



Review of Rock Lobster Sustainability Measures for 1 April 2013

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Introduction

The National Rock Lobster Management Group is the primary advisor to the Minister for Primary Industries (the Minister) 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, and the Ministry for Primary Industries (MPI).

The multi-stakeholder approach of the NRLMG allows representatives from all fishing sectors and MPI to work together to:

- Foster the utilisation of rock lobster fisheries while ensuring sustainability;
- Develop and implement innovative management strategies for rock lobster within the Quota Management System;
- Enable all sectors, including Maori, to maximise the benefits from a shared fishery;
- Identify and seize opportunities to add value to rock lobster fisheries.

There are two Initial Position Papers (IPPs) enclosed that provide the NRLMG's initial considerations on proposals to:

1. Use new management procedures to guide Total Allowable Catch (TAC) setting in CRA 7 (Otago) and CRA 8 (Southern) rock lobster fisheries;
2. Set TACs, Total Allowable Commercial Catches (TACCs) and allowances for:
 - a) CRA 3 (Gisborne) and CRA 4 (Hawkes Bay/Wellington) rock lobster fisheries using current management procedures,
 - b) CRA 7 and CRA 8 rock lobster fisheries using new or current management procedures¹.

The views outlined in the following IPPs are preliminary and are provided as a basis for consultation with stakeholders as required under the Fisheries Act 1996 (the Act).

In February 2013, and after considering submissions from interested parties, the NRLMG will compile the Final Advice Paper (FAP) for the attached proposals. The FAP will summarise tangata whenua and stakeholder views on the regulations being reviewed, and provide NRLMG final advice and recommendations to the Minister.

The FAP and the Minister's final decision letter will be posted on the MPI website as soon as they become available. Hard copies will be available on request.

Deadline for submissions

MPI (on behalf of the NRLMG) welcomes information and comments from tangata whenua, fishery stakeholders and other interested parties on the proposals. All written submissions must be received by MPI no later than 5pm on Friday, 1 February 2013.

¹ Refer to Appendix 1 for a map of rock lobster Quota Management Areas.

Written submissions should be sent directly to:

Email: FMSubmissions@mpi.govt.nz

Post: Rock Lobster Submissions
Fisheries Management – Inshore Fisheries
Ministry for Primary Industries
P O Box 2526
Wellington 6140

All submissions are subject to the Official Information Act 1982 and can be released if requested, under this Act. If you have specific reasons for wanting to have your submission withheld, please set out your reasons in the submission. MPI will consider those reasons when making any assessment for the release of submissions if requested under the Official Information Act.

Background Information

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”.

1.1 MANAGEMENT PROCEDURES

A management procedure is a tool used to guide the setting of catch limits, within the scope of the statutory structure of the Act. 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;
- 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 TACC, given the data);
- d) Has been extensively simulation-tested using an operating model of the fishery system being managed, including robustness to uncertainties in model assumptions of specific parameters.

1.1.1 Benefits of a management procedure approach

The traditional approach used to set catch limits in many of New Zealand's fisheries is to undertake a stock assessment and then provide TAC, TACC and allowance recommendations. This approach has some disadvantages: stock assessment capacity is limited, and for rock lobster only one or two assessments can be carried out each year. Delays in a stock assessment can cause catch limits to lag behind stock abundance.

A management procedure approach has a number of advantages over the traditional stock assessment approach. These include:

- a) The establishment of a management regime that can respond to changes in stock abundance in the fishery on an annual basis;
- b) An explicit definition of management goals (e.g. maximising yield, maximising stability, minimising risk);
- c) Greater certainty of achieving management goals;
- d) The involvement of fishery stakeholders in the choice of a management procedure (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);
- e) The ability to address uncertainty in all facets of the assessment and management process;
- f) The opportunity to free resources for other research: management procedures reduce the need for regular stock assessments.

1.1.2 History of management procedure use in New Zealand

Management procedures are currently in place for the following New Zealand rock lobster fisheries; CRA 3, CRA 4, CRA 5, CRA 7 and CRA 8.

Management procedures have been used by Ministers to guide statutory TAC setting in rock lobster fisheries for varying periods. The oldest example of the use of management procedures is in CRA 7 and CRA 8, where they have been used to guide TAC setting since 1997, first to rebuild the stocks and then to maintain them above reference levels with high probability.

Management procedures are generally reviewed every five years. The review aims to ensure that TAC setting remains compliant with the statutory structure set out in the Act. It involves the development of a new stock assessment model and new management procedure evaluations.

Table 1.1 provides an outline of the history of current management procedures use and when they are scheduled for review.

Table 1.1: History of current management procedure use and their review schedule

	CRA 3	CRA 4	CRA 5	CRA 7	CRA 8
First year the current management procedure was used	2010	2012	2012	2012	2008
Year of scheduled review	2014	2016	2016	2012	2012

1.2 DEFINITION OF STOCK INDICATORS (*Bmsy*, *Bref*, *Bmin*, *SSB*)

Four stock indicators are relevant to evaluation of the proposals presented in this paper²:

- a) The statutory reference level, ***Bmsy***. Section 13 of the Act requires the Minister to set a TAC that moves the stock to, or maintains the stock at, a size at or above a level that can produce the maximum sustainable yield or at a level that is not inconsistent with this objective. The stock size that can produce the maximum sustainable yield is commonly called *Bmsy*.
- b) The conceptual proxy, ***Bref***³. The use of *Bref* is a way of assessing a stock 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

² Stock size is measured in terms of autumn-winter vulnerable biomass for the *Bmsy*, *Bref* and *Bmin* indicators. “Vulnerable biomass” is the biomass that is available to be caught legally: above the minimum legal size and not egg bearing if female.

³ 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]

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 the stock size associated with lowest abundance in the observed history of the fishery.
- d) Spawning stock biomass, ***SSB***. *SSB* is the weight of all mature females in the autumn-winter, without regard to the minimum legal size (MLS), selectivity or vulnerability.

For each of the rock lobster stocks discussed in this document, there are some differences in the indicators that are reported. This is because the Rock Lobster Fisheries Assessment Working Group (RLFAWG) has continually improved the way indicators are calculated over time.

1.3 THE HARVEST STRATEGY STANDARD

In October 2008, MPI (then the Ministry of Fisheries) released the Harvest Strategy Standard (HSS) for New Zealand fisheries. The HSS specifies performance standards for Quota Management System species and also provides guidance for TAC setting under the Act.

The HSS specifies that management procedures should be designed to ensure that the probability of:

- Achieving the MSY-compatible target or better is at least 50%;
- Breaching the soft limit does not exceed 10%; and
- Breaching the hard limit does not exceed 2%.

For rock lobster:

- 'MSY-compatible target' reference points include those that relate to stock biomass (*Bmsy*) as well as conceptual proxies (*Bref*);
- The soft limit is defined as 20% of the unfished *SSB* level or 50% *Bref*;
- The hard limit is defined as 10% of the unfished *SSB* level or 25% *Bref*.

Extensive simulation-testing suggests that all of the management procedures discussed in this document are consistent with the HSS.

1.4 DRAFT NATIONAL FISHERIES PLAN FOR INSHORE SHELLFISH FISHERIES

Rock lobster are 'Group 1' stocks in the Draft MPI National Fisheries Plan for Inshore Shellfish Fisheries. Stocks in this group are highly desired by all sectors and tend to be fully utilised. Objectives for this group are to maximise the overall social, economic and cultural benefit obtained from each stock, and to maintain biomass of each stock at or above *Bmsy* (or an accepted proxy i.e. *Bref*). The management approach for this group is to monitor and manage these stocks closely to ensure full utilisation can continue in a sustainable way.

The use of responsive management procedures and regular review of rock lobster TACs is consistent with this management approach.

Proposal to use new management procedures to guide TAC setting in CRA 7 and CRA 8 – Initial Position Paper 1

SUMMARY

The NRLMG is seeking tangata whenua and stakeholder views on proposals to use new management procedures in CRA 7 and CRA 8 rock lobster fisheries to guide TAC setting from the 2013-14 fishing year onwards, from 1 April 2013.

The options considered are outlined in Table 2.1.

Table 2.1: Summary of options for CRA 7 and CRA 8

Stock	Option	Description
CRA 7	CRA7_A	Agree to use the <u>new</u> 'Rule 38' CRA 7 Management Procedure to guide TAC setting in CRA 7
	CRA7_B	Agree to use the <u>new</u> 'Rule 39' CRA 7 Management Procedure to guide TAC setting in CRA 7
	CRA7_C	Continue to use the <u>current</u> (2011) CRA 7 Management Procedure to guide TAC setting in CRA 7
CRA 8	CRA8_A	Agree to use the <u>new</u> 'Rule 1' CRA 8 Management Procedure to guide TAC setting in CRA 8
	CRA8_B	Continue to use the <u>current</u> (2008) CRA 8 Management Procedure to guide TAC setting in CRA 8

A central consideration when choosing whether 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 Act.

Application of the new CRA 7 and CRA 8 Management Procedures will ensure the Minister sets a TAC that has high probability of maintaining stock levels at a size at or above *Bmsy* or the agreed proxy (i.e. *Bref*). Best available information suggests CRA 7 is near *Bref* and CRA 8 is 1.4 times *Bref*⁴.

Simulation testing of the proposed new management procedures indicates that their application should:

- Improve CRA 7 abundance and result in improved utilisation benefits for all sectors;
- Maintain CRA 8 abundance and continue to provide high utilisation benefits for all sectors.

2.1 REASONS FOR NEW MANAGEMENT PROCEDURES

In 2012 new stock assessments and management procedures were developed and evaluated for CRA 7 and CRA 8. This work was part of a scheduled review that occurs about every five years in key rock lobster fisheries (the CRA 7 and CRA 8 stocks were last assessed in 2006).

⁴ *Bref* for CRA 7 and CRA 8 is the pre-season autumn-winter vulnerable biomass associated with the period 1979-81. 1979-81 was a period when the stocks showed good productivity and were demonstrably safe.

The recent history of management procedure use in CRA 7 is complex. In March 2011 the Minister agreed to use the current (2011) CRA 7 Management Procedure to guide TAC setting for the 2012-13 fishing year. The 2011 CRA 7 Management Procedure replaced a procedure that had been in use in the fishery since 2008. The 2011 procedure was expected to provide more stability in the TAC than the 2008 procedure because it included a harvesting 'plateau' (i.e. between commercial catch-per-unit-effort (or CPUE) values of 1.0 and 2.0kg/potlift the rule resulted in no change to the TAC).

