Ministry for Primary Industries
Manatū Ahu Matua

Review of Rock Lobster Sustainability Measures for 1 April 2017

Consultation Document

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1 Submission Information

The Ministry for Primary Industries (MPI) with the support of the National Rock Lobster Management Group (NRLMG) welcomes written submissions on any or all of the proposals contained in this Consultation Document. All written submissions must be received by MPI no later than 5pm on **Friday 10 February 2017**.

Written submissions should be sent directly to:

Inshore Fisheries Management
Ministry for Primary Industries
P O Box 2526
Wellington 6011

or emailed to FMsubmissions@mpi.govt.nz

1.1 OFFICIAL INFORMATION ACT 1982

All submissions are subject to the Official Information Act and can be released (along with personal details of the submitter) under the Act. If you have specific reasons for wanting to have your submission or personal details 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.

Rock lobster (CRA 3, 4 and 7)

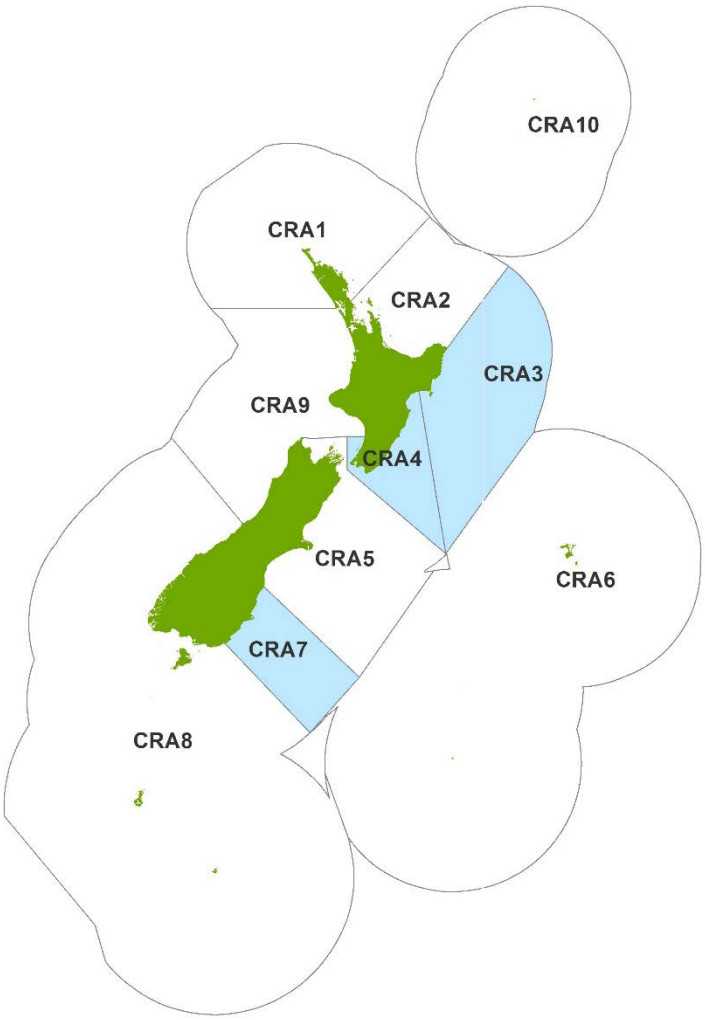

Figure 2.1: Map of rock lobster quota management areas (QMAs) showing stocks under review in blue.

2 Executive Summary

The Ministry for Primary Industries (MPI) is seeking tangata whenua and stakeholder input to inform a review of rock lobster sustainability measures for 1 April 2017.

The total allowable catch (TAC), allowances and total allowable commercial catch (TACC) proposals presented in this document are based on new stock assessment information and/or the results from the operation of management procedures or decision rules.

Management procedures are in place for most rock lobster stocks in New Zealand. Each procedure is operated every year and recommends a catch limit result that is consistent with the Minister's statutory obligations for setting catch limits. Management procedures are designed to move or maintain stock abundance above agreed reference levels using a comprehensive approach that recognises a range of customary Māori, recreational, and commercial values.

Table 2.1 provides a summary of the options proposed for rock lobster for the April 2017 fishing year. These include:

- TAC and TACC decreases for the CRA 3 (Gisborne) fishery with no changes to the non-commercial allowances;
- Replacing the current CRA 4 (Wellington/Hawkes Bay) management procedure with a new procedure, decreasing the TAC and TACC, and making no change to the non-commercial allowances; and
- TAC and TACC increases for the CRA 7 (Otago) fishery with no changes to the non-commercial allowances.

This document is solely concerned with TAC, allowance and TACC setting under sections 11, 13, 20 and 21 of the Fisheries Act 1996 (the Act). No regulatory or other changes are proposed as part of this document.

Table 2.1: TAC, allowance and TACC proposals for CRA 3, CRA 4 and CRA 7 from 1 April 2017 (all values in tonnes).

Stock	Option	TAC	TACC	Allowances		
				Customary **Māori**	Recreational	Other mortality
CRA 3	CRA3_01: Use the current CRA 3 management procedure and decrease the TAC by decreasing the TACC by 9%.	366.86 ↓	237.86 ↓	20	20	89
	CRA3_02 (*status quo*): Retain the current CRA 3 TAC, allowances and TACC.	389.95	260.95	20	20	89
CRA 4[1]	CRA4_01: Use the new *Rule 24* CRA 4 management procedure and reduce the TAC by reducing the TACC by 23%.	502 ↓	307 ↓	35	85	75
	CRA4_02: Use the new *Rule 6* CRA 4 management procedure and reduce the TAC by reducing the TACC by 27%.	484 ↓	289 ↓	35	85	75
CRA 7	CRA7_01: Use the current CRA 7 management procedure and increase the TAC by increasing the TACC by 15%.	132.52 ↑	112.52 ↑	10	5	5
	CRA7_02 (*status quo*): Retain the current CRA 7 TAC, allowances and TACC.	117.72	97.72	10	5	5

3 Purpose

3.1 NEED FOR ACTION

Every year MPI and the National Rock Lobster Management Group (NRLMG) consider the results from the operation of management procedures. This determines whether catch limit changes are required for the upcoming April fishing year to ensure the sustainable use of the rock lobster resource.

A management procedure is a kind of decision rule that is used to guide the setting of catch limits in rock lobster fisheries. Management procedures are informed by annual changes in commercial catch rates ('catch-per-unit-effort' or 'CPUE'). Commercial CPUE is considered

[1] The current CRA 4 TAC is 592 tonnes and the TACC is 397 tonnes.

a reliable indicator of abundance and is supported by scientific modelling to provide an overall assessment of stock status.

Management procedures are used in all rock lobster fisheries except for CRA 6 (Chatham Islands), CRA 9 (Westland/Taranaki) and CRA 10 (Kermadec). In 2016, new management procedures have been evaluated for the CRA 4 rock lobster fishery.

In 2012, a previous Minister agreed to use the current CRA 4 management procedure to guide TAC setting in the CRA 4 fishery until the 2016/17 fishing year. For the 2017/18 fishing year, a new stock assessment and management procedure evaluations were carried out for the CRA 4 fishery to select the new candidate management procedures outlined in this document. The NRLMG has selected two candidate rules for consultation, both of which are designed to rebuild the stock to or above the management target (B_{REF}) by 2021 with greater than 86% probability.

Based on the use of the proposed new and current management procedures, changes to the status quo are proposed for the CRA 3, CRA 4, and CRA 7 rock lobster fisheries. Operation of the CRA 1, CRA 2, CRA 5, and CRA 8 management procedures suggested no change was needed to the management settings for these fisheries from April 2017.[2]

3.2 MANAGEMENT APPROACH

The overall management approach for rock lobster fisheries is to monitor and manage them closely to provide for utilisation while ensuring sustainability. The use of responsive management procedures and regular review of rock lobster TACs is consistent with this management approach. Being able to respond to changes in rock lobster abundance is important because rock lobster populations can fluctuate with changes in their environment.

