NATIONAL ROCK LOBSTER MANAGEMENT GROUP

Review of Rock Lobster Sustainability Measures for 2021/22

Proposal to Alter Total Allowable Catches, Allowances, and Total Allowable Commercial Catches

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1 How to get more information and have your say

1. The National Rock Lobster Management Group (which includes Fisheries New Zealand) invites you to make a submission on the proposals set out in this Discussion Document. All submissions must be received by Fisheries New Zealand no later than 5pm on **Friday 5 February 2021.**

2. Please see the Fisheries New Zealand sustainability consultation webpage (https://www.fisheries.govt.nz/consultations/review-of-sustainability-measures-2021-april-round/) for related information, a helpful submissions template, and information on how to submit your feedback.

3. Written submissions should be emailed to FMSubmissions@mpi.govt.nz

   or sent directly to:

   Sustainability Review April 2021
   Fisheries Management
   Fisheries New Zealand
   P O Box 2526
   Wellington 6140.

2 Questions for submitters on the proposals

- What stock/s are you submitting on and do you support the need for review of these stock/s?
- Which option(s) do you support for revising the Total Allowable Catches? Why?
- If you do not support any of the Total Allowable Catch options listed, what alternative(s) should be considered? Why?
- Are the allowances for customary Māori non-commercial fishing appropriate? Why?
- Are the allowances for recreational fishing appropriate? Why?
- Are the allowances for other sources of fishing-related mortality appropriate? Why?
- What is your view on the proposed Total Allowable Commercial Catches?

3 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

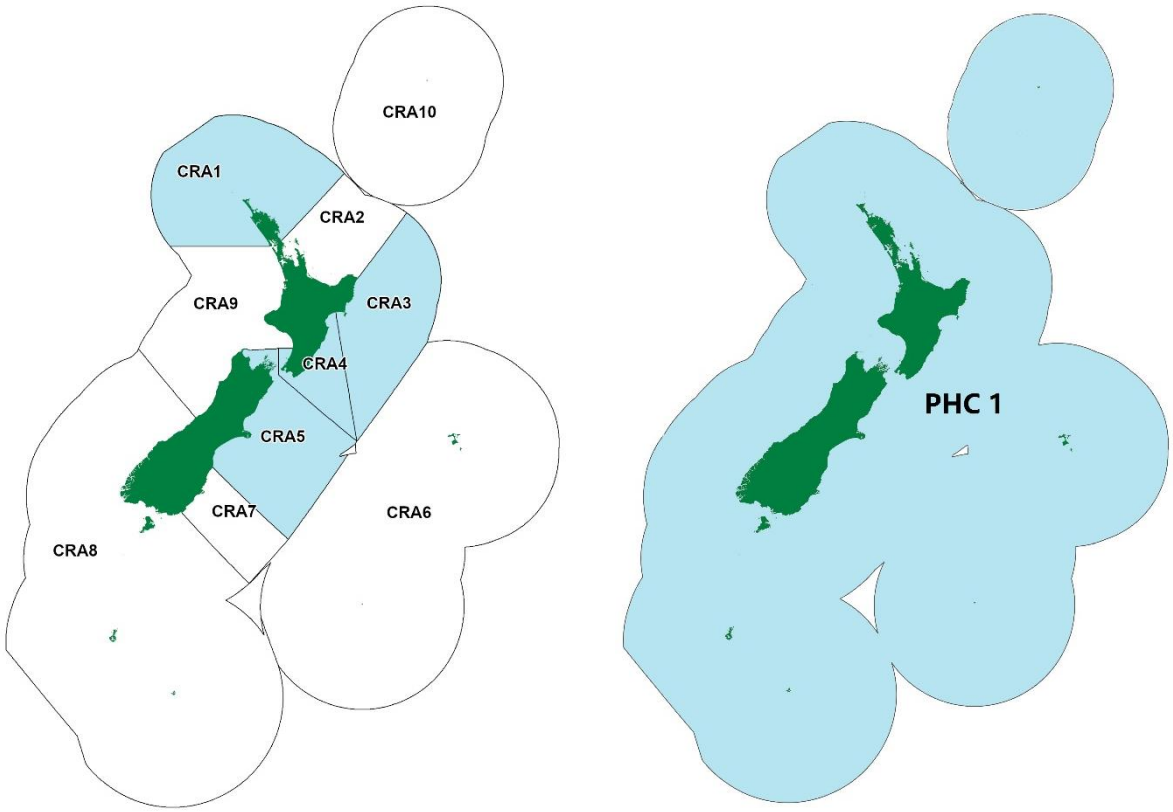

Figure 1: Map of rock lobster Quota Management Areas, showing stocks under review in blue.

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.

4 Summary

4. The National Rock Lobster Management Group (NRLMG) proposes that the Total Allowable Catch (TAC), allowances and the Total Allowable Commercial Catch (TACC) be reviewed for red rock lobster in Quota Management Areas CRA 1 (Northland), CRA 3 (Gisborne), CRA 4 (Wellington/Hawke's Bay), and CRA 5 (Canterbury/Marlborough), and for packhorse rock lobster in the PHC 1 (all of New Zealand) Quota Management Area (Figure 1).

5. Rock lobster stocks support important shared fisheries and are taonga for tangata whenua, popular species for recreational fishers to catch, 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.

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

7. 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.

8. Table 1 provides a summary of the options proposed for red and packhorse rock lobster. Any changes decided on as a result of this review will come into effect on 1 April 2021. In summary it is proposed that:
   - **CRA 1** – the TAC is maintained or decreased by 11%, which follows on from a 26% decrease to the TAC from April 2020.
   - **CRA 3** – the TAC is decreased by up to 19%. A 14% reduction was proposed to the TAC from April 2020, but the previous Minister of Fisheries chose to retain the status quo because of the under-catch caused by COVID-19.
   - **CRA 4** – the TAC is maintained or decreased by up to 30% to reflect stakeholder concerns about low stock biomass.
   - **CRA 5** – the TAC is maintained or decreased by up to 5%.
   - **PHC 1** – a TAC and allowances are set for the first time, with a modest increase to the TACC to reflect the utilisation opportunity.

9. 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.

10. A rebuilding strategy has been in place for the CRA 2 fishery since April 2018. The 2020 rapid assessment update results suggest abundance has increased and will continue to increase at current catch levels. From 1 July 2020, the CRA 2 recreational daily bag limit was reduced from six to three rock lobsters, and telson clipping was introduced for recreationally caught rock lobsters.[2] These measures are intended to manage recreational catch to the recreational allowance that was set in 2018, and to reduce illegal take. An annual survey of key access points for recreational fishers has been initiated to track relative changes in amateur harvest in CRA 2.

11. A review of the CRA 2 TAC, allowances, TACC, and other management controls is proposed at the time of the next CRA 2 stock assessment (currently proposed for 2022). Given the high interest in the stock, it is proposed that thorough community engagement occurs in 2021/22 before any management settings are reviewed.

[2] For more information on these regulatory changes, including information about telson clipping, see the Fisheries New Zealand website: **CRA 2**: https://www.mpi.govt.nz/cra2-review, **CRA 5**: https://www.mpi.govt.nz/cra5-review

Table 1: Proposed management options (in tonnes) for CRA 1, CRA 3, CRA 4, CRA 5, and PHC 1 from 1 April 2021.

Stock	Option	TAC	TACC	Allowances		
				Customary Māori	Recreational	Other mortality
CRA 1 Northland	**Option 1.1:** Status quo	203	110	20	32	41
	Option 1.2: Decrease the TAC by 11%	180.5 ↓ (11%)	100 ↓ (9%)		29 ↓	31.5 ↓
CRA 3 Gisborne	**Option 3.1:** Status quo	351.9	222.9	20	20	89
	Option 3.2: Decrease the TAC by 10%	317.5 ↓ (10%)	209.5 ↓ (6%)		13 ↓	
	Option 3.3: Decrease the TAC by 14%	302 ↓ (14%)	195 ↓ (13%)		12 ↓	75 ↓
	Option 3.4: Decrease the TAC by 19%	284 ↓ (19%)	178 ↓ (20%)		11 ↓	
CRA 4 Wellington Hawke's Bay	**Option 4.1:** Status quo	513.8	318.8	35	85	75
	Option 4.2: Decrease the TAC by 24%	388 ↓ (24%)	280 ↓ (12%)		40 ↓	33 ↓
	Option 4.3: Decrease the TAC by 30%	361 ↓ (30%)	260 ↓ (18%)		33 ↓	
CRA 5 Canterbury Marlborough	**Option 5.1:** Status quo	514	350	40	87	37
	Option 5.2: Decrease the TAC by 6%	484.5↓ (6%)	332.5 ↓ (5%)		75 ↓	
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
	Option P.2: Set the TAC at 79.3 tonnes	79.3	49.3 ↑ (22%)	10	15	5
	Option P.3: Set the TAC at 88 tonnes	88	58 ↑ (44%)	10	15	5

5 Legal basis for managing fisheries in New Zealand

12. The Fisheries Act 1996 (the Act) provides the legal basis for managing fisheries in New Zealand, including the Minister's responsibilities for setting and varying sustainability measures. See the separate document *Overview of legislative requirements and other considerations* on the Fisheries New Zealand sustainability consultation webpage at: https://www.fisheries.govt.nz/consultations/review-of-sustainability-measures-2021-april-round/ for more information.

6 Quota Management System

13. 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. For more information about the QMS go to: www.mpi.govt.nz/law-and-policy/legal-overviews/fisheries/quota-management-system/.

7 Input and participation of tangata whenua

14. The Act and the Fisheries Settlement make particular provision for customary non-commercial access and use of fisheries resources.

7.1 Kaitiakitanga

15. Tāngata Tiaki/Kaitiaki exercise kaitiakitanga[3] on behalf of their 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.

16. 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.

17. 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 do not support increases to any TACCs in their 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 (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.

18. 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.

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

7.2 Mātaitai reserves and temporary closures

20. When making allowances for Māori customary non-commercial fishing interests, the Minister must take into account the mātaitai reserves and any area closure or fishing restriction made under 186A of the Act in an area. There are several mātaitai reserves and 186A area 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);

[3] 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

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.

21. 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.[4]

22. 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 Background information

8.1 Management approach for rock lobster

23. The overall management approach for rock lobster fisheries is to monitor and manage them to provide for use while ensuring sustainability. The use of regular scientific assessments and reviews of rock lobster TACs is consistent with this approach. Being able to respond to changes in rock lobster abundance is important because rock lobster populations can fluctuate rapidly in response to changes in the environment which can affect recruitment, abundance, and availability.

