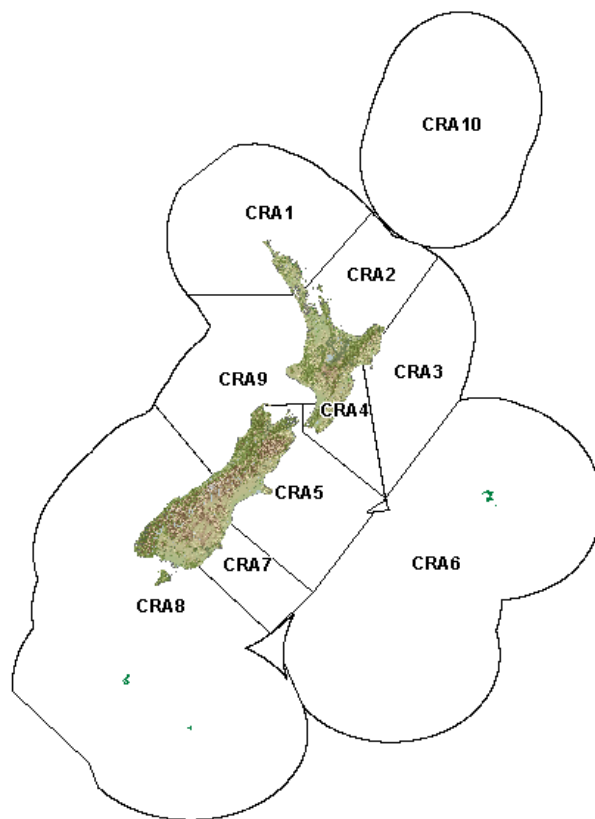


NEW ZEALAND ROCK LOBSTER FISHERIES

PUBLIC CONSULTATION DOCUMENT ON PROPOSALS TO REVIEW SUSTAINABILITY MEASURES AND OTHER MANAGEMENT CONTROLS FOR 1 APRIL 2011



13 DECEMBER 2010

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1. INTRODUCTION

PURPOSE OF THIS DOCUMENT

1. The purpose of this document is to commence a consultation process on behalf of the Minister of Fisheries on proposals to vary sustainability measures and other management controls for rock lobster fisheries for the 2011-12 fishing year.
2. There are three initial advice papers in this document that set out the National Rock Lobster Management Group's (NRLMG's) initial advice on proposals to:
 - a) use new management procedures to guide Total Allowable Catch (TAC) setting in the CRA 5 (Canterbury/Marlborough) and CRA 7 (Otago) spiny rock lobster stocks
 - b) set TACs and allowances for the CRA 4 (Wellington/Hawkes Bay), CRA 5 (Canterbury/Marlborough), CRA 7 (Otago) and CRA 8 (Southern) spiny rock lobster stocks
 - c) review deemed value rates for spiny and packhorse rock lobster.
3. The Ministry of Fisheries (MFish) welcomes information and comments from tangata whenua, fishery stakeholders and other interested parties on the proposals.
4. Stakeholders are requested to forward their comments on the proposals by **5pm Wednesday, 2 February 2011**.
5. Submissions should be sent directly to:

Trudie Macfarlane
Ministry of Fisheries
P O Box 1020
Wellington

or emailed to trudie.macfarlane@fish.govt.nz

TERMINOLOGY IN THE DOCUMENT

Management Procedures

6. A management procedure is a tool used to guide the setting of catch limits. Management procedures are becoming more widely used, especially in South Africa, Australia, Europe, North America, and in New Zealand. A management procedure:
 - a) specifies what data will be used to make catch limit decisions;
 - b) specifies how the data will be collected and analysed;
 - c) contains a harvest control rule (a mathematical equation that determines what the specific output of the procedure will be, such as the exact TAC or Total Allowable Commercial Catch (TACC)); and
 - d) has been extensively simulation-tested using an operating model that is a model of the fishery system being managed.

7. Under a management procedure approach, agreement is obtained among managers and stakeholders before the procedure is implemented: they agree about the data inputs, the way the inputs will be treated to make inferences, the harvest control rule and the period for which the management procedure will be used. Extensive simulation testing of the procedure is undertaken to ensure it will deliver the desired outcomes.
8. The advantages of a management procedure approach, over the conventional approach of periodic stock assessments followed by decision making, are:
 - a) the process leads to explicit definition of management objectives;
 - b) all participants in the fishery can become involved in the choice of procedure;
 - c) uncertainty in all facets of the assessment and management process can be addressed;
 - d) greater certainty of achieving outcomes is provided;
 - e) management procedures reduce the need for regular stock assessments, freeing resources for other research; and
 - f) the process is more understandable to fishers than the conventional approach.

Sustainability Indicators (Bmsy, Bref, Bmin)

9. The NRLMG uses sustainability indicators to report on stock health and to evaluate the effectiveness of management options. For most rock lobster stocks, performance is reported against sustainability reference levels and a minimum stock size.
10. Three sustainability indicators are relevant to evaluation of the proposals presented in this paper:
 - a) The statutory reference level, ***Bmsy***. TACs for rock lobster stocks are set under section 13 of the Act. Section 13 requires the Minister to set TACs for rock lobster stocks that move the stocks to, or maintain the stocks at, a level at or above *Bmsy*, or that is not inconsistent with this objective.
 - b) The proxy reference level, ***Bref***. When a *Bmsy* estimate is absent or unreliable, alternative proxy reference levels are used. Proxy reference levels are a way of setting a TAC that is not inconsistent with the objective of maintaining a stock at or above, or moving the stock towards a level that can maintain the maximum sustainable yield. This “not inconsistent” approach is set out in section 13(2A) of the Act where the Minister considers that current biomass or *Bmsy* cannot be estimated reliably using best information. *Bref* is generally a stock size at or above the stock size associated with a period in the fishery that showed good productivity and was demonstrably safe.
 - c) The minimum stock size, ***Bmin***. *Bmin* is either the stock size associated with lowest abundance in the observed history of the fishery or $\frac{1}{2}$ *Bref*.
11. For all these indicators, the stock size is measured in terms of vulnerable biomass. “Vulnerable biomass” is the total quantity of lobsters available to the fishery (ie, it does not include lobsters that cannot be harvested such as undersize lobsters and berried female lobsters).
12. The NRLMG’s management goal is for all rock lobster fisheries to be managed and maintained at or above the assessed and agreed reference levels, using a comprehensive approach that recognises a range of customary Maori, amateur, commercial and environmental concerns and

benefits. In order to be consistent with management goal the NRLMG has specified a desired performance in relation to sustainability indicators, which is:

- a) a stock size above the agreed proxy (*Bref*) with at least 50% of the time
 - b) a stock size that remains above the minimum (*Bmin*) with 90% probability; and
 - c) a spawning stock size that remains above 20% of its unfished level with high probability.
13. Extensive simulation-testing based on operating models of the stocks and associated fisheries suggest that all the management procedures discussed in this paper achieve the desired performance in relation to the sustainability indicators.

The Harvest Strategy Standard

14. In October 2008, MFish released the Harvest Strategy standard for New Zealand fisheries (the HSS), which specifies performance standards for Quota Management System species. The NRLMG considers the management procedures previously agreed for CRA 4, CRA 7 and CRA 8, and the proposed new management procedure for CRA 5 and CRA 7, to be consistent with the HSS.
15. The Guidelines for Harvest Strategy Standards (MFish 2008) 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]

ROCK LOBSTER FISHERIES

16. The spiny rock lobster (*Jasus edwardsii*; koura) has always been important to Maori and has supported increasingly important recreational and commercial fisheries. Rock lobsters support one of the country’s oldest commercial fisheries, and are one of the seafood industry’s top export earners. The packhorse rock lobster makes up less than 1% of commercial rock lobster landings. Estimates of non-commercial catches are unknown but non-commercial fishers are known to target packhorse rock lobster to the North of New Zealand.
17. For information on fishery and biological characteristics of rock lobster refer to sections in the 2010 NRLMG Annual Report.