The NRLMG acts as the primary advisor to the Minister for Primary Industries 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 MPI.

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

The NRLMG's management goal is consistent with the rock lobster objectives in the Draft MPI National Fisheries Plan for Inshore Shellfish Fisheries. These objectives are to maximise the overall social, economic and cultural benefit obtained from each stock and to maintain biomass of each stock at or above the level that can produce the maximum sustainable yield (B_{MSY}) or at a level that is not inconsistent with this (i.e. B_{MSY} or an accepted proxy, B_{REF} – refer to section 4.2 below).

[2] The current CRA 1, CRA 2, CRA 5 and CRA 8 management procedures are not discussed further in this document because there is no proposal to change the management procedure approach, or change the TAC, allowances or TACC for the 2017/18 fishing year.

4 Background Information

This section provides relevant background information on the management procedure approach, stock indicators, and the MPI Harvest Strategy Standard.

4.1 MANAGEMENT PROCEDURE APPROACH

4.1.1 History of management procedure use in New Zealand

Management procedures are currently in place for most of New Zealand's rock lobster fisheries. Each stock's procedure has been used by Ministers to guide statutory TAC setting in rock lobster fisheries for varying periods. The oldest example 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 unless a review is requested and approved by the NRLMG. 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 4.1 provides an outline of the use of current management procedures and when they are scheduled for review. New CRA 4 management procedures have been evaluated this year.

Table 4.1: History of current management procedure use and their review schedule.

	CRA 1	CRA 2	CRA 3	CRA 4	CRA 5	CRA 7	CRA 8
First year of the current management	2015	2014	2015	2012	2016	2013	2016
Year of scheduled review	2019	2017	2019	2016	2020	2020	2020

4.1.2 Management procedure benefits

The traditional approach used to set catch limits in many of New Zealand's fisheries is to undertake a stock assessment and then to provide recommendations on the TAC, allowances and the TACC. This approach has some disadvantages; stock assessment capacity is limited, and under this approach only one or two assessments could be carried out for rock lobster each year. Delays in updating a stock assessment can cause management action to be delayed and for catch limits to be set inappropriately for a fishery.

A management procedure 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;
e) The ability to address uncertainty in all facets of the assessment and management process; and

f) The opportunity to free up resources for other research, as management procedures reduce the frequency that stock assessments are required.

4.1.3 Evaluation of management procedures

Management procedures are evaluated with a modified stock assessment model, known as the 'operating model'. Data used in the stock assessment model include: customary, recreational, commercial and illegal catch; length frequencies of the catch from observer and industry logbook data; tag-recapture data (i.e. growth information); and larval settlement levels. The most important inputs to the assessment are commercial CPUE indices.

Extensive peer-review of stock assessment models and management procedures occurs at the Rock Lobster Fisheries Assessment Working Group and at the November Mid-year Fisheries Assessment Plenary. Each management procedure is also extensively simulation-tested, which includes testing for robustness to uncertainties in model assumptions (e.g. variable levels of recruitment and non-commercial catches) and modelling choices.

For further technical information on current management procedures for New Zealand rock lobster refer to the fisheries research report available for download from the MPI website here: http://www.mpi.govt.nz/document-vault/14566 [12MB].

4.1.4 Main data input

Standardised commercial CPUE from October to September each year is used as an input to a management procedure to determine the TAC or TACC for the fishing year that begins in the following April. This CPUE series is called 'offset year CPUE'. Use of offset year CPUE ensures the most up-to-date CPUE information is used in management procedure evaluations and decision-making.

CPUE is used as the main input because it is considered to be a reliable indicator of relative stock size in rock lobster fisheries. CPUE has been successfully used in several management procedures that have rebuilt stocks from low to high abundance levels.

4.2 DEFINITION OF STOCK INDICATORS

Four stock indicators are relevant to evaluation of the proposals presented in this document[3]:

a) The statutory reference level, $\boldsymbol{B_{MSY}}$, the stock size that can produce the maximum sustainable yield. 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.

[3] Stock size is measured in terms of autumn-winter vulnerable biomass for the B_{MSY}, B_{REF} and B_{MIN} indicators. "Vulnerable biomass" is the biomass that is available to be caught legally: above the minimum legal size and not egg bearing if female.

b) The conceptual proxy, B_{REF}, a reference biomass level or management target.[4] The use of B_{REF} 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 B_{MIN} cannot be estimated reliably using best available information. B_{REF} 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, B_{MIN}, which is the lowest stock size observed in the history of the fishery.
d) Spawning stock biomass, ***SSB***, which is the weight of all mature females in the autumn-winter.

4.3 NOVEMBER 2016 FISHERIES ASSESSMENT PLENARY REPORT

For further information on rock lobster biology, stock assessment and stock status refer to the November 2016 Fisheries Assessment Plenary report. This report is available for download from the MPI website: www.mpi.govt.nz/document-vault/15475 [10MB].

4.4 MPI HARVEST STRATEGY STANDARD

The Harvest Strategy Standard (HSS)[5] is a policy statement of best practice in relation to the setting of fishery and stock targets and limits for fishstocks in the Quota Management System.

The HSS specifies that management procedures[6] 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%;
- Breaching the hard limit does not exceed 2%.

For rock lobster:

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

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

[4] The Operational Guidelines for the Harvest Strategy Standard describe the B_{REF} concept as follows: "Conceptual proxies for B_{MSY}, F_{MSY} 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 B_{MSY}, F_{MSY} 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 B_{MSY}: 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].
[5] Published by the Ministry of Fisheries in 2008.
[6] Referred to in the HSS as Management Strategy Evaluations or MSEs.

5 Legal Considerations

The Minister's central statutory considerations for TAC and TACC setting are discussed below and for each individual stock as relevant in the following sections.

5.1 TAC SETTING

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.

Under section 13(2) of the Act the Minister must set a TAC that maintains at or above, restores to or above, or moves the stock towards or above a level that can produce the maximum sustainable yield. However, before a TAC can be set under section 13(2) the Minister must be provided with an assessment of both current biomass and the biomass that can produce the maximum sustainable yield (commonly called B_{MSY}).

Where current biomass or B_{MSY} estimates are not available or not reliable, then the Minister is required to apply section 13 (2A) of the Act for the purposes of setting a TAC. 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, $B_{MSY.}$

In considering the way and rate in which a stock is moved towards or above a level that can produce the maximum sustainable yield (i.e. B_{MSY}) under section 13(2)(b) or (c) or (2A), the Minister must have regard to such social, cultural and economic factors that are considered relevant.

The management procedures discussed in this document are designed to move stock biomass to, or maintain the biomass of each stock at, a size at or above B_{MSY} or the agreed proxy (i.e. B_{REF}) as required under section 13 of the Act.

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

5.2 TACC SETTING: SECTIONS 20 AND 21

When setting a TACC for a stock under section 20 of the Act, section 21 requires the Minister to have regard to the TAC for that stock and allow for Māori customary non-commercial fishing interests, recreational interests, and all other sources of fishing-related mortality to that stock.

The Act does not provide an explicit statutory mechanism to apportion available catch between sector groups either in terms of a quantitative measure or prioritisation of allocation. Accordingly, the Minister has the discretion to make allowances for various sectors based on best available information. Allowance options are discussed individually for each rock lobster stock later in this document.