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

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

26. The NRLMG is supportive of discussing initiatives to progress Fisheries New Zealand's pathway to ecosystem-based fisheries management, in line with the Act including the Environmental Principles.

8.2 Rock lobster science and monitoring information

27. 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.

28. 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 commercial catch rates (CPUE), an indicator of relative rock lobster abundance. Management procedures were designed to set a TAC that maintains the stock at or above a level that could produce the maximum sustainable yield.

29. 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 CPUE estimated under the new electronic reporting system was likely to differ from CPUE estimated under the paper form system. The

[4] View all of the customary fisheries management areas at: https://www.fisheries.govt.nz/law-and-policy/maori-customary-fishing/managing-customary-fisheries/customary-fisheries-management-areas/

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 these reporting issues.

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

31. The Rock Lobster Fisheries Assessment Working Group will continue to develop the rapid assessment update approach. There is potential to use the rapid assessments as the basis for development of a new type of management procedure as the basis for advice to the Minister and decisions on TAC changes.

8.3 Definition of stock assessment model outputs

32. For red rock lobster, the biomass level that can produce the maximum sustainable yield (MSY) is not currently available. Work has been undertaken to develop new biomass reference levels tailored to the biological characteristics of each red rock lobster stock. These reference levels 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. It is expected this work will be completed in 2021, following further stakeholder engagement.

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

34. 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)	x	x	x	x	✓

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

9.1 CRA 1 fishery overview

Māori customary fishing

35. 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.

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

Recreational fishing

37. 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 2)[5].

38. 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).

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

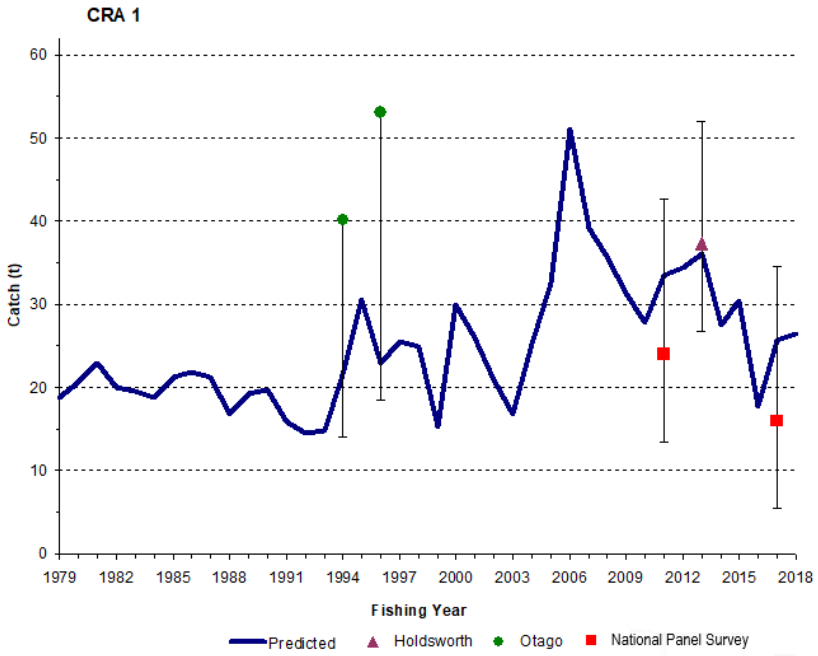

Figure 2: CRA 1 recreational catch trajectory for the 2019 CRA 1 stock assessment (error bars are ±2 standard errors, with the upper bounds of the Otago University survey estimates suppressed).

[5] 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).

Other mortality

40. 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 3). 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.

41. 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.

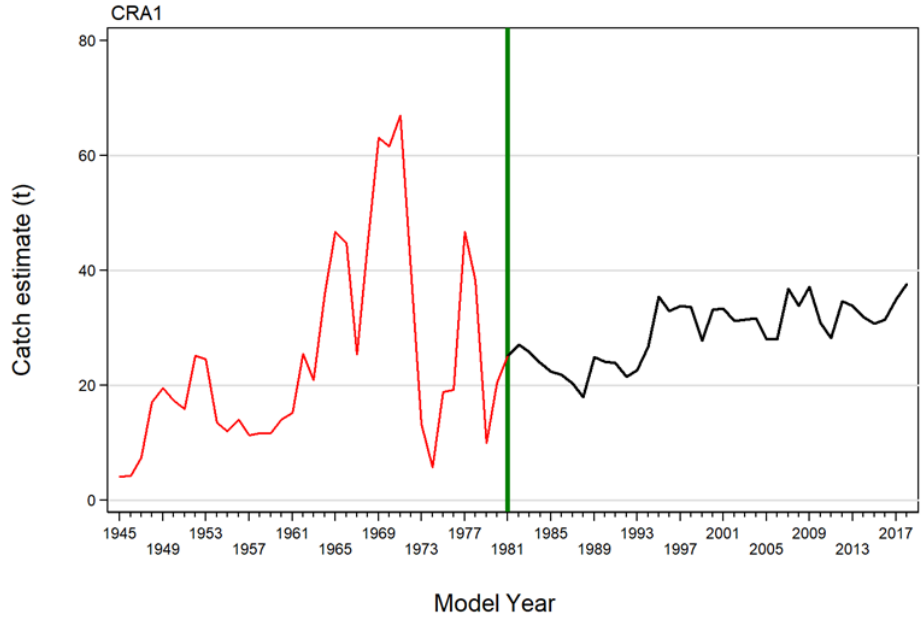

Figure 3: CRA 1 illegal catch trajectory assumed for the 2019 CRA 1 stock assessment[6].

Commercial fishing

42. CRA 1 commercial landings have remained at or near the TACC since the early 1990s (Figure 4). The TACC was 131 tonnes from the early 1990s until 1 April 2020, when it was reduced to 110 tonnes. The COVID-19 outbreak, particularly the effective closure of the Chinese 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.

43. 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.

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

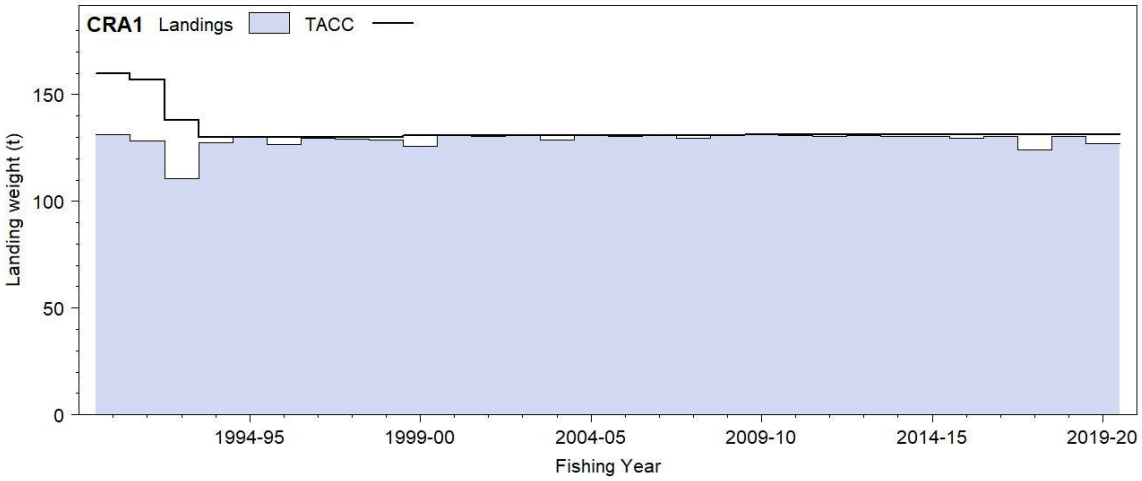

Figure 4: CRA 1 commercial landings and the TACCs from 1990 to 2020.

9.2 CRA 1 stock status

44. 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

45. 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.

46. 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 fishing-related mortality 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

47. 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%) (Figure 5).

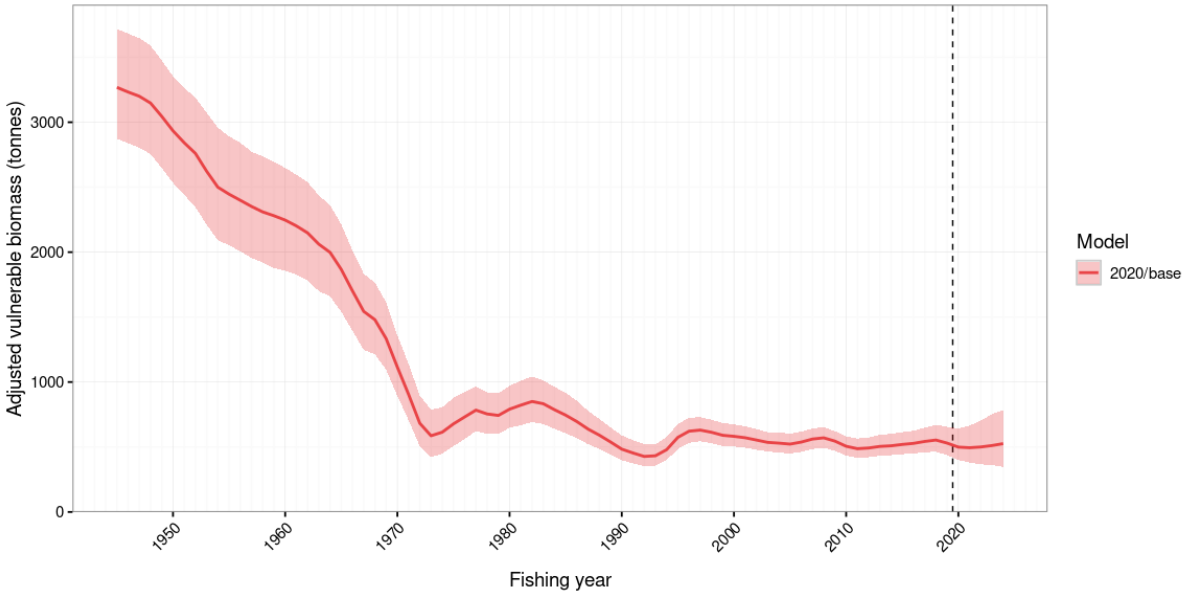

Figure 5: CRA 1 vulnerable biomass trajectories from the 2020 rapid assessment update. The solid line represents the median and the shaded region represents the 5% and 95% quantiles.