2. PROPOSAL TO USE NEW MANAGEMENT PROCEDURES TO GUIDE TAC SETTING IN CRA 5 AND CRA 7

SUMMARY

18. The National Rock Lobster Management Group (NRLMG) proposes to use new management procedures in CRA 5 (Canterbury/Marlborough) and CRA 7 (Otago) rock lobster fisheries to guide Total Allowable Catch (TAC) setting from the 2011-12 fishing year onwards, beginning 1 April 2011.
19. The following management options are proposed for CRA 5 and CRA 7 in this paper:

Stock	Option	Description
CRA 5	Option 1	Agree to use the proposed new CRA 5 Management Procedure to guide TAC setting in CRA 5
	Option 2	Continue to use periodic stock assessments to guide TAC setting in CRA 5 (<i>status quo</i>)
CRA 7	Option 1	Agree to use the proposed revised CRA 7 Management Procedure to guide TAC setting in CRA 7
	Option 2	Continue to use the current CRA 7 Management Procedure to guide TAC setting in CRA 7 (<i>status quo</i>)

20. A central consideration when choosing whether or not to use a management procedure to guide TAC setting in a fishery is whether the procedure enables the Minister of Fisheries to set a TAC that complies with section 13 of the Fisheries Act 1996 (the Act). Section 13 requires the Minister to set a TAC that moves the stock to, or maintains the stock at, a size at or above a level that can produce the maximum sustainable yield (ie, *Bmsy*) or at a level that is not inconsistent with this objective.
21. The NRLMG is confident that application of the proposed new CRA 5 management procedure and the proposed revised CRA 7 management procedure will ensure that the Minister sets a TAC that has a high probability of maintaining stock levels at or above *Bmsy* or the agreed proxy (ie, *Bref*). The use of management procedures to guide TAC setting improves overall sustainability outcomes by being responsive to changes in abundance in the stock.
22. Simulation-testing of the CRA 5 and CRA 7 management procedures also indicates that, as a result of maintaining the stocks well above sustainability reference levels (*Bref* and *Bmsy*), application of the management procedures would maintain or improve abundance, and hence would maintain or improve the current utilisation benefits of the fisheries for all sectors over the medium to long term.
23. With respect to CRA 7, the NRLMG advises that the main distinguishing factors between the current and proposed revised CRA 7 management procedures are improved stability in the fishery, less frequent and disruptive TAC changes and a resulting increase in predicted stock biomass levels under the revised management procedure (Option 1). This will, in turn, result in more stability and greater social, cultural and economic benefits. Option 1 is preferred by the

NRLMG and the CRA 7 rock lobster fisheries commercial stakeholder organisation (known as CRAMAC 7)

RATIONALE FOR THE USE OF MANAGEMENT PROCEDURES

24. Management procedures are a tool used to guide the setting of catch limits and specify how management changes will be made in response to changes in specified fishery data. The management procedure approach provides greater certainty of achieving management outcomes for a stock over the conventional approach of periodic stock assessments followed by decision-making; this benefits all sectors and those involved in fisheries management decision-making for rock lobster.
25. Management procedures are in place for several New Zealand rock lobster fisheries. Agreed management procedures are currently in place for CRA 3 (Gisborne), CRA 4 (Wellington/Hawkes Bay), CRA 7 (Otago) and CRA 8 (Southern) rock lobster fisheries and have been used by the Minister to guide statutory TAC setting in these fisheries for varying amounts of time. The oldest example of the use of management procedures is in CRA 7 and CRA 8, where they have been successfully used to guide TAC setting since 1996, first to rebuild the stocks and then to maintain them above reference levels with high probability.

REASONS FOR NEW MANAGEMENT PROCEDURES

26. New management procedures for CRA 5 and CRA 7 were developed for different reasons during 2010.
27. In 2009, the CRA 5 rock lobster fisheries commercial stakeholder organisation (CRAMAC 5) adopted a voluntary procedure to shelve annual catch entitlement (ACE) when catch per unit effort (CPUE) fell below a specified threshold. The rule has not been triggered, but CRAMAC 5 wanted a mechanism which offered the prospect of future Total Allowable Commercial Catch (TACC) increases if stock abundance continued to increase but were not willing to risk moving away from the level of CPUE that has been protected by the voluntary management procedure. The NRLMG agreed that a management procedure should be developed for CRA 5 in 2010 to replace this voluntary shelving rule with a formalised management procedure which has been tested to maintain the CRA 5 stock above reference levels.
28. In 2010, CRAMAC 7 requested a review of the current CRA 7 management procedure to obtain more stability in the TAC. The NRLMG agreed that a revised CRA 7 management procedure should be developed in 2010.

RELEVANT STATUTORY CONSIDERATIONS

29. A central consideration when choosing whether or not to use a management procedure to guide TAC setting in a fishery is whether the procedure enables the Minister to set a TAC that complies with section 13 of the Act. Section 13 requires the Minister to set a TAC that moves the stock to, or maintains the stock at, a size at or above *B_{msy}* or at a level that is not inconsistent with this objective.
30. The NRLMG is confident that application of proposed new CRA 5 management procedure and application of either the agreed or proposed revised CRA 7 management procedures will ensure that the Minister sets a TAC that has a high probability of maintaining stock levels at or above *B_{msy}* or the agreed proxy (ie, *B_{ref}*).

31. A full assessment of the management options against key statutory criteria is carried out in Paper 2: *Proposals to set TACs and allowances for CRA 4, CRA 5, CRA 7 and CRA 8.*

PROPOSAL TO USE A NEW MANAGEMENT PROCEDURE TO GUIDE TAC SETTING IN THE CRA 5 ROCK LOBSTER FISHERY

Summary of CRA 5 Management Options

32. The NRLMG is seeking comments on two management options for CRA 5.
33. Under **Option 1**, the Minister would use the CRA 5 Management Procedure to guide statutory TAC setting for CRA 5. The specifications of the CRA 5 Management Procedure are described in detail in Attachment 2.
34. The Minister would be guided by the operation of the management Procedure when setting the TAC for CRA 5 until the 2016-17 fishing year. During 2015, the management procedure would be reviewed.
35. Under **Option 2**, periodic stock assessments (which are relatively infrequent because of resource constraints) would continue to guide TAC setting for CRA 5. Seasonal CPUE information would be used to monitor stock abundance between stock assessments.
36. A stock assessment was conducted for CRA 5 in 2010 and could be used to inform TAC setting in this fishery if Option 1 is not suitable.

Analysis of Management Options for CRA 5

37. An analysis of the methods proposed for the Minister to use to guide TAC setting in CRA 5 is set out below.

Option 1 – Agree to use the CRA 5 Management Procedure to guide TAC setting in CRA 5

38. Under Option 1, it is proposed that the Minister would use the CRA 5 Management Procedure to guide statutory TAC setting for CRA 5 from the 2011-12 fishing year onwards, beginning 1 April 2011.

Stock Sustainability

39. Use of the CRA 5 management procedure to guide TAC setting in CRA 5 is unlikely to pose any risk to stock sustainability: simulation-testing of the procedure shows it to be very safe with respect to sustainability indicators. Ongoing application of the CRA 5 Management Procedure is expected to:
- a) Maintain the stock above *B_{msy}*, *B_{ref}* and *B_{min}* with greater than 95% probability;
 - b) Maintain mean biomass at about 2.3 times *B_{ref}*, which is greater than *B_{msy}* for CRA 5; and
 - c) Maintain spawning stock biomass well above 20% of its unfished level, which is consistent with the MFish Harvest Strategy Standard.

40. The NRLMG is confident that use of the CRA 5 management procedure will ensure that the statutory objective of managing the stock at or above *Bmsy* is met. This is because the management procedure is expected to maintain the stock well above *Bref* (and *Bmsy*).
41. The use of the CRA 5 management procedure is also safe from the standpoint of stock sustainability because the management procedure:
 - a) Was chosen from a set of management procedures that were evaluated for performance against sustainability criteria;
 - b) Has been tested using a model of the CRA 5 fishery based on the 2010 CRA 5 stock assessment model, which was accepted by the MFish Plenary in 2010;
 - c) Has been tested for robustness to uncertainties, including uncertainties in recruitment, in the level of non-commercial catches and in the stock assessment results. The procedure was robust to these uncertainties and desired performance against the sustainability indicators was maintained; and
 - d) Is responsive to changes in abundance in the stock.