When allowing for Māori customary non-commercial fishing interests the Minister must take into account any relevant mātaitai reserves within the relevant quota management areas and

any area closure or fishing method restriction or prohibition within those areas made under section 186A of the Act. There are several mātaitai reserves and temporary closures that fall within the areas of the rock lobster stocks discussed in this document. MPI considers that the proposed customary allowances for each stock will adequately provide for the harvest of rock lobster that is likely to be taken from a management area, after taking into account the mātaitai reserves and temporary closures in place.

When allowing for recreational interests, the Minister must take into account any regulations made under section 311 of the Act that prohibit or restrict fishing in any area. There are currently no section 311 regulations applying in the areas of the rock lobster stocks discussed in this document.

5.3 SUSTAINABILITY MEASURES: SECTION 11

Section 11 of the Act sets out additional matters that the Minister must take into account or have regard to when setting a sustainability measure such as a TAC.[7] These include:

- Effects of fishing on any stock and the aquatic environment;
- Any existing controls under the Act that apply to the stock or area concerned;
- The natural variability of the stock;
- Relevant regional policy statements, plans or proposed plans;
- Conservation and fisheries services; and
- Approved fisheries plans.

6 Review of the CRA 3 (Gisborne) Rock Lobster Fishery

6.1 CRA 3 STOCK STATUS

The results of the most recent CRA 3 stock assessment conducted in 2014 suggest there are no sustainability concerns for the CRA 3 fishery. 2013 biomass was well above both B_{MSY} (3.3 to 4.7 times) and B_{MIN} (3.0 to 3.6 times)[8]. Spawning stock biomass in 2013 was 70-107% of the unfished level.

With 2013 catch levels and recent recruitments, biomass was projected to decline by 15-31% by 2017, but would remain well above reference points.

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 6.1. CPUE increased from 2008 to 2012, but has since declined.

[7] Section 11 of the Act can be viewed here: www.legislation.govt.nz/act/public/1996/0088/latest/DLM395397.html?search=ts_act%40bill%40regulation%40deemedreg_fisheries+act+1996_resel_25_a&p=1

[8] B_{REF} is not reported for CRA 3 because it is not considered a useful indicator at this time.

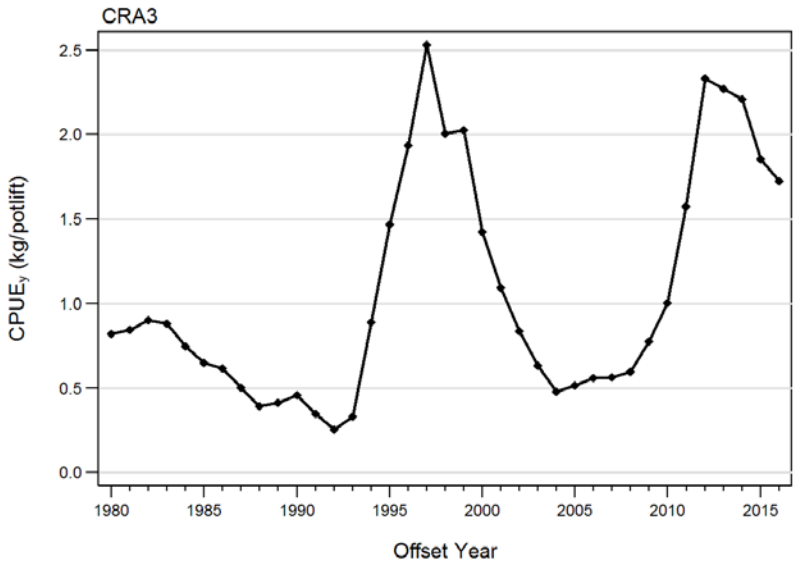

Figure 6.1: The history of CPUE in CRA 3, 1980 – 2016 (offset years) (based on the procedure for preparing data for CPUE standardisation called "F2-LFX").

6.2 PROPOSED CRA 3 OPTIONS

Table 6.1 provides a summary of the options proposed for CRA 3. The current CRA 3 management procedure has been used to guide TAC setting options. The proposals to decrease the TAC and TACC are expected to ensure the CRA 3 stock is maintained above B_{MSY}.

Table 6.1: TAC, allowance and TACC proposals for CRA 3 from 1 April 2017 (all values in tonnes).

Option	TAC	TACC	Allowances		
			Customary **Māori**	Recreational	Other mortality
CRA3_01: Use the current CRA 3 management procedure and decrease the TAC by decreasing the TACC by 9%.	366.86 ↓	237.86 ↓	20	20	89
CRA3_02 (*status quo*): Retain the current CRA 3 TAC, allowances and TACC.	389.95	260.95	20	20	89

6.2.1 TAC setting

The current CRA 3 TACC is 389.95 tonnes.

Best available information (i.e. recent commercial CPUE information) suggests CRA 3 biomass in 2016 is lower than biomass in 2014, but is still considered to be above B_{MSY}. Accordingly the Minister has two options, to set the CRA 3 TAC to maintain the stock at or above B_{MSY} (section 13(2)(a)).

- *Option CRA3_01 – Use the CRA 3 management procedure and decrease the CRA 3 TAC*

Under Option CRA3_01 the CRA 3 TAC would be decreased to 366.86 tonnes. The proposed TAC decrease is specified by the CRA 3 management procedure that the Minister agreed to use in 2015 to guide TAC setting in the fishery until the 2020/21 fishing year.

Ongoing application of the CRA 3 management procedure is expected to maintain the stock above B_{MSY} with greater than 50% probability and above B_{MIN} with greater than 90% probability. Simulation testing indicates it would maintain the stock above B_{MSY} with 99% probability.

This option will decrease the current commercial utilisation opportunities. Historically, only the TACC has been increased or decreased to give effect to the variations in the TAC.

Overall it is expected that ongoing application of the CRA 3 management procedure will maintain fishing opportunities for all sectors by maintaining stock abundance above the agreed reference levels.

- *Option CRA3_02 – Retain the current CRA 3 TAC*

Under Option CRA3_02 the CRA 3 TAC would stay at its current level for the 2017/18 fishing year.

This option is not supported by MPI, nor by the NRLMG. Maintaining the current TAC could result in a further decline in CRA 3 stock abundance and this could affect the utilisation opportunities for all fishing sectors.

6.2.2 Setting non-commercial allowances

- ***Customary Māori allowance***

No change is proposed to the 20 tonne customary Māori allowance for CRA 3.

Information on CRA 3 customary catches is available under the Fisheries (Kaimoana) Regulations 1998 and regulation 50 of the Fisheries (Amateur Fishing) Regulations 2013. In the 2015 calendar year, approximately 11,000 rock lobsters were reported as harvested from CRA 3. Noting the incompleteness and uncertainty in the CRA 3 customary harvest information, it is assumed that current harvest is within the 20 tonne allowance allocated for customary Māori interests.

An estimate of 20 tonnes was used in the last 2014 CRA 3 stock assessment model to represent customary catches.

- *Recreational allowance*

No change is proposed to the 20 tonne recreational allowance for CRA 3 because the current assumptions of recreational harvest are within the bounds of stock assessment model estimates.

In the 2014 CRA 3 stock assessment, recreational catch estimates from 1992, 1996 and 2011 recreational harvest surveys were used to construct a recreational catch trajectory (Figure 6.2). The model assumed that recreational catch was proportional to the spring-summer commercial CPUE for CRA 3. The resulting recreational catch trajectory showed a strong increasing trend from the early 1990s, exceeding 20 tonnes in the late 1990s, and then a strong decreasing trend in the early 2000s before an increase was seen in the late 2000s.

