock assessment and the impacts of packhorse rock lobster fishing on the coastal marine environment.

316. NRLMG recreational members, and Fisheries New Zealand, support Option P.2 because this recognises the utilisation opportunity of increased packhorse rock lobster abundance by providing a moderate increase to the TACC and the recreational allowance. NRLMG recreational members, and Fisheries New Zealand, support setting the recreational allowance at 15 tonnes to reflect anecdotal information that recreational catch has increased above the 10 tonne average catch estimate in recent years, indicating that packhorse rock lobster abundance may have increased.

317. NRLMG tangata whenua and commercial members support Option P.4 because it sets the combined TACC and recreational allowance at 68 tonnes, maximising catch while remaining within the MSY. They support setting the recreational allowance at 10 tonnes as this reflects the estimate of recreational catch included in the stock assessment model.

318. The difference in Options P.3 and P.4 relates to whether the recreational allowance should be set at 10 tonnes (Option P.4) or at 15 tonnes (Option P.3). Tangata whenua and commercial members support setting the recreational allowance at 10 tonnes, while recreational members, and Fisheries New Zealand, support setting it at 15 tonnes.

319. The NRLMG notes that it may be several years before the PHC 1 TAC is reviewed.[43] Work is planned to develop commercial catch data sampling, which, in addition to the establishment of the electronic CPUE series, may inform future reviews of the stock and may support an updated stock assessment for PHC 1.

13.4 Summary of PHC 1 submissions

320. Twenty-five submissions were received for PHC 1.

[43] Rapid assessment updates cannot currently be run between assessment years for the PHC 1 stock assessment. As the biomass dynamics stock assessment model used for PHC 1 uses CPUE as a main input, it is unlikely that another stock assessment will be run until the CPUE series is re-established.

Support for Option P.1

321. Kaitiaki Trust, NZRFC, the Auckland Conservation Board, ECO, and five individuals (M. Currie, C. Murphy, J. Tribble, C. Smith and N. Walker) support Option P.1.

322. NZRFC and Forest & Bird supported taking a precautionary approach in increasing the TAC. Forest & Bird noted that no spawning or total biomass has been estimated for PHC 1, and as it is treated as a single stock, overfishing in one area could disproportionately impact on the stock. ECO supported retaining the current TACC and undertaking more research to reduce the uncertainties in the stock assessment.

323. N. Walker noted that packhorse rock lobster grows more slowly than red rock lobster.

324. The Auckland Conservation Board did not support an increase of commercial catch limits for packhorse rock lobster, noting concerns about the impact fishing for packhorse rock lobster has on the coastal marine ecosystems, such as the decline of coastal macroalgal habitat. M. Currie supported decreasing all recreational allowances, or at minimum retaining the status quo, for conservation and sustainability reasons.

325. Mr Murphy considered that allowances should not necessarily be increased because abundance has increased, given that abundance fluctuates over time.

326. Te Ohu Kaimoana noted that Ngāti Apa, Whanganui Iwi Fisheries, and Ngāti Kahungunu support Option P.1.

Support for Option P.2

327. Joint recreational submitters supported Option P.2. on the basis that it allows for an increase in the TACC and sets a realistic allowance for recreational fishing without exceeding the 68.4 tonne MSY. They submitted that recreational catch of packhorse rock lobster has increased since the harvest was estimated in 2011/12 and 2013/14 due to increased abundance and an expanded range of the species. The submitters note that recreational fishers are encountering packhorse rock lobsters more often in the Hauraki Gulf and the Bay of Plenty than they used to.

Support for Option P.3

328. Te Arawa Fisheries, ICP, NZ RLIC, CRAMAC 1, CRAMAC 2, Jak Reader Fishing Ltd, Lee Fish Ltd, NZ Red, and one individual (A. Dawn) supported Option P.3.

329. Te Arawa Fisheries noted anecdotal information from fishers that packhorse rock lobster is abundant in PHC 1 and that there is a considerable utilisation opportunity. Jak Reader Fishing Ltd noted that the fishing ground has become healthier over the last decade.