Utilisation Benefits

42. Simulation-testing of the CRA 5 Management Procedure indicates that, as well as maintaining the stock well above reference levels (*Bref* and *Bmsy*), the management procedure would maintain the current utilisation benefits of the fishery for all sectors over the medium to long terms by maintaining the stock well above reference levels.
43. The CRA 5 management procedure delivers a TAC result that consists of three separate components: a component for the TACC, a component for recreational catch and a component for non-size limited catches (customary and illegal fishing).
44. The effect of the proposed CRA 5 management procedure on the costs and benefits conferred on any one sector would depend on allocation decisions. An assessment of how current non-commercial allowances should be adjusted is discussed in Paper 2 – *Proposal to set TACs and allowances for CRA 4, CRA 5, CRA 7 and CRA 8*.

Credibility and Acceptance

45. The CRA 5 Management Procedure already has a very high degree of acceptance and support among CRAMAC 5, partly because the procedure incorporates key elements of the voluntary ACE shelving rule that they have used since 2009. The management procedure is supported by the NRLMG's recreational and customary members; the NRLMG is seeking feedback from wider recreational and customary Maori fishery participants.
46. Agreeing to use the CRA 5 management procedure should reduce the frequency of stock assessments, free up resources for other research and potentially reduce the cost to commercial stakeholders.

Option 2 – Continue to use Periodic Stock Assessments to Guide TAC Setting in CRA 5

47. Under Option 2, periodic stock assessments would continue to guide TAC setting for CRA 5 (the *status quo*). Compared with Option 1, using periodic stock assessments to guide TAC setting for CRA 5:
 - a) is less responsive to observed changes in stock abundance in the fishery

- b) provides lesser certainty of achieving desired sustainability and utilisation outcomes
- c) may result in less cost efficient management of the fishery.

CRA 5 Initial Position

48. Based on best available information and the analysis set out above, the NRLMG's preferred option is **Option 1**: agree to use the CRA 5 management procedure to guide TAC setting in CRA 5 from the 2011-12 fishing year, beginning 1 April 2011.

PROPOSAL TO USE A NEW MANAGEMENT PROCEDURE TO GUIDE TAC SETTING IN THE CRA 7 ROCK LOBSTER FISHERY

Summary of CRA 7 Management Options

49. The NRLMG is seeking comments on two management options for CRA 7.
50. Under **Option 1**, the Minister would use the proposed revised CRA 7 Management Procedure to guide statutory TAC setting for CRA 7. It is proposed that the Minister would be guided by the operation of the revised management procedure when setting the TAC for CRA 7 until the 2012-13 fishing year.
51. Under **Option 2**, the Minister would continue to use the current CRA 7 Management Procedure to guide statutory TAC setting for CRA 7. The Minister agreed to use the current CRA 7 Management Procedure in March 2008 to guide TAC setting in the fishery until the 2012-13 fishing year.
52. Specifications of both the current and proposed revised CRA 7 management procedures are described in detail in Attachment 3.

Analysis of Management Options for CRA 7

53. An analysis of the two different management procedure options the Minister could use to guide TAC setting in CRA 7 is set out below.

CRAMAC 7's concerns with the current CRA 7 management procedure

54. Normally, management procedures are reviewed after five years. However, CRAMAC 7 requested an earlier review of the current CRA 7 management procedure because the rule has resulted in frequent large changes to the TAC.
55. CRAMAC 7 have now indicated they would prefer a management procedure with more stability, fewer changes and less dramatic changes in the TAC.

Comparison of the current and proposed revised CRA 7 management procedures

56. The NRLMG is confident that use of either CRA 7 management procedure will ensure that the Minister sets a TAC that has a high probability of achieving the statutory objective of managing the stock at or above *Bmsy*. This is because both management procedures are expected to maintain the stock well above *Bmsy* and the agreed proxy for *Bmsy*, *Bref*.
57. Both management procedures are safe from the standpoint of stock sustainability because they:

- a) were chosen from a set of management procedures that were evaluated for performance against sustainability criteria;
 - b) have been tested using a model of the CRA 7 fishery based on the 2006 CRA 7 stock assessment model;
 - c) have been tested for robustness to uncertainties, including uncertainties in recruitment, in the level of non-commercial catches and in the stock assessment results. The procedure was robust to these uncertainties and desired performance against the sustainability indicators was maintained; and
 - d) is responsive to changes in abundance in the stock.
58. Because evaluations of either CRA 7 management procedure suggest that the stock would be maintained well above *Bref*, the management procedures would likely increase the current utilisation benefits of the fishery for all sectors over the medium to long terms. The key differences between the two procedures are:
- a) The proposed revised CRA 7 management procedure (Option 1) is expected to provide more stability in the TAC, with fewer dramatic changes to the TAC than under the current management procedure (Option 2). This is because the proposed revised CRA 7 management procedure includes a harvesting “plateau” of 120 tonnes when commercial CPUE values are between 1.0 and 2.0 kg/potlift; the current procedure (Option 1) has no plateau.
 - a) The proposed revised management procedure (Option 1) results in fewer years where stock biomass is predicted to be less than *Bref*. Under Option 1, the stock would stay above *Bref* with 85% probability, whereas under Option 2 (the current procedure) the stock would stay above *Bref* with 80% probability.
 - b) The proposed revised procedure is expected to have a higher average stock abundance and commercial CPUE than the current procedure (Option 2). Under Option 1, the median average commercial CPUE is predicted to be 1.99kg/potlift, whereas under Option 2 the average CPUE was predicted to be 1.63 kg/potlift.
59. The harvest control rule in both CRA 7 management procedures generates a recommended TAC. Operation of the proposed revised CRA 7 management procedure for the 2011-12 fishing year results in no change to TAC for CRA 7. However, operation of the current CRA 7 management procedure for the 2011-12 fishing year results in a TAC decrease for CRA 7. The impact of the TAC decrease on the fishing sector stakeholders will depend on allocation decisions. Historically, the TACC has been varied to give effect to variations to the TAC, meaning the commercial sector may be most affected by the proposed TAC decrease (this is discussed in Paper 2 – *Proposal to set TACs and allowances for CRA 4, CRA 5, CRA 7 and CRA 8*).
60. The proposed revised CRA 7 Management Procedure has a high degree of acceptance and support among the CRA 7 rock lobster fisheries commercial stakeholder organisation (CRAMAC 7) because they provided initial input into the development of the procedure. The revised procedure is preferred by CRAMAC 7 (in comparison to the current rule, Option 2) because there is more stability in the procedure and there would be fewer dramatic changes in the TACC, which will enable them to stabilise (and potentially increase) their utilisation benefits. The proposed revised procedure is supported by the NRLMG’s recreational and customary members; the NRLMG is seeking feedback from wider recreational and customary Maori fishery participants.

CRA 7 Initial Position

61. Based on best available information and the analysis set out above, the NRLMG's preferred option is **Option 1**: agree to use the proposed revised CRA 7 management procedure to guide TAC setting in CRA 7 until the 2012-13 fishing year.

3. PROPOSAL TO SET TACs AND ALLOWANCES FOR CRA 4, CRA 5, CRA 7 AND CRA 8

SUMMARY

62. The National Rock Lobster Management Group (NRLMG) proposes to vary the Total Allowable Catch (TAC) and allowances for CRA 4 (Wellington/Hawkes Bay), CRA 5 (Marlborough/Canterbury), CRA 7 (Otago) and CRA 8 (Southern) rock lobster fisheries for the 2011-12 fishing year, beginning 1 April 2011.
63. The proposals are based on the operation of agreed management procedures for CRA 4 and CRA 8, two alternative management procedure options for CRA 7 (an agreed and proposed revised procedure), and a proposed new management procedure for CRA 5. The options are:

Stock	Option	TAC	TACC	Customary Allowance	Recreational Allowance	Other mortality
CRA 4	Option 1: Increase the TAC based on the operation of the agreed CRA 4 management procedure	661.9 tonnes	466.9 tonnes	35 tonnes	85 tonnes	75 tonnes
	Option 2: Retain the current TAC, TACC and allowances	610.625 tonnes	415.625 tonnes	35 tonnes	85 tonnes	75 tonnes
CRA 5	Option 1: Accept the proposed new CRA 5 management procedure and then increase the TAC based on its operation	522.1 tonnes	350 tonnes	10 tonnes	110.1 tonnes	52 tonnes
	Option 2: Retain the current TAC, TACC and allowances	467 tonnes	350 tonnes	40 tonnes	40 tonnes	37 tonnes
CRA 7	Option 1: Accept the proposed revised CRA 7 management procedure and then maintain the TAC based on its operation	104.5 tonnes	84.5 tonnes	10 tonnes	5 tonnes	5 tonnes
	Option 2: Reduce the TAC based on the operation of the agreed CRA 7 management procedure	95.7 tonnes	75.7 tonnes	10 tonnes	5 tonnes	5 tonnes
	Option 3: Retain the current TAC, TACC and allowances	104.5 tonnes	84.5 tonnes	10 tonnes	5 tonnes	5 tonnes
CRA 8	Option 1: Reduce the TAC based on the operation of the agreed CRA 8 management procedure	1053 tonnes	962 tonnes	30 tonnes	33 tonnes	28 tonnes
	Option 2: Retain the current TAC, TACC and allowances	1110 tonnes	1019 tonnes	30 tonnes	33 tonnes	28 tonnes

64. The NRLMG considers that management procedures are an appropriate way of ensuring that the TAC is consistent with the statutory objective of managing the stock at or above *Bmsy*.