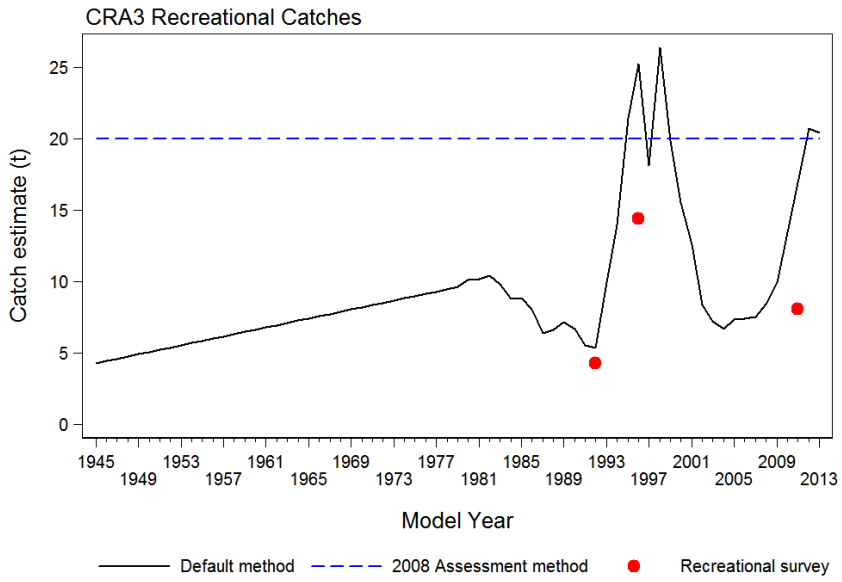

Figure 6.2: Recreational catch trajectory (t) for the 2014 stock assessment of CRA 3. The red dots refer to the recreational survey estimates. For comparison, the solid black line shows the catch trajectory made proportional to spring-summer CRA 3 CPUE. The blue dashed line is the recreational catch trajectory that was used in the 2008 stock assessment (a constant 20 tonnes). Section 111 catches which were taken by commercial fishers for non-commercial purposes were added to the 2014 trajectory (i.e. a maximum of 2.94 tonnes).

- *Other mortality allowance*

No change is proposed to the 89 tonne CRA 3 allowance for other sources of fishing-related mortality (i.e. for illegal catch).

There is no reliable information on current levels of illegal catch. The Rock Lobster Fisheries Assessment Working Group used available MPI estimates from 1989 and a constant illegal catch of 89 tonnes per year from 2002 to 2013. MPI considers that there are moderate to high levels of illegal fishing in CRA 3.

6.2.3 TACC setting

The current CRA 3 TACC is 260.95 tonnes.

- *Option CRA3_01 – Decrease the CRA 3 TACC by 23.09 tonnes*

Under Option CRA3_01 the CRA 3 TACC would be decreased to 237.86 tonnes from 1 April 2017, as guided by the use of the CRA 3 management procedure. The proposed 23.09 tonne TACC decrease has the potential to result in a loss of revenue for the industry of approximately $1.7 million (based on 2016 average port price information).

A graphical representation of the CRA 3 management procedure is provided in Figure 6.3. The graph shows the proposed TACC for the next year as a function of offset-year CPUE in the current year. The 2016 standardised offset year CPUE was 1.72 kg/potlift, a decrease from 1.88 kg/potlift in 2015. When the rule was operated with the 2016 CPUE it resulted in a TACC of 237.86 tonnes (shown by the red square on the graph).

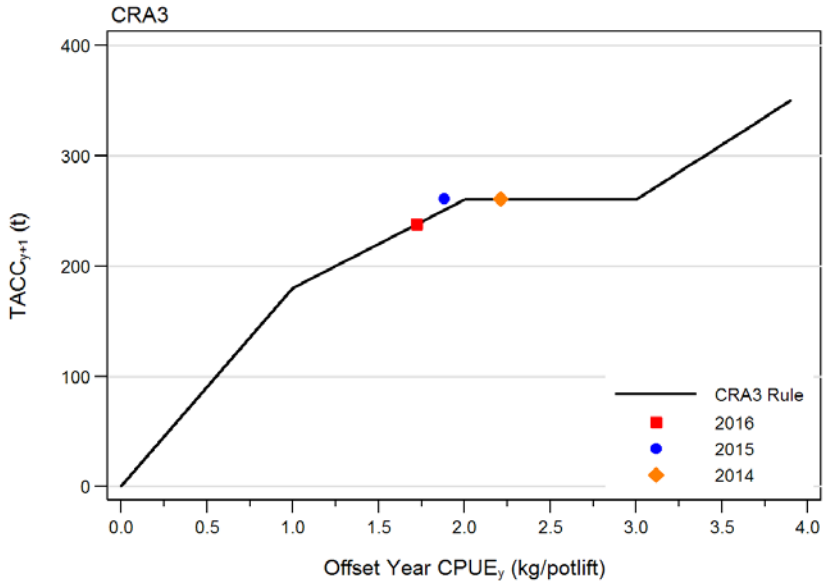

Figure 6.3: The CRA 3 management procedure, showing the TACCs resulting from the rule evaluations performed in 2014 through 2016 for the 2014/15 through 2017/18 fishing years (shown as coloured shapes).

- *Option CRA3_02 – Retain the current CRA 3 TACC*

Under Option CRA3_02 the CRA 3 TACC would stay at its current level. This option would maintain the current commercial fishing opportunities.

This option is not supported by MPI, nor by the NRLMG.

7 Review of the CRA 4 (Wellington/Hawkes Bay) Rock Lobster Fishery

7.1 CRA 4 STOCK STATUS

A new stock assessment was carried out for the CRA 4 fishery in 2016 (the previous was in 2011). The assessment results suggest that stock biomass in 2016 was 1.3 times B_{MIN}, but below the management target, B_{REF}, by 25%.[9] Spawning stock biomass in 2016 was 51% of the unfished level.

With 2016 catch levels and recent recruitments, stock biomass is projected to decline in the next four years by 6%.

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 7.1. CPUE increased from 2008 to 2012, but has since declined**.**

[9] B_{REF} for CRA 4 is the average pre-season autumn-winter vulnerable biomass associated with the period 1979-88.

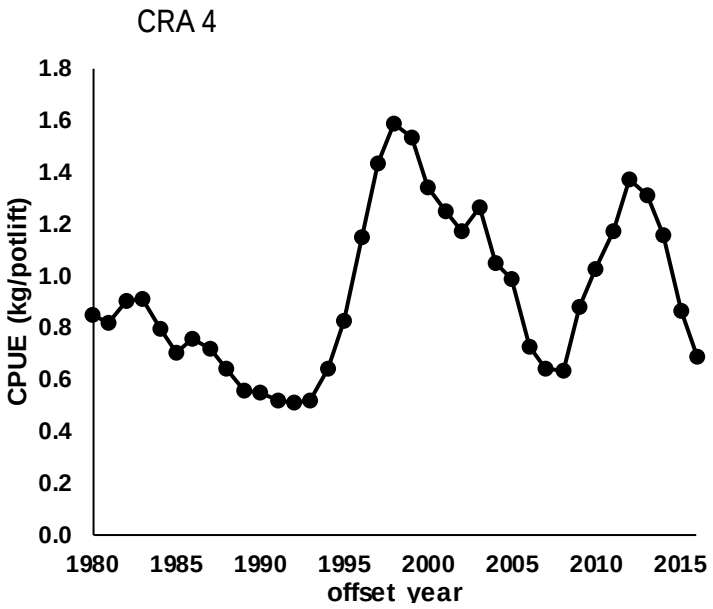

Figure 7.1: The history of CPUE in CRA 4, 1980 – 2016 (offset years) (based on the procedure for preparing data for CPUE standardisation called "F2-LFX").