330. Commercial submitters noted that increasing the TAC to 88 tonnes allows for the continued growth and utilisation of a healthy, sustainable fishery. NZ Red also considered that Option P.3. would provide relief to the CRA 1 and CRA 2 fishing communities that were affected by catch limit reductions in previous years, and the negative socio-economic impacts of COVID-19.

Other comments

331. Te Ohu Kaimoana, Ngati Wai Fisheries, and NZ RLIC supported an alternative option, where the TAC was set at 83 tonnes, the TACC was increased to 58 tonnes, the customary allowance was set at 10 tonnes, the recreational allowance was set at 10 tonnes, and the other mortality allowance was set at 5 tonnes. Ngati Wai Fisheries noted that exceeding a recreational allowance of 10 tonnes contradicts the best available catch information for packhorse rock lobster.

332. Te Ohu submits that setting a recreational allowance of greater than this estimate is contradictory to the framework provided by the Act and examples of case law (refer to *Guidance – Case law* in Table 3 in *Section 5 – Central statutory considerations* above). This is discussed further in paragraph 349.

333. NZ RLIC notes the assessment is somewhat conservative as a result of only using CPUE from operators who take PHC as a bycatch. Because these operators are often seeking to avoid PHC because of a lack of ACE, their CPUE is relatively low. NZ RLIC recommended catch limits equal to the MSY estimate (a TACC of 58 tonnes and a recreational allowance of 10 tonnes). NZ RLIC considers that this is consistent with the Act, will maintain a high level of biomass, and would recognise the significant investment made by the quota share owners in fishery characterisation and the stock assessment, in addition to the logbook and tag and recapture program and horn tagging for packhorse lobsters on the domestic market.

334. Two individual submitters (D. Mladek and A. Flavell-Johnson) generally supported retaining current catch settings. Mr Mladek raised concerns about other sources of mortality from commercial and recreational fishing. Mr Flavell-Johnson stated that slight increases in packhorse rock lobster abundance should not result in an immediate increase in catch limits.

335. An individual (P. Strang) generally supported decreases of catch settings. Mr Strang did not specify the level of reduction.

336. Prof. Jeffs did not support an increase to catch limits, criticised the stock assessment for packhorse rock lobster, and noted recruitment is expected to decrease in the future due to the effects of climate change on recruitment. Prof Jeffs is concerned with how the impacts of packhorse rock lobster fishing on the environment are being managed and mitigated, and considers that the proposed options do not adequately deal with adverse effects of lobster fishing on the marine environment The NRLMG environmental members supported these concerns.

13.5 Analysis

337. The PHC 1 biomass level that can produce MSY has been estimated at 309.6 tonnes, and MSY has been estimated at 68.4 tonnes, which includes commercial catch and 10 tonnes of recreational catch. The best available information suggests that under current catch levels with recent levels of recruitment and other life history parameters, vulnerable biomass will stay constant and stay well above B_{MSY} with high probability. Over the next four years, with commercial catch levels of 47 to 67 tonnes, vulnerable biomass is projected to decrease from 79% to 66-76% of B_0, remaining well above B_{MSY} (137-157% B_{MSY}).

Stock biomass projections for different catch setting proposals

338. Biomass projections for the next twenty years under different levels of catch are given in Figure 28. Each projected level of catch includes the commercial component (labelled, in tonnes) and assumes an additional 10 tonnes of recreational catch. The 67 tonne commercial catch projection with 10 tonnes of recreational catch exceeds the modelled maximum sustainable yield (MSY) of 68.4 tonnes (Figure 28, d).

