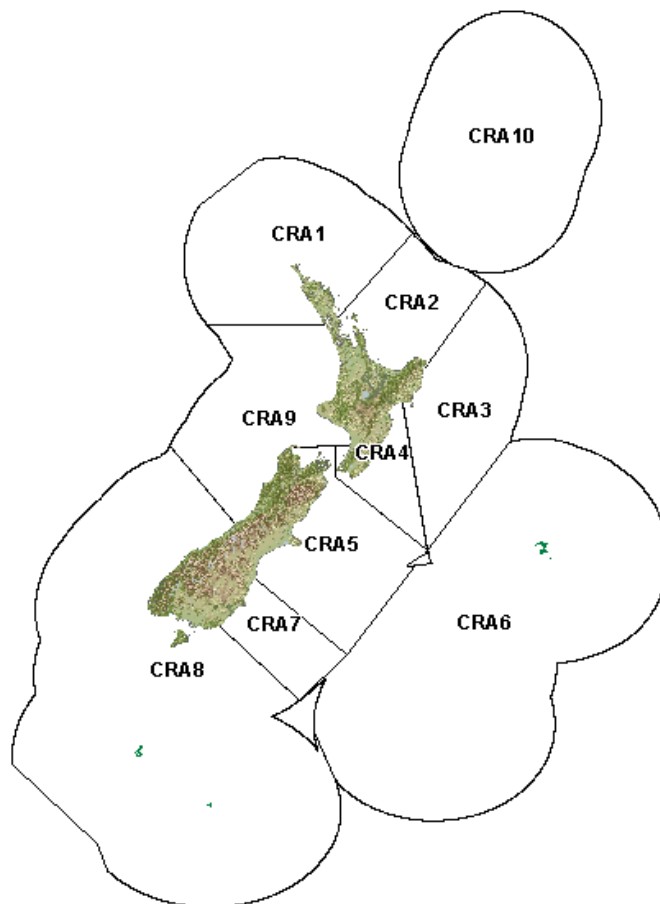




**Review of Rock Lobster Sustainability Measures for 1 April 2012
Initial Position Paper – December 2011**



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INTRODUCTION

1. The National Rock Lobster Management Group (NRLMG) is a national-level, multi-stakeholder group comprising representatives of customary, recreational and commercial fishing sectors, and the Ministry of Agriculture and Forestry¹ (the Ministry). The NRLMG acts as the Minister's primary advisor on catch limit, regulatory and other management interventions that apply specifically to rock lobster fisheries.

PURPOSE OF THIS DOCUMENT

2. The purpose of this document is to commence a consultation process on behalf of the Minister on proposals to vary rock lobster sustainability measures for the 2012-13 fishing year.
3. There are two initial advice papers in this document that set out the NRLMG's initial advice on proposals to:
 - a) use new management procedures to guide Total Allowable Catch (TAC) setting in the CRA 4 (Wellington/Hawkes Bay) and CRA 5 (Canterbury/Marlborough) spiny rock lobster stocks
 - b) set TACs and allowances for the CRA 3 (Gisborne), CRA 4 (Wellington/Hawkes Bay), CRA 5 (Canterbury/ Marlborough) and CRA 7 (Otago) spiny rock lobster stocks.
4. The Ministry welcomes information and comments from tangata whenua, fishery stakeholders and other interested parties on the proposals.
5. Stakeholders are requested to forward their comments on the proposals by **5pm Friday, 3 February 2012**.
6. Submissions should be sent directly to:

Alicia McKinnon
Ministry of Agriculture and Forestry
P O Box 12034
Ahuriri
Napier 4144

or emailed to alicia.mckinnon@maf.govt.nz

TERMINOLOGY IN THE DOCUMENT

Management Procedures

7. A management procedure is a tool used to guide the setting of catch limits. Management procedures are becoming more widely used, especially in South Africa, Australia, Europe, North America, and in New Zealand. A management procedure:
 - a) Specifies what data will be used to make catch limit decisions
 - b) Specifies how the data will be collected and analysed

¹ previously the Ministry of Fisheries.

- c) Contains a harvest control rule (a mathematical equation that determines what the specific output of the procedure will be, such as the exact TAC or Total Allowable Commercial Catch (TACC))
 - d) Has been extensively simulation-tested using an operating model that is a model of the fishery system being managed.
- 8. Under a management procedure approach, agreement is obtained among managers and stakeholders before the procedure is implemented: they agree about the data inputs, the way the inputs will be treated to make inferences, the harvest control rule and the period for which the management procedure will be used. Extensive simulation testing of the procedure is undertaken to ensure it will deliver the desired outcomes.
- 9. The advantages of a management procedure approach, over the conventional approach of periodic stock assessments followed by decision making, are:
 - a) The process leads to explicit definition of management objectives
 - b) All participants in the fishery can become involved in the choice of procedure
 - c) Uncertainty in all facets of the assessment and management process can be addressed
 - d) Greater certainty of achieving outcomes is provided
 - e) Management procedures reduce the need for regular stock assessments, freeing resources for other research
 - f) The process is more understandable to fishers than the conventional approach.
- 10. Management procedures are currently in place for several New Zealand rock lobster fisheries including, CRA 3 (Gisborne), CRA 4 (Wellington/Hawkes Bay), CRA 7 (Otago) and CRA 8 (Southern). These management procedures have been used by the Minister to guide statutory TAC setting in these fisheries for varying amounts of time. The oldest example of the use of management procedures is in CRA 7 and CRA 8, where they have been successfully used to guide TAC setting since 1996, first to rebuild the stocks and then to maintain them above reference levels with high probability.

Sustainability Indicators (Bmsy, Bref, Bmin)

- 11. The NRLMG uses sustainability indicators to report on stock health and to evaluate the effectiveness of management options. For most rock lobster stocks, performance is reported against sustainability reference levels and a minimum stock size.
- 12. Three sustainability indicators are relevant to evaluation of the proposals presented in this document:
 - a) The statutory reference level, ***Bmsy***. TACs for rock lobster stocks are set under section 13 of the Fisheries Act 1996 (the Act). Section 13 requires the Minister to set TACs for rock lobster stocks that move the stocks to, or maintain the stocks at, a level at or above ***Bmsy***, or that is not inconsistent with this objective.
 - b) The proxy reference level, ***Bref***. Proxy reference levels are a way of setting a TAC that is not inconsistent with the objective of maintaining a stock at or above, or moving the stock towards a level that can maintain the maximum sustainable yield. This “not inconsistent” approach is set out in section 13(2A) of the Act where the Minister

considers that current biomass or *Bmsy* cannot be estimated reliably using best information. *Bref* is generally a stock size at or above the stock size associated with a period in the fishery that showed good productivity and was demonstrably safe.

- c) The minimum stock size, ***Bmin***. *Bmin* is either the stock size associated with lowest abundance in the observed history of the fishery or $\frac{1}{2}$ *Bref*.
13. For all these indicators, the stock size is measured in terms of vulnerable biomass. “Vulnerable biomass” is the total quantity of lobsters available to the fishery (ie, it does not include lobsters that cannot be harvested such as undersize lobsters and berried female lobsters).
14. 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 Maori, amateur, commercial and environmental concerns and benefits*”. In order to be consistent with this management goal the NRLMG has specified a desired performance in relation to sustainability indicators, which is:
- a) A stock size above the agreed proxy (*Bref*) at least 50% of the time
 - b) A stock size that remains above the minimum (*Bmin*) with 90% probability
 - c) A spawning stock size that remains above 20% of its unfished level with high probability.
15. Extensive simulation-testing based on operating models of the stocks and associated fisheries suggest that all the management procedures discussed in this document achieve the desired performance in relation to the sustainability indicators.

The Harvest Strategy Standard

16. In October 2008, the Ministry released the Harvest Strategy Standard (HSS) for New Zealand fisheries, which specifies performance standards for Quota Management System species. The NRLMG considers the management procedures previously agreed for CRA 3 and CRA 7, and the recommended new management procedures for CRA 4 and CRA 5, to be consistent with the HSS.
17. The Guidelines for Harvest Strategy Standards describe the *Bref* concept as follows: “Conceptual proxies for BMSY, FMSY and MSY are qualitative surrogates that can be used in the absence of adequate information to directly estimate these reference points themselves. The conceptual interpretation embraces the spirit and intent of section 13 of the Act. It can be used in cases where there is insufficient information to estimate BMSY, FMSY or MSY explicitly, or where such estimates may be unreliable because, for example, there is little or nothing known about the stock recruitment relationship. Conceptual BMSY: In cases where the relationship between CPUE and abundance can be assumed to be more or less proportional, or where some other form of relationship has been derived from data, it may be reasonable to select an appropriate historical period when both CPUE and catches were relatively high and to use this CPUE level as a target. *The best example in current use in New Zealand is that for rock lobster.*” [emphasis added]

INITIAL ADVICE PAPER 1: PROPOSAL TO USE NEW MANAGEMENT PROCEDURES TO GUIDE TAC SETTING IN CRA 4 AND CRA 5

SUMMARY

18. The National Rock Lobster Management Group (NRLMG) proposes to use new management procedures in CRA 4 (Wellington/Hawkes Bay) and CRA 5 (Canterbury/Marlborough) rock lobster fisheries to guide Total Allowable Catch (TAC) setting from the 2012-13 fishing year onwards, beginning 1 April 2012.
19. The management options proposed for CRA 4 and CRA 5 in this paper are outlined in Table 1 below.