CRA 4 Options

65. The proposed variation to the CRA 4 TAC under Option 1 is the result of the operation of the CRA 4 management procedure that the Minister of Fisheries agreed to use in March 2009 to guide TAC setting for this stock until the 2011-12 fishing year (this is the procedures last year of operation before a scheduled review next year).
66. Implementing the procedure would result in a TAC increase of 51.275 tonnes. The NRLMG proposes allocating the full TAC increase to the commercial sector because they received a significant reduction in TACC (54% decrease) in 2009 while allowances to other sectors remained constant. Commercial representatives to the NRLMG also consider it reasonable for the commercial sector to receive the full TAC increase because the proposed 2011 TACC increase represents the increase that could have been taken in 2010 but was declined by the majority of industry participants. Although uncertain, best available information suggests existing CRA 4 customary Maori and recreational catch is within the allowances allocated for these interests.
67. The NRLMG advises retaining the current CRA 4 TAC (Option 2) is also an acceptable option because both options are expected to ensure a sustainable CRA 4 fishery.

CRA 5 Options

68. The proposed variation to the CRA 5 TAC under Option 1 is the result of the operation of the proposed new CRA 5 management procedure presented for consideration in Paper 1: *“Proposal to use new management procedures to guide TAC setting in CRA 5 and CRA 7”*. The NRLMG has reviewed best available information and has identified no reason why the Minister should not use the results of the proposed CRA 5 management procedure to guide statutory TAC setting decisions.
69. If the Minister chooses to be guided by the CRA 5 management procedure it is proposed that the TAC will increase by 55.1 tonnes. The TAC increase is the result of changes to non-commercial allowances to reflect best available information on catch levels. Based on this information, the NRLMG is consulting on proposals to decrease the allowance for customary Maori from 40 tonnes to 10 tonnes, increase the allowance for recreational interests from 40 tonnes to 110.1 tonnes and increase the allowance for other sources of fishing-related mortality (eg, illegal fishing) from 37 tonnes to 52 tonnes. However, there is considerable uncertainty around the estimates of non-commercial catches and other mortality, in particular recreational removals.
70. The NRLMG notes the non-commercial allowance proposals do not include any recommendations to introduce new constraints on catch for any sector at this time (eg, amateur bag limit changes).
71. The NRLMG advises retaining the current CRA 5 TAC (Option 2) is also an acceptable option because both TAC options are expected to result in a sustainable CRA 5 fishery.

CRA 7 Options

72. The TAC options presented for CRA 7 are the result of the operation of current and proposed revised CRA 7 management procedures that are presented for consideration in Paper 1: *“Proposal to use new management procedures to guide TAC setting in CRA 5 and CRA 7”*.
73. The NRLMG proposes that the Minister chooses to be guided by the revised CRA 7 management procedure when setting the CRA 7 TAC for the 2011-12 fishing year. The proposed revised CRA 7 management procedure is expected to provide more stability and there would be fewer

dramatic changes in the TAC than the current procedure. If the Minister chooses to use the new management procedure (Option 1), the TAC for CRA 7 would be retained for 2011-12. If the Minister chooses to be guided by the current CRA 7 management procedure (Option 2) it is proposed that the TAC will decrease by 8.8 tonnes. Under Option 3 the CRA 7 TAC would be retained for 2011-12.

CRA 8 Options

74. The proposed variation to the CRA 8 TAC under Option 1 is the result of the operation of the CRA 8 management procedure that the Minister agreed to use in March 2008 to guide TAC setting for this stock until the 2012-13 fishing year.
75. Implementing the procedure would result in a TAC decrease of 57 tonnes. The NRLMG proposes allocating the full TAC decrease to the commercial sector only because they received both increases and decreases in commercial catch since 1999 and best available information suggests existing CRA 8 customary Maori and recreational allowances are not being caught at this time. The NRLMG considers reducing only the TACC provides greatest certainty that stock size will increase because catch from the commercial sector can be more directly controlled.
76. The NRLMG advises retaining the current CRA 8 TAC (Option 2) is also an acceptable option because both TAC options are expected to result in a sustainable CRA 8 fishery.

REASON FOR REVIEWING ROCK LOBSTER TACS AND ALLOWANCES

77. Agreed management procedures are currently in place for CRA 3, CRA 4, CRA 7 and CRA 8 rock lobster fisheries. In 2010, a new CRA 5 management procedure and a revised CRA 7 management procedure were evaluated. The management procedures are designed to move the biomass to, or maintain the biomass, of each stock above reference levels (*Bmsy* and or *Bref* (proxy for *Bmsy*)) as required under section 13 of the Act with a high degree of probability. Operation of the relevant management procedures results in a TAC that moves the stock to a level at or above *Bmsy*, or that is not inconsistent with this objective.
78. Operation of the CRA 3 management procedure in 2010 resulted in no proposed change to the CRA 3 TAC for the 2011-12 fishing year. The CRA 3 fishery is therefore not discussed further in this paper.
79. The Minister may choose any alternative TAC based on his assessment of best available information. However, the NRLMG considers that there is considerable benefit in consistent implementation of TACs generated by agreed management procedures. Such an approach provides certainty to stakeholders over management actions, reduces conflict over management decision-making and meets legislative obligations.

TAC SETTING FOR ROCK LOBSTER STOCKS

80. When setting or varying a TAC for CRA 4, CRA 5, CRA 7 or CRA 8 rock lobster fisheries, the Minister is required to consider a range of matters from the Act (these are set out below).

International Obligations and Treaty of Waitangi (Section 5)

81. In setting or varying sustainability measures, the Minister must act in a manner consistent with New Zealand's international obligations to fishing and the provisions of the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992.

82. The NRLMG considers that the proposed TAC options for rock lobster stocks are consistent with a wide range of international obligations that relate to fishing, including use and sustainability of fish stocks and maintaining biodiversity.
83. The NRLMG also considers that the proposed TAC options are consistent with the provisions of the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992. The NRLMG notes that Maori have customary, commercial and recreational fishing interests. All proposals seek to maintain good fishing opportunities or improve stock health and, therefore, improve fishing opportunities for all sectors.

Purpose of the Act (Section 8)

84. The purpose of the Act is to provide for the utilisation of fisheries resources while ensuring sustainability, and defines the meanings of utilisation and sustainability. The TAC options presented in this paper for CRA 4, CRA 5, CRA 7 and CRA 8 provide for the utilisation of these stocks while ensuring sustainability.