Although the 2011 CRA 7 Management Procedure has been in use for only one year, it was considered appropriate to review the procedure because it was based on an assessment conducted in 2006. The 2012 CRA 7 stock assessment model provided the opportunity to develop and evaluate new CRA 7 management procedures based on up-to-date fishery information.

The 2008 CRA 8 Management Procedure has been in use since the 2008-09 fishing year. A management procedure should not be used for more than 5 years without review because fishery dynamics may have changed (i.e. recruitment, growth and the size frequency of the population) and it is important to ensure the Minister's statutory obligations are being met.

2.2 OPTIONS

The NRLMG is seeking comments and information from tangata whenua and stakeholders on any utilisation, economic, social, and cultural factors that may be relevant to the following management options.

2.2.1 CRA 7 Options

- Under **Option CRA7_A**, the new 'Rule 38' CRA 7 Management Procedure would be used to guide TAC setting in CRA 7 from the 2013-14 fishing year until the 2018-19 fishing year (5 years);
- Under **Option CRA7_B**, the new 'Rule 39' CRA 7 Management Procedure would be used to guide TAC setting in CRA 7 from the 2013-14 fishing year until the 2018-19 fishing year (5 years);
- Under **Option CRA7_C**, the current (2011) CRA 7 Management Procedure would continue to guide TAC setting in CRA 7.

The specifications of the new and current CRA 7 Management Procedures are described in detail in Appendix 4. There are substantial differences in the parameters of each CRA 7 Management Procedure (these differences are discussed further below and in Appendix 4).

2.2.2 CRA 8 Options

- Under **Option CRA8_A**, the new 'Rule 1' CRA 8 Management Procedure would be used to guide TAC setting in CRA 8 from the 2013-14 fishing year until the 2018-19 fishing year (5 years);
- Under **Option CRA8_B**, the current (2008) CRA 8 Management Procedure would continue to guide TAC setting in CRA 8.

The specifications of the new and current CRA 8 Management Procedures are described in detail in Appendix 5. In short, the new CRA 8 Management Procedure is similar to the current procedure, except that the new procedure uses CPUE standardised by a different procedure.

2.3 ANALYSIS OF OPTIONS

This section analyses the approaches proposed for the Minister to use to guide TAC setting in CRA 7 and CRA 8.

For the new CRA 7 and CRA 8 Management Procedures, a new procedure for preparing data for CPUE standardisation has been used. The current CRA 7 and CRA 8 Management Procedures use CPUE standardised by the procedure adopted in 2003. The new procedure for preparing data for CPUE standardisations is designed to better represent the estimation/landing process than the 2003 procedure and adjusts for change in data reporting practices.

2.3.1 The new 'Rule 38' and 'Rule 39' CRA 7 Management Procedures

Sustainability

Ongoing application of the new CRA 7 Management Procedures (Options CRA7_A and CRA7_B) to guide CRA 7 TAC setting should not pose a risk to stock sustainability. 'Rule 38' and 'Rule 39' have virtually the same performance with respect to sustainability indicators (see Table 2.2). The rules are expected to meet Harvest Strategy Standard requirements and maintain CRA 7 biomass above *Bref* with greater than 89% probability and above 50% *Bref*, 25% *Bref* and *Bmin* with greater than 99% probability.

Table 2.2: CRA 7 performance indicators in 20-year simulations for 'Rule 38' and 'Rule 39' (run under the 'base case' operating model).

Performance Indicator	Option CRA7_A 'Rule 38'	Option CRA7_B 'Rule 39'
Mean biomass	1.5 times <i>Bref</i>	1.5 times <i>Bref</i>
Proportion of years with biomass below <i>Bref</i>	10%	11%
Proportion of years with biomass below 50% <i>Bref</i>	0%	0%
Proportion of years with biomass below 25% <i>Bref</i>	0%	0%
Proportion of years with biomass below <i>Bmin</i>	0%	0%

The new CRA 7 Management Procedures have been tested for robustness to uncertainties in model assumptions of specific parameters. One of the robustness trials carried out involved reduced model recruitment (i.e. new lobsters entering the model) to see if this altered the performance of the management procedures. The new procedures were robust to uncertainties in recruitment (along with other specific trials) and desired performance against the sustainability indicators was maintained.

Utilisation

Simulation-testing of the new CRA 7 Management Procedures suggests they will improve the current utilisation benefits of the CRA 7 fishery for all sectors. This is because ongoing application of the new procedures is expected to move the CRA 7 stock to a level at or above *Bref* with high probability.

Both of the new CRA 7 Management Procedures feature a 'plateau'. This feature is likely to benefit CRA 7 commercial fishers because it delivers catch stability by holding the TACC constant over a range of CPUE values (from 1.0 to 1.75 kg/potlift). On the plateau the

proposed TACC would be 80 tonnes. Simulation testing of both of the new procedures suggests the TACC will remain on the plateau about 55% of the time.

The major difference between the two options is that 'Rule 38' (Option CRA7_A) would propose a zero TACC at a CPUE of 0.50kg/potlift, whereas 'Rule 39' (CRA7_B) would propose a zero TACC at a CPUE of 0.17 kg/potlift. The 2012 standardised off-set year CPUE was 0.63 kg/potlift.

'Rule 38' is not preferred by commercial representatives. At a CPUE of 0.5kg/potlift and under, the TACC would be zero. This would remove the opportunity to collect vital commercial CPUE information because the fishery would effectively be closed. Commercial CPUE is a relative indicator of abundance and is the main input to a management procedure. Without commercial CPUE, the fishery could not be re-opened unless fishery independent research was carried out.

2.3.2 The current (2011) CRA 7 Management Procedure

Sustainability

Ongoing application of the current (2011) CRA 7 Management Procedure (Option CRA7_C) was expected, based on the 2006 stock assessment model, to meet Harvest Strategy Standard requirements and maintain CRA 7 biomass above *Bref* with about 85% probability and above *Bmin* with about 98% probability.

However, when an analogue (similar structure) of the 2011 CRA 7 Management Procedure was evaluated with a 2012 model of the fishery, it did not perform as well as expected. When the 2011 procedure was tested for robustness in uncertainties in future recruitment, it performed badly in relation to stock sustainability indicators. Under decreased recruitment, the 2011 procedure is expected to maintain CRA 7 biomass above *Bref* with about 20% probability⁵. The NRLMG considers that this is a good reason to explore alternative CRA 7 Management Procedures.

Utilisation

Simulation-testing of the 2011 CRA 7 Management Procedure suggests that it will improve the current utilisation benefits of the CRA 7 fishery for all sectors. This is because ongoing application of the 2011 procedure is expected to move the CRA 7 stock to a level at or above *Bref* with high probability (except under reduced future recruitment).

The 2011 CRA 7 Management Procedure has a similar 'plateau' feature to the new 'Rule 38' and 'Rule 39' CRA 7 Management Procedures. Between CPUEs of 1.0 and 2.0 kg/potlift the TACC would be held at 100 tonnes (the new rules have a plateau with an 80 tonne TACC). Simulation testing of the 2011 procedure suggests the TACC will remain on the plateau about 70% of the time.

As with 'Rule 39', the 2011 procedure would also propose a TACC of zero at a CPUE of 0.17 kg/potlift.

⁵ 'Rule 38' and 'Rule 39' had expected probabilities of about 33% and 29% respectively.

2.3.3 The new 'Rule 1' CRA 8 Management Procedure

Sustainability

Ongoing application of the new 'Rule 1' CRA 8 Management Procedure (Option CRA8_A) to guide CRA 8 TAC setting should not pose any risk to stock sustainability.

Ongoing application of the new CRA 8 Management Procedure is expected to maintain:

- CRA 8 biomass above *Bref* with greater than 98% probability and above 50% *Bref*, 25% *Bref* and *Bmin* with greater than 99% probability;
- Mean CRA 8 biomass at about 1.8 times *Bref*;
- CRA 8 spawning stock biomass well above 20% of its unfished level with greater than 99% probability.

The 'Rule 1' CRA 8 Management Procedure has been tested for robustness to uncertainties in model assumptions of specific parameters. It was robust to uncertainties in recruitment (along with other specific trials) and desired performance against the sustainability indicators was maintained.

Utilisation

Simulation-testing of the 'Rule 1' CRA 8 Management Procedure suggests it will maintain the current utilisation benefits of the CRA 8 fishery for all sectors over 5-20 year terms. This is because ongoing application of the new procedure is expected to maintain the CRA 8 stock well above *Bref* with high probability.

2.3.4 The current (2008) CRA 8 Management Procedure

The performance of the current (2008) CRA 8 Management Procedure (Option CRA8_B), in relation to sustainability and utilisation indicators, is virtually the same as the new 'Rule 1' procedure.

The NRLMG considers it more appropriate to use the new 'Rule 1' CRA 8 Management Procedure, however. This is because evaluations of the new procedure are based on a 2012 model of the fishery and use standardised CPUE derived through an improved data preparation procedure that more closely represents the estimation/landing process and adjusts for changes in reporting behaviour. In comparison, the 2008 procedure uses a 2006 model of the fishery and a data preparation procedure developed in 2003.

2.4 OTHER CONSIDERATIONS

2.4.1 Results of the operation of the CRA 7 and CRA 8 management procedures

Operation of the new and current CRA 7 Management Procedures would result in a CRA 7 TAC decrease for the 2013-14 fishing year. Operation of the new or current CRA 8 Management Procedures would result in no change to the CRA 8 TAC. Refer to Initial Position Paper 2 for details on the proposed allocation of the TAC for these fisheries.

2.4.2 Use periodic stock assessment to guide TAC setting in CRA 7 and CRA 8

If the use of management procedures to guide TAC setting in CRA 7 and CRA 8 is considered inappropriate, it is proposed that periodic stock assessments would be used instead.

Stock assessments were conducted for CRA 7 and CRA 8 in 2012. The CRA 8 stock assessment could be used to inform CRA 8 TAC setting for the 2013-14 fishing year, beginning 1 April 2013. However, further assessment work would be required during 2013 before the CRA 7 stock assessment could inform CRA 7 TAC setting. Given the status of the CRA 7 stock this could pose a risk to stock sustainability if the TAC is not reduced from 1 April 2013.

The NRLMG notes that compared to a management procedure approach, using periodic stock assessments to guide TAC setting for CRA 7 and CRA 8:

- Would be less responsive to observed changes in stock abundance in the fishery;
- Would provide less certainty of achieving desired sustainability and utilisation outcomes;
- Might result in less cost efficient management of the fishery.

2.5 INITIAL CONSULTATION

During September and November 2012, tangata whenua and key stakeholder representatives were provided with an opportunity to input into the development of new CRA 7 and CRA 8 management procedures.