Stock	Option	Description
CRA 4	Option A	Agree to use the recommended <u>new</u> CRA 4 Management Procedure to guide TAC setting in CRA 4
	Option B	Use periodic stock assessments to guide TAC setting in CRA 4
CRA 5	Option C	Agree to use the recommended <u>new</u> CRA 5 Management Procedure to guide TAC setting in CRA 5
	Option D	Continue to use periodic stock assessments to guide TAC setting in CRA 5 (<i>status quo</i>)

Table 1: Proposed management options for CRA 4 and CRA 5

20. A central consideration when choosing whether or not to use a management procedure to guide TAC setting in a fishery is whether the procedure enables the Minister to set a TAC that complies with section 13 of the Fisheries Act 1996 (the Act). Section 13 requires the Minister to set a TAC that moves the stock to, or maintains the stock at, a size at or above *Bmsy* or at a level that is not inconsistent with this objective.
21. The NRLMG is confident that application of the recommended new CRA 4 and CRA 5 Management Procedures will ensure that the Minister sets a TAC that has a high probability of maintaining stock levels at or above *Bmsy* or the agreed proxy (ie, *Bref*). Best available information suggests both stocks, CRA 4 and CRA 5, are currently well above *Bmsy* and *Bref*.
22. Simulation-testing of the CRA 4 and CRA 5 Management Procedures also indicate that their application would maintain or improve abundance, and hence would maintain or improve the current utilisation benefits of the fisheries for all sectors over the medium- to long-term.

REASONS FOR NEW MANAGEMENT PROCEDURES

23. In 2011, new management procedures were developed for CRA 4 and CRA 5 for different reasons.

24. The management procedure that has been in use in the CRA 4 fishery since the 2007-08 fishing year has expired (it was first used to guide voluntary Annual Catch Entitlement (ACE) shelving for 2 years and then by the Minister to guide TAC setting in the fishery for 3 years). A management procedure should not be used for more than 5 years because fishery dynamics may have changed and it is important to ensure the Minister's statutory obligations are being met with high probability. In 2011, a set of new CRA 4 management procedures were developed and evaluated for the NRLMG to consider for use in TAC setting (one of these management procedures is proposed for use in this paper).
25. A voluntary procedure has been used by the CRA 5 rock lobster fisheries commercial stakeholder organisation (CRAMAC 5) to shelve ACE when catch per unit effort (CPUE) fell below a specified threshold. The rule has not been triggered, but CRAMAC 5 wanted a mechanism which offered the prospect of future Total Allowable Commercial Catch (TACC) increases if stock abundance continued to increase. A new CRA 5 Management Procedure was developed in 2010 and was proposed for use in 2010-11 TAC setting. The Minister did not accept the 2010 CRA 5 Management Procedure, however because consultation showed a widespread lack of support for the mechanics of management procedure (eg, allowance outputs) from tangata whenua and the commercial sector. In 2011, a new Management Procedure was developed and evaluated for the NRLMG to consider for use in TAC setting (this management procedure is proposed for use in this paper).

CRA 4 and CRA 5 Management Options

26. The NRLMG is seeking comments on the following management options for CRA 4 and CRA 5.
27. Under **Option A**, it is proposed the Minister would use the new CRA 4 Management Procedure to guide statutory TAC setting for CRA 4 from the 2012-13 fishing year until the 2017-18 fishing year. During 2016, the management procedure would be reviewed. The specifications of the CRA 4 Management Procedure are described in detail in Attachment 2.
28. Under **Option B**, periodic stock assessments (which are relatively infrequent because of resource constraints) would guide TAC setting for CRA 4. Seasonal CPUE information would be used to monitor stock abundance between stock assessments. A stock assessment was conducted for CRA 4 in 2011 and could be used to inform TAC setting in this fishery if Option A is not suitable.
29. Under **Option C**, it is proposed the Minister would use the new CRA 5 Management Procedure to guide statutory TAC setting for CRA 5 from the 2012-13 fishing year until the 2016-17 fishing year. During 2015, the management procedure would be reviewed. The specifications of the CRA 5 Management Procedure are described in detail in Attachment 3.
30. Under **Option D**, periodic stock assessments would continue to guide TAC setting for CRA 5. Seasonal CPUE information would be used to monitor stock abundance between stock assessments. A stock assessment was conducted for CRA 5 in 2010 and could be used to inform TAC setting in this fishery if Option C is not suitable.

Analysis of Management Options for CRA 4 and CRA 5

31. An analysis of the approaches proposed for the Minister to use to guide TAC setting in CRA 4 and CRA 5 is set out below.

Option A – Agree to use the recommended new CRA 4 Management Procedure to guide TAC setting in CRA 4

AND

Option C – Agree to use the recommended new CRA 5 Management Procedure to guide TAC setting in CRA 5

Sustainability

32. Use of the new CRA 4 Management Procedure (Option A) or the new CRA 5 Management Procedure (Option C) to guide TAC setting in these fisheries is unlikely to pose any risk to stock sustainability. This is because ongoing application of the CRA 4 or CRA 5 Management Procedures is expected to:
 - a) Maintain the CRA 4 and CRA 5 stocks above *Bmsy*, *Bref* and *Bmin* with greater than 99% probability
 - b) For CRA 4, maintain mean biomass at about 1.5 times *Bref* and 2.0 times *Bmsy* (*Bref* is larger than *Bmsy* in CRA 4)
 - c) For CRA 5, maintain mean biomass at about 2.3 times *Bref* (a comparative *Bmsy* figure was not calculated for CRA 5)
 - d) Maintain spawning stock biomass in CRA 4 and CRA 5 well above 20% of its unfished level, which is consistent with the Ministry's Harvest Strategy Standard (HSS).
33. The NRLMG is confident that use of the CRA 4 and CRA 5 Management Procedures will ensure the Minister sets a TAC that has a high probability of maintaining CRA 4 and CRA 5 stock levels at or above *Bref*.
34. The use of the CRA 4 and CRA 5 Management Procedures is also safe from the standpoint of stock sustainability because the management procedures:
 - a) Were chosen from a set of management procedures that were evaluated for performance against sustainability criteria
 - b) Have been tested using a model of each fishery based on a stock assessment model. The CRA 4 and CRA 5 stock assessment models have been accepted by the Ministry's Fisheries Assessment Plenary
 - c) Have been tested for robustness to uncertainties in model assumptions of specific parameters. One of the robustness trials carried out for both stocks was if model assumptions of recruitment (ie, new lobsters entering the model) were altered how this would change the performance of the management procedures. Both procedures were robust to uncertainties in recruitment (along with other specific trials) and desired performance against the sustainability indicators was maintained
 - d) Are responsive to changes in abundance in the stock, which helps to improve overall sustainability outcomes for a stock.

Utilisation

35. Simulation-testing of the CRA 4 and CRA 5 Management Procedures suggests they will maintain the current utilisation benefits of each fishery for all sectors over the medium- to long-terms.

This is because ongoing application of the CRA 4 or CRA 5 Management Procedures is expected to maintain the CRA 4 and CRA 5 stocks well above *Bref* with high probability.

36. Operation of the recommended new CRA 4 and CRA 5 Management Procedures for the 2012-13 fishing year results in no change to the CRA 4 or CRA 5 TAC. Refer to Paper 2 – “*Proposed TACs and allowances for CRA 3, CRA 4, CRA 5 and CRA 7* - for details on the proposed allocation of the TAC for CRA 4 and CRA 5.

Initial Stakeholder Acceptance and Support

37. The recommended new CRA 4 Management Procedure has a high degree of acceptance and support among CRA 4 customary and recreational fishery representatives and the CRA 4 rock lobster fisheries commercial stakeholder organisation (CRAMAC 4) because they were involved in its’ initial development. A multi-stakeholder meeting in September 2011 indicated customary, recreational and commercial CRA 4 fishery representatives wanted “high abundance”, “high catch rates” and a stable fishery. The development of the new CRA 4 Management Procedure was guided by the outcomes of this multi-stakeholder meeting and the productivity of the stock.
38. The CRA 5 Management Procedure has a very high degree of acceptance and support among CRAMAC 5, partly because the procedure incorporates key elements of the voluntary ACE shelving rule that they have used since 2009 (ie, includes a rebuilding slope, a plateau where the TACC stays the same between a range of CPUEs, and below a CPUE of 0.3 kg/potlift the TACC is zero). The Management Procedure is supported by the NRLMG’s recreational and customary members.

Option B – Use periodic stock assessments to guide TAC setting in CRA 4

AND

Option D – Continue to use periodic stock assessments to guide TAC setting in CRA 5 (the status quo)

39. Under Options B and D, periodic stock assessments would guide TAC setting for CRA 4 and CRA 5. Compared with Options A and C (use recommended new management procedures) using periodic stock assessments to guide TAC setting for CRA 4 and CRA 5:
 - a) Is less responsive to observed changes in stock abundance in the fishery
 - b) Provides lesser certainty of achieving desired sustainability and utilisation outcomes
 - c) May result in less cost efficient management of the fishery.