48. 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 6.)

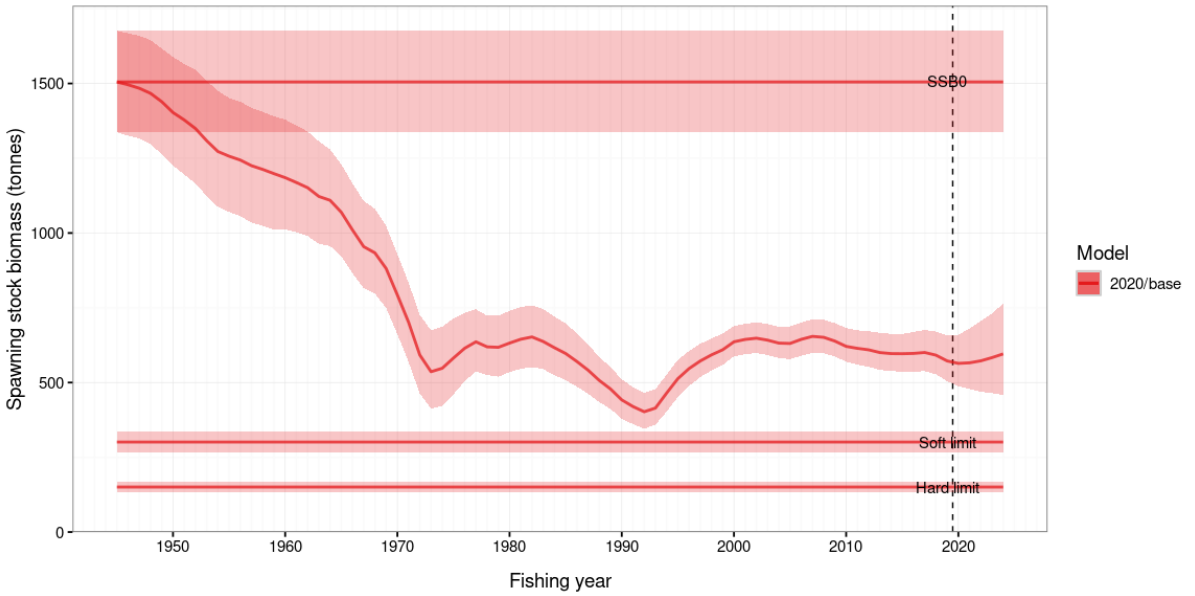

Figure 6: CRA 1 spawning biomass (SSB) trajectories from the 2020 rapid assessment update, including the soft limit (20% SSB_0)[7], and the hard limit (10% SSB_0)[8]. The solid line represents the median and the shaded region represents the 5% and 95% quantiles.

49. Table 3 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 of 10% (or 0.100) and 25.4% (or 0.254) of unfished levels (5% and 95% quantiles).

[7] 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.
[8] 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.

Table 3: Median results from the 2020 CRA 1 rapid assessment update. 5% and 95% quantiles are provided to show the spread and uncertainty of the data.[9]

Performance indicators	5% quantile	Median	95% quantile	Interpretation of the median results
Vulnerable biomass (B)				
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%)
Spawning stock biomass (SSB)				
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

50. 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.

9.3 Proposed CRA 1 options

51. Table 4 provides a summary of options proposed for CRA 1 (Northland). 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 no agreed target biomass reference level for CRA 1.

Table 4: Proposed management options (in tonnes) for CRA 1 from 1 April 2021.

Option	TAC	TACC	Allowances		
			Customary Māori	Recreational	Other mortality
Option 1.1: Status quo	203	110	20	32	41
Option 1.2: Decrease the TAC by 11%	180.5 ↓ (11%)	100 ↓ (9%)		29 ↓	31.5 ↓

[9] 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.

Varying the TAC

52. 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%.

53. 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

54. Table 5 provides a summary of information on current non-commercial allowances for CRA 1 (Northland) and stock assessment assumptions of non-commercial catch.

Table 5: 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

55. 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.

Recreational fishing

56. 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.

57. 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. This is while noting 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.

58. Under Option 1.2 it is expected that vulnerable biomass will increase. As recreational catch is likely to increase under this option 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.

59. The NRLMG welcomes 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.

Other mortality

60. Under Option 1.1 (status quo), no change is proposed to the 41 tonne CRA 1 allowance for other sources of fishing-related mortality (i.e. illegal catch and handling mortality). While noting the incompleteness and uncertainty in the CRA 1 information, it is assumed that current illegal harvest and handling mortality is within the 41 tonne allowance.

61. Under Option 1.2 it is proposed that the allowance for other sources of fishing-related mortality 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

62. 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.

63. 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).

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

10.1 CRA 3 fishery overview

Māori customary fishing

64. 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.

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

Recreational fishing

66. 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 7).

67. 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).

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

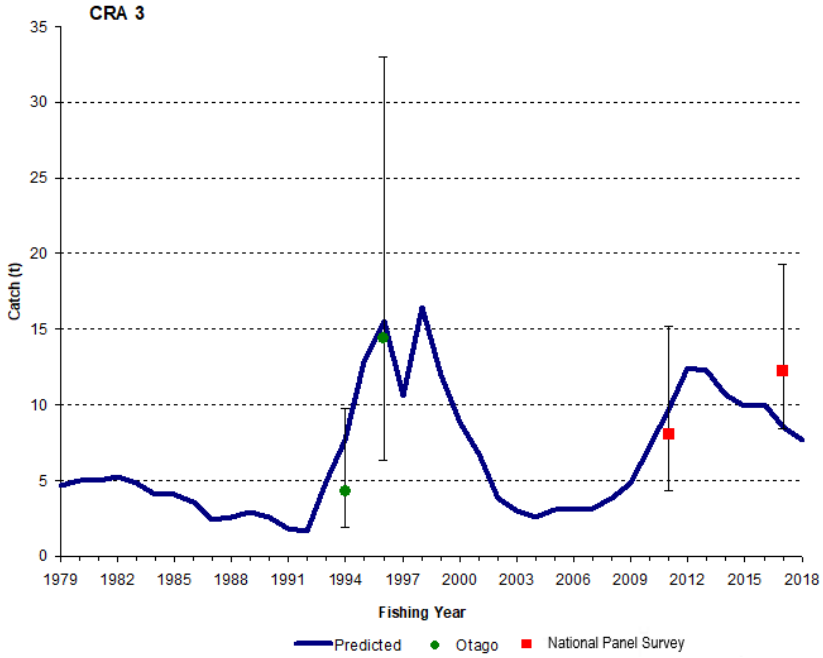

Figure 7: CRA 3 recreational catch trajectory for the 2019 CRA 3 stock assessment (error bars are ±2 standard errors).

Other mortality

69. 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 8). 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 8, 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.

70. 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.

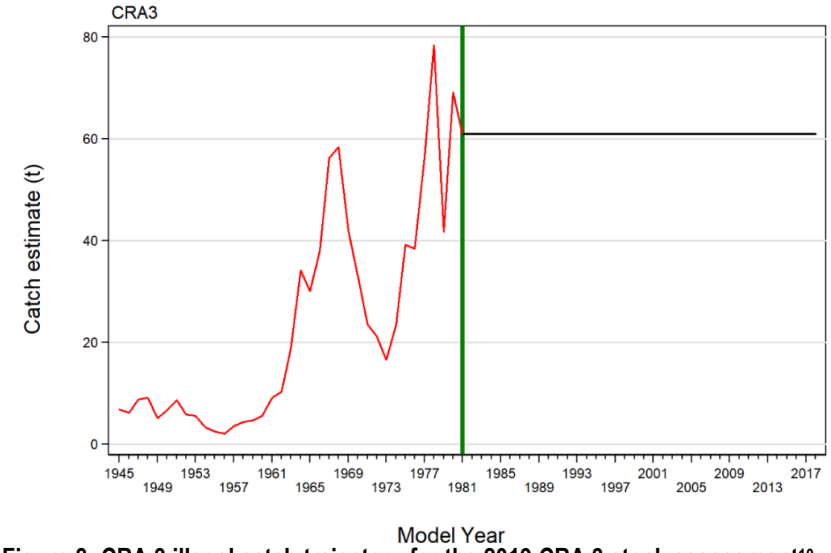

Figure 8: CRA 3 illegal catch trajectory for the 2019 CRA 3 stock assessment[10].

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

Commercial fishing

71. Annual landings and the TACC for CRA 3 (Gisborne) since 1990 are shown in Figure 9.

72. 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 9).

73. 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.

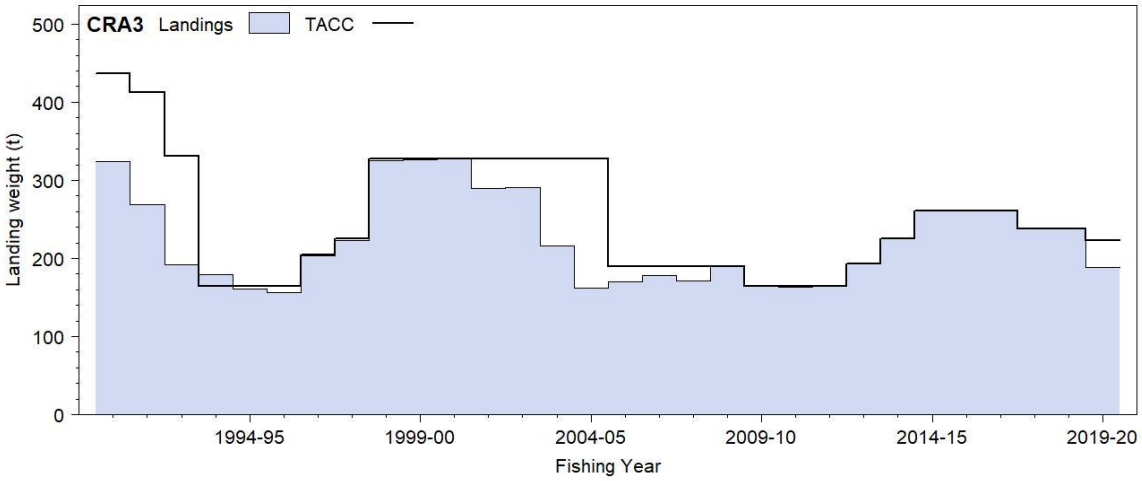

Figure 9: CRA 3 commercial landings and the TACCs from 1990 to 2020.