Environmental Principles (Section 9)

85. When making any decision under the Act, the Minister must take into account the following environmental principles:
 - a) *Associated or dependent species should be maintained above a level that ensures their long-term viability*

Rock lobster is taken by potting and hand gathering fishing methods which have a relatively low level of by-catch. The levels of incidental catch landed from commercial rock lobster potting have been analysed for the period 1989 to 2003 (Bentley, Starr et al. 2005). Non-lobster catch landed ranged from 2 to 11% of the estimated rock lobster catch weight per quota management area (QMA) over this period. The most frequently reported incidental species caught (comprising on average greater than 99% of the bycatch per QMA) were, in decreasing order of catch across all stocks: octopus, conger eel, blue cod, trumpeter, sea perch, red cod, butterfish and leatherjackets. The TAC options proposed for CRA 5, CRA 7 and CRA 8 are unlikely to increase incidental bycatch from commercial rock lobster potting; the TAC increase proposed for CRA 4 may increase incidental bycatch slightly.
 - b) *Biological diversity of the aquatic environment should be maintained*

Potting is the main method of targeting rock lobster and is usually assumed to have very little direct impact on the aquatic environment. Several Australian studies have looked at the impacts of lobster pots on the environment. These studies suggest there is little impact on seaweed and other benthic communities, including fragile corals from rock lobster potting. Consequently, the TAC options proposed are unlikely to have a demonstrable adverse effect on biological diversity. In addition, all commercial fishing is prohibited within the internal waters of Fiordland (within the CRA 8 area) in an aim to protect important species and habitats in the area.
 - c) *Habitats of particular significance for fisheries management should be protected*

No habitats of particular significance to fisheries management have been identified that would be affected by the TAC options proposed.

Information Principles (Section 10)

86. The Minister must also take into account certain information principles when making decisions under the Act, including that decisions should be based on the best available information, that any uncertainty in the information available should be considered, and caution should be applied when information is uncertain, unreliable, or inadequate, but the absence of, or uncertainty in, information should not be used as a reason for postponing or failing to set a TAC. The TAC options presented in this paper are based on best available information and the NRLMG has endeavoured to set out the relevant uncertainty in, and inadequacy, of any information so that the appropriate caution can be applied in assessing the proposed management options.

Sustainability Measures (Section 11)

87. When setting or varying a sustainability measure such as a TAC, the Minister must take into account the following:

a) *Any effects of fishing on any stock and the aquatic environment*

The NRLMG considers the proposed TAC options for rock lobster stocks do not significantly affect any stock or the aquatic environment. Non-commercial methods (diving and potting) and the commercial potting method is assumed to have very little direct impact on non-target species and the aquatic environment.

b) *Any existing controls under the Act that apply to the stock or area concerned*

A range of management controls apply to rock lobster fisheries including minimum legal sizes, daily bag limits for amateur fishers, method restrictions, protection of egg-bearing females, closed areas and closed seasons (in CRA 7 only). No changes are proposed to these existing controls.

c) *The natural variability of the stock*

Recruitment to rock lobster stocks is highly variable. This variability was taken into account during development of management procedures for CRA 4, CRA 5, CRA 7 and CRA 8. This is done using Bayesian methods to deal with uncertain recruitment in constructing the operating model and by projecting uncertain recruitment forward when evaluating management procedures.

d) *Any conservation or fisheries services; and any decisions not to require these services*

The NRLMG is not aware of any conservation or fisheries services – or any decisions not to require conservation or fisheries services – that would be affected by the proposed TAC options.

e) *Any relevant fisheries plan approved under section 11A*

The NRLMG is not aware of any relevant fisheries plans approved under section 11A.

88. The Minister must also have regard to any provisions of the following that apply to the coastal marine area that he considers relevant:

a) *Any regional policy statement, regional plan, or proposed regional plan, or proposed regional plan under the Resource Management Act 1991*

There are seven regional councils (Hawkes Bay, Horizons, Greater Wellington, Environment Canterbury, Otago, Environment Southland, and West Coast) with jurisdictional boundaries covering CRA 4, CRA 5, CRA 7 and CRA 8. The NRLMG is not aware of any policy statements, regional plans or draft regional plans for these councils that are specifically relevant to TAC setting for rock lobster stocks.

b) *Any management strategy or management plan under the Conservation Act 1987*

There are seven Department of Conservation Conservancies (East Coast/Hawkes Bay, Wellington, Nelson/Marlborough, Canterbury, Otago, Southland, and West Coast) with jurisdictional boundaries covering CRA 4, CRA 5, CRA 7 and CRA 8. The NRLMG is not aware of anything in any management strategy or plan for these conservancies that are relevant to TAC setting for rock lobster stocks.

c) *Sections 7 and 8 of the Hauraki Gulf Marine Park Act 2000*

The CRA 4, CRA 5, CRA 7 or CRA 8 rock lobster fisheries do not intersect with the Hauraki Gulf Marine Park; therefore there are no relevant considerations.

Total Allowable Catch (Section 13)

89. TACs for rock lobster stocks are set under section 13 of the Act. Specifically, under section 13(2) the Minister must set a TAC that maintains, restores or moves the stock to a level that can produce the maximum sustainable yield (ie, *Bmsy*). However, before a TAC can be set under section 13(2) the Minister must be provided with an estimate of both current biomass and the biomass that can produce the maximum sustainable yield (ie, *Bmsy*).
90. Where current biomass or *Bmsy* estimates are not available or not reliable section 13 (2A) of the Act is used. 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*.
91. In considering the way and rate in which a stock is moved towards or above a level that can produce the maximum sustainable yield (ie, *Bmsy*) under section 13(2)(b) or (c) or (2A), the Minister must have regard to such social, cultural and economic factors that he considers relevant.
92. *Bmsy* and proxy sustainability reference levels for CRA 4, CRA 5, CRA 7 and CRA 8 and social, cultural and economic factors are discussed in the context of each individual stock in later sections of this paper.
93. When setting a TAC under section 13 the Minister must have regard to the interdependence of stocks. Interdependence of stocks is where there is a direct trophic (ie, a stock is likely to be directly affected by the abundance of another stock) or symbiotic relationship between stocks.
94. Rock lobsters are predators of molluscs and other invertebrates. Survey and experimental work in north-eastern New Zealand has shown that predation by rock lobsters in marine reserves is capable of influencing the demography of surf clams of the genus *Dosinia*. Predation by rock lobsters has also been implicated in contributing to trophic cascades in a number of studies in New Zealand and overseas. For example, in Leigh marine reserve rock lobsters and snapper preyed on urchins, the densities of urchins decreased and kelp beds re-established in the absence of urchin grazing. This implies that rock lobster fishing is one of a number of factors that may alter the ecosystem from one more dominated by kelp beds to one more dominated by urchin barrens. Trophic cascades are hard to demonstrate however, as controlled experiments are difficult, food webs are complex and environmental factors are changeable.
95. Predation upon rock lobsters is known from octopus, blue cod, groper, southern dogfish, rig and seals; no evidence exists to suggest that the availability of rock lobster as prey determines the size of any of these populations.
96. Although uncertain, the TAC options proposed are unlikely to have any significant effect on the interdependence of stocks.

97. When setting a TAC under section 13 the Minister must also have regard to the biological characteristics of the stock and any environmental conditions affecting the stock. The TAC options proposed are based on the application of management procedures which have been tested using a model of the fishery that is based on a stock's assessment model. Stock assessment models take into account biological characteristics of the stock and variability in recruitment (which is thought to be related to environmental conditions).

SETTING OF NON-COMMERCIAL ALLOWANCES AND THE TACC

98. Sections 20 and 21 of the Act require the Minister to allow for Maori customary non-commercial fishing interests, recreational fishing interests and all other sources of fishing-related mortality within the TAC when setting or varying the TACC.
99. 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.
100. When allowing for Maori customary interests the Minister must take into account any relevant mātaihai reserves and any area closure or fishing method restriction or prohibition made under section 186a of the Act. 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.
101. Allocation options and existing management controls, including mātaihai reserves and section 186a restrictions, are discussed individually for each rock lobster stock in subsequent sections.

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

Summary of CRA 4 Management Options

102. The NRLMG is seeking comments on two management options for setting TACs and allowances for CRA 4:

Stock	Option	TAC	TACC	Customary Allowance	Recreational Allowance	Other mortality
CRA 4	Option 1: Increase the TAC based on the operation of the agreed CRA 4 management procedure	661.9 tonnes	466.9 tonnes	35 tonnes	85 tonnes	75 tonnes
	Option 2: Retain the current TAC, TACC and allowances	610.625 tonnes	415.625 tonnes	35 tonnes	85 tonnes	75 tonnes

103. Under **Option 1**, the TAC for CRA 4 would increase from 610.625 tonnes to 661.9 tonnes from 1 April 2011. Within this TAC it is proposed to increase the TACC from 415.625 tonnes to 466.9 tonnes as specified by the CRA 4 Management Procedure. It is proposed that the allowances set for customary Maori, recreational interests and other fishing mortality are not changed.
104. Under **Option 2**, the current CRA 4 TAC and allowances would be retained for the 2011-12 fishing year, beginning 1 April 2011.