At a September 2012 meeting in Dunedin the following joint sector aspirations were identified:

- *For CRA 7:* increased abundance, improved stability, a more responsive management regime and increase safety;
- *For CRA 8:* high stock abundance and maintained stability.

These aspirations were used to guide development of the new CRA 7 and CRA 8 management procedures.

Proposed TACs, TACCs and allowances for CRA 3, CRA 4, CRA 7 & CRA 8 – Initial Position Paper 2

SUMMARY

The NRLMG is seeking tangata whenua and stakeholder views on proposals to review TACs, TACCs and allowances for CRA 3, CRA 4 and CRA 7 rock lobster fishers for the 2013-14 fishing year, beginning 1 April 2013. Although a new management procedure is proposed for CRA 8 this year, its operation results in no change to the CRA 8 TAC, TACC or allowances.

The options considered are outlined in Table 3.1.

Table 3.1: Summary of TAC, TACC and allowance options for CRA 3, CRA 4, CRA 7 and CRA 8

Stock	Option	TAC	TACC	Customary Allowance	Recreational Allowance	Other mortality
CRA 3	CRA3_01: Be guided by the CRA 3 Management Procedure and increase the TAC and TACC	354.5 tonnes	225.5 tonnes	20 tonnes	20 tonnes	89 tonnes
	CRA3_02: Retain the current CRA 3 TAC, TACC and allowances	322.3 tonnes	193.3 tonnes	20 tonnes	20 tonnes	89 tonnes
CRA 4	CRA4_01: Be guided by the CRA 4 Management Procedure and increase the TAC and TACC	694.7 tonnes	499.7 tonnes	35 tonnes	85 tonnes	75 tonnes
	CRA4_02: Retain the current CRA 4 TAC, TACC and allowances	661.9 tonnes	466.9 tonnes	35 tonnes	85 tonnes	75 tonnes
CRA 7	CRA7_01: Be guided by the <u>new</u> 'Rule 38' CRA 7 Management Procedure and decrease the TAC and TACC	40 tonnes	20 tonnes	10 tonnes	5 tonnes	5 tonnes
	CRA7_02: Be guided by the <u>new</u> 'Rule 39' CRA 7 Management Procedure and decrease the TAC and TACC	64 tonnes	44 tonnes	10 tonnes	5 tonnes	5 tonnes
	CRA7_03: Be guided by the <u>current</u> (2011) CRA 7 Management Procedure and decrease the TAC and TACC	68.3 tonnes	48.3 tonnes	10 tonnes	5 tonnes	5 tonnes
	CRA7_04: Retain the current CRA 7 TAC, TACC and allowances	83.9 tonnes	63.9 tonnes	10 tonnes	5 tonnes	5 tonnes
CRA 8	CRA8_01: Be guided by the <u>new</u> 'Rule 1' CRA 8 Management Procedure and retain the current TAC, TACC and allowances	1053 tonnes	962 tonnes	30 tonnes	33 tonnes	28 tonnes
	CRA8_02: Be guided by the <u>current</u> (2008) CRA 8 Management Procedure and retain the current TAC, TACC and allowances	1053 tonnes	962 tonnes	30 tonnes	33 tonnes	28 tonnes

3.1 REASON FOR REVIEWING TACs

Management procedures are currently in place for CRA 3, CRA 4, CRA 5, CRA 7 and CRA 8 rock lobster fisheries. New management procedures have been evaluated for CRA 7 and CRA 8 in 2012 to replace the current procedures. These new management procedures are described in Initial Position Paper 1.

Each year, management procedures are operated to deliver a TAC result that is consistent with the Minister's statutory obligations. Operation of the CRA 3, CRA 4 and CRA 7 management procedures results in proposed TAC changes. Operation of the CRA 5 and CRA 8 management procedures results in no change⁶.

3.2 CRA 3 ROCK LOBSTER FISHERY

3.2.1 CRA 3 stock status

The 2008 CRA 3 stock assessment results indicated that 2008 stock biomass was just above *Bmin* and well below *Bref*⁷. Based on 2008 catch levels and recent recruitments the assessment predicted a 75% probability that stock biomass would decline over the four years up to 2012. On the basis of this assessment the CRA 3 TAC was reduced from 319 to 293 tonnes from 1 April 2009.

The CRA 3 Management Procedure has been used to guide TAC setting in the CRA 3 fishery from 1 April 2010. When the CRA 3 Management Procedure was evaluated in 2009, the RLFAG agreed to evaluate the rule against a target of 90% of *Bref*. This decision was made to address a potential 'regime shift' that may have resulted in lower productivity of the stock. It was considered inappropriate by the RLFAG for 100% *Bref* (which was based on historically higher productivity) to be used as a target if recruitment was to continue at recent low levels.

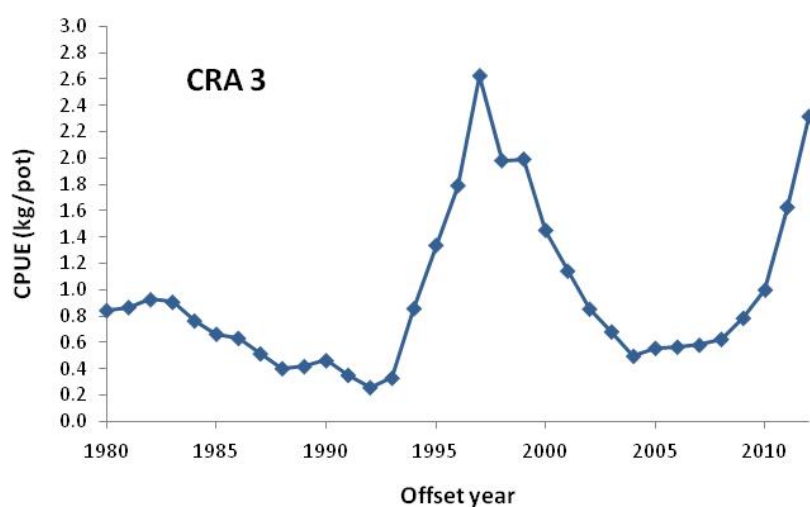
Evaluation of the management procedure indicated the median rebuild year to the desired target stock level, a CPUE equivalent of 1.14 kg/potlift in the autumn-winter season, was 2016. In 2012, CRA 3 autumn-winter standardised CPUE was 2.35 kg/potlift (well above the target).

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 (i.e. October through September) CRA 3 commercial CPUE is shown in Figure 3.1. CPUE has increased steadily in the three years since 2008 and is now 12% below the 1996/97 peak.

⁶ The current CRA 5 Management Procedure is not discussed further in this paper because there is no proposal to change the management procedure approach, or change the TAC, TACC or allowances for the 2013-14 fishing year.

⁷ *Bref* for CRA 3 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.

Figure 3.1: The history of offset CPUE in CRA 3 (based on the 2003 procedure for preparing data for CPUE standardisation)



3.2.2 CRA 3 options

The NRLMG is seeking comments and information from tangata whenua and stakeholders on any utilisation, economic, social, and cultural factors that may be relevant to the following management options (Table 3.2).

Table 3.2: Proposed CRA 3 TAC, TACC and allowance options

Option	TAC	TACC	Customary Allowance	Recreational Allowance	Other mortality
CRA3_01: Be guided by the CRA 3 Management Procedure and increase the TAC and TACC	354.5 tonnes	225.5 tonnes	20 tonnes	20 tonnes	89 tonnes
CRA3_02: Retain the current CRA 3 TAC, TACC and allowances	322.3 tonnes	193.3 tonnes	20 tonnes	20 tonnes	89 tonnes

3.2.3 CRA 3 analysis

TAC setting

There are no reliable estimates of current biomass and *Bmsy* for CRA 3. Because of this the Minister must set a TAC for CRA 3 under section 13(2A). Section 13(2A) requires the Minister to set a TAC using the best available information and that is not inconsistent with the objective of maintaining the stock at or above, or moving the stock towards or above, *Bmsy*. *Bref* is used as a proxy for *Bmsy*.

Option CRA3_01 – Be guided by the CRA 3 Management Procedure and increase the TAC

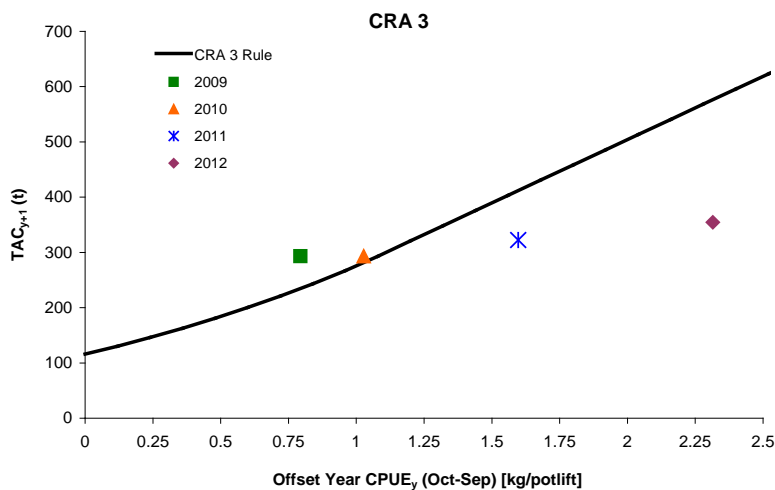
The CRA 3 TAC would be set at 354.5 tonnes under Option CRA3_01. The proposed TAC increase is specified by the CRA 3 Management Procedure that the Minister agreed to use in March 2010 to guide TAC setting in the fishery until the 2015-16 fishing year.

A graphical representation of the CRA 3 Management Procedure is provided in Figure 3.2 (refer to Appendix 2 for further technical details). The graph shows the proposed TAC for the next year is a function of offset-year CPUE in the current year, after operation of all

components of the management procedure including minimum and maximum change thresholds.

Standardised offset year CPUE was 2.31 kg/potlift in 2012. When the harvest control rule was operated with this CPUE it resulted in a TAC of 576.2 tonnes. This was a greater increase than the maximum increase of 10% allowed under the rule, so the TAC could increase only by 10% to 354.5 tonnes (shown by the purple diamond in the graph).

Figure 3.2: The CRA 3 Management Procedure, showing the TACs resulting from the rule evaluations performed in 2009 through 2012 for the 2010-11, 2011-12, 2012-13 and 2013-14 fishing years (shown as coloured shapes).