Initial Position for CRA 4 and CRA 5

40. For CRA 4, based on best available information and the analysis set out above, the NRLMG’s preferred option is **Option A**: agree to use the recommended new CRA 4 Management Procedure to guide TAC setting in CRA 4 from the 2012-13 fishing year, beginning 1 April 2012.
41. For CRA 5, based on best available information and the analysis set out above, the NRLMG’s preferred option is **Option C**: agree to use the recommended new CRA 5 management procedure to guide TAC setting in CRA 5 from the 2012-13 fishing year, beginning 1 April 2012.

INITIAL ADVICE PAPER 2:

PROPOSED TACs AND ALLOWANCES FOR CRA 3, CRA 4, CRA 5 & CRA 7

SUMMARY

42. The National Rock Lobster Management Group (NRLMG) proposes that the Total Allowable Catch (TAC) and allowances for CRA 3 (Gisborne) and CRA 7 (Otago) rock lobster fisheries are varied for the 2012-13 fishing year, beginning 1 April 2012. Although a new TAC setting approach is proposed for CRA 4 (Wellington/Hawkes Bay) and CRA 5 (Marlborough/Canterbury) rock lobster fisheries this year, it is proposed that the current CRA 4 and CRA 5 TAC and allowances be retained.
43. The TAC and allowance options are based on the operation of a previously used management procedure for CRA 3, and new management procedures for CRA 4, CRA 5 and CRA 7 (the Minister agreed to use the new CRA 7 Management Procedure to guide TAC setting for the 2012-13 fishing year in March 2011). The options for CRA 3, CRA 4, CRA 5 and CRA 7 are outlined in Table 2 below.

Stock	Option	TAC	TACC	Customary Allowance	Recreational Allowance	Other mortality
CRA 3	Option 1: Be guided by the CRA 3 Management Procedure and increase the TAC and TACC	322.3 tonnes	193.3 tonnes	20 tonnes	20 tonnes	89 tonnes
	Option 2: Retain the current CRA 3 TAC and allowances	293 tonnes	164 tonnes	20 tonnes	20 tonnes	89 tonnes
CRA 4	Option 3: Be guided by the recommended <u>new</u> CRA 4 Management Procedure and retain the current TAC and allowances	661.9 tonnes	466.9 Tonnes	35 tonnes	85 tonnes	75 tonnes
	Option 4: Retain the current CRA 4 TAC and allowances	661.9 tonnes	466.9 tonnes	35 tonnes	85 tonnes	75 tonnes
CRA 5	Option 5: Be guided by the recommended <u>new</u> CRA 5 Management Procedure and retain the current TAC and allowances	467 tonnes	350 tonnes	40 tonnes	40 tonnes	37 tonnes
	Option 6: Retain the current CRA 5 TAC and allowances	467 tonnes	350 tonnes	40 tonnes	40 tonnes	37 tonnes
CRA 7	Option 7: Be guided by the CRA 7 Management Procedure, and decrease the TAC and TACC	83.9 tonnes	63.9 tonnes	10 tonnes	5 tonnes	5 tonnes
	Option 8: Retain the current CRA 7 TAC and allowances	95.7 tonnes	75.7 tonnes	10 tonnes	5 tonnes	5 tonnes

Table 2: Proposed CRA 3, CRA 4, CRA 5 and CRA 7 TAC and allowance options

CRA 3 (Gisborne)

44. The proposed variation to the CRA 3 TAC (Option 1) is the result of the operation of the CRA 3 Management Procedure that the Minister agreed to use in March 2010 to guide TAC setting for this stock until the 2015-16 fishing year.
45. Implementing the CRA 3 Management Procedure would result in a TAC increase of 29.3 tonnes. It is proposed that the TAC will be varied by increasing the TACC only because in the past the commercial sector has received significant reductions in their catch, while allowances to other sectors remained constant (however, there is uncertainty in the levels of actual non-commercial removals and whether these removals are above or below the allowance allocated for non-commercial interests). Customary and commercial members of the NRLMG support Option 1 because they consider the use of the CRA 3 Management Procedure for TAC setting is robust from the standpoint of stock sustainability.
46. Option 2 proposes to retain the current CRA 3 TAC of 293 tonnes for the 2012-13 fishing year. Recreational members of the NRLMG support Option 2 because they consider that it is too soon to increase the TAC and would prefer for the fishery to rebuild to higher abundance levels first.

CRA 4 (Wellington/Hawkes Bay)

47. The proposed retention of the current CRA 4 TAC (Option 3) is the result of the operation of the recommended new CRA 4 Management Procedure presented for consideration in Initial Advice Paper 1. Although implementing the new CRA 4 Management Procedure would result in a TAC increase of 0.1 tonnes for the 2012-13 fishing year, the NRLMG proposes that no change is made to the CRA 4 TAC given the minor increase. The NRLMG has reviewed best available information and has identified no reason why the Minister should not use the results of the proposed CRA 4 Management Procedure to guide statutory TAC setting decisions. No change is proposed to the CRA 4 TACC or non-commercial allowances.

CRA 5 (Marlborough/Canterbury)

48. The proposed retention of the current CRA 5 TAC (Option 5) is the result of the operation of the recommended new CRA 5 Management Procedure presented for consideration in Initial Advice Paper 1. The NRLMG has reviewed best available information and has identified no reason why the Minister should not use the results of the proposed CRA 5 Management Procedure to guide statutory TAC setting decisions. No change is proposed to the CRA 5 TACC or non-commercial allowances.

CRA 7 (Otago)

49. The proposed variation to the CRA 7 TAC (Option 7) is the result of the operation of the CRA 7 Management Procedure that the Minister agreed to use in March 2011 to guide TAC setting for this stock until the 2012-13 fishing year (this is the procedures last year of operation before a scheduled review next year). The NRLMG has reviewed best available information and has identified no reason why the Minister should not use the results of the CRA 7 Management Procedure to guide statutory TAC setting decisions.
50. Implementing the CRA 7 Management Procedure would result in a TAC decrease of 11.8 tonnes. It is proposed that the TAC will be varied by decreasing the TACC only because in the past the industry has received both increases and decreases in commercial catch, while allowances to other sectors have remained constant. The NRLMG considers reducing only the TACC provides

the greatest certainty that stock size will increase because catch from the commercial sector can be more directly controlled.

REASON FOR REVIEWING ROCK LOBSTER TACS AND ALLOWANCES

51. Management procedures are currently in place for CRA 3, CRA 4, CRA 7 and CRA 8 rock lobster fisheries. A voluntary management procedure is currently used by the CRA 5 industry. Operation of the existing CRA 8 Management Procedure in 2011 resulted in no proposed change to the CRA 8 TAC or the allowances for the 2012-13 fishing year. The CRA 8 fishery is therefore not discussed further in this paper.
52. In 2011, new CRA 4 and CRA 5 Management Procedures were evaluated. These management procedures are designed to move stock biomass to, or maintain the biomass of each stock at, a size at or above *Bmsy* (or *Bref* (proxy for *Bmsy*)) as required under section 13 of the Act with a high degree of probability.
53. The Minister may choose any alternative TAC based on his assessment of best available information. In general, the NRLMG considers that there is considerable benefit in consistent implementation of TACs generated by agreed management procedures. Such an approach provides certainty to stakeholders over management actions, reduces conflict over management decision-making and meets legislative obligations.

REVIEW OF THE CRA 3 (GISBORNE) ROCK LOBSTER FISHERY

CRA 3 Management Options

54. The NRLMG is seeking comments on two management options for setting TACs and allowances for CRA 3 (Table 3).

Option	TAC	TACC	Customary Allowance	Recreational Allowance	Other mortality
Option 1: Be guided by the CRA 3 Management Procedure and increase the TAC and TACC	322.3 tonnes	193.3 tonnes	20 tonnes	20 tonnes	89 tonnes
Option 2: Retain the current CRA 3 TAC and allowances	293 tonnes	164 tonnes	20 tonnes	20 tonnes	89 tonnes

Table 3: Proposed CRA 3 TAC and allowance options

CRA 3 Stock Status

55. The 2008 CRA 3 stock assessment results indicated that stock size in 2008 was just above *Bmin* and well below *Bref*². Under 2008 catches and recent recruitments, the assessment predicted a 75% probability that stock size would decline over the four years up to 2012. On the basis of the 2008 assessment the Minister reduced the CRA 3 TAC from 319 tonnes to 293 tonnes from 1 April 2009.

² *Bref* is the pre-season autumn-winter vulnerable biomass associated with the period 1974-79. 1974-79 was a period when the stock showed good productivity and was demonstrably safe, having gone below this level and then recovered.

56. The Minister then agreed to use the CRA 3 Management Procedure to guide TAC setting for CRA 3 from 1 April 2010. When the CRA 3 Management Procedure was evaluated in 2009, the Rock Lobster Fisheries Assessment Working Group (RLFAWG) agreed to evaluate the rule against a target of 90% of *Bref*. This decision was made to address a potential that a 'regime shift' may have resulted in lower productivity and that reference points based on historically higher productivity are inappropriate if recruitment were to continue at recent low levels. Evaluation of the management procedure indicated the median rebuild year to the desired target stock level was 2016; a CPUE equivalent of 1.14 kg/potlift in the autumn-winter season. In 2011, CRA 3 autumn-winter standardised CPUE was 1.61 kg/potlift.
57. Standardised CPUE is considered to be a reliable indicator of relative stock size in CRA 3 and is the abundance indicator used in the CRA 3 Management Procedure. The history of offset year (ie, October through September) commercial CPUE in CRA 3 is shown in Figure 1. CPUE has increased each year since 2004, with a 59% increase in 2011.