Sustainability Indicators and Stock Status

105. A stock assessment was last performed for CRA 4 in 2005. No reliable estimate of *Bmsy* was calculated in this assessment. The MFish Plenary instead agreed to use a *Bmsy* proxy, *Bref*, which is the autumn-winter (April through September) vulnerable biomass associated with the period 1979-88. 1979-88 was a period when the CRA 4 stock showed good productivity and was demonstrably safe: it subsequently declined to lower levels then recovered.
106. *Bmin* for CRA 4 is defined as the lowest autumn-winter vulnerable biomass in the observed history of the CRA 4 fishery.
107. The 2005 CRA 4 stock assessment results indicated that stock size in 2004-05 was well above *Bmin* and *Bref*. The median expectation was that stock size would decline slightly over the subsequent three years but would remain above *Bref*. Uncertainty around these median projections was very high. In the event, the stock declined substantially as demonstrated by analysis of CPUE information.
108. Standardised CPUE is considered to be a reliable indicator of relative stock size in CRA 4 and is the abundance indicator used in the agreed CRA 4 Management Procedure. The history of commercial autumn-winter CPUE in CRA 4 is shown in Figure 1. CPUE increased strongly from 1993 to 1998, and then declined to 2007, increased strongly in 2009 but decreased by 3.4% in 2010.

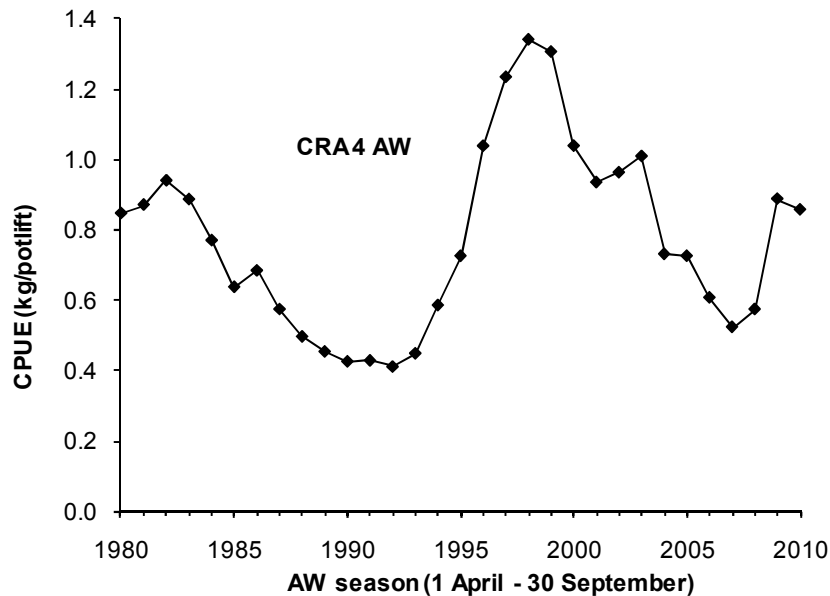


Figure 1: The history of autumn-winter CPUE in CRA 4

Analysis of Management Options for CRA 4

109. An analysis of the setting of the TAC, non-commercial allowances and the TACC for CRA 4 is set out below.

TAC Setting

110. As there are no reliable estimates of current biomass and *Bmsy*, the Minister must set a TAC for CRA 4 under section 13(2A) of the Act. Best available information suggests the current CRA 4 stock is above the agreed *Bmsy* proxy, *Bref*.
111. Two TAC options are proposed for CRA 4:

Option 1 – Increase the TAC to 661.9 tonnes

112. Under Option 1, the CRA 4 TAC would be set at 661.9 tonnes. The proposed increase in TAC is specified by the CRA 4 Management Procedure that the Minister agreed to use in March 2009 to guide TAC setting in the fishery until the 2011-12 fishing year (this is the procedures last year of operation before a scheduled review next year).
113. A graphic representation of the CRA 4 Management Procedure is provided in Figure 2 (for further technical details on the CRA 4 Management Procedure refer to Attachment 1). The graph shows the TAC in the next year as a function of commercial autumn-winter CPUE in the current year. It also shows the CPUE values (coloured shapes) that generated the TAC proposals for the 2007-08, 2008-09, 2009-10, 2010-11 and 2011-12 fishing years. Although autumn-winter CPUE decreased in the last year (from 0.871 kg/potlift to 0.857 kg/potlift) the operation of the management procedure has resulted in a proposed 51.275 tonne increase. This is because the Minister chose to set a TAC/TACC that was approximately 50 tonnes lower in 2010-11 than the recommended increase that was specified by the management procedure.
114. It is the NRLMG's view that the proposed TAC variation guided by the operation of the CRA 4 Management Procedure is "not inconsistent" with the objective of maintaining the stock at or above, or moving the stock to a level at or above *Bmsy* (or the accepted proxy) in a way and rate considered appropriate for the stock. This is because ongoing application of the CRA 4

Management Procedure is expected to meet Harvest Strategy Standard (HSS) requirements and maintain the stock above the agreed proxy, *Bref*, with higher than 50% probability and above *Bmin* with greater than 90% probability; simulation testing indicates the CRA 4 Management Procedure would maintain the stock above *Bref* with 93% probability and above *Bmin* with 100% probability. The CRA 4 management procedure also ensures that the Minister sets a TAC that maintains the stock at or above the reference levels (*Bmsy* or *Bref*) in a way and rate considered appropriate for the stock. This is because the management procedure uses current fishery data and is responsive to changes in abundance.

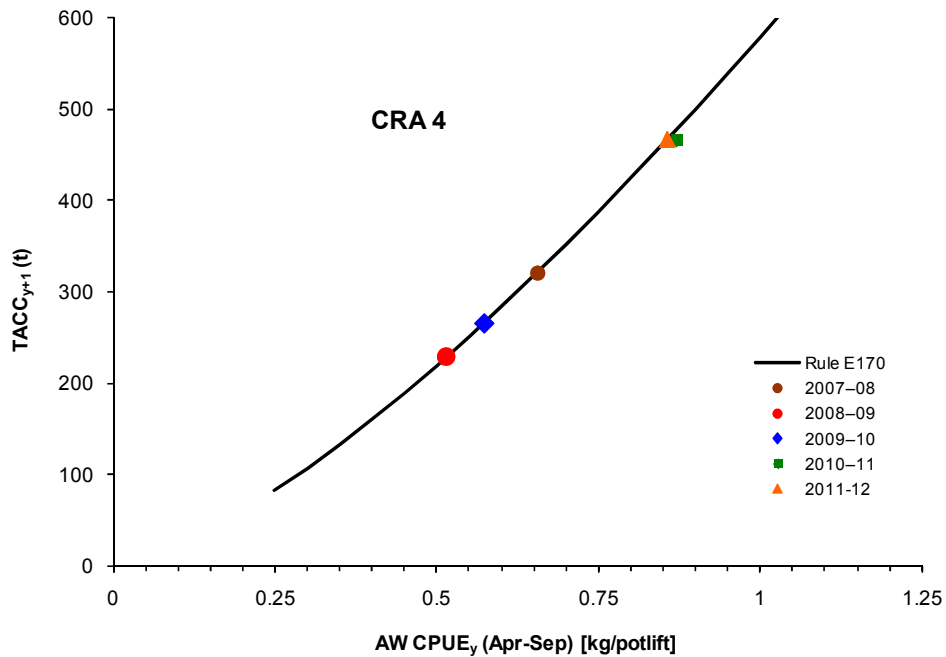


Figure 2: Graphic representation of the CRA 4 Management Procedure.

115. Option 1 is likely to 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 to the TAC, meaning the commercial sector may benefit the most from the proposed TAC increase through the ability to take greater yield and potentially increase their revenue. Utilisation benefits for customary Maori and recreational interests are likely to be maintained under this option because best available information suggests the current CRA 4 stock size is above the agreed *Bmsy* proxy, *Bref* and ongoing application of the CRA 4 management procedure is designed to maintain stock size well above the reference level.