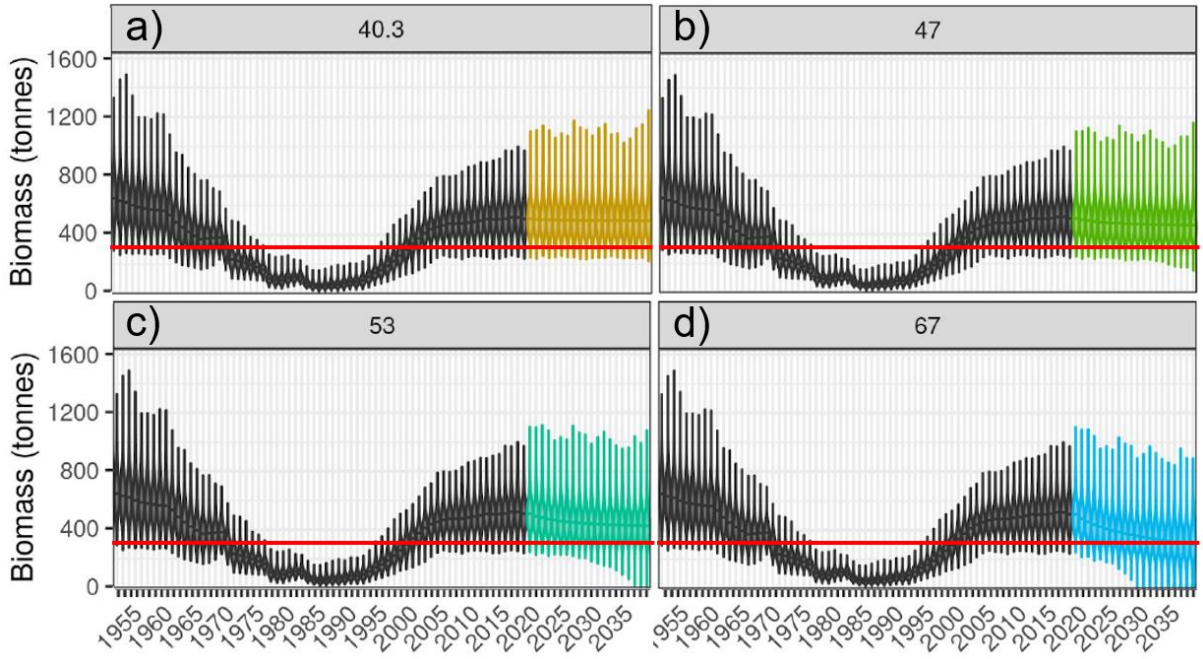

Figure 28: Projections of PHC 1 vulnerable biomass over the next 20 years at a range of commercial catch levels: a) 40.3 tonnes (the current TACC); b) 47 tonnes; c) 53 tonnes; and d) 67 tonnes. All projections assume 10 tonnes of recreational catch. The horizontal red line shows B_{MSY}. Note the TACC proposed for Options P.3 and P.4 fits between c) and d).

339. For each level of modelled catch, the projected effect over the next four years on the vulnerable biomass and the probability of breaching the soft limit (20% of the unfished biomass, B_0) are given in Table 23 below. Performance indicators are not available for the specific proposed options in Table 22 because the modelling work was completed before the NRLMG determined consultation options.

Table 23: Projected change in vulnerable biomass for PHC 1 under four commercial catch levels. 5% and 95% quantiles are provided for the performance indicators to show the spread and uncertainty of the data. (continued over the page)

Performance indicators	Commercial catch level	5% quantile	Median	95% quantile	Interpretation of the median results
Vulnerable biomass (B) – Beginning of season autumn-winter vulnerable biomass (legal males/females without eggs)					
B_{2024} / B_0	40.3 (current)	0.634	0.788	0.941	Vulnerable biomass in 2024 with the current TACC will be 79% of unfished levels
	47	0.606	0.758 ↓	0.912	Vulnerable biomass in 2024 with 47 t commercial catch will be 76% of unfished levels
	53	0.579	0.731 ↓	0.886	Vulnerable biomass in 2024 with 53 t commercial catch will be 73% of unfished levels
	67	0.513	0.663 ↓	0.821	Vulnerable biomass in 2024 with 67 t commercial catch will be 66% of unfished levels
B_{2024} / B_{MSY}	40.3 (current)	1.347	1.628	1.949	Vulnerable biomass in 2024 with current commercial catch will be 163% of B_{MSY}
	47	1.289	1.567 ↓	1.883	Vulnerable biomass in 2024 with 47 t commercial catch will be 157% of B_{MSY}
	53	1.233	1.510 ↓	1.823	Vulnerable biomass in 2024 with 53 t commercial catch will be 151% of B_{MSY}
	67	1.095	1.374 ↓	1.683	Vulnerable biomass in 2024 with 67 t commercial catch will be 137% of B_{MSY}