10.2 CRA 3 stock status

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

Summary of 2019 stock assessment results

75. 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.

76. 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 and the negative financial implications of the COVID-19 outbreak on the commercial sector.

Summary of the 2020 rapid assessment update

77. 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[11] 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 10).

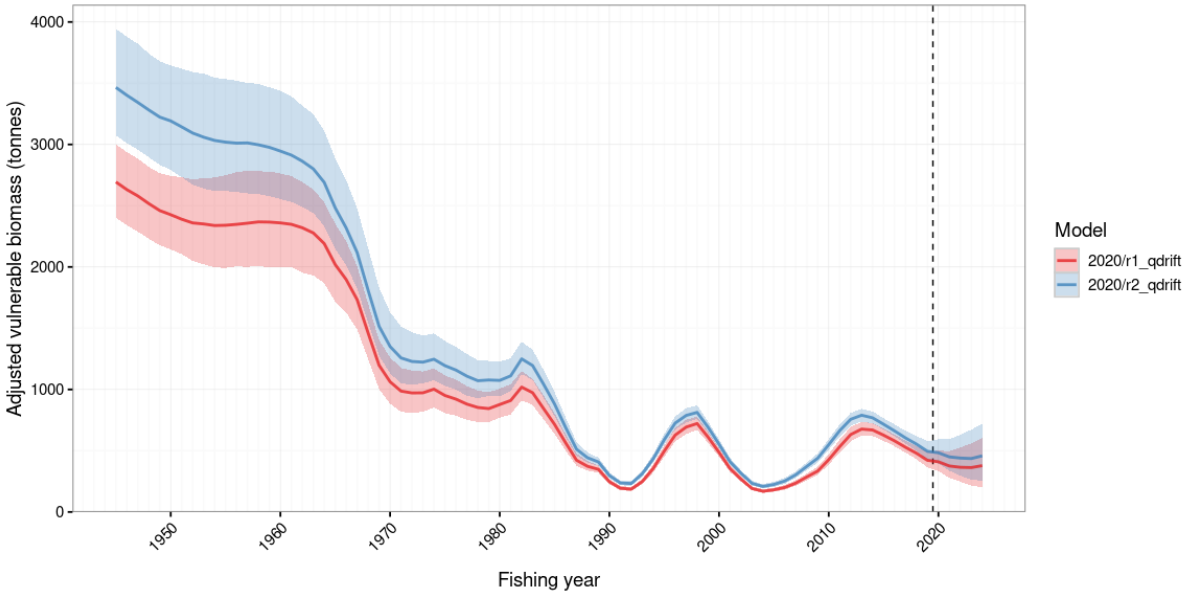

Figure 10: CRA 3 vulnerable biomass trajectories from 2020 rapid assessment update (red and blue lines)[12]. The solid line represents the median and the shaded region represents the 5% and 95% quantiles.

78. 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 11.)

[11] 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

[12] 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).

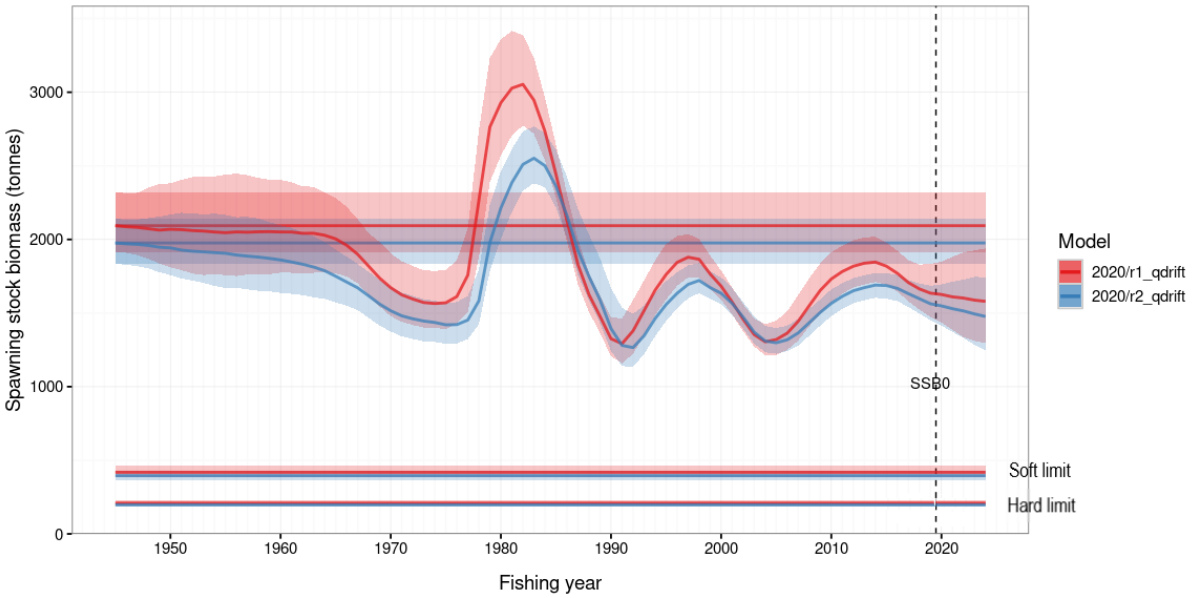

Figure 11: CRA 3 spawning biomass (SSB) trajectories from the 2020 rapid assessment update (red and blue lines), including the soft limit (20% SSB_0)[13], and the hard limit (10% SSB_0)[14]. The solid line represents the median and the shaded region represents the 5% and 95% quantiles.

79. Table 6 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 6: Median results from the 2020 CRA 3 rapid assessment update. 5% and 95% quantiles are provided to show the spread and uncertainty of the data. The range in the figures relates to the two different base case stock assessment models that were used for CRA 3.

Performance indicators	5% quantile	Median	95% quantile	Interpretation of the median results
Vulnerable biomass (B)				
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)				
$Btot_{2020}$ / $Btot_0$	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%)
Spawning stock biomass (SSB)				
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

[13] 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.
[14] 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
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

80. 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. The 2020 rapid assessment suggests the two regions of CRA 3 will behave differently over the next four years:

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

81. 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.

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

10.3 Proposed CRA 3 options

83. Table 7 provides a summary of options proposed for CRA 3 (Gisborne). The results from the 2019 CRA 3 stock assessment and its 2020 rapid assessment update have been used to inform the options for varying the TAC. There is no agreed target biomass reference level for CRA 3.

Table 7: Proposed management options (in tonnes) for CRA 3 from 1 April 2021.

Option	TAC	TACC	Allowances		
			Customary Māori	Recreational	Other mortality
Option 3.1: Status quo	351.9	222.9	20	20	89
Option 3.2: Decrease the TAC by 10%	317.5 ↓ (10%)	209.5 ↓ (6%)		13 ↓	
Option 3.3: Decrease the TAC by 14%	302 ↓ (14%)	195 ↓ (13%)		12 ↓	75 ↓
Option 3.4: Decrease the TAC by 19%	284 ↓ (19%)	178 ↓ (20%)		11 ↓	

Varying the TAC

84. 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%.

85. 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%.

86. 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.

87. 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

88. Table 8 provides a summary of information on current non-commercial allowances for CRA 3 (Gisborne) and stock assessment assumptions of non-commercial catch.

Table 8: 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

89. 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.

Recreational fishing

90. 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.

91. 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 and it is not proposed that the recreational daily bag limit is decreased at this time.

92. Under Option 3.2-3.4 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.

93. The NRLMG welcomes 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.

Other mortality

94. Under all options, except the status quo, it is proposed that the 89 tonne CRA 3 allowance for other sources of fishing-related mortality (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

95. 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.

96. 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).

97. 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).

98. 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).

Other matters – CRA 3 differential minimum legal size review

99. 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 proposal.

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

11.1 CRA 4 fishery overview

Māori customary fishing

100. 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 that occurs under the Amateur Regulations for the purposes of hui and tangi is not required to be reported.

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

Recreational fishing

102. 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 12). 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).

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

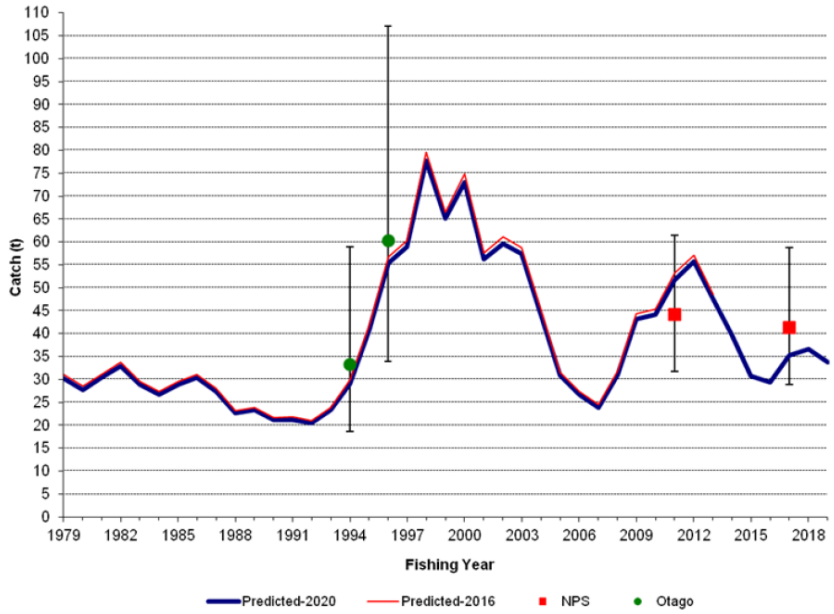

Figure 12: CRA 4 recreational catch trajectory (tonnes) for the 2020 CRA 4 stock assessment model (error bars are ±2 standard errors).

Other mortality

104. 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.

105. The CRA 4 assessment also assumed that handling mortality was 10% of returned lobsters until 1990, and then 5% thereafter (Figure 13). The model estimate of handling mortality was 14.1 tonnes for 2019.