The proposed CRA 3 TAC increase:

- Does not pose a risk to stock sustainability;
- Should not have an impact on stock rebuilding goals (i.e. to a level at or above a standardised autumn-winter CPUE equivalent of 1.14kg/potlift). The increase is guided by the CRA 3 Management Procedure which is considered safe to use from the standpoint of stock sustainability.

The proposed TAC variation is “not inconsistent” with the objective of moving the stock to a level at or above 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 requirements by moving the stock towards the target, 90% of *Bref*, and maintaining the stock above *Bmin* with greater than 90% probability.

Option CRA3_01 should increase the current utilisation benefit of the fishery. How the benefits are accrued will depend on allocation decisions. Historically the TACC has been varied to give effect to variations in the TAC. If this occurs, the commercial sector will benefit from receiving an explicit share of the proposed TAC increase.

Utilisation benefits for customary Maori and recreational interests should be at least maintained 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.

Option CRA3_02 – Retain the current CRA 3 TAC

Under Option CRA3_02, the current CRA 3 TAC of 322.3 tonnes would be retained for the 2013-14 fishing year.

Retaining the current TAC could result in increased short-term abundance in the CRA 3 fishery. This may result in:

- Higher CPUE for commercial fishers which may reduce harvesting costs (but there would be a loss of overall revenue from not being able to take advantage of a higher TACC);
- Increased non-commercial catch rates compared to Option CRA3_01.

If the Minister chooses this option, the CRA 3 Management Procedure will not be valid for use in TAC setting for the 2014-15 fishing year. Once a management procedure has been agreed for use it is preferable to follow the results, otherwise its performance in relation to stock sustainability indicators can become uncertain. Failing to use the CRA 3 Management Procedure to manage the fishery may pose a risk to stock sustainability in the future if commercial CPUE decreases. Choosing not to follow the CRA 3 Management Procedure also has possible consequences for the acceptability of management procedures in other fisheries.

If this option is chosen, a new CRA 3 stock assessment would be needed, along with new management procedure evaluations (if considered appropriate). This additional work could affect scheduled research for other rock lobster fisheries in 2013 (i.e. CRA 2 – Bay of Plenty).

Setting of non-commercial allowances and the TACC

Allowances for customary Maori, recreational interests and other mortality

The NRLMG recognises CRA 3 rock lobsters are taonga to Maori and are highly sought after by recreational fishers.

A comparison of model assumptions of non-commercial catch and the current allowances are shown in Table 3.3 below.

Table 3.3: Current CRA 3 allowances and model assumptions of non-commercial catches

CRA 3	Customary	Recreational	Other mortality	Total
Current allowances	20 tonnes	20 tonnes	89 tonnes	129 tonnes
Non-commercial catch assumptions for the 2008 stock assessment	20 tonnes	20 tonnes	89.5 tonnes	129.5 tonnes

Under option CRA3_01, the NRLMG proposes that the allowances set for customary Maori, recreational interests and other sources of fishing-related mortality (e.g. illegal fishing) do not change at this time for the following reasons:

1. 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.
2. 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.

3. Model assumptions of recreational catch assume current removals are in the vicinity of the existing recreational allowance. There is considerable uncertainty associated with the recreational catch estimate, however, because it is based on uncertain information. A change to the recreational allowance may be considered when new quantitative recreational catch information becomes available (e.g. from the results of large-scale multi-species recreational harvest survey due in 2013 and from the requirement for amateur charter vessel operators to report rock lobster harvest from October 2012).
4. The allowances made for customary Maori and recreational fishers do not constrain their overall harvest.
5. The RLFAWG used available MPI estimates for illegal catches from 1990 to 2003 to determine an appropriate estimate for other mortality (e.g. illegal fishing). There is little confidence in the estimates of illegal catch because the estimates cannot be verified. The NRLMG sector members are concerned about the high level of estimated illegal take in the CRA 3 fishery and again recommend that every effort is made to reduce this.

TACC

The NRLMG proposes that the TAC increase proposed under Option CRA3_01 should result in an increase of only the TACC, with allowances remaining at current levels. The proposed 32.2 tonne TACC increase has the potential to generate over \$1.8 million in additional earnings for the commercial sector (based on 2011-12 average landed beach price information).

No change is proposed to the TACC under Option CRA3_02. This option would constrain utilisation in the commercial fishery and result in a loss of additional earnings (compared to Option CRA3_01).

3.3 CRA 4 ROCK LOBSTER FISHERY

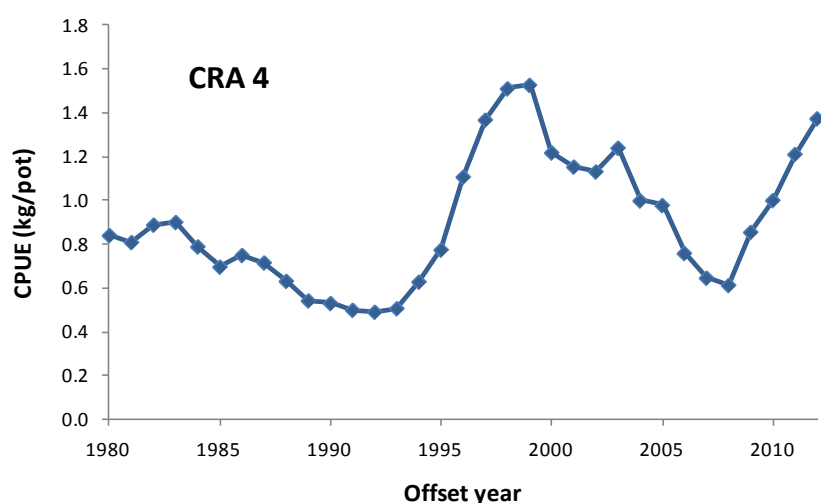
3.3.1 CRA 4 stock status

The 2011 CRA 4 stock assessment results indicated that 2010 stock biomass was about twice B_{min} , more than twice B_{msy} (B_{min} is larger than B_{msy}) and about 1.7 times B_{ref} ⁸ (B_{ref} is larger than B_{msy}). CRA 4 spawning stock biomass in 2010 was above 20% of its unfished level with greater than 99% probability. Based on 2010 catch levels and recent recruitments the assessment predicted that stock size would decline by about 13% over the four years up to 2015, but would still remain well above B_{ref} . However, new information suggests stock size has increased.

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 (i.e. October through September) CRA 4 commercial CPUE is shown in Figure 3.3. In the recent history, CPUE has increased each year since a low in 2008.

⁸ B_{ref} for CRA 4 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.

Figure 3.3: The history of offset CPUE in CRA 4 (based on the 2003 procedure for preparing data for CPUE standardisation)



3.3.2 CRA 4 options

The NRLMG is seeking comments and information from tangata whenua and stakeholders on any utilisation, economic, social, and cultural factors that may be relevant to the following management options (Table 3.4).

Table 3.4: Proposed CRA 4 TAC, TACC and allowance options

Option	TAC	TACC	Customary Allowance	Recreational Allowance	Other mortality
CRA4_01: Be guided by the CRA 4 Management Procedure and increase the TAC and TACC	694.7 tonnes	499.7 tonnes	35 tonnes	85 tonnes	75 tonnes
CRA4_02: Retain the current CRA 4 TAC, TACC and allowances	661.9 tonnes	466.9 tonnes	35 tonnes	85 tonnes	75 tonnes

3.3.3 CRA 4 analysis

TAC setting

Best available information suggests the current CRA 4 stock is well above *Bmsy* (and the agreed proxy *Bref*, which is larger than *Bmsy*). Accordingly the Minister may set or vary the CRA 4 TAC to maintain the stock at or above *Bmsy* (section 13(2)(a)).

Option CRA4_01 – Be guided by the CRA 4 Management Procedure and increase the TAC

The CRA 4 TAC would be set at 694.7 tonnes under Option CRA4_01. The proposed TAC increase is specified by the CRA 4 Management Procedure that the Minister agreed to use in March 2012 to guide TAC setting in the fishery until the 2017-18 fishing year. Important elements of the CRA 4 Management Procedure are set out below and in Appendix 3.

The operation of the CRA 4 Management Procedure enables the stock to be maintained above *Bref*. Ongoing application of the CRA 4 Management Procedure is expected to meet Harvest Strategy Standard requirements and maintain the stock above *Bref* with greater than 50% probability and above *Bmin* with greater than 90% probability. Simulation testing indicates it would maintain the stock above *Bref* with 99% probability.

Option CRA4_01 should increase the current utilisation benefit of the fishery. How the benefits are accrued will depend on allocation decisions. Historically, the TACC has been varied to give effect to variations in the TAC. If this occurs, the commercial sector will benefit from receiving an explicit share of the proposed TAC increase.

Utilisation benefits for customary Maori and recreational interests are expected to be maintained over time because ongoing application of the CRA 4 Management Procedure is designed to maintain stock size well above *Bref*.

Option CRA4_02 – Retain the current CRA 4 TAC

The current CRA 4 TAC of 661.9 tonnes would be retained for the 2013-14 fishing year under Option CRA4_02. This could result in increased short-term abundance in the CRA 4 and higher catch rates for non-commercial and commercial fishers compared to Option CRA4_01 (but at an opportunity cost to the industry through a loss of overall revenue).

If the Minister chooses not to follow the CRA 4 Management Procedure this may pose a risk to stock sustainability in the future if CPUE decreases. Without a current CRA 4 stock assessment, the NRLMG would not have good information to advise on management of the stock. The need for a new assessment could impact on scheduled research for other rock lobster fisheries in future years. Also, choosing not to follow the CRA 4 Management Procedure has possible consequences for the acceptability of management procedures in other fisheries.

Setting of non-commercial allowances and the TACC

Allowances for customary Maori, recreational interests and other mortality

The NRLMG recognises CRA 4 rock lobsters are taonga to Maori and are highly sought after by recreational fishers.

A comparison of model assumptions of non-commercial catch and the current allowances are shown in Table 3.5 below.

Table 3.5: Current CRA 4 allowances and model assumptions of non-commercial catches

CRA 4	Customary	Recreational	Other mortality	Total
Current allowances	35 tonnes	85 tonnes	75 tonnes	195 tonnes
Non-commercial catch assumptions for the 2011 stock assessment	20 tonnes (constant)	Assumed to vary with changes in biomass. Estimated 54.4 tonnes for 2010.	40 tonnes (constant)	114.4 tonnes for 2010

Under Option CRA4_01, the NRLMG proposes that the allowances set for customary Maori, recreational interests and other sources of fishing-related mortality (e.g. illegal fishing) do not change at this time for the following reasons:

1. 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.