Performance indicators	Commercial catch level	5% quantile	Median	95% quantile	Interpretation of the median results
Probabilities					
$P(B_{2024}>B_{2020})$	40.3 (current)		0.467		47% probability that 2024 vulnerable biomass will be greater than 2020 levels with current commercial catch
	47		0.285		29% probability that 2024 vulnerable biomass will be greater than 2020 levels with 47 t commercial catch
	53		0.162		16% probability that 2024 vulnerable biomass will be greater than 2020 levels with 53 t commercial catch
	67		0.030		3% probability that 2024 vulnerable biomass will be greater than 2020 levels with 67 t commercial catch
$P(B_{2024}>B_{MSY})$	40.3 (current)		1.000		100% probability that 2024 vulnerable biomass will be greater than B_{MSY} with current commercial catch
	47		0.999		100% probability that 2024 vulnerable biomass will be greater than B_{MSY} with 47 t commercial catch
	53		0.999		100% probability that 2024 vulnerable biomass will be greater than B_{MSY} with 53 t commercial catch
	67		0.985		99% probability that 2024 vulnerable biomass will be greater than B_{MSY} with 67 t commercial catch
$P(B_{2024}<20\%B_0)$	All levels		0.000		0% probability that 2024 vulnerable biomass will fall below the soft limit

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

Setting the TAC

341. No TAC has previously been set for PHC 1.

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

343. Under Option P.1, the PHC 1 TAC would be set at 65.3 tonnes, which is below the projected MSY. The TACC would stay at its current level of 40.3 tonnes under this option, which could result in foregone opportunity to harvest the available sustainable yield from the fishery. Vulnerable biomass is predicted to stay stable over the next four years under this option but will remain well above the soft limit with 100% certainty, and well above B_{MSY}.

344. Under Option P.2, the PHC 1 TAC would be set at 79.3 tonnes. The combined recreational allowance and TACC under this option is 64.3 tonnes, below the estimated MSY (combined recreational allowance and TACC) of 68.4 tonnes. The harvest under this option would be about 6% below that which could be taken under the estimated MSY of 68.4 tonnes. If the TACC is increased under this option, it would allow the commercial sector to realise some increase in the utilisation benefits. Considering that packhorse rock lobster may have increased in abundance, this may affect the current utilisation benefits for non-commercial fishers. This will result in declining abundance, but should enable the stock to remain above B_{MSY}.

Vulnerable biomass is predicted to decline approximately 4% over the next four years under this option but will remain well above the soft limit, and well above B_{MSY}.

345. Under Option P.3, the PHC 1 TAC would be set at 88 tonnes. The combined recreational allowance and TACC under this option is 73 tonnes, which exceeds the estimated MSY (combined recreational allowance and TACC) of 68.4 tonnes. This option would allow the commercial sector to realise short-term utilisation benefits that arise from increased packhorse rock lobster abundance. This option is unlikely to affect current utilisation benefits for non-commercial fishers. With a TACC of 58 tonnes and a recreational allowance of 15 tonnes instead of 10 tonnes as modelled, removals would likely exceed the estimated level of MSY, and could lead to the stock declining below B_{MSY}.

346. Under Option P.4, the PHC 1 TAC would be set at 83 tonnes. The combined recreational allowance and TACC under this option is 68 tonnes, which is at the estimated MSY (combined recreational allowance and TACC) of 68.4 tonnes. This option would allow the commercial sector to realise utilisation benefits that arise from increased packhorse rock lobster abundance. Considering that packhorse rock lobster may have increased in abundance, this option may affect current utilisation benefits for non-commercial fishers. In theory, this option would reduce the stock to B_{MSY} over time. A TACC of 58 tonnes and a recreational allowance of 10 tonnes, vulnerable biomass is predicted to decline approximately 8-16% over the next four years, but will remain well above the soft limit and well above B_{MSY}..