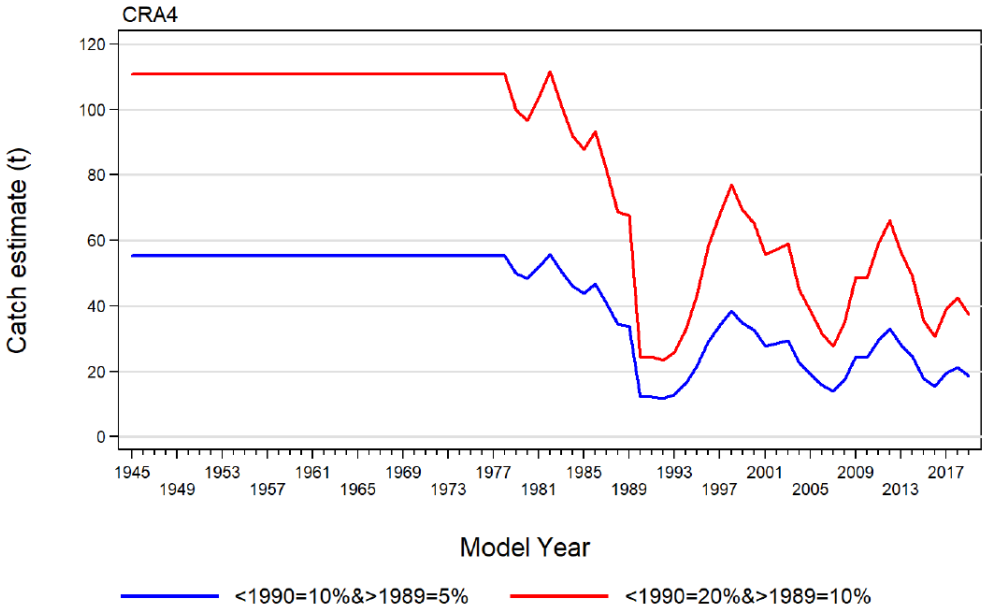

Figure 13: CRA 4 illegal catch trajectory for the 2020 CRA 4 stock assessment (blue line) and the sensitivity (red line).

Commercial fishing

106. Annual landings and the TACC for CRA 4 (Wellington/Hawke's Bay) since 1990 are shown in Figure 14.

107. In 2007 and 2008, the CRA 4 TACC was substantially under-caught because industry used a voluntary management procedure to guide ACE shelving (Figure 14). 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.

108. 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 14).

109. 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.

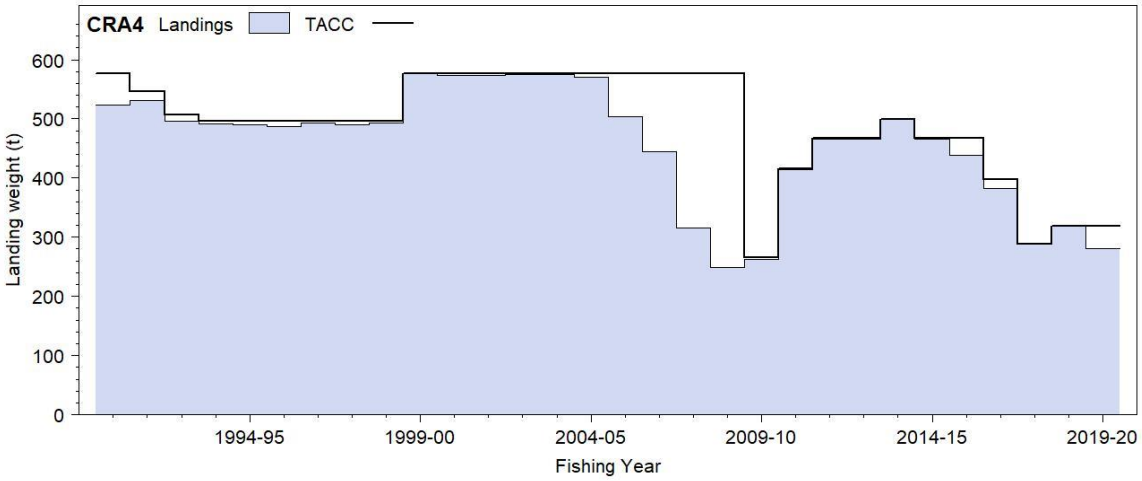

Figure 14: CRA 4 commercial landings and TACCs from 1990 to 2020.

11.2 CRA 4 stock status

110. A new stock assessment was conducted for CRA 4 in 2020.

111. The assessment results are summarised in Figures 15 and 16 and Table 9. 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.

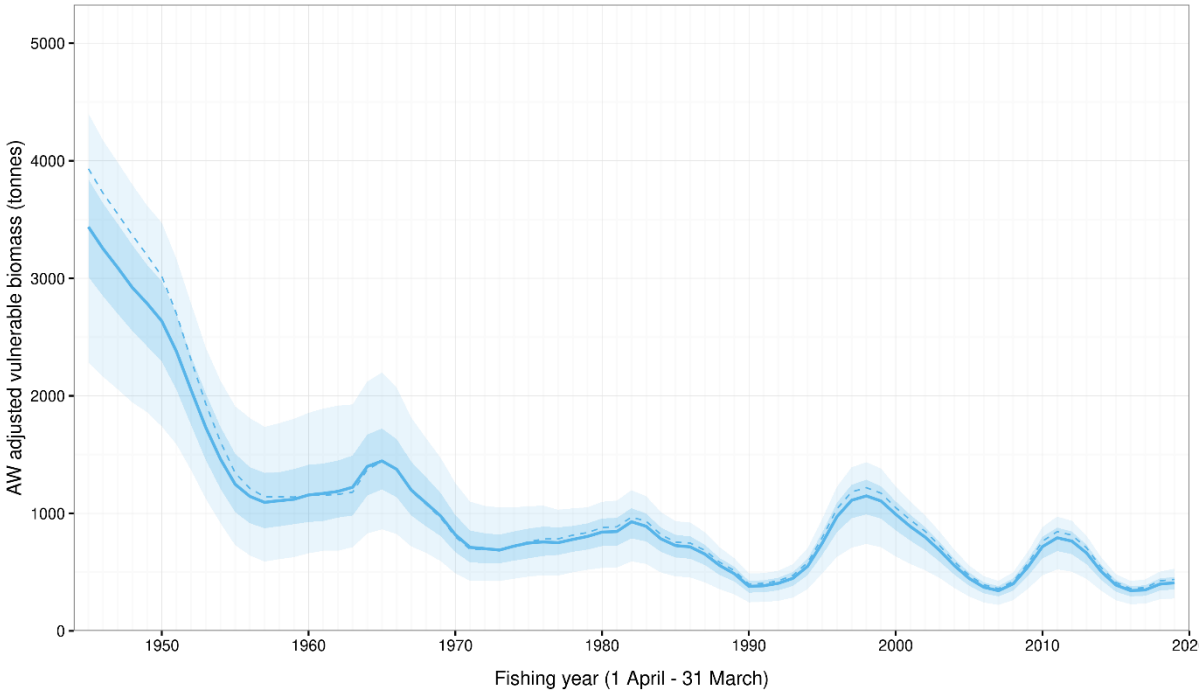

Figure 15: CRA 4 vulnerable biomass trajectory from the 2020 CRA 4 stock assessment. The solid line indicates the median, and the dashed line indicates the MAP (maximum a posteriori) estimate.

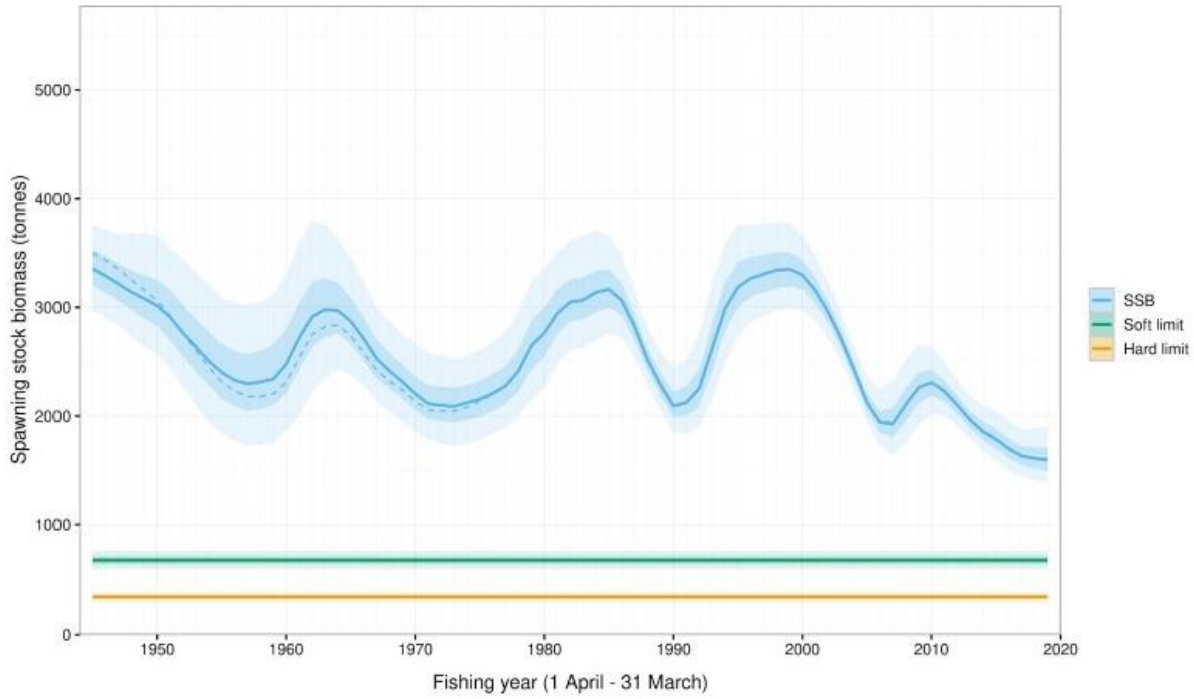

Figure 16: CRA 4 spawning biomass (SSB) trajectory from the 2020 CRA 4 stock assessment, including the soft limit (20% SSB_0)[15], and the hard limit (10% SSB_0)[16]. The solid line indicates the median, and the dashed line indicates the MAP (maximum a posteriori) estimate.

112. Table 9 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[17] 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).

113. 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 9: Median results from the 2020 CRA 4 stock assessment. 5% and 95% quantiles are provided for the performance indicators to show the spread and uncertainty of the data.

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

[15] 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.
[16] 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.
[17] 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.

Performance indicators	5% quantile	Median	95% quantile	Interpretation of the median results
$Btot_{2024}$ / $Btot_{0}$	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

114. 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 for April 2022.