Option 2 – Retain the current TAC of 610.625 tonnes

116. Under Option 2, the current CRA 4 TAC of 610.625 tonnes would be retained for the 2011-12 fishing year. Retaining the current TAC for CRA 4 would likely result in a larger stock size than would occur under Option 1.
117. This option would constrain take of rock lobster in this fishery. However, retaining the current TAC would likely result in increased short-term abundance and therefore increased CPUE for commercial fishers, as well as increased catch rates in the non-commercial fisheries compared to Option 1. This could result in improved fishing opportunities for all sectors.

Setting of Non-commercial Allowances and the TACC

118. Proposals to change the CRA 4 non-commercial allowances and the TACC are discussed for Option 1 only because no TAC change is proposed under Option 2. The Minister may adopt different allowances and TACCs than those proposed.

Allowances for customary Maori, recreational interests and other mortality

119. Current allowances and estimated catches for customary Maori, recreational interests and other sources of fishing-related mortality (eg, illegal fishing) are outlined in Table 1 below for CRA 4.

CRA 4	Customary	Recreational	Other mortality
Current allowances	35 tonnes	85 tonnes	75 tonnes
Catch estimates (from 2005 CRA 4 stock assessment ¹)	20 tonnes	47 tonnes	40 tonnes

Table 1: *Current CRA 4 allowances and estimated catches for non-commercial*

120. Under Option 1, where the TAC would be increased by 51.275 tonnes, the NRLMG proposes that no change is made to current allowances for customary Maori, recreational interests and other mortality. Although uncertain, best available information suggests existing CRA 4 customary Maori and recreational catch is within the allowances allocated for these interests.
121. When allowing for customary interests the Minister must take into account any relevant mātaimai reserve or closures/restrictions under section 186A. There is one mātaimai reserve located in CRA 4, the Moremore mātaimai reserve (Napier); and one Section 186A closure at Pukerua Bay (Wellington). The NRLMG considers the CRA 4 customary allowance adequately provides for the harvest of lobster likely to be taken from the mātaimai and section 186A closure within the QMA.

TACC

122. Commercial fishers are legally obliged to report how much rock lobsters they take on a monthly basis. Figure 3 shows historical CRA 4 landings and the TACC since the 1990-91 fishing year.
123. CRA 4 commercial stakeholders did not harvest the full TACC in 2004-05 (six tonne shortfall), in 2005-06 (72 tonne shortfall) or in 2006-07 (131 tonne shortfall). Using the CRA 4 Management Procedure to guide voluntary Annual Catch Entitlement (ACE) shelving (with the express purpose of halting declining abundance and to ensure the ongoing economic viability of the fishery), CRA 4 quota owners shelved 44% of their ACE in 2007-08 and 58% in 2008-09. The CRA 4 Management Procedure was formally accepted by the Minister in 2009 which when operated resulted in a significant reduction in TACC (54% decrease) for the 2009-10 fishing year, while allowances for other sectors remained constant.
124. The TAC/TACC was increased in 2010-11 but the increase was smaller than specified by the CRA 4 management procedure. A number of stakeholders, including the majority of industry participants, preferred a more modest increase in the TAC. The Minister decided to take a cautious approach given the fishery's recent history of catch limit reductions and "bank"

¹ Refer to the Mid-Year Stock Assessment Plenary report (Annex 3 of the 2010 NRLMG Annual Report).

approximately 50 tonnes of the increased abundance. The TACC was set at 415.625 tonnes and not 465.5 tonnes as first proposed.

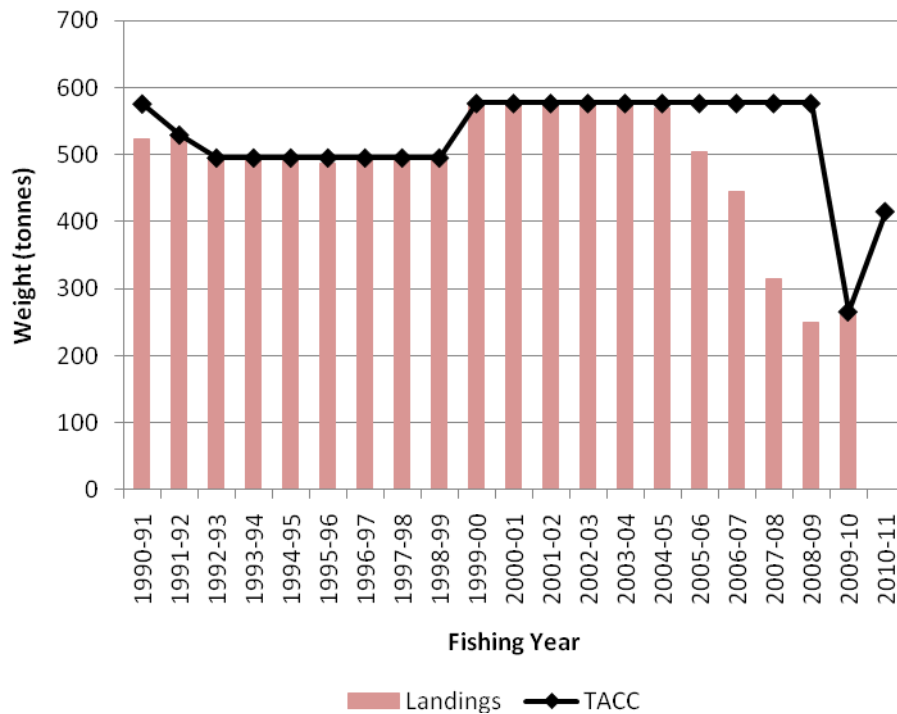


Figure 3: CRA 4 historical landings (from monthly harvest return reports) and TACC. Note that landings are not available for 2010-11 because the year is incomplete.

125. The NRLMG proposes allocating the full TAC increase to the commercial sector because in the past the commercial catch limit has been significantly reduced while allowances to other sectors remained constant. The NRLMG notes, however, that the Zone 5 Sports Fishing Council Clubs (Zone 5 encompasses the CRA 4 area) declared a voluntary bag limit reduction over several years (from 6 lobsters per person per day to 4) to support efforts to increase abundance in the fishery.
126. The NRLMG suggests that because the proposed TACC increase from 415.625 tonnes to 466.9 tonnes does not exceed the level in place before the 2009-10 reduction (the previous TACC was 577 tonnes), it is reasonable for the commercial sector to receive the full benefit of this TACC increase up to the point of the historical catch level. Commercial members to the NRLMG also consider it reasonable for the commercial sector to receive the full TAC increase because the proposed 51.275 tonne TACC increase for 2011 represents the increase that could have been taken in 2010 but was declined by the majority of industry participants. The NRLMG notes Zone 5 has now removed the voluntary bag limit reduction.
127. The NRLMG advises, based on average 2010 landing price information, that the proposed 51.275 tonne increase has the potential to generate approximately \$2.84 million in additional earnings for the commercial sector based on current and predicted prices for CRA 4 landings.

CRA 4 Initial Position

128. Based on best available information and the analysis set out above, the NRLMG’s preferred option is **Option 1**: increase the TAC for CRA 4 and allocate the increased catch only to the TACC as specified by the CRA 4 Management Procedure.

129. The NRLMG notes Option 2 (the status quo) is also an acceptable option. This is because both options will ensure a sustainable CRA 4 fishery. However, choosing not to follow a management procedure has possible consequences for the acceptability of management by management procedures.

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

Summary of CRA 5 Management Options

130. The NRLMG is seeking comments on two management options for settings TACs and allowances for CRA 5:

Stock	Option	TAC	TACC	Customary Allowance	Recreational Allowance	Other mortality
CRA 5	Option 1: Accept the proposed new CRA 5 management procedure and then increase the TAC based on its operation	522.1 tonnes	350 tonnes	10 tonnes	110.1 tonnes	52 tonnes
	Option 2: Retain the current TAC, TACC and allowances	467 tonnes	350 tonnes	40 tonnes	40 tonnes	37 tonnes

131. Under **Option 1**, the TAC for CRA 5 would increase from 467 tonnes to 522.1 tonnes from 1 April 2011. Within this TAC it is proposed to set allowances for customary Maori, recreational interests and other fishing mortality as noted above. It is proposed that the TACC would be retained at 350 tonnes.
132. The proposed variations result from the operation of the proposed CRA 5 Management Procedure (refer to Paper 1 titled – “*Proposal to use new management procedures to guide TAC setting in CRA 5 and CRA 7*”). The operation of this management procedure represents the best available information to guide TAC setting for CRA 5 fishery in the 2011-12 fishing year. The management procedure is designed to maintain the stock biomass above *Bref* and *Bmsy* with a high degree of probability.
133. Under **Option 2**, the current CRA 5 TAC and allowances would be retained for the 2011-12 fishing year, beginning 1 April 2011.