Varying allowances and the TACC

347. Non-commercial allowances have not been previously set for PHC 1.

Māori customary fishing

348. It is proposed that the allowance for customary Māori fishing be set at 10 tonnes for both options. This reflects the fact that packhorse rock lobster (pawharu) is important for tangata whenua and current reporting of customary catch is incomplete. Fisheries New Zealand notes that the Mai i nga Kuri a Wharei ki Tihirau Iwi Fisheries Forum supported setting a customary allowance for PHC 1, but did not specify a level.

Recreational fishing

349. It is proposed that the allowance for recreational fishing be set at 10 tonnes for Options P.1 and P.4. This reflects the best available information on recreational catch in 2011/12 based on the National Panel Survey. The Rock Lobster Fisheries Assessment Working Group assumed that doubling the estimate of 4.9 tonnes (± 1.5 tonnes) from the 2013/14 survey of east Northland recreational fishers was a reasonable assumption. An estimate of 10 tonnes was used as the average annual recreational catch in the stock assessment and projections. While there is uncertainty in these estimates of recreational catch, they are considered to be within the proposed 10 tonne allowance.

350. Under Options P.2 and P.3, it is proposed that the recreational allowance be set at 15 tonnes. This reflects an increase in packhorse rock lobster availability and abundance of packhorse rock lobster since the surveys in 2011/12 and 2013/14. While the extent to which PHC 1 recreational harvest may have increased in recent years is uncertain, the assumption used in most red rock lobster stock assessments is that recreational catch is proportional to abundance. Anecdotal information also indicates that recreational catch has been increasing in areas outside Northland in recent years. While uncertain and not quantified, this information suggests that recreational harvest of packhorse rock lobster may have increased since the last survey estimates in 2011/12 and 2013/14 and could now exceed that estimate.

Other mortality

351. It is proposed that the allowance for other sources of mortality to the stock caused by fishing be set at 5 tonnes for all options. Setting the other mortality allowance at 9-12% of the TACC (9% for Options P.2 and P.4, 10% for Option P.3, and 12% for Option P.1) reflects the general uncertainty of other mortality to the stock.

Total Allowable Commercial Catch

352. Under Option P.1 (status quo), the PHC 1 TACC would stay at its current level of 40.3 tonnes. This option would result in foregone opportunity to increase sustainable utilisation in the commercial fishery.

353. CRA 1 industry has taken the initiative to fund both the fishery characterisation and stock assessment which have been used to inform this advice. They have also collected fishery information under their voluntary logbook program and initiated tagging for commercially taken packhorse lobsters on the domestic market as a tool to address illegal take for sale.

354. Under Option P.2 (22% TACC increase), the PHC 1 TACC would be increased to 49.3 tonnes. The proposed 9 tonne has the potential to result in an increase of annual revenue to the catching sector alone of approximately $485,000 (based on 2020/21 port price information of $53.94 per kg).

355. Under Options P.3 and P.4 (44% TACC increase), the PHC 1 TACC would be increased to 58 tonnes. The proposed 17.7 tonne increase has the potential to result in a short-term increase of annual revenue to the catching sector alone of approximately $955,000 (based on 2020/21 port price information of $53.94 per kg). CRAMAC 1 and CRAMAC 2 support this estimate, noting that associated businesses will also benefit, particularly in smaller coastal towns and communities.

Other matters – PHC 1 minimum legal size measure

356. The NRLMG supports a proposal to change the way of measuring the minimum legal size for packhorse rock lobster in PHC 1 from tail length to tail width, as for red rock lobsters. See *Section 14 – Other relevant matters* for more information on this proposal.

14 Other relevant matters

14.1 Deemed values

357. 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 24 below.

Table 24: Standard deemed value rates ($/kg) for all red and packhorse 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

358. Fisheries New Zealand notes that the interim deemed value rate is 90% of the annual deemed value rate for all red and packhorse rock lobster stocks, which is consistent with the Deemed Value Guidelines.

359. No changes to deemed values for any rock lobster stock are proposed for 1 April 2021.

14.2 Proposed future consultations

Review of CRA 3 differential minimum legal size

360. The NRLMG is currently reviewing the minimum legal size (MLS) regime for red rock lobster in CRA 3. Since 2014, Ministers of the day have taken a strong interest in the CRA 3 differential MLS regime and have requested that Fisheries New Zealand and stakeholders find solutions to the longstanding concerns, predominately from some members of the recreational sector.