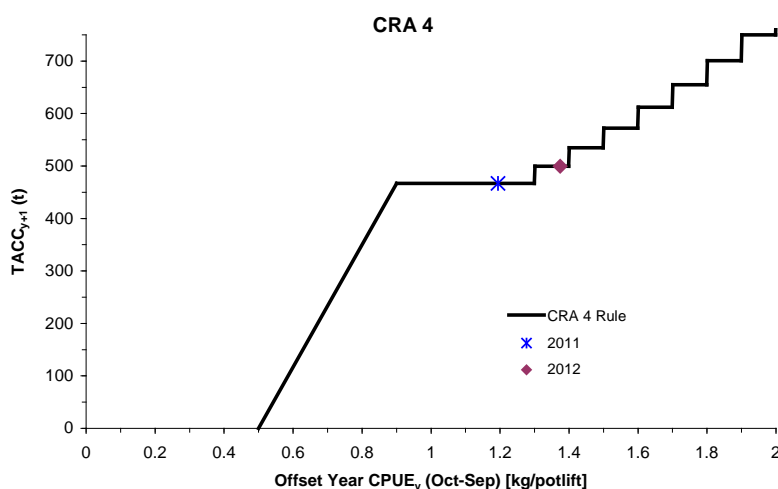
2. Best available information suggests existing CRA 4 customary Maori catch is within the allowance allocated for this interest at this time. Although incomplete, reported customary catches under the Fisheries (Kaimoana) Regulations 1998 and regulation 27A of the Fisheries (Amateur Fishing) Regulations 1986, from 2000 to 2008, suggest the maximum annual catch was roughly 6 tonnes.
3. Model assumptions of recreational catch assume current recreational removals are within the allowance allocated for this interest at this time. There is considerable uncertainty around this estimate, however, because information used to determine the model assumption of recreational catch is based on uncertain historical recreational harvest surveys. A change to the recreational allowance may be considered when new quantitative recreational catch information becomes available (e.g. from the results of large-scale multi-species recreational harvest survey due in 2013 and from the requirement for amateur charter vessel operators to report rock lobster harvest from October 2012).
4. The allowances made for customary Maori and recreational fishers do not constrain their overall harvest.
5. The RLFAWG used available MPI estimates for illegal catches from 1990 to 2004 to determine an appropriate estimate for other mortality (e.g. illegal fishing). There is little confidence in the estimates of illegal catch because the estimates cannot be verified.

TACC

The NRLMG suggests that the TAC increase proposed under Option CRA4_01 should result in an increase of only the TACC, with allowances remaining at current levels.

A graphical representation of the CRA 4 Management Procedure is provided in Figure 3.4. The graph shows the proposed TACC for the next year is a function of offset-year CPUE in the current year. The 2012 standardised offset year CPUE was 1.37 kg/potlift. When the harvest control rule was operated with this CPUE it resulted in a TACC of 499.7 tonnes (shown by the purple diamond in the graph).

Figure 3.4: The CRA 4 Management Procedure, showing the TACCs resulting from the rule evaluations performed in 2011 and 2012 for the 2012-13 and 2013-14 fishing years (shown as coloured shapes).



The proposed 32.8 tonne TACC increase has the potential to generate over \$1.83 million in additional earnings for the commercial sector (based on 2011-12 average landed beach price information).

No change is proposed to the TACC under Option CRA4_02. This option would constrain utilisation in the commercial fishery and result in an opportunity cost of additional earnings (compared to Option CRA4_01).

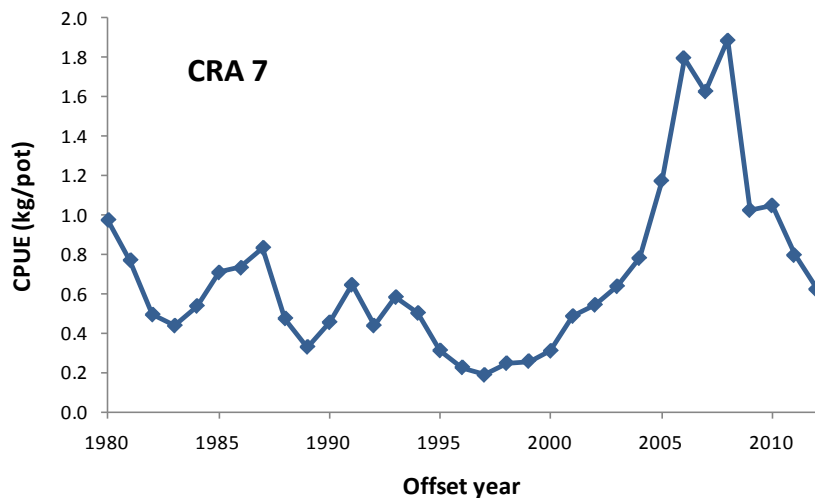
3.4 CRA 7 ROCK LOBSTER FISHERY

3.4.1 CRA 7 stock status

The 2012 CRA 7 stock assessment results indicated that 2011 stock biomass was about 4 times *Bmin* and near *Bref* (about 3% below)⁹. The proportion of years with biomass below 50% and 25% *Bref* were close to zero. Based on 2011 catch levels and recent recruitments, the assessment predicted that stock biomass will increase by about 26% over the four years up to 2015.

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 new CRA 7 Management Procedure. The history of offset year (i.e. October through September) CRA 7 commercial CPUE is shown in Figure 3.5. Between 2008 and 2012, CPUE declined by 67%.

Figure 3.5: The history of offset CPUE in CRA 7 (based on the new procedure for preparing data for CPUE standardisation)



3.4.2 CRA 7 options

The NRLMG is seeking comments and information from tangata whenua and stakeholders on any utilisation, economic, social, and cultural factors that may be relevant to the following management options (Table 3.6).

⁹ *Bref* for CRA 7 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.

Table 3.6: Proposed CRA 7 TAC, TACC and allowance options

Option	TAC	TACC	Customary Allowance	Recreational Allowance	Other mortality
CRA7_01: Be guided by the <u>new</u> 'Rule 38' CRA 7 Management Procedure and decrease the TAC and TACC	40 tonnes	20 tonnes	10 tonnes	5 tonnes	5 tonnes
CRA7_02: Be guided by the <u>new</u> 'Rule 39' CRA 7 Management Procedure and decrease the TAC and TACC	64 tonnes	44 tonnes	10 tonnes	5 tonnes	5 tonnes
CRA7_03: Be guided by the <u>current</u> (2011) CRA 7 Management Procedure and decrease the TAC and TACC	68.3 tonnes	48.3 tonnes	10 tonnes	5 tonnes	5 tonnes
CRA7_04: Retain the current CRA 7 TAC, TACC and allowances	83.9 tonnes	63.9 tonnes	10 tonnes	5 tonnes	5 tonnes

3.4.3 CRA 7 analysis

TAC Setting

There is a reliable estimate of current biomass, but no reliable estimate of $Bmsy$ ¹⁰. Because of this the Minister must set a TAC for CRA 7 under section 13(2A). Section 13(2A) requires the Minister to set a TAC using the best available information and that is not inconsistent with the objective of maintaining the stock at or above, or moving the stock towards or above, $Bmsy$. $Bref$ is used as a proxy for $Bmsy$.

Options CRA7_01, CRA7_02 and CRA7_03 – Be guided by a CRA 7 Management Procedure and decrease the TAC

The CRA 7 TAC would be set at 40 tonnes under Option CRA7_01, 64 tonnes under Option CRA7_02, and 68.3 tonnes under Option CRA7_03.

Each proposed TAC variation is “not inconsistent” with the objective of maintaining the stock at or above the accepted proxy, $Bref$. Ongoing application of any CRA 7 Management Procedure is expected to meet Harvest Strategy Standard requirements by maintaining the stock above $Bref$ with greater than 50% probability and above $Bmin$ with greater than 90% probability. Simulation testing indicates the new procedures would maintain the stock above $Bref$ with greater than 89% probability, and under the current procedure with about 85% probability.

Each of the CRA 7 Management Procedure options will reduce the current utilisation benefit of the fishery. Ongoing application of any CRA 7 Management Procedure, however, is expected to improve fishing opportunities for all sectors by increasing the stock from its current size.

¹⁰ The RLFAWG agreed that $Bmsy$ and SSB indicators were not useful for CRA 7 because of the high level of out-migrations estimated for the stock and that $Bref$ should be used for CRA 7.

Important elements of the new and current CRA 7 Management Procedures are set out further below, in Initial Position Paper 1 and in Appendix 4. There are substantial differences in the parameters of each management procedure.

CRA7_04 – Retain the current CRA 7 TAC

The current CRA 7 TAC of 83.9 tonnes would be retained for the 2013-14 fishing year under Option CRA7_04. The NRLMG advises that maintaining the current TAC could result in stock abundance declining further and consequently affect utilisation benefits for all fishing sectors. Choosing not to follow the CRA 7 management procedure also has possible consequences for the acceptability of management procedures in other fisheries.

Setting of non-commercial Allowances and the TACC

Allowances for customary Maori, recreational interests and other mortality

The NRLMG recognises CRA 7 rock lobsters are taonga to Maori and are highly sought after by recreational fishers.

A comparison of model assumptions of non-commercial catch and the current allowances are shown in Table 3.7 below.

Table 3.7: Current CRA 7 allowances and model assumptions of non-commercial catches

CRA 7	Customary	Recreational	Other mortality	Total
Current allowances	10 tonnes	5 tonnes	5 tonnes	20 tonnes
Non-commercial catch assumptions for the 2012 stock assessment	1 tonne (constant)	Assumed to vary with changes in biomass. Estimated 8.7 tonnes for 2011.	1 tonne (constant)	10.7 tonnes for 2011

Under Options CRA7_01, CRA7_02 and CRA7_03, the NRLMG propose that the allowances set for customary Maori, recreational interests and other sources of fishing-related mortality (e.g. illegal fishing) do not change at this time for the following reasons:

1. There is no up-to-date or reliable information for recreational catch or levels of other sources of fishing-related mortality.
2. Best available information suggests existing CRA 7 customary Maori catch is within the allowance allocated for this interest at this time. Reports of customary harvest under the Fisheries (South Island Customary Fishing) Regulations 1999 suggest there are low levels of rock lobster harvest from CRA 7.
3. Model assumptions of recreational catch assume the existing allowance may be smaller than current removals. There is considerable uncertainty associated with the recreational catch estimate, however, because it is based on uncertain historical recreational harvest surveys. A change to the recreational allowance may be considered when new quantitative recreational catch information becomes available (e.g. from the results of large-scale multi-species recreational harvest survey due in 2013 and from the requirement for amateur charter vessel operators to report rock lobster harvest from October 2012).
4. The allowances made for customary Maori and recreational fishers do not constrain their actual harvest.