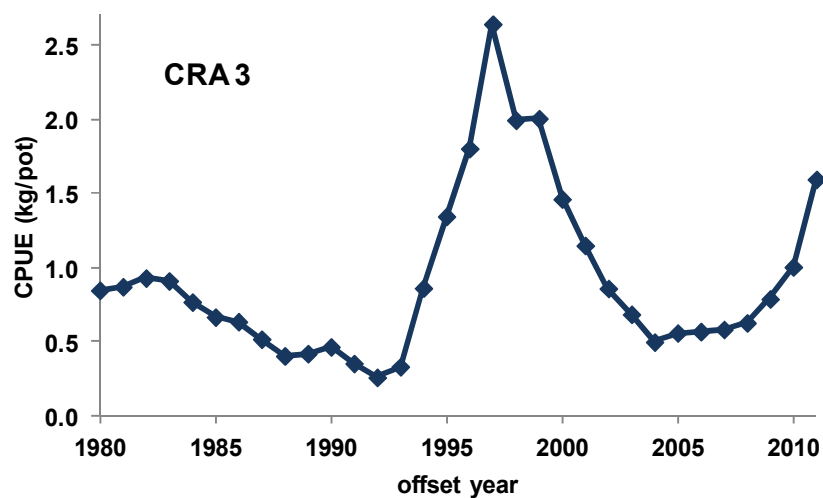


Figure 1: The history of offset year CPUE in CRA 3

Analysis of Management Options for CRA 3

Option 1 – Be guided by the CRA 3 Management Procedure and increase the TAC and TACC

Sustainability

58. Under Option 1, the CRA 3 TAC would be set at 322.3 tonnes. The proposed increase in TAC is specified by the CRA 3 Management Procedure that the Minister agreed to use in March 2010 to guide TAC setting in the fishery until the 2015-16 fishing year. For further technical details on the CRA 3 Management Procedure refer to Attachment 1.
59. The proposed increase in TAC would not pose a risk to sustainability. The proposed TAC variation guided by the operation of the CRA 3 Management Procedure is “not inconsistent” with the objective of moving the stock to a level at or above *Bmsy* (or the accepted proxy, 90% of *Bref*) in a way and rate considered appropriate for the stock. This is because ongoing application of the CRA 3 Management Procedure is expected to meet Harvest Strategy Standard (HSS) requirements by moving the stock towards the target, 90% of *Bref*, and maintaining the stock above *Bmin* with greater than 90% probability. The proposed 29.3 tonne increase in TAC/TACC for CRA 3 is unlikely to have an impact on the stock rebuilding goals because the increase is guided by the CRA 3 Management Procedure.

Utilisation

60. Under Option 1 it is proposed that the TAC will be varied by increasing the TACC only. This change is likely to increase the current utilisation benefit for the commercial sector and is considered appropriate by customary and commercial members of the NRLMG because in the past the industry has received significant reductions in their catch while allowances to other sectors have remained constant. Based on 2010-11 average landed beach price information, the proposed 29.3 tonne increase has the potential to generate over \$1.64 million in additional earnings for the commercial sector.
61. The NRLMG recognises that rock lobsters are taonga to Maori and are highly sought after by recreational fishers, with significant non-commercial cultural and social value. Utilisation benefits for customary Maori and recreational interests are also likely to improve under this option because best available information suggests CRA 3 stock size is increasing (as expected under application of the CRA 3 Management Procedure). Experience has shown as stock size increases non-commercial fishing success generally improves.
62. In compiling this advice the NRLMG have considered the difference in assumptions of non-commercial catch that were used in the model to evaluate the CRA 3 Management Procedure and the current allowances (refer Table 4 below). The sum of the current non-commercial allowances is slightly less than the sum of the model assumptions of non-commercial catch.

CRA 3	Customary	Recreational	Other mortality	Total
Current allowances	20 tonnes	20 tonnes	89 tonnes	129 tonnes
Model assumptions of non-commercial catch (as used in management procedure evaluations)	20 tonnes (constant)	Assumed to vary with changes in biomass. 20 year projections estimate a mean catch of 25.3 tonnes.	89.5 tonnes (constant)	134.8 tonnes

Table 4: Current CRA 3 allowances and model assumptions of non-commercial catches.

63. The NRLMG proposes that the allowances set for customary Maori, recreational interests and other sources of fishing-related mortality (eg, illegal fishing) will not change at this time for the following reasons:
- There is no up-to-date or reliable information for recreational catch or levels of other sources of fishing-related mortality. There is incomplete information available on customary catch.
 - Best available information suggests existing CRA 3 customary Maori catch is within the allowance allocated for this interest at this time. Although incomplete, reported customary catches under the Fisheries (Kaimoana) Regulations 1998 and regulation 27A of the Fisheries (Amateur Fishing) Regulations 1986, from 2000 to 2008, suggest the maximum catch in any fishing year was roughly 10 tonnes.
 - Model assumptions of recreational catch suggest the existing recreational allowance could be smaller than current removals. However, there is considerable uncertainty around this estimate of recreational catch because it is based on uncertain information; it is unknown if actual recreational catch is currently above or below the 20 tonne allowance allocated for recreational interests. A change to the recreational allowance

may be considered when new quantitative recreational catch information becomes available (eg, information from the large-scale multi-species recreational harvest survey from 2013 and from amateur charter boating reporting for rock lobster within CRA 3 from October 2012).

- d) In determining an appropriate estimate for other mortality (eg, illegal fishing), the RLFAWG used available Ministry estimates for illegal catches from 1990 to 2003. There is little confidence in the estimates of illegal catch because the estimates cannot be verified.

Option 2 – Retain the current TAC and allowances

- 64. Under Option 2, the current CRA 3 TAC of 293 tonnes would be retained for the 2012-13 fishing year. Retaining the current TAC for CRA 3 would likely result in a larger stock size than would occur under Option 1.
- 65. This option would constrain utilisation in the commercial fishery and result in an opportunity cost of over \$1.64 million. However, retaining the current TAC would likely result in increased short-term abundance and therefore increased CPUE for commercial fishers, as well as increased catch rates in the non-commercial fisheries compared to Option 1. This could result in improved fishing opportunities for all sectors.

CRA 3 Initial Position

- 66. There is no agreement within the NRLMG on a preferred TAC option for CRA 3.
- 67. Customary and commercial NRLMG members support **Option 1**: be guided by the CRA 3 Management Procedure and increase the TAC and TACC. These members support this option because they consider the use of the CRA 3 Management Procedure is robust from the standpoint of stock sustainability.
- 68. Recreational NRLMG members support **Option 2**: retain the current CRA 3 TAC and allowances. These members support this option because they: consider that it is too soon to increase the TAC; would prefer the fishery to rebuild to higher abundance levels first; and consider that their issues in regard to the CRA 3 Concession Area Regulations should be resolved before a TAC increase.

REVIEW OF THE CRA 4 (WELLINGTON/HAWKES BAY) ROCK LOBSTER FISHERY

CRA 4 Management Options

69. The NRLMG is seeking comments on two management options for setting TACs and allowances for CRA 4 (Table 5).

Option	TAC	TACC	Customary Allowance	Recreational Allowance	Other mortality
Option 3: Be guided by the recommended <u>new</u> CRA 4 Management Procedure and retain the current TAC and allowances	661.9 tonnes	466.9 tonnes	35 tonnes	85 tonnes	75 tonnes
Option 4: Retain the current CRA 4 TAC and allowances	661.9 tonnes	466.9 tonnes	35 tonnes	85 tonnes	75 tonnes

Table 5: Proposed CRA 4 TAC and allowance options

CRA 4 Stock Status

70. The 2011 CRA 4 stock assessment results indicate that the current stock is about twice *Bmin*, more than twice *Bmsy* and 1.6 times *Bref*³ (*Bref* is larger than *Bmsy*). Under 2010 catches and recent recruitments, the assessment predicted with high certainty that stock size will decline by about 13% over the four years up to 2015, but will still remain well above *Bref*.
71. Standardised CPUE is considered to be a reliable indicator of relative stock size in CRA 4 and is the abundance indicator used in the CRA 4 Management Procedure. The history of offset year (ie, October through September) commercial CPUE in CRA 4 is shown in Figure 2. CPUE has increased each year since 2008.

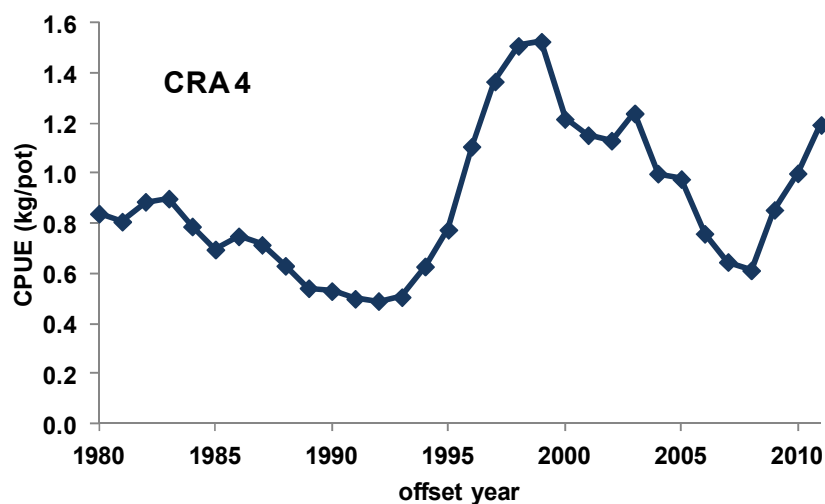


Figure 2: The history of offset year CPUE in CRA 4.