361. The CRA 3 differential MLS regime allows commercial fishers to land smaller male rock lobsters at or above 52 mm tail width (TW), rather than the 54 mm TW that applies for the recreational sector, during June, July and August. This measure is strongly linked to a voluntary commercial closure in statistical areas 909 (East Cape) and 910 (Gisborne) from 1 September to 15 January. The voluntary closure in northern CRA 3 helps to reduce competition between commercial and recreational fishers over the busy summer season in waters close to Gisborne.

362. The NRLMG's review goal is to align the MLS for commercial and recreational fishers in CRA 3. This could mean that there is a change to the recreational MLS or commercial MLS at different times of year in specific sub-areas of the fishery. Assessment work has been undertaken to examine the effect of the current MLS regime and that regime is taken into account in the stock assessment and projections. Monitoring has also been undertaken to assess the availability of lobsters of legal size in summer in the Gisborne area – an area of concern to recreational fishers. This issue has been influenced by perceptions and it is important the review considers the available research and monitoring information.

363. A number of submissions were received on this matter during the public consultation and the views received were broadly consistent with existing views amongst the sectors.

364. To progress the review, Fisheries New Zealand (with the support of the NRLMG) is intending to hold a multi-stakeholder meeting in Gisborne in 2021. This meeting will enable all interests to share their aspirations for the fishery and to put forward local solutions to a local problem. Feedback from this meeting will be used to inform next steps and whether any regulatory amendments should be progressed. Te Ohu Kaimoana noted its support for this approach.

PHC 1 minimum legal size measure

365. The NRLMG supports a proposal to change the way of measuring the minimum legal size (MLS) for packhorse rock lobsters in PHC 1 from tail length (TL) to tail width (TW) in 2021/22.

366. PHC 1 currently has an MLS measure of 216 mm TL.[44] As legal-sized packhorse rock lobsters are large and strong animals, it can be difficult to straighten out the tail and get an accurate measurement, and damage to the lobster can also occur. Standardising the MLS measure to TW could increase the accuracy and consistency of MLS measurements for packhorse rock lobsters, considering that all red rock lobster stocks except for CRA 7 (Otago) use TW as the way of measuring the MLS.

367. As part of the new PHC 1 stock assessment, the relationship between TL and TW was analysed for packhorse rock lobsters. The results suggest that an MLS of 84 mm TW for males and 90 mm TW for females could be analogous to the current MLS of 216 mm TL.

368. This difference in TW measurements between the sexes is broadly consistent with the MLS for red rock lobster, which is 54 mm TW for males and 60 mm for females in most cases.[45] The suggested PHC 1 MLS measures would be 30 mm larger than red rock lobster for both sexes, which could make implementation and enforcement of any new measure easier.

369. As part of the consultation document, tangata whenua and stakeholders were asked to provide initial feedback on the matter. A number of submissions were received in support of changing the PHC 1 MLS measure to 84 mm TW for males and 90 mm TW for females, mainly from the commercial sector.

370. The NRLMG intends to carry out public consultation on the proposal during 2021.

[44] Measured along the underside of the tail, from the rear of the calcified bar of the first segment to the tip of the middle fan of the tail (the telson).
[45] The exceptions are the CRA 7 (Otago) MLS, which is measured in tail length (127 mm tail length for females and males), and the CRA 3 MLS of 52 mm tail width for males over winter.

14.3 Other management issues

371. Table 25 below sets out additional information on rock lobster management measures the NRLMG wishes to bring to your attention.