- The RLFAWG used available MPI estimates for illegal catches from 1990 to 2002 and a constant illegal catch of 1 tonne/year from 2003 to 2010 to determine an appropriate estimate for other mortality (e.g. illegal fishing). There is little confidence in the estimates of illegal catch because the estimates cannot be verified.

TACC

The NRLMG proposes that only the CRA 7 TACC is reduced under Options CRA7_01, CRA7_02 and CRA7_03. Reducing the TACC provides greatest certainty of benefit to the stock, particularly because catch from the commercial sector can be more directly controlled.

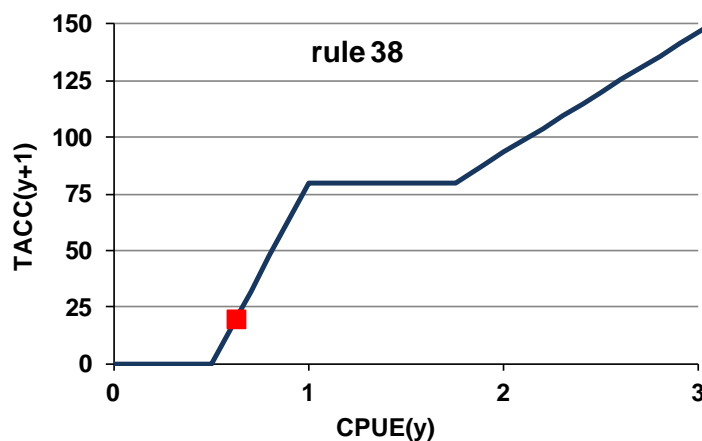
No change is proposed to the TACC under Option CRA7_04 (this option is not preferred by commercial representatives).

Option CRA7_01 – Be guided by the new ‘Rule 38’ CRA 7 Management Procedure

A graphical representation of the ‘Rule 38’ CRA 7 Management Procedure is provided in Figure 3.6. The graph shows the proposed TACC for the next year is a function of offset-year CPUE in the current year. The 2012 standardised offset year CPUE was 0.57 kg/potlift. When the harvest control rule was operated with this CPUE it resulted in a TACC of 20 tonnes.

The proposed 43.9 tonne TACC decrease under Option CRA7_01 has the potential to reduce the earnings of the commercial sector by about \$1.6 million. This estimate is based on 2012 commercial landings of 48.9 tonnes and on 2011-12 average landed beach price information.

Figure 3.6: The new ‘Rule 38’ CRA 7 Management Procedure, showing the TACC resulting from the rule evaluations performed in 2012 for the 2013-14 fishing year (shown as a red square).



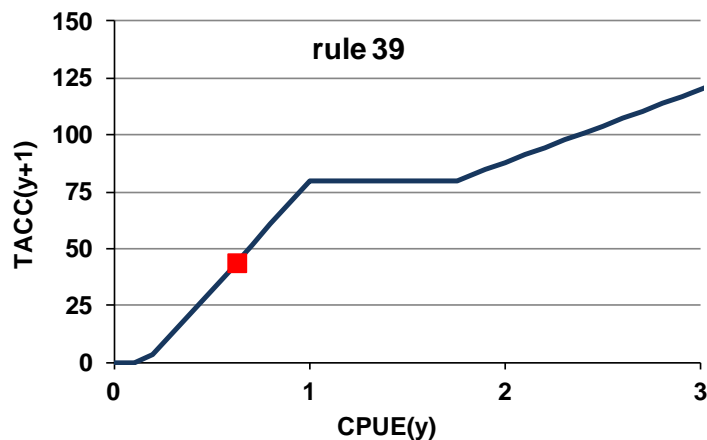
Option CRA7_02 – Be guided by the new ‘Rule 39’ CRA 7 Management Procedure

A graphical representation of the ‘Rule 39’ CRA 7 Management Procedure is provided in Figure 3.7. When the harvest control rule was operated with a CPUE of 0.57 kg/potlift it resulted in a TACC of 44 tonnes.

The proposed 19.9 tonne TACC decrease under Option CRA7_02 has the potential to reduce the earnings of the commercial sector by about \$274,000 (based on 2012 commercial landings of 48.9 tonnes and 2011-12 average landed beach price information).

This option is preferred by commercial representatives.

Figure 3.7: The new 'Rule 39' CRA 7 Management Procedure, showing the TACC resulting from the rule evaluations performed in 2012 for the 2013-14 fishing year (shown as a red square).

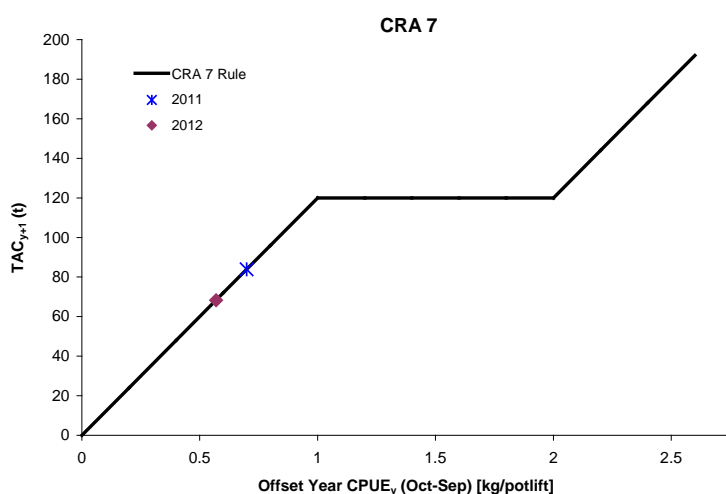


Option CRA7_03 – Be guided by the current (2011) CRA 7 Management Procedure

A graphical representation of the current CRA 7 Management Procedure is provided in Figure 3.8. When the harvest control rule was operated with a CPUE of 0.57 kg/potlift it resulted in a TAC of 68.3 tonnes. The TACC was then determined by subtracting allowances of 20 tonnes from the harvest control rule result under this option. This results in a TACC of 48.3 tonnes (shown by the blue star in the graph).

The proposed 15.6 tonne TACC decrease under Option CRA7_03 is unlikely to reduce the current earnings of the commercial sector. This is because reported commercial landings in 2012 were about the same level as the proposed TACC of 48.3 tonnes.

Figure 3.8: The current (2011) CRA 7 Management Procedure, showing the TAC resulting from the rule evaluations performed in 2011 and 2012 for the 2012-13 and 2013-14 fishing years (shown as coloured shapes).



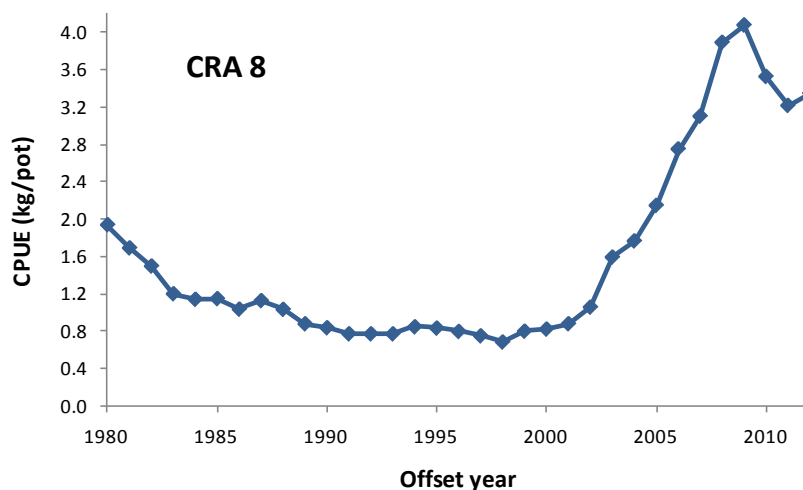
3.5 CRA 8 ROCK LOBSTER FISHERY

3.5.1 CRA 8 stock status

The 2012 CRA 8 stock assessment results indicated that 2011 stock biomass was about 3.7 times B_{min} , about 2.2 times B_{msy} and about 1.4 times B_{ref}^{11} (B_{ref} is larger than B_{msy}). CRA 8 spawning stock biomass in 2011 was above 20% of its unfished level with greater than 99% probability. Based on 2011 catch levels and recent recruitments the assessment predicted that stock biomass will decline by about 16% over the four years up to 2016, but will still remain well above B_{msy} and B_{ref} .

Standardised commercial CPUE is considered to be a reliable indicator of relative stock size in CRA 8 and is the abundance indicator used in the new CRA 8 Management Procedure. The history of offset year (i.e. October through September) CRA 8 commercial CPUE is shown in Figure 3.9. CPUE increased continuously and strongly between 1998 and 2009; declined by 21% between 2009 and 2011, but has since recovered slightly.

Figure 3.9: The history of offset CPUE in CRA 8 (based on the new procedure for preparing data for CPUE standardisation)



3.5.2 CRA 8 options

The NRLMG is seeking comments and information from tangata whenua and stakeholders on any utilisation, economic, social, and cultural factors that may be relevant to the following management options (Table 3.8).

¹¹ B_{ref} for CRA 8 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.

Table 3.8: Proposed CRA 8 TAC, TACC and allowance options

Option	TAC	TACC	Customary Allowance	Recreational Allowance	Other mortality
Option CRA8_01: Be guided by the <u>new</u> 'Rule 1' CRA 8 Management Procedure and retain the current TAC, TACC and allowances	1053 tonnes	962 tonnes	30 tonnes	33 tonnes	28 tonnes
Option CRA8_02: Be guided by the <u>current</u> (2008) CRA 8 Management Procedure and retain the current TAC, TACC and allowances	1053 tonnes	962 tonnes	30 tonnes	33 tonnes	28 tonnes

3.5.3 CRA 8 analysis

TAC setting

Best available information suggests the current CRA 8 stock is well above *Bmsy* (and the agreed proxy *Bref*). Accordingly the Minister may set or vary the CRA 8 TAC to maintain the stock at or above *Bmsy* (section 13(2)(a)).

Under both options the current CRA 8 TAC would be retained at 1053 tonnes. The approach to specifying the TAC is different however: use the new 'Rule 1' CRA 8 Management Procedure (Option CRA8_01), or use the current (2008) CRA 8 Management Procedure (Option CRA8_02).