7.2 PROPOSED CRA 4 OPTIONS

Table 7.1 provides a summary of the options proposed for CRA 4. Two different and new CRA 4 management procedures have been used to guide TAC setting options. These procedures are designed to rebuild the CRA 4 stock to the management target (B_{REF}).

Table 7.1: TAC, allowance and TACC proposals for CRA 4 from 1 April 2017 (all values in tonnes).

Option	TAC	TACC	Allowances		
			Customary **Māori**	Recreational	Other mortality
CRA4_01: Use the new *Rule 24* CRA 4 management procedure and reduce the TAC by reducing the TACC by 23%.	502 ↓	307 ↓	35	85	75
CRA4_02: Use the new *Rule 6* CRA 4 management procedure and reduce the TAC by reducing the TACC by 27%.	484 ↓	289 ↓	35	85	75

7.2.1 Use of a new management procedure

It is proposed that a new management procedure is used to guide TAC setting in the CRA 4 fishery for five years from the 2017/18 to 2021/22 fishing years.

Two different management procedure options are proposed for consideration: either *Rule 24* [Option CRA4_01] or *Rule 6* [Option CRA4_02]. It is proposed that one of these new procedures replaces the current CRA 4 management procedure that has been in use in the fishery since 2012 and has now effectively expired.

The development of the new CRA 4 management procedure was guided by feedback received from a multi-sector meeting in Masterton in July 2016 where future aspirations for the fishery were discussed. Common themes that were identified at the meeting included: sustainability, good levels of abundance, stability, safety and fish being available for the next

generation. Feedback from the NRLMG was used to refine the set of possible candidate procedures.

Use of either of the new CRA 4 management procedures should not pose a risk to stock sustainability. Application of either procedure is expected to rebuild current stock biomass towards the management target, B_{REF}, in the next five years by greater than 86% probability. For further information on the specifications of the new CRA 4 procedures refer to Appendix 1.

Table 7.2: Summary of indicator results from base case evaluations for the new candidate CRA 4 management procedures (Options CRA4_01 and CRA4_02).

Stock Indicators[10]	*Results*	
	Rule 24 (CRA4_01)	*Rule 6 (CRA4_02)*
Probability of stock biomass being above B_{REF} in 2021	86.3%	91.7%
Catch Indicators		
Average commercial catch over five years	326 t	309 t
Commercial catch in 2021	396 t	369 t
CPUE Indicators		
Average CPUE over 5 years	0.76 kg/potlift	0.78 kg/potlift
Commercial CPUE in 2021	0.94 kg/potlift	0.97 kg/potlift

There are a number of similarities between the proposed new CRA 4 management procedures, including: between CPUE values of 0 to 0.1 kg/potlift the TACC is zero, the TACC then increases linearly with CPUE to 0.9 kg/potlift, and as CPUE increases above 1.3 kg/potlift, the TACC increases in steps with a width of 0.1 kg/potlift and a height of 5.3% of the preceding TACC. The two procedures differ in their design with respect to the plateau height: for *Rule 24* between CPUEs of 0.9 to 1.3 kg/potlift the TACC is 420 tonnes, and for *Rule 6* between the same CPUEs the TACC is 380 tonnes (see Figures 7.3 and 7.4).

7.2.2 TAC setting

The current CRA 4 TAC is 592 tonnes.

There is a reliable estimate of current biomass but no reliable estimate of B_{MSY}. Because of this, any variation of the CRA 4 TAC must be done under section 13(2A).

- *Option CRA4_01 – Use the new Rule 24 CRA 4 management procedure and decrease the CRA 4 TAC*

Under Option CRA4_01 the CRA 4 TAC would be decreased to 502 tonnes. This TAC is guided by the use of the new *Rule 24* CRA 4 management procedure.

Under *Rule 24* there is an 86.3% probability that the stock will be above the management target, $B_{REF,}$ in 2021. Rebuilding the CRA 4 stock towards the target should provide increased utilisation opportunities for all sectors.

It is proposed that the TAC decrease comes solely from a 90 tonne decrease to the TACC.

[10] An explanation of the stock indicators is provided in section 4.2.

- *Option CRA4_02 – Use the new Rule 6 CRA 4 management procedure and decrease the CRA 4 TAC*

Under Option CRA4_02 the CRA 4 TAC would be decreased to 484 tonnes. This TAC is guided by the use of the new *Rule 6* CRA 4 management procedure.

Under *Rule 6* there is a 91.7% probability that the stock will be above the management target, $B_{REF,}$ in 2021, which should provide increased utilisation opportunities for all sectors.

It is proposed that the TAC decrease comes solely from a 108 tonne decrease to the TACC.

7.2.3 Setting non-commercial allowances

- ***Customary Māori allowance***

No change is proposed to the 35 tonne customary Māori allowance for CRA 4 under either option.

Information on CRA 4 customary catches is available under the Fisheries (Kaimoana) Regulations 1998 and regulation 50 of the Fisheries (Amateur Fishing) Regulations 2013. In the last three April fishing years, less than 5 tonnes of rock lobsters were reported as landed each year in CRA 4 under the regulations. Noting the incompleteness and uncertainty in the CRA 4 customary harvest information, it is assumed current harvest is within the 35 tonne allowance allocated for customary Māori interests.

An estimate of 20 tonnes was used in the 2016 CRA 4 stock assessment model to represent customary catches.

- *Recreational allowance*

No change is proposed to the 85 tonne recreational allowance for CRA 4 under either option because the current assumptions of recreational harvest are within the bounds of stock assessment model estimates.

In the 2016 CRA 4 stock assessment, recreational catch estimates from 1994, 1996 and 2011 recreational harvest surveys were used to construct a recreational catch trajectory (Figure 7.2). The model assumed that recreational catch was proportional to the spring-summer commercial CPUE for CRA 4. The resulting recreational catch trajectory showed a strong increasing trend up to the end of 1990s, following by a steep drop to 2007/08, which since recovered by 2013/14 before dropping again from 2014/15.

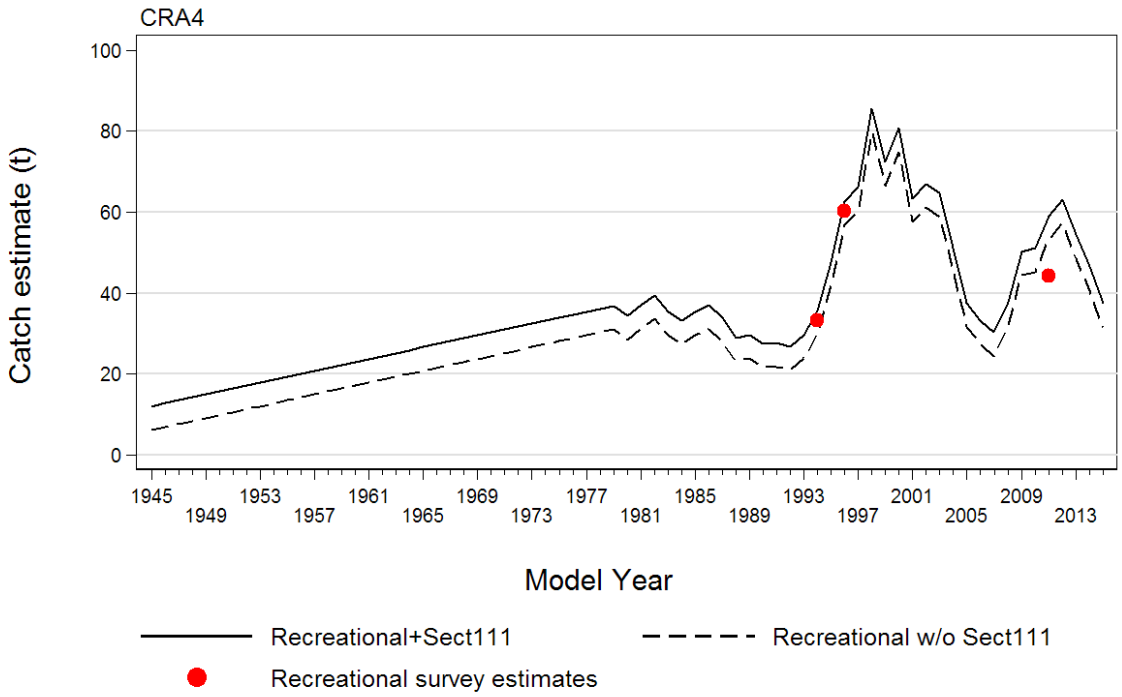

Figure 7.2: Recreational catch trajectories (tonnes) for the 2016 stock assessment of CRA 4. The red dots refer to the recreational survey estimates. Trajectories with (solid black line) and without (dashed black line) the additional Section 111 catches which were taken by commercial fishers for non-commercial purposes are shown (i.e. a maximum of 5.8 tonnes of section 111 catches).