11.3 Proposed CRA 4 options

115. Table 10 provides a summary of options proposed for CRA 4 (Wellington/Hawke's Bay). The results from the new CRA 4 stock assessment have been used to guide the options for varying the TAC. There is no agreed target biomass reference level for CRA 4.

Table 10: Proposed management options (in tonnes) for CRA 4 from 1 April 2021.

Option	TAC	TACC	Allowances		
			Customary Māori	Recreational	Other mortality
Option 4.1: Status quo	513.8	318.8	35	85	75
Option 4.2: Decrease the TAC by 24%	388 ↓ (24%)	280 ↓ (12%)		40 ↓	33 ↓
Option 4.3: Decrease the TAC by 30%	361 ↓ (30%)	260 ↓ (18%)		33 ↓	

Varying the TAC

116. 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.

117. 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%.

118. 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

119. Table 11 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 11: 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

120. 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.

Recreational fishing

121. 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.

122. 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 and it is not proposed that the recreational daily bag limit is decreased at this time.

123. 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 greater constraints proposed on commercial catch.

124. 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.

125. The NRLMG welcomes 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.

Other mortality

126. Under all options, except the status quo, it is proposed that the 75 tonne CRA 4 allowance for other sources of fishing-related mortality (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

127. 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.

128. 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).

129. 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).

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

12.1 CRA 5 fishery overview

Māori customary fishing

130. 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.

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

Recreational fishing

132. 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[18] 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 17). In 2019, the model estimate of CRA 5 recreational catch was 74.6 tonnes.

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

[18] 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.

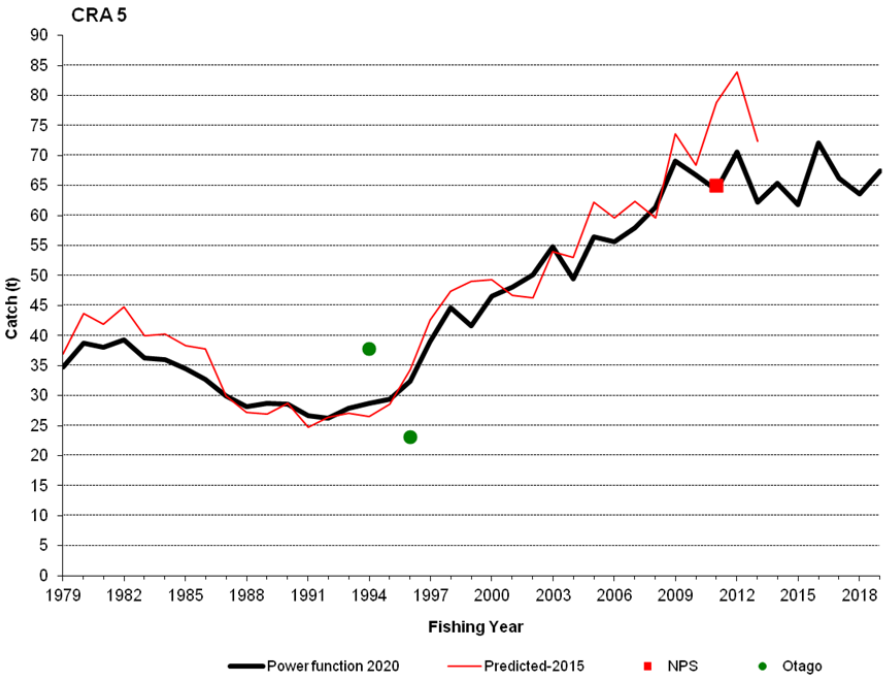

Figure 17: CRA 5 recreational catch trajectory (tonnes) for the 2020 CRA 5 stock assessment model.

Other mortality

134. 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.

135. The CRA 5 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 14.9 tonnes for 2019.

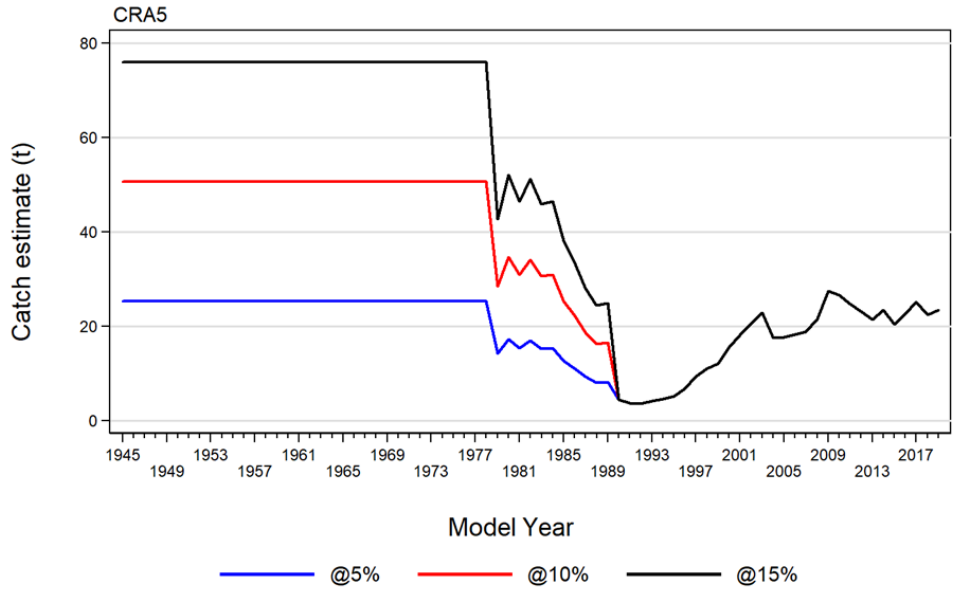

Figure 18: CRA 5 illegal catch trajectory for the 2020 CRA 5 stock assessment. The red line shows the illegal catch trajectory that was used prior to 1990 as the base case in the 2020 stock assessment.

Commercial fishing

136. Annual landings and the TACC for CRA 5 (Canterbury/Marlborough) since 1990 are shown in Figure 19.

137. 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 19). 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 19).

138. 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.

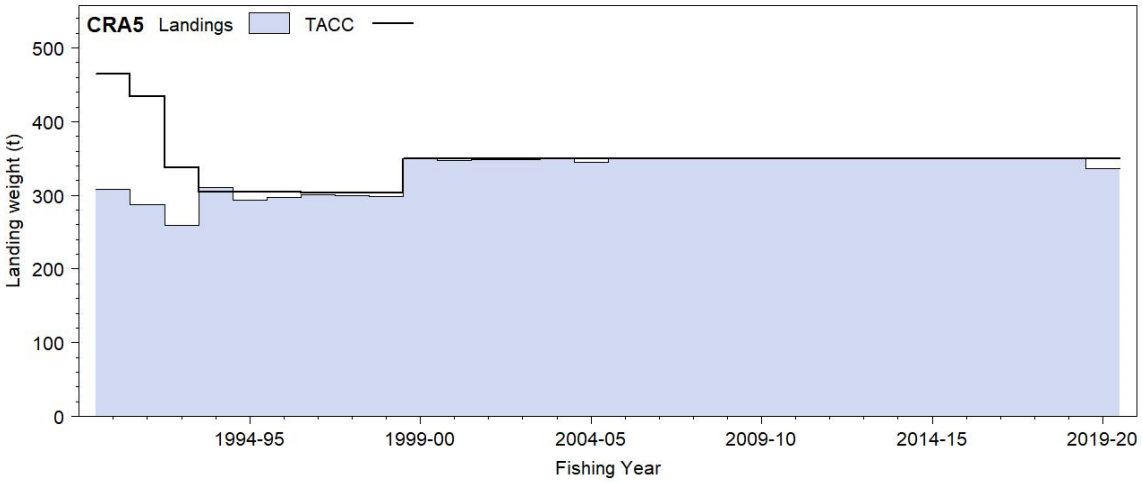

Figure 19: CRA 5 commercial landings and TACCs from 1990 to 2020.

12.2 CRA 5 stock status

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

140. The assessment results are summarised in Figures 20 and 21 and Table 12 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.

141. 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.

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

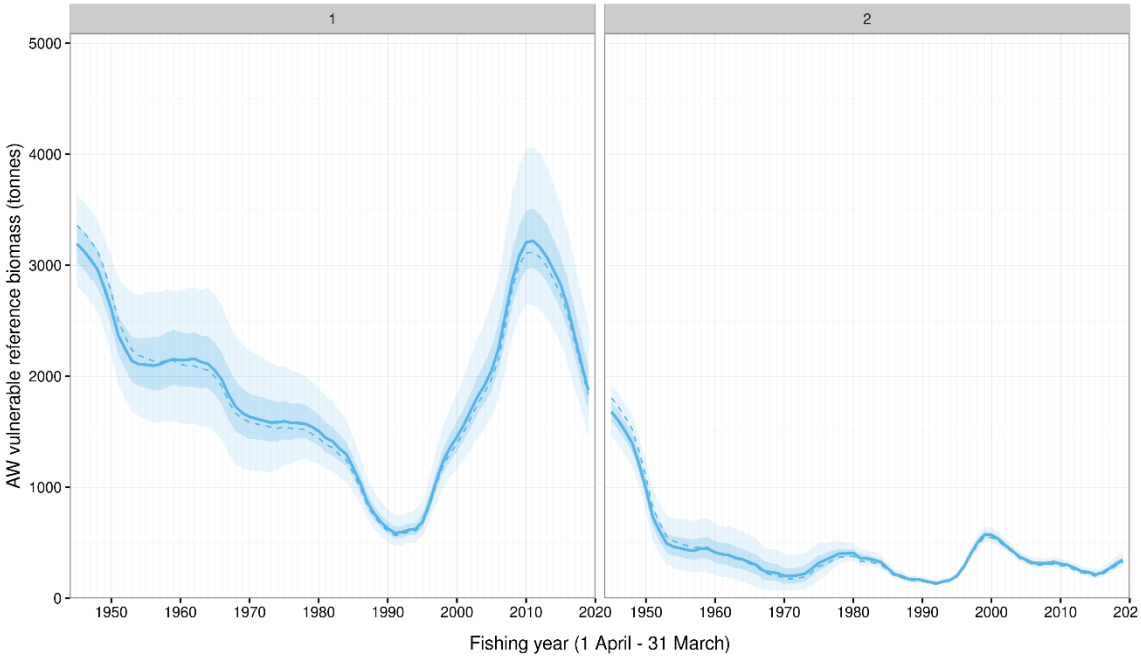

Figure 20: CRA 5 vulnerable biomass trajectory for Region 1 and Region 2 from the 2020 CRA 5 stock assessment. The solid line indicates the median, and the dashed line indicates the MAP (maximum a posteriori) estimate.