Operation of the new and current CRA 8 Management Procedures:

- Will enable the stock to be maintained at a level at or above *Bref*. Ongoing application of both management procedures is expected to meet Harvest Strategy Standard requirements and maintain the stock above *Bref* with greater than 50% probability and above *Bmin* with greater than 90% probability. Simulation testing indicates they would maintain the stock above *Bref* with 98% probability.
- Will not change the current utilisation benefits of the fishery. This is because no change is proposed to the current TACC or to constraints on non-commercial fishing under either option (except for the internal waters of Fiordland¹²). Utilisation benefits for all interests are expected to be maintained over time because ongoing application of the management procedures is designed to maintain stock size well above *Bref*.

Important elements of the new and current CRA 8 Management Procedures are set out further below, in Initial Position Paper 1 and in Appendix 5. In short, both procedures are the same except that the new procedure uses CPUE standardised by a different procedure.

Setting of non-commercial Allowances and the TACC

Allowances for customary Maori, recreational interests and other mortality

The NRLMG recognises CRA 8 rock lobsters are taonga to Maori and are highly sought after by recreational fishers.

¹² MPI, on behalf of the NRLMG, recently consulted on a separate proposal to increase the daily bag limit from three to six rock lobsters and allow accumulation of up to 15 rock lobsters in the internal waters of the Fiordland Marine Area, except Milford Sound. The Minister's decision on these proposals is expected early 2013.

A comparison of model assumptions of non-commercial catch and the current allowances are shown in Table 3.9 below.

Table 3.9: Current CRA 8 allowances and model assumptions of non-commercial catches

CRA 8	Customary	Recreational	Other mortality	Total
Current allowances	30 tonnes	33 tonnes	28 tonnes	91 tonnes
Non-commercial catch assumptions for the 2012 stock assessment	6 tonnes (constant)	Assumed to vary with changes in biomass. Estimated 87.5 tonnes for 2011.	3 tonnes (constant)	96.5 tonnes for 2011.

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

1. Best available information suggests existing CRA 8 customary Maori catch is within the allowance allocated for this interest at this time. Reports of customary harvest under the Fisheries (South Island Customary Fishing) Regulations 1999 suggest an average of 6 tonnes of rock lobster was harvested from CRA 8 each year between 2006-07 and 2011-12. Based on this information the RLFAWG decided to use an estimate of 6 tonnes to represent customary catch in the 2012 CRA 8 stock assessment (2 tonnes was used in previous assessments).
2. Model assumptions of recreational catch assume the current recreational allowance is smaller than current removals. There is considerable uncertainty around this estimate, however, because information used to determine the model assumption of recreational catch is based on uncertain historical recreational harvest surveys. A change to the recreational allowance may be considered when new quantitative recreational catch information becomes available (e.g. from the results of large-scale multi-species recreational harvest survey due in 2013 and from the requirement for amateur charter vessel operators to report rock lobster harvest from October 2012).
3. The allowances made for customary Maori and recreational fishers do not limit the actual harvest.
4. The NRLMG has little confidence in the estimates of illegal catch because they cannot be verified, but considers the level of illegal take in CRA 8 has decreased in recent years. This could be related to the introduction of a recreational rock lobster accumulation limit in the Fiordland Marine Area in 2005 and current industry dynamics. The RLFAWG used available MPI estimates for illegal catches from 1990 to 2002. For 2011, 3 tonnes was used as an estimate for illegal take based on monitoring and enforcement information supplied by MPI.
5. The sum of the non-commercial catch assumptions is below the sum of non-commercial allowances for CRA 8 at this time.

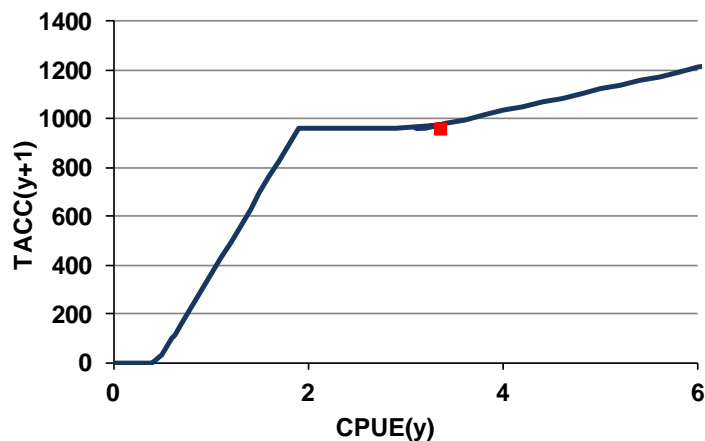
As a side, the NRLMG is currently considering whether principles should be developed for allowance setting, instead of a 'piece meal' approach that has traditionally been used. These principles would need to be discussed further with all sectors groups.

TACC

The NRLMG proposes no change to the CRA 8 TACC under either option.

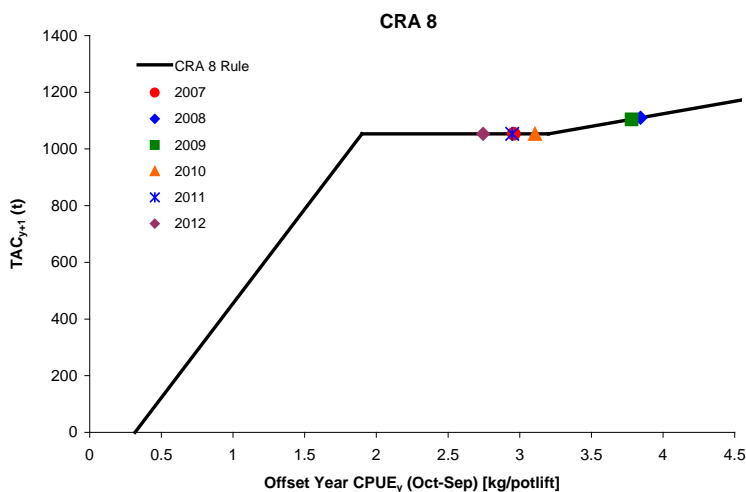
For Option CRA8_01: A graphical representation of the new CRA 8 Management Procedure is provided in Figure 3.10. The graph shows the proposed TACC for the next year is a function of offset-year CPUE in the current year. The 2012 standardised offset year CPUE was 3.35 kg/potlift (based on the new data procedure). When the harvest control rule was operated with this CPUE it generated a small increase, less than the 5% minimum change threshold, leading to a TACC equal to the plateau height of 962 tonnes.

Figure 3.10: The new 'Rule 1' CRA 8 Management Procedure, showing the TACC resulting from the rule evaluations performed in 2012 for the 2013-14 fishing years (shown as a red square).



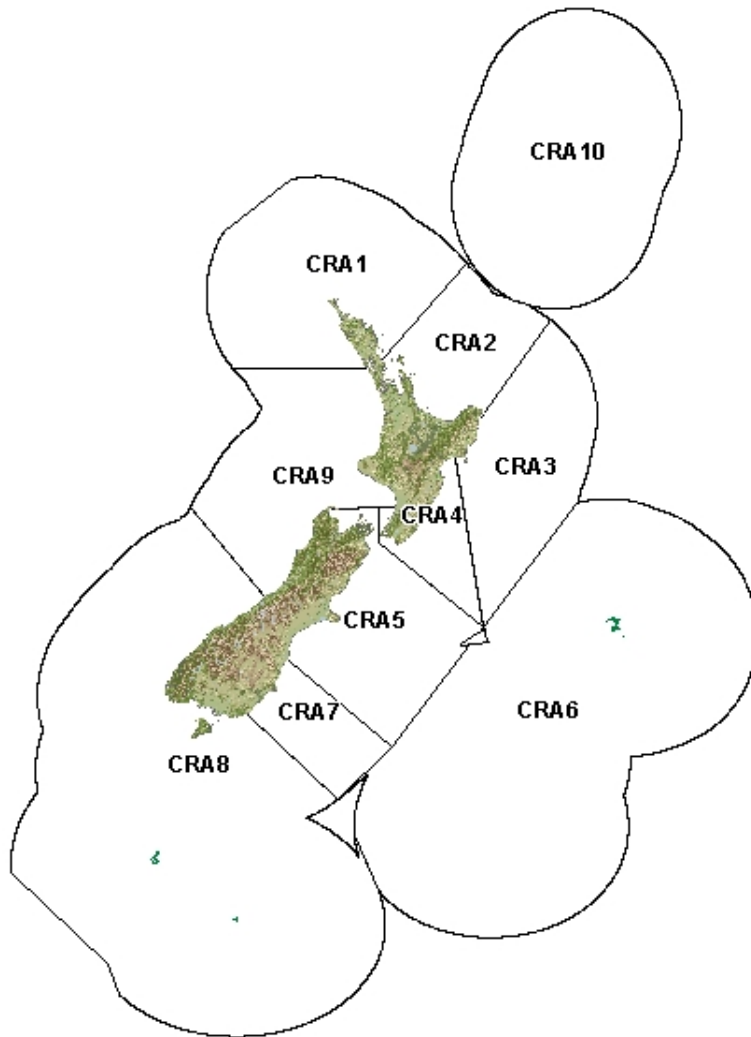
For Option CRA8_02: A graphical representation of the current CRA 8 Management Procedure is provided in Figure 3.11. A 2012 standardised offset year CPUE of 2.75 kg/potlift (based on the 2003 data procedure) puts the TAC on the plateau (a TAC of 1053 tonnes). The TACC was determined by subtracting non-commercial allowances of 91 tonnes from the rule result for this option. This results in a TACC of 962 tonnes.

Figure 3.11: The current (2008) CRA 8 Management Procedure, showing the TACs resulting from the rule evaluations performed in 2009 through 2012 for the 2008-09 to the 2013-14 fishing years (shown as coloured shapes).



Appendix 1

Map of rock lobster Quota Management Areas



Appendix 2

SPECIFICATIONS OF THE CRA 3 MANAGEMENT PROCEDURE

In March 2010 the Minister agreed to use the 'Rule 2a' CRA 3 Management Procedure from the 2010-11 fishing year.

Some important elements of the CRA 3 Management Procedure are:

- a) It proposed a TAC of 293 tonnes for 3 years (2010–11, 2011–12 and 2012–13) unless offset-year CPUE fell below 0.75 kg/potlift or increased above 1.08 kg/potlift. If the CPUE fell outside these limits, the harvest control rule equations would lead to a TAC recommendation (this occurred for the 2012-13 fishing year).
- b) After the 2012–13 fishing year it is proposed that the harvest control rule equations will lead to a TAC recommendation.
- c) Offset-year standardised CPUE is used as an input to the rule to determine the TAC for the fishing year that begins in the following April.
- d) CPUE is calculated using the 2003 "B4" procedure. This procedure sums all landings (to a licensed fisher receiver) and effort for a vessel within a calendar month and allocates the landings to statistical areas based on the reported area distribution of the estimated catches.
- e) The management procedure is to be evaluated every year (no "latent year"), based on offset-year CPUE.
- f) When the conditions referred to in a) above do not apply: 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 CRA 3 Management Procedure is based on a generalised plateau rule with a plateau of zero width.