- *Other mortality allowance*

No change is proposed to the 75 tonne CRA 4 allowance for other sources of fishing-related mortality under either option.

There is no reliable information on current levels of illegal catch. The Rock Lobster Fisheries Assessment Working Group used available MPI estimates from 1990 to 2004 in the 2016 stock assessment model to estimate illegal catches. For the 2015/16 fishing year the illegal catch estimate assumed for the model was 40 tonnes.

The 2016 CRA 4 assessment also assumed that handling mortality was 10% of returned lobsters until 1990 and then 5%, based on a literature review. The 2016 model estimate of handling mortality was 18.14 tonnes.

It is assumed that estimated levels of illegal catch and handling mortality are within the other mortality allowance.

7.2.4 TACC setting

The current TACC for CRA 4 is 397 tonnes.

- *Option CRA4_01 - Decrease the CRA 4 TACC by 90 tonnes (as guided by the new Rule 24 CRA 4 management procedure)*

Under Option CRA4_01 the CRA 4 TACC would be decreased to 307 tonnes from 1 April 2017, as guided by the use of the new CRA 4 management procedure (*Rule 24*). The proposed 90 tonne TACC decrease has the potential to result in a loss of revenue for the industry of approximately $6.5 million (based on 2016 average port price information).

A graphical representation of the *Rule 24* CRA 4 management procedure is provided in Figure 7.3. The graph shows the proposed TACC for the next year as a function of offset-year CPUE in the current year. The 2016 standardised offset year CPUE was 0.69 kg/potlift, and when the rule was operated with the 2016 CPUE it resulted in a TACC of 307 tonnes (shown by the red square on the graph).

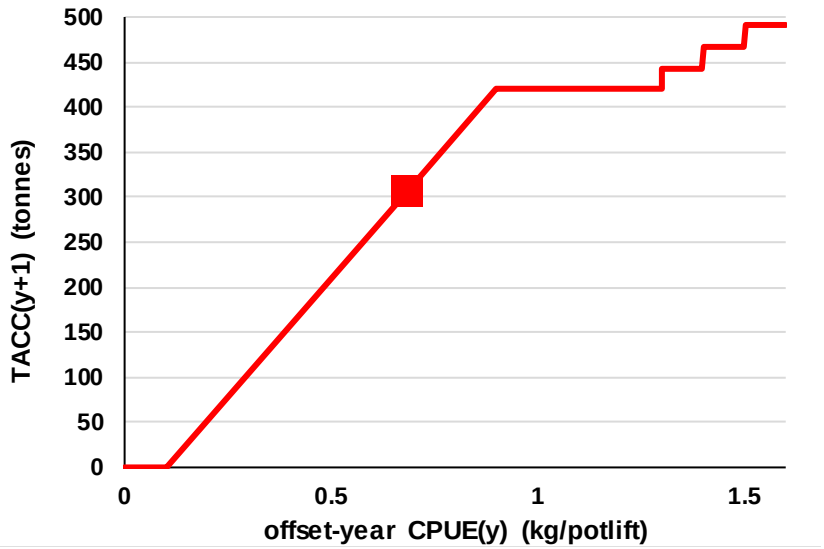

Figure 7.3: The new *Rule 24* CRA 4 management procedure, showing the TACC resulting from the rule evaluation performed in 2016 for the 2017/18 fishing year.

- *Option CRA4_02 - Decrease the CRA 4 TACC by 108 tonnes (as guided by the new Rule 6 CRA 4 management procedure)*

Under Option CRA4_02 the CRA 4 TACC would be decreased to 289 tonnes from 1 April 2017, as guided by the use of the new CRA 4 management procedure (*Rule 6*). The proposed 108 tonne TACC decrease will result in a loss of revenue for the industry of approximately $7.8 million (based on 2016 average port price information).

A graphical representation of the *Rule 6* CRA 4 management procedure is provided in Figure 7.4. When the rule was operated with the 2016 standardised offset year CPUE of 0.69 kg/potlift it resulted in a TACC of 289 tonnes (shown by the red square on the graph).

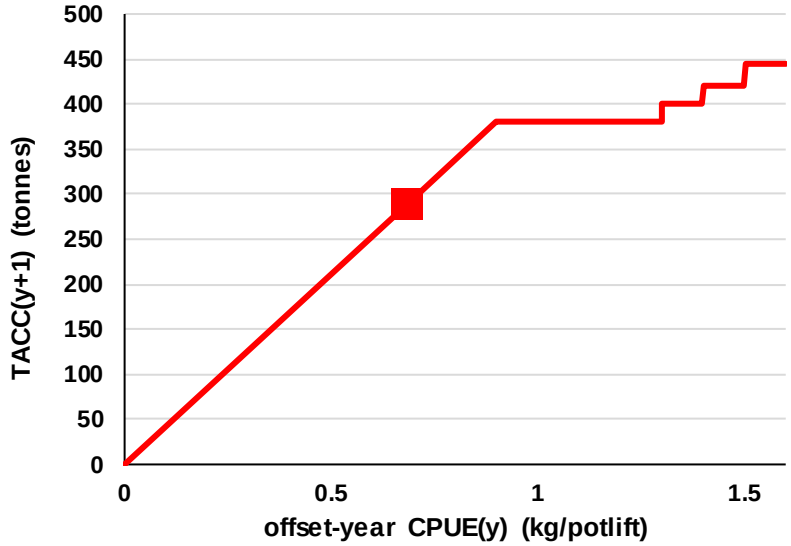

Figure 7.4: The new *Rule 6* CRA 4 management procedure, showing the TACC resulting from the rule evaluation performed in 2016 for the 2017/18 fishing year.

8 Review of the CRA 7 (Otago) Rock Lobster Fishery

8.1 CRA 7 STOCK STATUS

The results of the most recent CRA 7 stock assessment conducted in 2015 suggest there are no sustainability concerns for the CRA 7 fishery. 2015 biomass was twice B_{REF} and 8.4 times B_{MIN}. Spawning stock biomass in 2014 was 17% of the unfished level. [11]

With 2014 catch levels and recent recruitments, biomass was projected to decline by 7% by 2018, but would remain well above reference levels.

Standardised 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 (i.e. October through September) CRA 7 commercial CPUE is shown in Figure 8.1. CPUE has increased substantially since 2012.

[11] B_{REF} for CRA 7 is the average 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. There are no reliable B_{MSY} and *SSB* estimates available for CRA 7 because of the high level of emigration estimated for the stock.