³ *Bref* is the pre-season autumn-winter vulnerable biomass associated with the period 1979-88. 1979-88 was a period when the stock showed good productivity and was demonstrably safe, it subsequently declined to lower levels then recovered.

Analysis of Management Options for CRA 4

72. Although both options (Options 3 and 4) propose exactly the same TAC and allowances, the approach to specifying them is different (ie, a management procedure approach versus periodic stock assessments).

Option 3 – Be guided by the recommended new CRA 4 Management Procedure and retain the current TAC and allowances

Sustainability

73. Under Option 3, the current CRA 4 TAC of 661.9 tonnes would be retained for the 2012-13 fishing year. The proposed TAC is specified by the recommended new CRA 4 Management Procedure (refer Paper 1). Although implementing the new CRA 4 Management Procedure would result in a TAC increase of 0.1 tonnes for the 2012-13 fishing year, the NRLMG proposes that no change is made to the CRA 4 TAC given the minor increase. For further technical details on the CRA 4 Management Procedure refer to Attachment 2.
74. The operation of the new CRA 4 Management Procedure enables the stock to be maintained at a level at or above *Bref*. Ongoing application of the CRA 4 Management Procedure is expected to meet HSS requirements and maintain the stock above *Bref* with greater than 50% probability and above *Bmin* with greater than 90% probability.

Utilisation

75. Option 3 does not change the current utilisation value of the fishery because no change is proposed to the current TACC or constraints on non-commercial fishing (eg, a recreational bag limit change). Ongoing application of the CRA 4 Management Procedure is designed to maintain stock size well above *Bref* and consequently provide for customary Maori, recreational and commercial utilisation benefits over time.
76. In compiling this advice the NRLMG have considered the difference in assumptions of non-commercial catch that were used in the model to evaluate the CRA 4 Management Procedure and the current allowances (refer Table 6 below). The sum of the current non-commercial allowances is larger than the sum of the model assumptions of non-commercial catch.

CRA 4	Customary	Recreational	Other mortality	Total
Current allowances	35 tonnes	85 tonnes	75 tonnes	195 tonnes
Model assumptions of non-commercial catch (as used in management procedure evaluations)	20 tonnes (constant)	Assumed to vary with changes in biomass. 20 year projections estimate a mean catch of 44.3 tonnes.	40 tonnes (constant)	104.3 tonnes

Table 6: Current CRA 4 allowances and model assumptions of non-commercial catches.

77. The NRLMG proposes that the allowances set for customary Maori, recreational interests and other sources of fishing-related mortality (eg, illegal fishing) will not change at this time for the following reasons:

- a) There is no up-to-date or reliable information for recreational catch or levels of other sources of fishing-related mortality. There is incomplete information available on customary catch.
- b) Best available information suggests existing CRA 4 customary Maori catch is within the allowance allocated for this interest at this time. Although incomplete, reported customary catches under the Fisheries (Kaimoana) Regulations 1998 and regulation 27A of the Fisheries (Amateur Fishing) Regulations 1986, from 2000 to 2008, suggest the maximum annual catch was roughly 6 tonnes.
- c) Model assumptions of recreational catch suggest current recreational removals are within the allowance allocated for this interest at this time. However, there is considerable uncertainty around this estimate because information used to determine the model assumption of recreational catch is based on uncertain historical recreational harvest surveys from 1994 and 1996; it is unknown if actual recreational catch is currently above or below the 85 tonne allowance allocated for recreational interests. A change to the recreational allowance may be considered when new quantitative recreational catch information becomes available (eg, information from the large-scale multi-species recreational harvest survey from 2013 and from amateur charter boating reporting for rock lobster within CRA 4 from October 2012).
- d) In determining an appropriate estimate for other mortality (eg, illegal fishing), the RLFAWG used available Ministry estimates for illegal catches from 1990 to 2004. There is little confidence in the estimates of illegal catch because the estimates cannot be verified.

Option 4 – Retain the current CRA 4 TAC and allowances

- 78. Under Option 4, the current CRA 4 TAC and allowances would be retained for the 2012-13 fishing year. This option has no short-term impacts on stock sustainability or current sector utilisation benefits.

CRA 4 Initial Position

- 79. Based on best available information and the analysis set out above, the NRLMG's preferred option is **Option 3**: be guided by the recommended new CRA 4 Management Procedure and retain the current TAC and allowances.
- 80. The NRLMG has identified no reason why the Minister should not use the results of the recommended new CRA 4 Management Procedure to guide statutory TAC setting decisions.

REVIEW OF THE CRA 5 (CANTERBURY/MARLBOROUGH) ROCK LOBSTER FISHERY

CRA 5 Management Options

81. The NRLMG is seeking comments on two management options for settings TACs and allowances for CRA 5 (Table 7).

Option	TAC	TACC	Customary Allowance	Recreational Allowance	Other mortality
Option 5: Be guided by the recommended <u>new</u> CRA 5 Management Procedure and retain the current TAC and allowances	467 tonnes	350 tonnes	40 tonnes	40 tonnes	37 tonnes
Option 6: Retain the current CRA 5 TAC and allowances	467 tonnes	350 tonnes	40 tonnes	40 tonnes	37 tonnes

Table 7: Proposed CRA 5 TAC and allowance options

CRA 5 Stock Status

82. The 2010 CRA 5 stock assessment results indicated that stock size in 2010 was well above *Bmin*, *Bref*⁴ and *Bmsy* by factors of 2 to 5 (*Bref* is larger than *Bmsy*). Under 2009 catches and recent recruitments, the assessment predicted stock size to decline over the four years up to 2014 but will still remain well above *Bref*.
83. Standardised CPUE is considered to be a reliable indicator of relative stock size in CRA 5 and is the abundance indicator used in the recommended new CRA 5 Management Procedure. The history of offset year (ie, October through September) commercial CPUE in CRA 5 is shown in Figure 3. CPUE dropped by 10% in 2010 from 2009, the highest level observed in the 32 year series after a short period of decline in the mid-2000s.

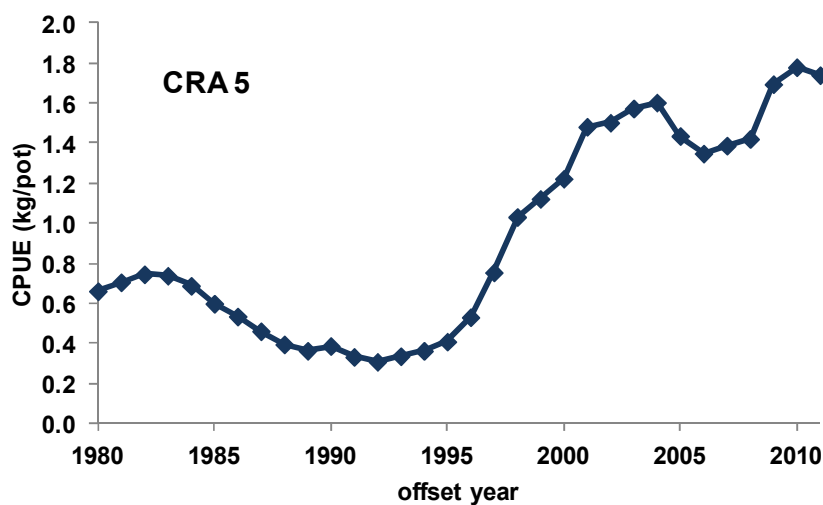


Figure 3: The history of offset year CPUE in CRA 5

⁴ *Bref* is the pre-season autumn-winter vulnerable biomass associated with the period 1979-88. 1979-88 was a period when the stock was relatively stable and the stock showed good productivity.

Analysis of Management Options for CRA 5

84. Although both options (Options 5 and 6) propose exactly the same TAC and allowances, the approach to specifying them is different (ie, a management procedure approach versus the *status quo*).

Option 5 – Be guided by the recommended new CRA 5 Management Procedure and the retain the current TAC and allowances

Sustainability

85. Under Option 5, the current CRA 5 TAC of 467 tonnes would be retained for the 2012-13 fishing year. The proposed TAC is by the recommended new CRA 5 Management Procedure (refer Paper 1). For further technical details on the CRA 5 Management Procedure refer to Attachment 3.
86. The operation of the new CRA 5 Management Procedure enables the stock to be maintained at a level at or above *Bref*. Ongoing application of the CRA 5 Management Procedure is expected to meet HSS requirements and maintain the stock above *Bref* with greater than 50% probability and above *Bmin* with greater than 90% probability.

Utilisation

87. Option 5 does not change the current utilisation value of the fishery because no change is proposed to the current TACC or constraints on non-commercial fishing (eg, a recreational bag limit change). Ongoing application of the CRA 5 Management Procedure is designed to maintain stock size well above *Bref* and consequently provide for customary Maori, recreational and commercial utilisation benefits over time.
88. In compiling this advice the NRLMG have considered the difference in assumptions of non-commercial catch that were used in the model to evaluate the CRA 5 Management Procedure and the current allowances (refer Table 8 below). The sum of the current non-commercial allowances is less than the sum of the model assumptions of non-commercial catch.