History of the CRA 3 Management Procedure

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

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.

Year of analysis	Applied to Fishing Year	Offset-year CPUE at time of analysis (kg/potlift)	Rule result: TAC (t)	TAC (t) set by the Minister	TACC (t) set by the Minister
2009	2010–11	0.794	293	293	164
2010	2011–12	1.027	293	293	164
2011	2012–13	1.597	322.3	322.3	193.3
2012	2013–14 (Option CRA3_01)	2.314	354.53	–	–

Appendix 3

SPECIFICATIONS OF THE CRA 4 MANAGEMENT PROCEDURE

In March 2012 the Minister agreed to use the 'Rule 28a' CRA 4 Management Procedure from the 2012-13 fishing year.

Some important elements of the CRA 4 Management Procedure are:

1. The output variable is TACC (tonnes) (non-commercial catch assumptions are made from the operating model).
2. Offset-year standardised CPUE is used as an input to the rule to determine the TACC for the fishing year that begins in the following April.
3. CPUE is calculated using the 2003 "B4" procedure. This procedure sums all landings (to a licensed fisher receiver) and effort for a vessel within a calendar month and allocates the landings to statistical areas based on the reported area distribution of the estimated catches.
4. The management procedure is to be evaluated every year (no "latent year"), based on offset-year CPUE.
5. It has no thresholds for minimum and maximum change, except a maximum 25% increase limit below the first plateau.

The CRA 4 Management Procedure is based on a generalised 'step' rule. Below a CPUE of 0.5 kg/potlift, the TACC is zero; between a CPUE of 0.5 and 0.9 kg/potlift, the 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.

History of the CRA 4 Management Procedure

Table B provides an outline of the history of the CRA 4 Management Procedure.

Table B: History of the CRA 4 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.

Year of analysis	Applied to Fishing Year	Offset-year CPUE at time of analysis (kg/potlift)	Rule result: TACC (t)	TAC (t) set by the Minister	TACC (t) set by the Minister
2011	2012-13	1.194	466.9	661.9	466.9
2012	2013-14 (Option CRA4_01)	1.374	499.69	-	-

Appendix 4

SPECIFICATIONS OF THE NEW AND CURRENT CRA 7 MANAGEMENT PROCEDURES

The new 'Rule 38' and 'Rule 39' CRA 7 Management Procedures

In 2012 a new version of the multi-stock length-based stock assessment model was developed for CRA 7 and CRA 8. This assessment model was used to set the operating model for evaluating new CRA 7 management procedures.

Four different CRA 7 harvest control rule options were considered by the NRLMG in November 2012. Of these four rules, the NRLMG have put forward two 'final' rules for consideration; 'Rule 38' and 'Rule 39'.

Some important elements of the new CRA 7 Management Procedures are:

- a) The output variable is TACC (tonnes) (non-commercial catch assumptions are made from the operating model).
- b) Offset-year standardised CPUE is used as an input to the rules to determine the TACC for the fishing year that begins in the following April.
- c) CPUE is calculated using the new "F2-LFX" procedure which uses:
 - landings to a licensed fisher receiver, along with recreational landings from a commercial vessel and the amount of rock lobsters returned to the water in accordance with Schedule 6 of the Act (i.e. highgraded rock lobsters),
 - estimates, by vessel, of the ratio of annual landed catch divided by annual estimated catch to correct every landing record in a quota management area for the vessel.
- d) The management procedures are to be evaluated every year (no "latent year"), based on offset-year CPUE.

The proposed CRA 7 Management Procedures are based on generalised plateau rules.

For Rule 38: below a CPUE of 0.17 kg/potlift, the TACC is zero; between a CPUE of 0.5 and 1.0 kg/potlift, the TACC increases linearly with CPUE to a plateau of 80 tonnes, which extends to a CPUE of 1.75 kg/potlift. As CPUE increases above 1.75 kg/potlift, TACC increases linearly. The minimum change threshold for the TACC is 10% and the maximum change threshold is 50%.

Rule 39 is similar to Rule 38, except for: the TACC is zero below a CPUE of 0.5 kg/potlift; and as CPUE increases above 1.75 kg/potlift the steepness of the slope is less (which means the TACC can't increase as much as Rule 38 when CPUE is above 1.75 kg/potlift).

Table C provides the results of the operation of proposed CRA 7 Management Procedures for the 2013-14 fishing year.

Table C: Result of the proposed 'Rule 38' and 'Rule 39' CRA 7 Management Procedures for the 2013-14 fishing year, after operation of all their components including thresholds.

Proposed CRA 7 rule	Offset-year CPUE at time of analysis (kg/potlift)	Rule result: TACC (t)
Rule 38 (Option CRA7_01)	0.625	19.96
Rule 39 (Option CRA7_02)	0.625	43.96

The current (2011) CRA 7 Management Procedure

In March 2011 the Minister agreed to use the 'Rule 157' CRA 7 Management Procedure from the 2012-13 fishing year.

Some important elements of the 2011 CRA 7 Management Procedure are:

1. The output variable is TAC (tonnes).
2. Offset-year standardised CPUE is used as an input to the rule to determine the TAC for the fishing year that begins in the following April.
3. CPUE is calculated using the 2003 "B4" procedure. This procedure sums all landings (to a licensed fisher receiver) and effort for a vessel within a calendar month and allocates the landings to statistical areas based on the reported area distribution of the estimated catches.
4. 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).
5. If the TAC change would be less than 10%, no change is made.
6. If the TAC change would be greater than 50%, the TAC is changed by 50% only.

The 2011 CRA 7 Management Procedure is a generalised plateau rule. Between a CPUE of 0 and 1.0 kg/potlift, the TAC increases linearly with CPUE to a plateau of 120 tonnes, this extends to a CPUE of 2.0 kg/potlift. As CPUE increases above 2.0 kg/potlift, the TAC increases linearly (using the same slope as below 1.0 kg/potlift).

History of the current (2011) CRA 7 Management Procedure

Table D provides an outline of the history of the current CRA 7 Management Procedure.

Table D: History of the current (2011) CRA 7 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.

Year of analysis	Applied to Fishing Year	Offset-year CPUE at time of analysis (kg/potlift)	Rule result: TAC (t)	TAC (t) set by the Minister	TACC (t) set by the Minister
2011	2012-13	0.699	83.9	83.9	63.9
2012	2013-14 (Option CRA7_03)	0.569	68.264	-	-

Appendix 5

SPECIFICATIONS OF THE NEW AND CURRENT CRA 8 MANAGEMENT PROCEDURES

The new 'Rule 1' CRA 8 Management Procedure

The 2012 CRA 8 stock assessment model was used to set the operating model for evaluating new CRA 8 management procedures.

Three different CRA 8 harvest control rule options were considered by the NRLMG in November 2012. Of these three rules, the NRLMG have put forward one 'final' rule for consideration; 'Rule 1' (an analogue of the current rule).

Some important elements of the new CRA 8 Management Procedure are:

- a) The output variable is TACC (tonnes) (non-commercial catch assumptions are made from the operating model).
- b) Offset-year standardised CPUE is used as an input to the rules to determine the TACC for the fishing year that begins in the following April.
- c) CPUE is calculated using the new "F2-LFX" procedure which uses:
 - landings to a licensed fisher receiver, along with recreational landings from a commercial vessel and the amount of rock lobsters returned to the water in accordance with Schedule 6 of the Act (i.e. highgraded rock lobsters),
 - estimates, by vessel, of the ratio of annual landed catch divided by annual estimated catch to correct every landing record in a quota management area for the vessel.
- d) The management procedures are to be evaluated every year (no "latent year"), based on offset-year CPUE.

The new CRA 8 Management Procedure is based on a generalised plateau rule. Below a CPUE of 0.4535 kg/potlift, the TACC is zero; between a CPUE of 0.4535 and 1.9 kg/potlift, the TACC increases linearly with CPUE to a plateau of 962 tonnes, which extends to a CPUE of 3.2 kg/potlift. As CPUE increases above 3.2 kg/potlift, the TACC increases linearly. The minimum change threshold for the TACC is 5%; there is no maximum change threshold.

Table E provides the results of the operation of proposed 'Rule 1' CRA 8 Management Procedure for the 2013-14 fishing year.

Table E: Result of the proposed 'Rule 1' CRA 8 Management Procedure for the 2013-14 fishing year; after operation of all its components including thresholds.

Proposed CRA 8 rule	Offset-year CPUE at time of analysis (kg/potlift)	Rule result: TACC (t)
Rule 1 (Option CRA8_01)	3.246	962

The current (2008) CRA 8 Management Procedure

In March 2008 the Minister agreed to use the ‘Rule 86303’ CRA 8 Management Procedure from the 2008-09 fishing year.

Some important elements of the 2008 CRA 8 Management Procedure are:

1. The output variable is TAC (tonnes).
2. Offset-year standardised CPUE is used as an input to the rule to determine the TAC for the fishing year that begins in the following April.
3. CPUE is calculated using the 2003 “B4” procedure. This procedure sums all landings (to a licensed fisher receiver) and effort for a vessel within a calendar month and allocates the landings to statistical areas based on the reported area distribution of the estimated catches.
4. The TAC can decrease in any year.
5. If the TAC change would be less than 5%, no change is made.

The 2008 CRA 8 Management Procedure is a generalised plateau rule. TAC is constant over a wide range of CPUE, decreasing at a faster rate than CPUE when CPUE is below a threshold (1.9 kg/potlift) and increasing more slowly when CPUE is above a threshold (3.2 kg/potlift).

History of the current (2008) CRA 8 Management Procedure

Table F provides an outline of the history of the current CRA 8 Management Procedure.

Table F: History of the current (2008) CRA 8 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.

Year of analysis	Applied to Fishing Year	Offset-year CPUE at time of analysis (kg/potlift)	Rule result: TAC (t)	TAC (t) set by the Minister	TACC (t) set by the Minister
2007	2008-09	2.960	1053	1053	966
2008	2009-10	3.844	1110	1110	1019
2009	2010-11	3.781	1110	1110	1019
2010	2011-12	3.107	1053	1053	962
2011	2012-13	2.947	1053	1053	962
2012	2013-14 (Option CRA8_02)	2.745	1053	–	–