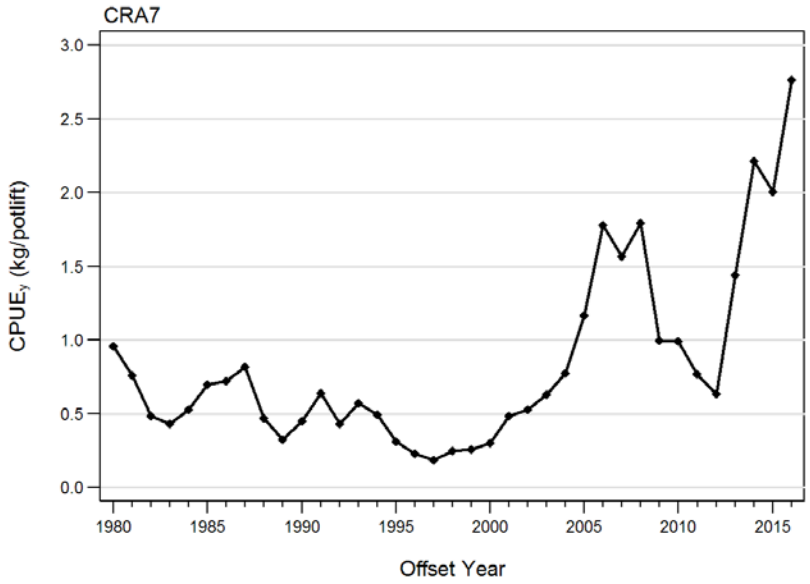

Figure 8.1: The history of CPUE in CRA 7, 1980 – 2016 (offset years) (based on the procedure for preparing data for CPUE standardisation called "F2_LFX").

8.2 PROPOSED CRA 7 OPTIONS

Table 8.1 provides a summary of the options proposed for CRA 7. The current CRA 7 management procedure has been used to guide TAC setting options. The proposals to increase the TAC and TACC will provide for increased utilisation opportunities whilst ensuring sustainability.

Table 8.1: TAC, allowance and TACC proposals for CRA 7 from 1 April 2017 (all values in tonnes).

Option	TAC	TACC	Allowances		
			Customary **Māori**	Recreational	Other mortality
CRA7_01: Use the current CRA 7 management procedure and increase the TAC by increasing the TACC by 15%.	132.52 ↑	112.52 ↑	10	5	5
CRA7_02 (*status quo*): Retain the current CRA 7 TAC, allowances and TACC.	117.72	97.72	10	5	5

8.2.1 TAC setting

The current CRA 7 TAC is 117.72 tonnes.

There is a reliable estimate of current biomass but no reliable estimate of B_{MSY}. Because of this any variation to the CRA 7 TAC must be done under section 13(2A).

- *Option CRA7_01 – Use the CRA 7 management procedure and increase the CRA 7 TAC*

Under Option CRA7_01 the CRA 7 TAC would be increased to 132.52 tonnes. The proposed TAC increase is specified by the CRA 7 management procedure that the Minister agreed to use in 2013 to guide TAC setting in the fishery. The CRA 7 management procedure was evaluated with a new operating model in 2015, effectively extending its use from 2017/18 to the 2020/21 fishing year.

Ongoing application of the CRA 7 management procedure is expected to maintain the stock above B_{REF} with greater than 50% probability. Simulation testing indicates it would maintain the stock above B_{REF} with 98% probability.

This option will increase the current utilisation opportunities. Historically, only the TACC has been increased or decreased to give effect to the variations in the TAC. Overall utilisation benefits are likely to increase for all sectors under the management procedure approach through increases to CRA 7 abundance.

- *Option CRA7_02 – Retain the current CRA 7 TAC*

Under Option CRA7_02 the CRA 7 TAC would stay at its current level for the 2017/18 fishing year.

This option could result in increased abundance in the CRA 7 fishery in the short-term, increased non-commercial catches and catch rates compared to Option CRA7_01, and higher CPUE for commercial fishers, which may result in reduced harvesting costs (but at the cost of not being able to take advantage of the proposed TACC increase under Option CRA7_01).

8.2.2 Setting non-commercial allowances

- ***Customary Māori allowance***

No change is proposed to the 10 tonne customary Māori allowance for CRA 7.

Reports of customary Māori catch made under the Fisheries (South Island Customary Fishing) Regulations 1999 suggests there are low levels of rock lobster harvest from CRA 7. It is assumed current harvest is within the 10 tonne allowance allocated for customary Māori interests at this time.

An estimate of 1 tonne was used in the last 2015 CRA 7 stock assessment model to represent customary catches (red line in Figure 8.2 below).

- *Recreational allowance*

No change is proposed to the 5 tonne recreational allowance for CRA 7 because the current assumptions of recreational harvest are within the bounds of stock assessment model estimates.

In the 2015 CRA 7 stock assessment, recreational catch estimates were assumed to be at 1 tonne in 1945 and were ramped to 5 tonnes in 1979. A constant estimate of 5 tonnes was assumed from 1979 to 2014 (Figure 8.2).

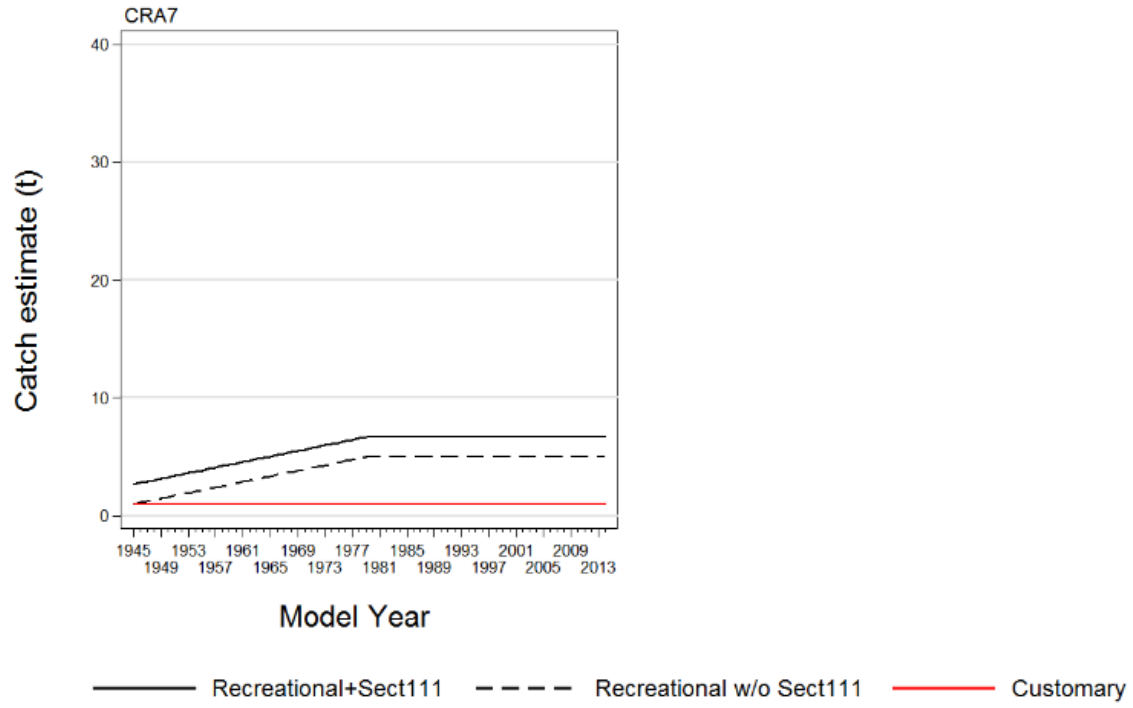

Figure 8.2: Recreational (black line) catch trajectory (tonnes) for the 2015 stock assessment of CRA 7. The red line is the customary catch trajectory used in the 2015 assessment. Section 111 catches which were taken by commercial fishers for non-commercial purposes were added to the 2015 recreational catch trajectory (i.e. a maximum of 1.7 tonnes).