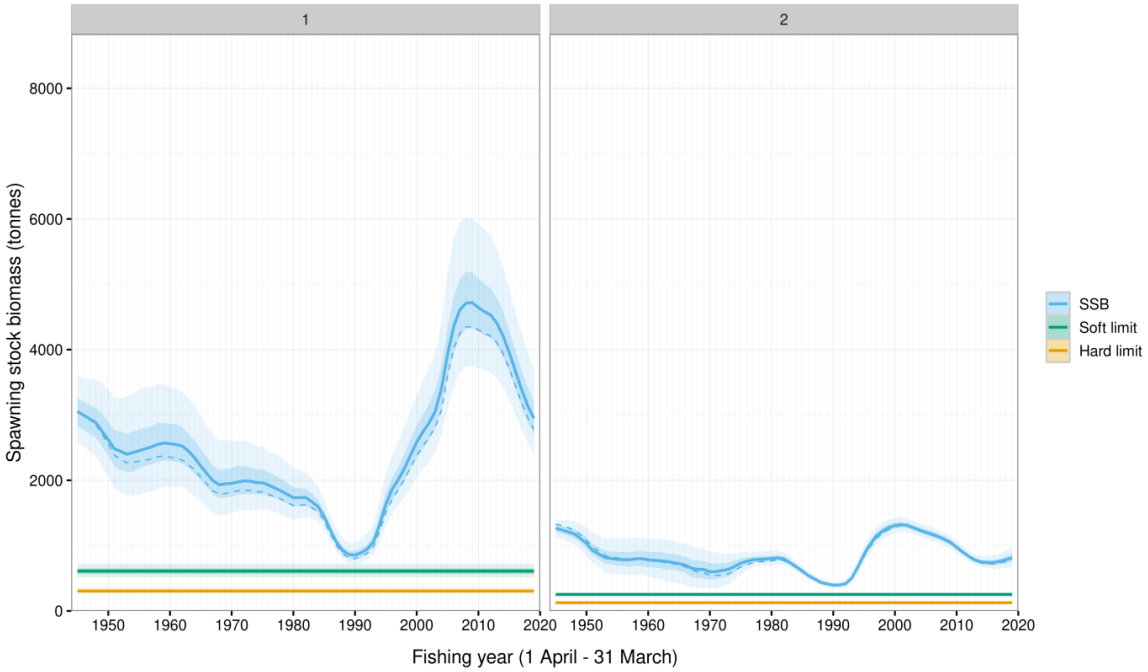

Figure 21: CRA 5 spawning biomass (SSB) trajectory for Region 1 and Region 2 from the 2020 CRA 5 stock assessment, including the soft limit (20% SSB_0)[19], and the hard limit (10% SSB_0).[20] The solid line indicates the median, and the dashed line indicates the MAP (maximum a posteriori) estimate.

143. Table 12 provides further results of the 2020 stock assessment in terms of vulnerable, total and spawning stock biomass, with uncertainties in the results also shown.

[19] 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.
[20] 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.

144. Over the next four years, with 2020 catch levels[21] 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) of unfished level (5% and 95% quantiles). There is currently about a 4% probability that the overall CRA5 vulnerable biomass will increase by 2024 and a 16% probability that spawning stock biomass will increase.

Table 12: Median results from the 2020 CRA 5 stock assessment. 5% and 95% quantiles are provided for the performance indicators to show the spread and uncertainty of the data.

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

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

- 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.
- 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.

[21] 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.

146. 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.

147. 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 for April 2022.

12.3 Proposed CRA 5 options

148. Table 13 provides a summary of options proposed for CRA 5 (Canterbury/Marlborough). The results from the new CRA 5 stock assessment have been used to guide the options for varying the TAC. There is no agreed target biomass reference level for CRA 5.

Table 13: Proposed management options (in tonnes) for CRA 5 from 1 April 2021.

Option	TAC	TACC	Allowances		
			Customary Māori	Recreational	Other mortality
Option 5.1: Status quo	514	350	40	87	37
Option 5.2: Decrease the TAC by 6%	484.5 ↓ (6%)	332.5 ↓ (5%)		75 ↓	

Varying the TAC

149. 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%.

150. 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

151. Table 14 provides a summary of information on current non-commercial allowances for CRA 5 (Canterbury/Marlborough) and stock assessment assumptions of non-commercial catch.

Table 14: 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

152. 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.

Recreational fishing

153. 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.

154. 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.

155. The NRLMG welcomes feedback on whether a change to CRA 5 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.

Other mortality

156. No change is proposed to the 37 tonne allowance for other sources of fishing-related mortality 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

157. 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.

158. 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).

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

13.1 PHC 1 fishery overview

159. 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.

Māori customary fishing

160. Fisheries New Zealand holds limited reports of customary harvest from PHC 1. The harvest is thought to be low.

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

Recreational fishing

162. 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.[22] 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

[22] 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).

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.

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

164. An estimate of 10 tonnes from 1979 to 2019 was used in the 2020 PHC 1 stock assessment model to represent average recreational catches. Actual annual catch is likely to vary with availability and abundance as it does in red rock lobster stocks.

165. 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.

Other mortality

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

Commercial fishing

167. 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.

168. Annual landings and the TACC for PHC 1 since 1990 are shown in Figure 22.

169. 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 22). Monitoring information also suggests catch rates have been rapidly increasing in recent years.

170. 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 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.

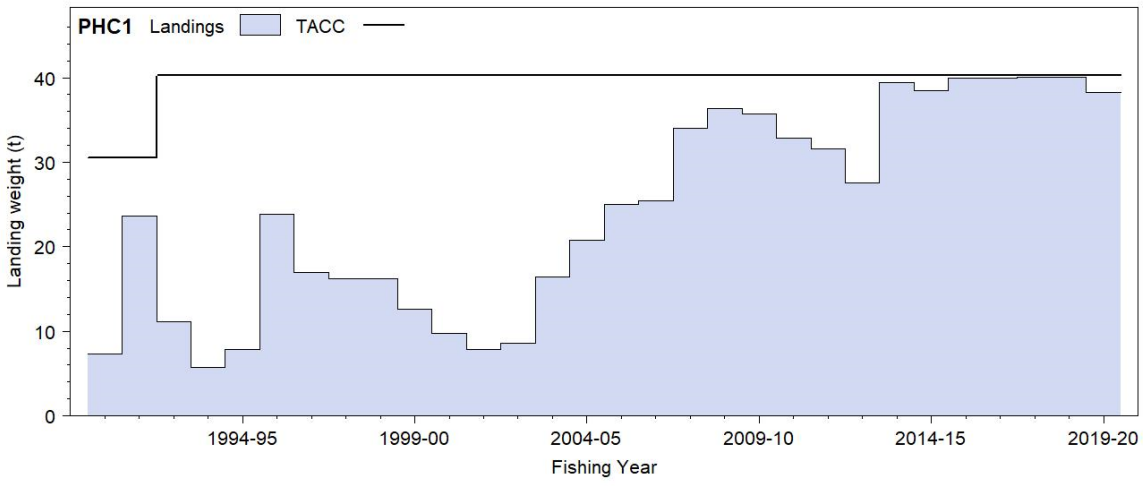

Figure 22: PHC 1 commercial landings and TACCs from 1990 to 2020.

13.2 PHC 1 stock status

171. The first successful stock assessment was conducted for PHC 1 in 2020. A length-structured stock assessment model is conducted for red rock lobster, but this was not possible for packhorse due to lack of adequate data. Instead, a simple biomass dynamics model was used.

172. The assessment results are summarised in Figures 23 and Table 15. 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 23).

173. The PHC 1 stock assessment estimated B_{MSY} (the biomass, or weight of fish, which produces the maximum sustainable yield (MSY)[23], at 309.6 tonnes, and MSY at 68.4 tonnes. The assessment results suggest the 2019 vulnerable biomass is well above B_{MSY} (about 165% of B_{MSY}).

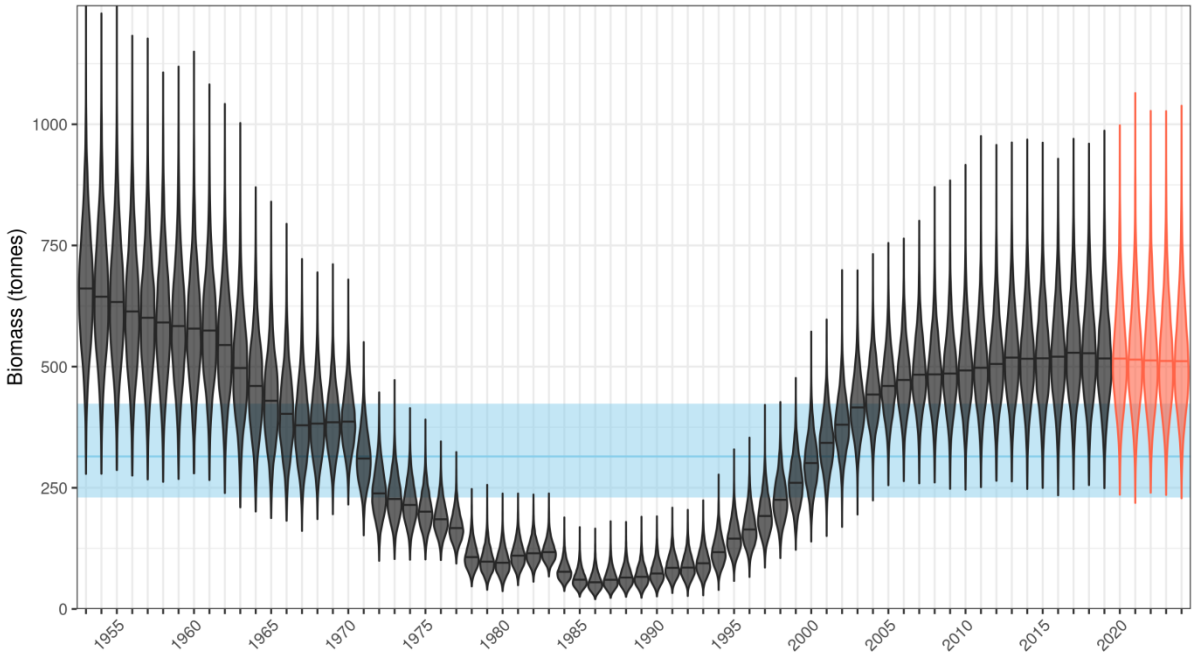

Figure 23: PHC 1 vulnerable biomass (black), including a five-year projection at current catches (red) from 2020. The blue line is the median and 90% credible interval of B_{MSY}.