CRA 5	Customary	Recreational	Other mortality	Total
Current allowances	40 tonnes	40 tonnes	37 tonnes	117 tonnes
Model assumptions of non-commercial catch (as used in management procedure evaluations)	10 tonnes (constant)	Assumed to vary with changes in biomass. 20 year projections estimate a median catch of 107 tonnes.	52 tonnes (constant)	169 tonnes

Table 8: Current CRA 5 allowances and model assumptions of non-commercial catches.

89. The NRLMG proposes that the allowances set for customary Maori, recreational interests and other sources of fishing-related mortality (eg, illegal fishing) will not change at this time for the following reasons:
- There is no up-to-date or reliable information for recreational catch or levels of other sources of fishing-related mortality. There is incomplete information available on customary catch.

- b) Best available information suggests existing CRA 5 customary Maori catch is within the allowance allocated for this interest at this time. From 2007, reported customary catches under the South Island Customary Regulations 1999 and regulation 27A of the Fisheries (Amateur Fishing) Regulations 1986 suggest in any fishing year, customary catch was about 1 tonnes. This figure is considered incomplete and likely to be an underestimate because iwi at the top of the South Island are not required to report their catches to the Ministry. Due to the incomplete nature of the information, the RLFAWG agreed to use an estimate of 10 tonnes to represent customary catch in the model used to evaluate the performance of the management procedure.
 - c) Model assumptions of recreational catch suggest the existing recreational allowance is smaller than current removals. However, there is considerable uncertainty around estimate because information used to determine the model assumption of recreational catch is based on uncertain historical recreational harvest surveys from 1994 and 1996. Also, the model assumption does not include any ceiling on recreational catch that may be expected based on the size of the local (or holiday) population that fishes for rock lobster in any year.
 - d) Historical estimates of other mortality (eg, illegal fishing) suggest the existing allowance may be being exceeded. In determining an appropriate estimate for other mortality, the RLFAWG used available Ministry estimates for illegal catches from 1990 to 2003. There is little confidence in the estimates of illegal catch because the estimates cannot be verified.
90. For the recreational allowance in particular, the NRLMG proposes to consider a change to this allowance when new quantitative recreational catch information becomes available (eg, information from the large-scale multi-species recreational harvest survey from 2013 and from amateur charter boating reporting for rock lobster within CRA 5 from October 2012).
91. While there is no reliable information on actual recreational harvest to determine whether current catches are beyond the allowance of 40 tonnes, the bag limit ultimately constrains recreational harvest. Commercial members of the NRLMG note if abundance in the CRA 5 fishery declines in the future, consideration needs to be given to a recreational bag limit reduction. However, recreational members of the NRLMG suggest it would be more difficult to fulfil their daily bag limit of six rock lobsters if abundance declines substantially (ie, constraints on recreational fishing success are self-regulated by abundance).

Option 6 – Retain the current CRA 5 TAC and allowances (the status quo)

92. Under Option 6, the current CRA 5 TAC of 467 tonnes would be retained for the 2012-13 fishing year. This option has no short-term impacts on stock sustainability or sector utilisation benefits.

CRA 5 Initial Position

93. Based on best available information and the analysis set out above, the NRLMG's preferred option is **Option 5**: be guided by the recommended new CRA 5 Management Procedure and retain the current TAC and allowances.
94. The NRLMG has identified no reason why the Minister should not use the results of the CRA 5 Management Procedure to guide statutory TAC setting decisions.

REVIEW OF THE CRA 7 (OTAGO) ROCK LOBSTER FISHERY

Summary of CRA 7 Management Options

95. The NRLMG is seeking comments on two management options for setting TACs and allowances for CRA 7 (Table 9).

Option	TAC	TACC	Customary Allowance	Recreational Allowance	Other mortality
Option 7: Be guided by the CRA 7 Management Procedure and decrease the TAC and TACC	83.9 tonnes	63.9 tonnes	10 tonnes	5 tonnes	5 tonnes
Option 8: Retain the current CRA 5 TAC and allowances	95.7 tonnes	75.7 tonnes	10 tonnes	5 tonnes	5 tonnes

Table 9: Proposed CRA 7 TAC and allowance options

CRA 7 Stock Status

96. The 2006 CRA 5 stock assessment results indicated stock size in 2006 was well above B_{min}^5 and was approximately 1.7 times the B_{msy} proxy, B_{ref}^6 .
97. Standardised commercial CPUE is considered to be a reliable indicator of relative stock size in CRA 7 and is the abundance indicator used in the CRA 7 Management Procedure. The history of offset year (ie, October through September) commercial CPUE in CRA 7 is shown in Figure 4. Except for one year, CPUE increased continuously and strongly between 1998 and 2008; it declined by 56% in 2009, recovered slightly and declined by 31% in 2011.

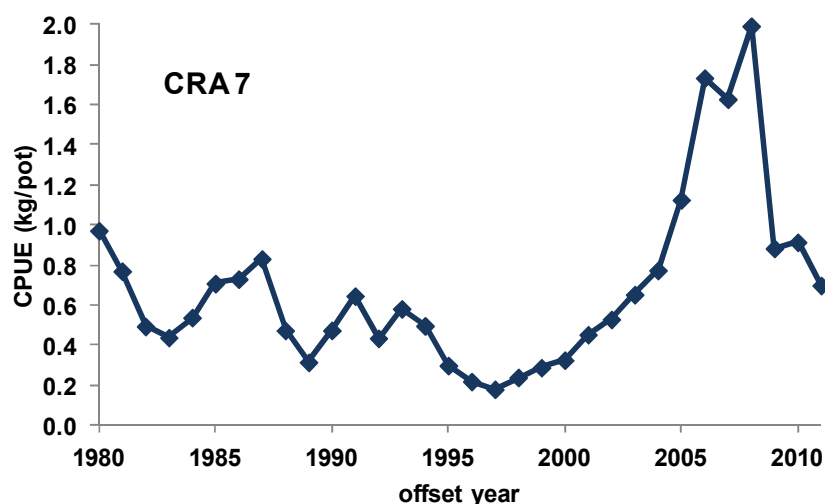


Figure 4: The history of offset year CPUE in CRA 7

⁵ B_{min} for CRA 7 is considered to be one half B_{ref} .

⁶ B_{ref} is the pre-season autumn-winter vulnerable biomass associated with the period 1979-81. 1979-81 was a period when the stock showed good productivity and was demonstrably safe.

Analysis of Management Options for CRA 7

Option 7 – Be guided by the CRA 7 Management Procedure and decrease the TAC and TACC

Sustainability

98. Under Option 7, the CRA 7 TAC would be set at 83.9 tonnes. The proposed decrease in TAC is specified by the CRA 7 Management Procedure that the Minister agreed to use in March 2011 to guide TAC setting in the fishery until the 2012-13 fishing year (this is the procedures last year of operation before a scheduled review next year). For further technical details on the CRA 7 Management Procedure refer to Attachment 4.
99. The proposed TAC variation, guided by the operation of the CRA 7 Management Procedure is “not inconsistent” with the objective of maintaining the stock at or above, or moving the stock to a level at or above *Bref* in a way and rate considered appropriate for the stock. This is because ongoing application of the CRA 7 Management Procedure is expected to meet HSS requirements, and maintain the stock above the agreed proxy, *Bref*, with higher than 50% probability and above *Bmin* with greater than 90% probability.

Utilisation

100. Under Option 7 it is proposed that the TAC will be varied by decreasing the TACC only. The NRLMG considers there is greater certainty of benefit to the stock associated with a reduction to the TACC, particularly because catch from the commercial sector can be more directly controlled. The NRLMG also considers the TACC reduction appropriate because in the past the industry has received both increases and decreases in commercial catch, while allowances to other sectors have remained constant.
101. The reduction in TACC is likely to decrease the current utilisation benefits for the commercial sector. Based on 2010-11 average landed beach price information, the proposed 11.8 tonne TACC decrease has the potential to reduce the earnings of the commercial sector by approximately \$660,800.
102. In compiling this advice the NRLMG have considered the difference in assumptions of non-commercial catch that were used in the model to evaluate the CRA 7 Management Procedure and the current allowances (refer Table 10 below). The sum of the current non-commercial allowances is larger than the sum of the model assumptions of non-commercial catch.

CRA 7	Customary	Recreational	Other mortality	Total
Current allowances	10 tonnes	5 tonnes	5 tonnes	20 tonnes
Model assumptions of non-commercial catch (as used in management procedure evaluations)	1 tonne (constant)	4.51 tonnes (constant)	1 tonne (constant)	6.51 tonnes

Table 10: Current CRA 7 allowances and model assumptions of non-commercial catches.