- *Other mortality allowance*

No change is proposed to the 5 tonne CRA 7 allowance for other sources of fishing-related mortality (i.e. for illegal catch).

There is no reliable information on current levels of illegal catch. The Rock Lobster Fisheries Assessment Working Group used available MPI estimates from 1990 to 2002 and assumed 1 tonne per year from 2002 to 2014 in the stock assessment model.

8.2.3 TACC setting

The current CRA 7 TACC is 97.72 tonnes.

- *Option CRA7_01 – Increase the CRA 7 TACC by 14.8 tonnes*

Under Option CRA7_01 the CRA 7 TACC would be increased to 112.52 tonnes from 1 April 2017, as guided by the use of the CRA 7 management procedure. The proposed 14.8 tonne TACC increase has the potential to result in a gain of revenue for the industry of approximately $1.07 million (based on 2016 average port price information).

A graphical representation of the CRA 7 management procedure is provided in Figure 8.3. The graph shows the proposed TACC for the next year as a function of offset-year CPUE in the current year. The 2016 standardised offset year CPUE was 2.78 kg/potlift, and when the rule was operated with the 2016 CPUE it resulted in a TACC of 112.52 tonnes (shown by the red square on the graph).

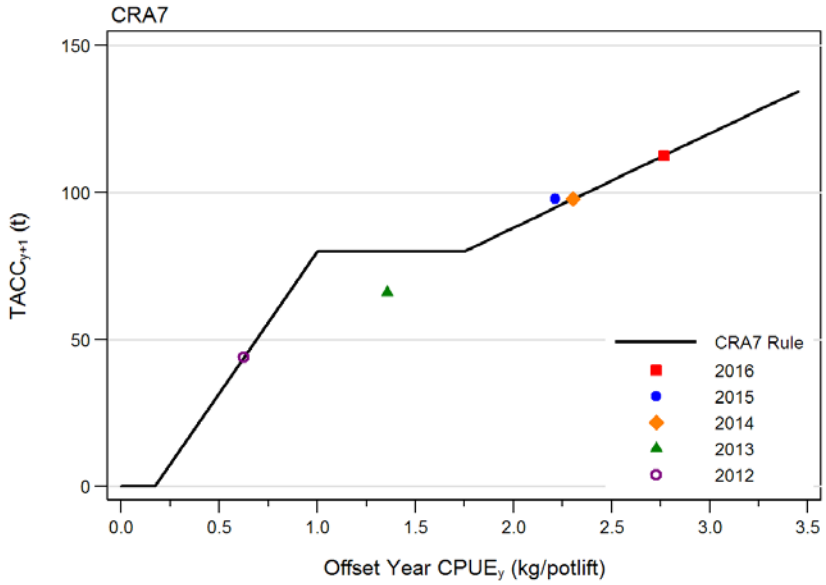

Figure 8.3: The CRA 7 management procedure, showing the TACCs resulting from the rule evaluations performed in 2012 through 2016 for the 2013/14 through 2017/18 fishing years (shown as coloured shapes).

- *Option CRA7_02 – Retain the current CRA 7 TACC*

Under Option CRA7_02 the CRA 7 TACC would stay at its current level. This option would maintain the current level of sustainability of the commercial fishery without realising the potential utilisation opportunities for commercial fishers.

9 Other Matters

9.1 CRA 2 (BAY OF PLENTY) ROCK LOBSTER FISHERY

MPI acknowledges the concerns expressed by some stakeholders about the availability of rock lobsters in the CRA 2 (Hauraki Gulf/Bay of Plenty) fishery. The current CRA 2 management procedure has recommended no change to the CRA 2 TAC for April 2017 and there is no other information to suggest a strong sustainability concern for the fishery at this time.

MPI will be taking a closer look at the CRA 2 fishery in 2017/18. The CRA 2 stock assessment has been brought forward from 2018 to 2017, and a local multi-sector reference group will be set up in 2017 to discuss issues facing the fishery and identify potential solutions. This new science information and local engagement will inform a comprehensive review of management measures for 2018.

9.2 CRA 9 (WESTLAND/TARANAKI) ROCK LOBSTER FISHERY

A management procedure for CRA 9 was used to guide TAC setting for the 2014/15 fishing year. However, an audit of the CRA 9 CPUE data in 2015 suggested that the CRA 9 CPUE index was not a reliable indicator of abundance in CRA 9 because of the small number of vessels fishing in recent years (six or fewer) and the large size of the CRA 9 area, in which changes in the area fished could affect CPUE substantially. The Minister agreed not to use

the CRA 9 management procedure for April 2016 TAC setting as long as alternative management approaches were explored.

From April 2015 the CRA 9 industry has put effort into increasing their logbook programme coverage. There are now five regular logbook participants, which is improving information on catch rates and the size frequency distributions of lobsters in pots.

The stock status of rock lobster in CRA 9 is unknown. However, the size frequency distribution from recent logbook data shows a large proportion of fish are well above the minimum size limit, which suggests the stock has only had low fishing pressure in the recent history of the fishery. MPI plans to analyse data from the monitoring programme in 2017 to provide updated advice on the status of the CRA 9 stock.

10 Conclusion

MPI and the NRLMG support the use of management procedures in New Zealand's rock lobster fisheries where they can be demonstrated to be robust in terms of informing TAC-setting decisions. Use of management procedures to guide TAC setting allows for much more rapid management responses than does the conventional approach of periodic stock assessment followed by decision making. Having infrequent stock assessments can cause delays to the implementation of management actions required for stock sustainability.

MPI and the NRLMG consider that once a management procedure has been agreed for use, it should be followed unless there are compelling reasons in a particular case not to follow it.

MPI and the NRLMG have based the proposals contained in this discussion document on these principles and seeks information and views from tangata whenua and stakeholders to inform this review of rock lobster sustainability measures for 1 April 2017.

11 Appendix 1: New CRA 4 management procedure specifications

In 2016 a new stock assessment was carried out for CRA 4. This assessment model was used as the operating model for evaluating new CRA 4 management procedures.

The NRLMG considered numerous CRA 4 management procedure options late in 2016 and have put forward two candidate rules, called *Rule 24* and *Rule 6*, for consideration.

Some important elements of the proposed new CRA 4 management procedures are:

a) The output variable is TACC (tonnes);
b) 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;
c) CPUE is calculated using the 2012 F2_LFX procedure which uses:
    i. 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),
    ii. 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 procedure is to be evaluated every year (no "latent year"), based on offset-year CPUE; and
e) The minimum change threshold for the TACC is 5%. There is no maximum change threshold for the TACC.

The proposed new CRA 4 management procedures are both generalised plateau step rules, illustrated in Figures 7.3 and 7.4 above.

For Rule 24: between CPUE values of zero and 0.1 kg/potlift the TACC is zero, the TACC then increases linearly to 0.9 kg/potlift, and between CPUEs of 0.9 and 1.3 kg/potlift the TACC is 420 tonnes. As CPUE increases above 1.3 kg/potlift, the TACC increases in steps with a width of 0.1 kg/potlift and a height of 5.3% of the preceding TACC.

For Rule 6: the specifications are the same as *Rule 24*, except that between CPUEs of 0.9 and 1.3 kg/potlift the TACC is 380 tonnes.

The table below provides the results of the operation of the proposed new CRA 4 management procedures for the 2017/18 fishing year.

Proposed CRA 4 rules	Offset-year 'F2-LFX' CPUE at time of analysis (kg/potlift)	Rule result: TACC (t)
Rule 24 (Option CRA4_01)	0.685	307
Rule 6 (Option CRA4_02)	0.685	289