174. Over the next four years, with 2020 catch levels and recent recruitment, vulnerable biomass is projected to stay constant relative to the unfished level, and projected to be at about 163% of B_{MSY} (Table 15).

175. The median results of the stock assessment suggest that over the next four years, with 2020 catch levels and recent recruitment, PHC 1 vulnerable biomass is projected to decrease slightly relative to 2020 levels (Table 15). However, there are uncertainties associated with these estimates, as shown in Table 15. 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).

[23] Maximum Sustainable Yield (MSY) is the largest long-term average catch or yield that can be taken from a stock without impairing the stock's renewability through natural growth and reproduction (under prevailing ecological and environmental conditions).

Table 15: 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

13.3 Proposed PHC 1 options

176. Table 16 provides a summary of options proposed for PHC 1 (all of New Zealand). The results from the new PHC 1 stock assessment have been used to guide the options for setting the TAC.

Table 16: Proposed management options (in tonnes) for PHC 1 from 1 April 2021.

Option	TAC	TACC	Allowances		
			Customary Māori	Recreational	Other mortality
Current settings	**-**	**40.3**	**-**	**-**	**-**
Option P.1: Set the TAC at 65.3 tonnes	65.3	40.3	10	10	5
Option P.2: Set the TAC at 79.3 tonnes	79.3	49.3 ↑ (22%)	10	15	5
Option P.3: Set the TAC at 88 tonnes	88	58 ↑ (44%)	10	15	5

Stock biomass projections for different catch setting proposals

177. Biomass projections for the next twenty years under different levels of catch are given in Figure 24. 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 24, d).

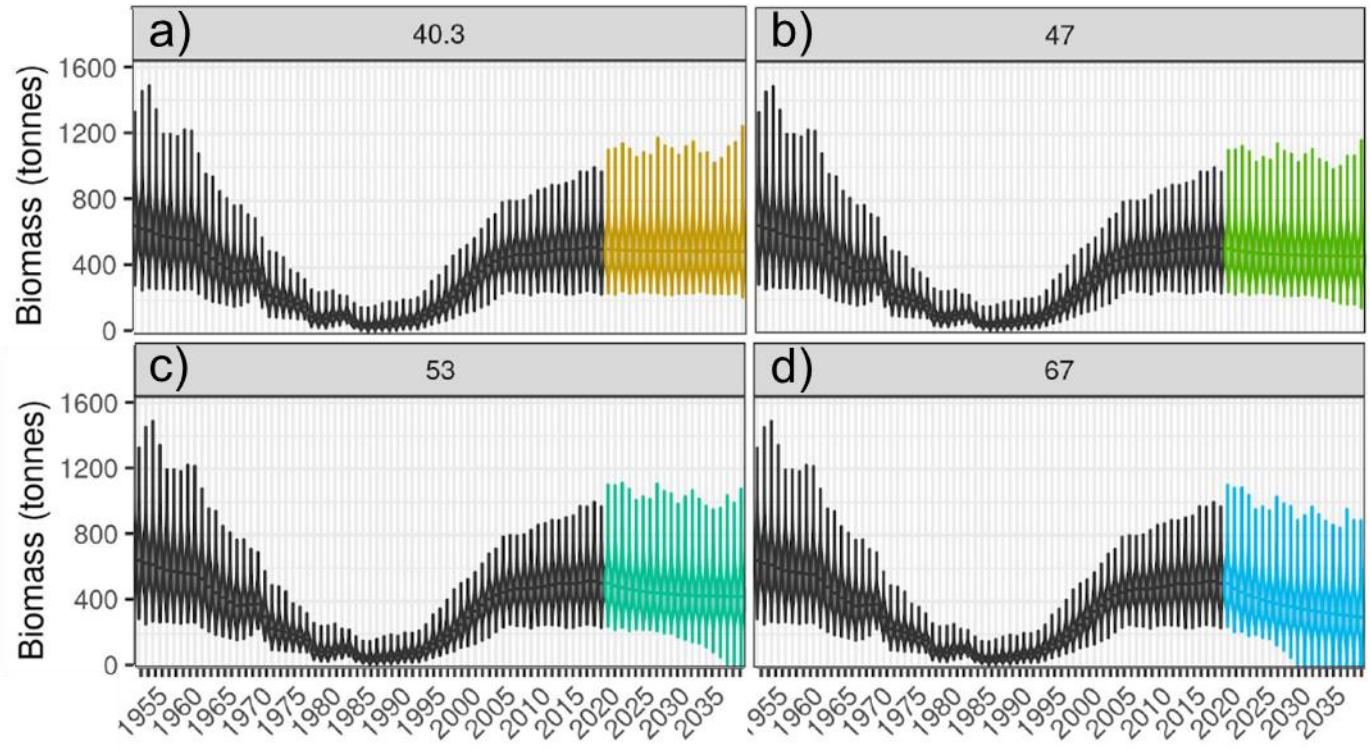

Figure 24: Projections of PHC 1 vulnerable biomass over the next 20 years at a range of commercial catch levels: a) 40.3 tonnes (the current TACC); b) 47 tonnes; c) 53 tonnes; and d) 67 tonnes. All projections assume an additional 10 tonnes of recreational catch.

178. 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 17 below. Performance indicators are not available for the specific catch settings proposed in Table 16 because the modelling work was completed before the NRLMG determined consultation options.

Table 17: 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.

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

179. 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

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

181. 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).

182. 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 decline slightly (1%) over the next four years under this option but will remain well above the soft limit with 100% certainty, and well above B_{MSY}.

183. Under Option P.2, the PHC 1 TAC would be set at 79.3 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. This is unlikely to affect current utilisation benefits for non-commercial fishers. 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}.

184. Under Option P.3, the PHC 1 TAC would be set at 88 tonnes. This option would allow the commercial sector to realise 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 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}. However, if the recreational allowance is set at 15 tonnes instead of 10 tonnes as modelled, removals would likely exceed the estimated level of MSY.

Varying allowances and the TACC

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

Māori customary fishing

186. 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.

187. The NRLMG welcomes information from tangata whenua and stakeholders on the proposed 10 tonne allowance.

Recreational fishing

188. It is proposed that the allowance for recreational fishing be set at 10 tonnes for Option P.1. This reflects the best available information on recreational catch, with both the 2011/12 National Panel Survey and the 2013/14 Holdsworth survey estimating recreational packhorse rock lobster catch in PHC 1 at 10 tonnes. While there is uncertainty in the current estimate of recreational catch, it is considered to be within the proposed 10 tonne allowance.

189. Under Options P.2 and P.3, it is proposed that the recreational allowance be set at 15 tonnes. This reflects the 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, anecdotal information indicates that recreational catch has been increasing in areas outside Northland in recent years

Other mortality

190. 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 Option P.2, 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

191. 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.

192. 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 pack horse lobsters on the domestic market as a tool to address illegal take for sale.

193. 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).

194. Under Option P.3 (44% TACC increase), the PHC 1 TACC would be increased to 58 tonnes. The proposed 17.7 tonne has the potential to result in an 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).

Other matters – PHC 1 minimum legal size measure

195. 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 Biological and environmental factors

196. When varying a TAC under Section 13 of the Act, the Minister must also have regard to the interdependence of the stocks, the biological characteristics of the stock, and any environmental conditions affecting the stock.

Interdependence of stocks

197. 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.

198. 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 similar long larval phase as 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.

199. 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.

200. 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. Nationally, the most frequently reported incidental species caught via commercial red 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.

201. 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, and predation on packhorse rock lobsters is known from octopus.

202. 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.

Biological characteristics and environmental conditions

203. 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.

204. 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 document.

14.2 Deemed values

205. 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 18 below.

Table 18: 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

206. 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.

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

14.3 Proposed future consultations

CRA 3 differential minimum legal size review

208. 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 inter-sector concerns.

209. The CRA 3 differential MLS regime allows commercial fishers to land smaller male rock lobsters at or above 52 mm tail width, rather than 54 mm tail width, 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 fishers over the busy summer season in waters close to Gisborne.

210. 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.

211. To progress the review, Fisheries New Zealand (with the support of the NRLMG) is intending to hold a multi-stakeholder meeting in Gisborne early 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.

PHC 1 minimum legal size measure

212. 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.

213. PHC 1 currently has an MLS measure of 216 mm TL.[24] 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.

214. 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.

215. This 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.[25] 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.

216. Your initial feedback on this matter is welcomed. The NRLMG intends to carry out public consultation on the proposal during 2021.

14.4 Other management issues

More responsive decision-making

217. 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 to implement a regulatory change than catch settings. The NRLMG support measures to align the legislative requirements of 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.

Recreational catch estimation

218. 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.

219. More frequent surveys, or revised approaches that are available, need to be evaluated for their cost and utility for rock lobster fisheries. This will be a focus area for the NRLMG in 2021.

Illegal catch estimation

220. 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.

221. 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.

[24] 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).

[25] 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.

Recreational accumulation limits

222. 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.

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

Telson clipping

224. 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.

225. 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 has this year been introduced in the CRA 2 fishery.

226. 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.

Recreational charter vessel industry

227. The NRLMG supports better management of amateur charter-fishing vessel (ACV) fishing overall, and improvements to the reporting regime. ACVs have been required to report their catch since 2010, however there are some concerns with the completeness, credibility, and quality of these data from some vessels. In 2021, the NRLMG will provide advice to the Minister on how to better manage the recreational ACV sector.

15 Further Information

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

November 2020 Fisheries Assessment Plenary Report: https://www.mpi.govt.nz/dmsdocument/43321-Fisheries-Assessment-Plenary-November-2020-Stock-Assessment-and-Stock-Status-Introductory-section-to-Yellowfin-Tuna

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

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

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

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

Recent reviews of rock lobster stocks:

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

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

CRA 2, 4, 7 and 8 Sustainability Round Review April 2018: https://www.mpi.govt.nz/dmsdocument/27966-review-of-rock-lobster-sustainability-measures-1-april-2018