Table 25: Rock lobster management issues and NRLMG considerations

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 and packhorse lobster. However, there are currently no accepted management targets for any red or packhorse 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 remaining red rock lobster stocks when possible (i.e., at the next full stock assessment). 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 stakeholders to develop these targets in 2021.	
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.	
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 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 2021 and will involve the relevant Fisheries Assessment Working Groups.	
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. The NRLMG will work with MPI Compliance, who are improving information collected on their compliance activity, to develop mechanisms to improve estimates of illegal take.	
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

Management issue	Description
	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. The NRLMG may consider proposing further accumulation limits in other rock lobster QMAs as necessary.	
Telson clipping	Telson clipping provides Fishery Officers with an additional 'tool in the toolbox' to address illegal take for sale in rock lobster fisheries by: 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, and may consider proposing telson clipping in other areas as necessary.	
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.
The NRLMG supports better management of ACV fishing overall, and improvements to the reporting regime. In 2021, the NRLMG will provide advice to the Minister on how to better manage the recreational ACV sector.	

Addendum 1 – Other statutory considerations

In addition to your central statutory considerations for setting or varying TACs and TACCs under the Act, the following statutory considerations are also relevant.

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".[46]
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.
The NRLMG considers that the options presented in this paper will provide for the section 9 principles to be maintained. Red and packhorse 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.	

[46] *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
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.[47] 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.	
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 PAU 4 (Chatham Islands).	

[47] A non-binding Fisheries New Zealand Policy Document.

Addendum 2 – 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	Te Ohu Kaimoana, Ngāti Wai Fisheries, NZ RLIC, CRAMAC 1, CRAMAC 2, CRAMAC 4, CRAMAC 5, Lee Fish Ltd, Robbie and Lynda Matthews Family Trust, A. Dawn, NZ Red, P. Cleall, Legacy Fishing Ltd, C. Smith	NRLMG tangata whenua, recreational and commercial sector members are concerned about the timeliness and reliability 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. Fisheries New Zealand considers that information on the level of recreational harvest of rock lobsters has improved in recent years through specific onsite and National Panel surveys. 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 2021.
Estimating and effectively constraining illegal harvest	Te Ohu Kaimoana, Ngāti Wai Fisheries, NZ RLIC, CRAMAC 1, CRAMAC 2, CRAMAC 4, Lee Fish Ltd, A. Dawn, NZ Red	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 2021.
Regulatory measures		
Reducing the daily recreational bag limit for red rock lobster (such as CRA 1, 3 & 4)	NZ RLIC, Legacy Fishing Ltd, P. Reinke, N. Byrne & R. Lovell, S. Depree	A reduction to the CRA 1, 3 & 4 recreational bag limits will be considered in the future if required to manage catch (on average) to the allowance.
Recreational accumulation limit and telson clipping	Te Ohu Kaimoana, NZ RLIC, NZRFC, C. Smith	The 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 2021.

Topic	Submitter	NRLMG Response
Amateur charter vessels	NZ RLIC, CRAMAC 5, Perak Fishing	The NZ RLIC considers 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 2021 to better manage the amateur charter vessel sector.
Revoke the CRA 7 & 8 differential minimum legal sizes	Joint recreational submitters	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 (as discussed in *Section 14.2 – Proposed future consultations*).
Closure of the CRA 4 fishery from May to August	S. Depree	Temporal fishery closures are not currently being considered by the NRLMG for CRA 4, but are part of the toolkit of regulatory measures that could be considered in future if necessary to manage the fishery.
Splitting the CRA 4 QMA	S. Depree	Splitting the CRA 4 QMA is not currently being considered by the NRLMG.
Tail fan necrosis		
Spread of tail fan necrosis through handling and returning lobsters during fishing	Prof A. Jeffs	There is no scientific evidence that tail fan necrosis is transmitted through handling lobsters, or that commercial fishing activity is initiating tail fan necrosis in rock lobster populations. Tail fan necrosis is a complex syndrome and its cause is currently unknown. Work is currently underway with the Ministry for Primary Industries and NZ RLIC to conduct an epidemiological study to understand the prevalence, distribution, and possible risk factors of tail fan necrosis.
Future management approaches – e.g., management procedures		
Management system that considers historic and current fisheries data	Wakatū Inc	The NRLMG notes that stock assessments use long time series of historic data, and incorporate the most recent data available to the assessment models. The NRLMG will continue to explore future management approaches, including potential ways information such as rapid assessment updates could be used to guide TAC setting in between stock assessment years.

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 2021 Sustainability Round: Part 1 of 2"* has been provided to your office.