103. The NRLMG proposes that the allowances set for customary Maori, recreational interests and other sources of fishing-related mortality (eg, illegal fishing) will not change at this time for the following reasons:

- a) There is no up-to-date or reliable information for recreational catch or levels of other sources of fishing-related mortality.
 - b) Existing customary Maori and recreational allowances form a small component of the TAC (10 tonnes and 5 tonnes respectively). Best available information suggests these interests are within the allowance allocated for them at this time.
 - c) In determining an appropriate estimate for other mortality (eg, illegal fishing), the RLFAWG used available Ministry estimates for illegal catches from 1990 to 2002. There is little confidence in the estimates of illegal catch because the estimates cannot be verified.
104. Ongoing application of the CRA 7 Management Procedure, however, is likely to improve fishing opportunities for all sectors by increasing the stock from its current size. This is because the CRA 7 Management Procedure is designed to maintain stock size well above the reference level, *Bref* (ie, if commercial CPUE decreases the Management Procedure recommends a TAC decrease).

CRA 7 Initial Position

105. Based on best available information and the analysis set out above, the NRLMG's preferred option is **Option 7**: be guided by the CRA 7 Management Procedure and decrease the TAC and TACC by 11.8 tonnes.
106. The NRLMG has identified no reason why the Minister should not use the results of the CRA 7 Management Procedure to guide statutory TAC setting decisions.

FUTURE CONSIDERATIONS FOR CRA 3, CRA 7 AND CRA 8

107. It is expected that the Minister will make a decision on the future of the CRA 3, CRA 7 and CRA 8 Concession Area regulations early 2012. Concession Area regulations allow commercial fishers to harvest rock lobster at smaller sizes than the 54 mm tail width for males and 60 mm tail width for females minimum legal sizes that apply to commercial and recreational fishers in all other parts of New Zealand.
108. If the Minister decides to remove or phase out the CRA 3, CRA 7 or CRA 8 Concession Area regulations, current TAC setting processes may be affected because of the change to fish selectivity. The removal or phase out of any Concession Area regulations has not been taken into account when compiling this initial advice paper because the decision is yet to be made. The NRLMG will incorporate any decision the Minister makes on Concession Area regulations into its advice development processes in 2012.

ATTACHMENT 1: SPECIFICATIONS OF THE CRA 3 MANAGEMENT PROCEDURE

The Minister agreed to use the 'Rule 2a' CRA 3 Management Procedure in March 2010. Some important elements of the CRA 3 Management Procedure are:

- It proposes a TAC of 293 tonnes for 3 years (2010–11, 2011–12 and 2012–13) unless offset-year CPUE falls below 0.75 kg/potlift or increases above 1.08 kg/potlift. If the CPUE falls outside these limits, the harvest control rule equations will lead to a TAC recommendation;
- After the 2012–13 fishing year it is proposed that the harvest control rule equations will lead to a TAC recommendation;
- Offset-year standardised CPUE, calculated in November, is used as input to the rule to determine the TAC for the fishing year that begins in the following April;
- The management procedure is to be evaluated every year (no "latent year"), based on offset-year CPUE;
- After the initial TAC expires, if the procedure results in a TAC that does not change by more than 5%, no change will be made; and if the procedure results in a TAC that changes by more than 10%, the TAC will be changed by 10% only.

The relation between CPUE and provisional TAC (before minimum and maximum change limits operate, and ignoring the initial fixed TAC) is illustrated by the solid line in Figure A. Figure A also shows the results of the first three years of operation of the CRA 3 Management Procedure.

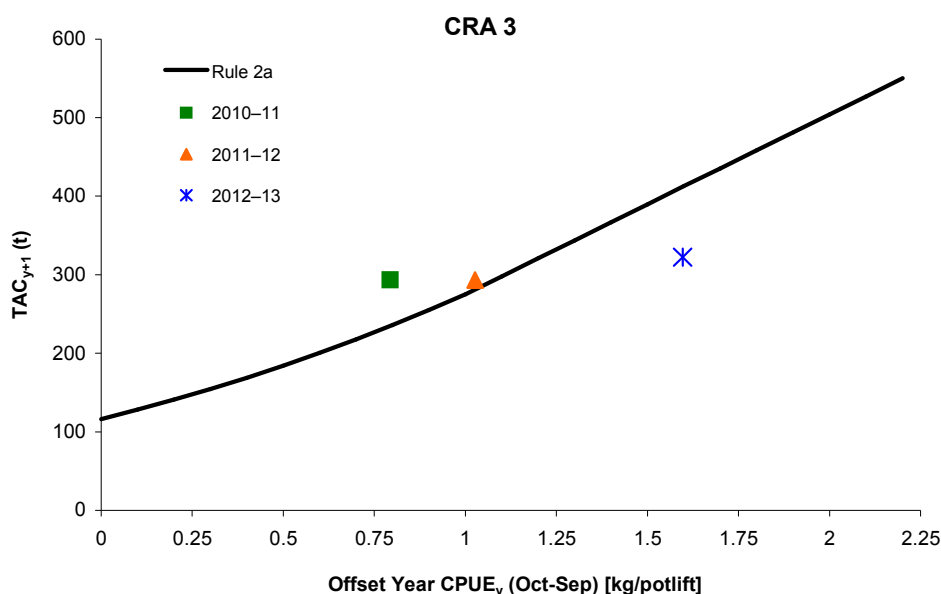


Figure A: The CRA 3 Management Procedure, showing the provisional TAC as a function of offset year CPUE, and showing the TAC outcomes resulting from the rule evaluations performed for the 2010–11, 2011–12 and 2012–13 fishing years.

When the rule was operated in 2009 for the 2010-11 fishing year, standardised offset-year CPUE for 2008–09 was 0.794 kg/potlift. Because this was greater than the 0.75 kg/potlift threshold and less than the 1.08 kg/potlift threshold, the 2010–11 TAC remained at 293 tonnes. The TACC was determined by subtracting non-commercial allowances of 129 tonnes (20 tonnes each for customary and recreational, and 89 tonnes for other mortality), to obtain 164 tonnes.

When the rule was operated in 2010 for the current (2011–12) fishing year, standardised offset-year CPUE for 2009-10 was 1.027 kg/pot. Because this was greater than the 0.75 kg/potlift threshold and less than the 1.08 kg/potlift threshold, the 2011–12 TAC remained at 293 tonnes.

When the rule was operated in 2011 for the 2012-13 fishing year, standardised offset-year CPUE for 2010-11 was 1.597 kg/potlift. Because this is above the upper threshold of 1.08 kg/potlift, the TAC is determined by the harvest control rule equations. The relevant equation is:

$$TAC'_{y+1} = 275 \left(1 + \frac{0.5(I_y - 1)}{0.6} \right) \text{ for } I_y > 1$$

where TAC'_{y+1} is the provisional TAC result from the rule and I_y is the input offset-year CPUE.

which evaluates to a TAC of 411.744 tonnes. This is a greater increase than the maximum increase of 10%, so the TAC would increase by 10% to 322.3 tonnes. If the current non-commercial allowances were used the TACC would be 193.3 tonnes, which would be an 18% increase.

Table A provides an outline of the history of the CRA 3 Management Procedure.

Year	Applied to Fishing Year	Offset-year CPUE (kg/potlift)	Rule result: TAC (t)	TACC (t)	TAC (t)
2009	2010–11	0.794	293	164	293
2010	2011–12	1.027	293	164	293
2011	2012–13 (proposed)	1.597	322.3	–	–

Table A: History of the CRA 3 Management Procedure. “Rule result” is the result of the management procedure after operation of all its components including thresholds; ‘–’: to be determined by the Minister.

ATTACHMENT 2: SPECIFICATIONS OF THE CRA 4 MANAGEMENT PROCEDURE

It is proposed that the expired CRA 4 Management Procedure is replaced by a recommended new Management Procedure (see Paper 1) from the 2012-13 fishing year onwards. A new 2011 stock assessment was used to set the operating model for evaluating the new CRA 4 Management Procedure.

Some important elements of the new CRA 4 Management Procedure are:

- The output variable is TACC (tonnes) and that standardised CPUE (kg/potlift) is to be used as the input variable;
- Standardised CPUE is to be based on the offset year from 1 October;
- CPUE is to be standardised according to the recent usage described in annual Fishery Assessment Reports (FARs), using a data extract obtained in November to ensure that sufficient data from the most recent autumn-winter season have been entered;
- The management procedure is to be evaluated every year (no “latent year”), based on offset-year CPUE; and
- It has no thresholds for minimum and maximum change, except a maximum 25% increase limit below the first plateau.

The relation between CPUE and the TACC is illustrated by the solid line in Figure B. Below a CPUE of 0.5 kg/potlift, the TACC is zero; between a CPUE of 0.5 and 0.9 kg/potlift, TACC increases linearly with CPUE to a plateau of 467 tonnes, which extends to a CPUE of 1.3 kg/potlift. As CPUE increases above 1.3 kg/potlift, TACC increases in steps with a width of 0.1 kg/potlift and a height of 7% of the preceding TACC. Figure B also shows the results of the first year of operation of the CRA 4 Management Procedure (eg, red square).

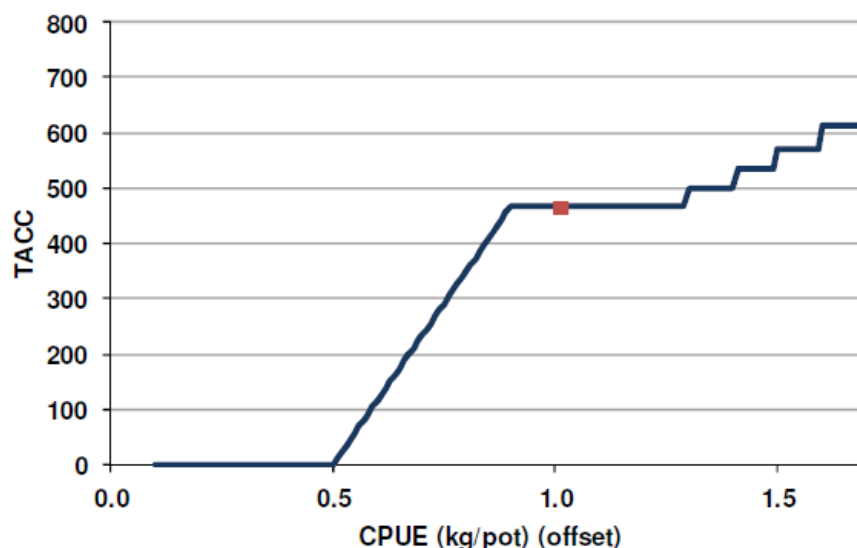


Figure B: The recommended new CRA 4 Management Procedure, showing the TACC as a function of offset year CPUE, and showing the proposed TACC outcome resulting from the rule evaluations performed for 2012–13 fishing year.

When the new management procedure was operated in 2011 for the 2012-13 fishing year, standardised offset-year CPUE for 2010-11 was 1.194 kg/potlift. Under the recommended new CRA 4 Management Procedure, the proposed TACC would be 467 tonnes, a 0.1 tonne increase from the current level. It is proposed that the TAC will be determined by adding the non-commercial allowances, which are currently 195 tonnes (ie, a TAC of 662 tonnes).

ATTACHMENT 3: SPECIFICATIONS OF THE CRA 5 MANAGEMENT PROCEDURE

A recommended new management procedure was developed for CRA 5 in 2011. The new management procedure was based on a 2010 stock assessment and incorporates elements of the voluntary annual catch entitlement shelving rule the CRA 5 industry has used since 2009

Some important elements of the new CRA 5 Management Procedure are:

- The output variable is TACC (tonnes) and that standardised CPUE (kg/potlift) is to be used as the input variable;
- Standardised CPUE is to be based on the offset year from 1 October;
- CPUE is to be standardised according to the recent usage described in annual Fishery Assessment Reports (FARs), using a data extract obtained in November to ensure that sufficient data from the most recent autumn-winter season have been entered;
- The management procedure is to be evaluated every year (no “latent year”), based on offset-year CPUE; and
- The management procedure has no thresholds for minimum and maximum change.

The relation between CPUE and the TACC is illustrated by the solid line in Figure C. Below a CPUE of 0.3 kg/potlift, the TACC is zero; between a CPUE of 0.3 and 1.4 kg/potlift, TACC increases linearly with CPUE to a plateau of 350 tonnes, which extends to a CPUE of 2.0 kg/potlift. As CPUE increases above 2.0 kg/potlift, TACC increases in steps with a width of 0.2 kg/potlift and a height of 5% of the preceding TACC. Figure C also shows the results of the first year of operation of the CRA 5 Management Procedure (eg, red square).

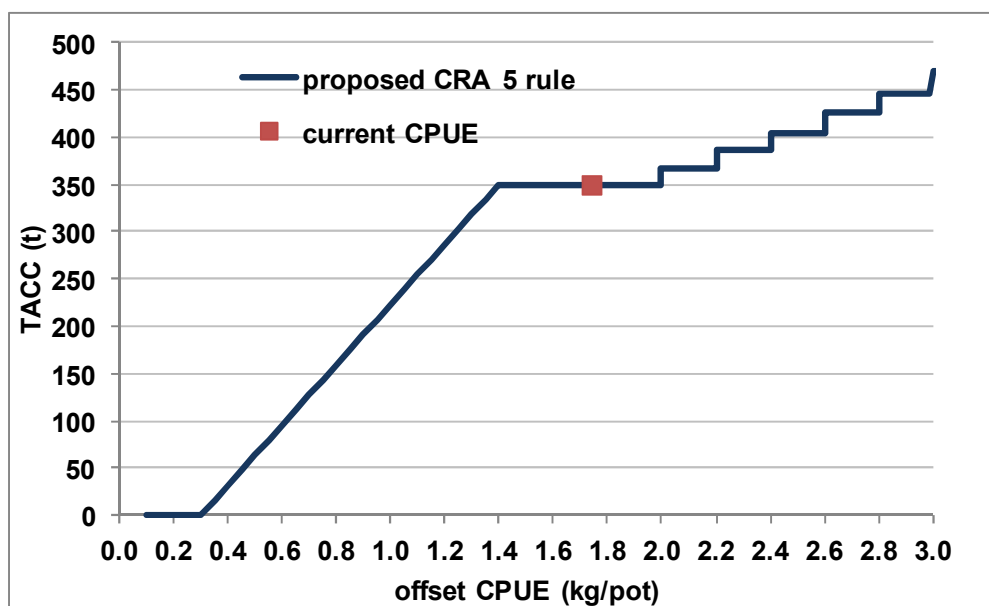


Figure C: The recommended new CRA 5 Management Procedure, showing the TACC as a function of offset year CPUE, and showing the proposed TACC outcome resulting from the rule evaluations performed for 2012–13 fishing year.

When the rule was operated in 2011 for the 2012-13 fishing year, standardised offset-year CPUE for 2010-11 was 1.740 kg/potlift. Under the recommended new CRA 5 Management Procedure, the TACC would be 350 tonnes, unchanged from the current level. It is proposed that the TAC will be determined by adding the non-commercial allowances, which are currently 117 tonnes (ie, a TAC of 467 tonnes).

ATTACHMENT 4: SPECIFICATIONS OF THE CRA 7 MANAGEMENT PROCEDURE

The Minister agreed to use the CRA 7 Management Procedure in March 2011. Some important elements of the CRA 7 Management Procedure are:

- The output variable is TAC (tonnes) and that standardised CPUE (kg/pot) is to be used as the input variable,
- Standardised CPUE is to be based on the offset year from 1 October;
- CPUE is to be standardised according to the recent usage described in annual Fishery Assessment Reports (FARs), using a data extract obtained in November to ensure that sufficient data from the most recent autumn-winter season have been entered.
- The TAC can decrease in any year, but cannot increase if a change (either an increase or a decrease) was made to the TAC in the previous year (asymmetric latent year).
- If the TAC change would be less than 10%, no change is made.
- If the TAC change would be greater than 50%, the TAC is changed by 50% only.

The relation between CPUE and the TAC is illustrated by the solid line in Figure D. It has a plateau of a 120 tonne TAC between CPUE values of 1.0 and 2.0 kg/potlift, and increases linearly with increasing CPUE at the same slope above and below these values. Figure D also shows the results of the first year of operation of the CRA 7 Management Procedure (eg, blue cross).

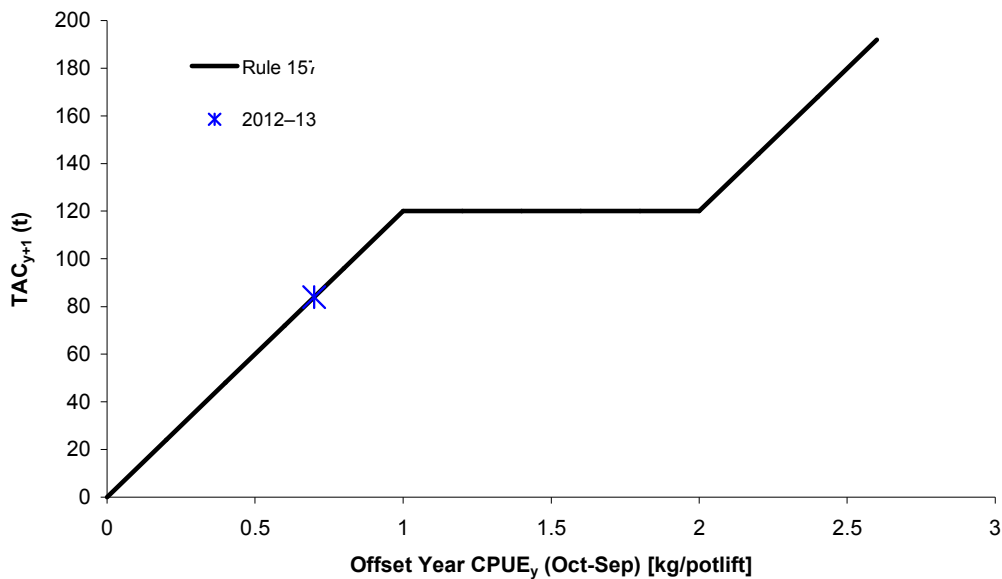


Figure D: The CRA 7 Management Procedure, showing the TAC as a function of offset year CPUE, and showing the proposed TAC outcome resulting from the rule evaluations performed for 2012–13 fishing year.

When the rule was operated in 2011 for the 2012-13 fishing year, standardised offset-year CPUE for 2010-11 was 0.699 kg/potlift, which gives a TAC of 83.9 tonnes. This would be a 12% decrease, above the minimum threshold of 10% and below the maximum threshold of 50%. It is expected that the TACC will be determined by subtracting the non-commercial allowances, which are currently 20 tonnes (ie, a TACC of 63.9 tonnes).