Sustainability Indicators and Stock Status

134. A stock assessment was performed for CRA 5 in 2010. In this assessment a reliable estimate of *Bmsy* was calculated along with the previously accepted *Bmsy* proxy, *Bref*, which is the autumn-winter vulnerable biomass associated with the period 1979-88. 1979-88 was a period when CRA 5 biomass was relatively stable and the stock showed good productivity. The two sustainability indicators *Bmsy* and *Bref* are consequently available for CRA 5.
135. *Bmin* for CRA 5 is defined as the lowest autumn-winter vulnerable biomass in the observed history of the CRA 5 fishery.
136. The 2010 CRA 5 stock assessment results indicate the current stock is well above *Bmin*, *Bref* and *Bmsy* by factors of 2 to 5. Biomass is predicted to decline over the next four years, at current levels of catch and recruitment, but will remain well above *Bmsy* and *Bref*.
137. Standardised CPUE is considered to be a reliable indicator of relative stock size in CRA 5 and is the abundance indicator used in the proposed CRA 5 Management Procedure. The history of commercial offset year (October through September) CPUE in CRA 5 is shown in Figure 4. CPUE

increased strongly from 1995-2004, decreased for two years, then increased in each of the past four years to its current historical high.

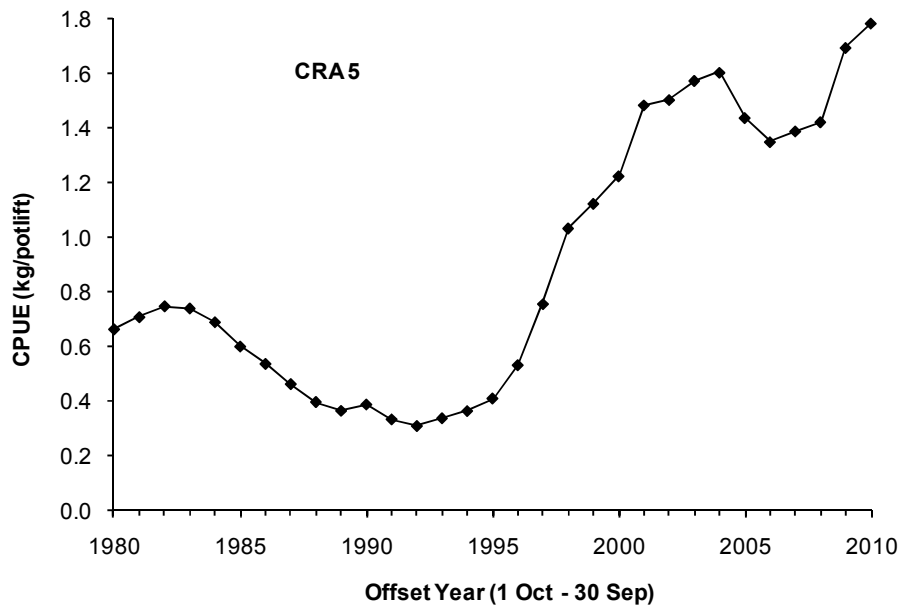


Figure 4: The history of offset year CPUE in CRA 5

Analysis of Management Options for CRA 5

138. An analysis of the setting of the TAC, non-commercial allowances and the TACC for CRA 5 is set out below.

TAC Setting

139. Best available information suggests the current CRA 5 stock is well above *Bmsy* (and the previously agreed proxy, *Bref*). As such the Minister is able to set a TAC that maintains the stock at or above this level (section 13(2)(a)).
140. Two TAC options are proposed for CRA 5:

Option 1 – Increase the TAC to 522.1 tonnes

141. Under Option 1, the CRA 5 TAC would be set at 522.1 tonnes. The proposed increase in TAC is specified by the proposed CRA 5 Management Procedure (refer Paper 1) and is the result of changes to non-commercial allowances to reflect new stock assessment model estimates of current catch levels; the proposal does not include any recommendations to introduce new constraints on catch for any sector at this time (eg, amateur bag limit changes).
142. The NRLMG considers that the proposed TAC variation, guided by the operation of the proposed CRA 5 Management Procedure, enables the stock to be maintained at a level at or above *Bmsy*. Ongoing application of the CRA 5 Management Procedure is also expected to meet HSS requirements and maintain the stock above *Bmsy*, (or the agreed proxy, *Bref*), with greater than 50% probability and above *Bmin* with greater than 90% probability; simulation testing indicates the CRA 5 Management Procedure would maintain the stock above *Bmsy*, *Bref* and *Bmin* with greater than 95% probability.
143. Option 1 is likely to maintain the current utilisation benefit of the fishery. The change to the TAC is intended to reflect new stock assessment model estimates of current catch. The Rock

Lobster Fisheries Assessment Working Group (the Working Group) considers the model estimate to be the best estimate of recreational catch because it is likely that the level of recreational catch has increased as abundance; however, there is considerable uncertainty around non-commercial estimates.

144. Ongoing application of the proposed CRA 5 Management Procedure is expected to maintain the CRA 5 stock well above the reference levels; therefore good fishing opportunities for all sectors are likely to be provided for in the future.

Option 2 – Retain the current TAC of 467 tonnes

145. Under Option 2, the current CRA 5 TAC of 467 tonnes would be retained for the 2011-12 fishing year. Utilisation would not be restricted under this option because there are no proposals to include recommendations to introduce new constraints on catch for any sector at this time (eg, amateur bag limit changes).
146. The NRLMG notes that based on the Working Group’s best estimates of non-commercial catch total removals from the fishery are likely to exceed the TAC of 467 tonnes; however, there is considerable uncertainty around non-commercial estimates.

Setting of Non-commercial Allowances and the TACC

147. Proposals to change CRA 5 non-commercial allowances and the TACC are discussed for Option 1 only because no change is proposed to the TAC under Option 2. The Minister may adopt different allowances and TACCs than those proposed.

Allowances for customary Maori, recreational interests and other mortality

148. Current allowances and estimated catches for customary Maori, recreational interests and other sources of fishing-related mortality (eg, illegal fishing) are outlined in Table 2 below for CRA 5.

CRA 5	Customary	Recreational	Other mortality
Current allowances	40 tonnes	40 tonnes	37 tonnes
Catch estimates (from 2010 CRA 5 stock assessment ²)	10 tonnes	110.1 tonnes	52 tonnes

Table 2: Current CRA 5 allowances and estimated catches for non-commercial

CRA 5 Allowance for Customary Maori

149. Under Option 1, it is proposed that the current allowance for customary Maori would decrease from 40 tonnes to 10 tonnes in CRA 5. The allowance represents the results of Working Group discussions on current customary harvest levels rather than a cap on the amount that can be harvested by customary fishers.
150. The Working Group agreed to use an estimate of 10 tonnes to represent customary catch for the 2010 CRA 5 stock assessment (a constant value of 10 tonnes is also used in the operation of the proposed CRA 5 Management Procedure). In determining an appropriate customary catch estimate for CRA 5, MFish provided available information on customary catches from two

² Refer to the Mid-Year Stock Assessment Plenary report (Annex 3 of the 2010 NRLMG Annual Report).

sources: the South Island Customary Regulations 1999 and Regulation 27A of the Fisheries (Amateur Fishing) Regulations 1986. When these data were summarised (using a mean weight of 0.499 kg/lobster) the estimated catch from customary sources was about 1 tonne in any fishing year, which is much smaller than the 10 tonne estimate used in the stock assessment. However, information on the quantity of lobster harvested under customary fishing permits or authorisations is currently incomplete; therefore 1 tonne is likely to be an underestimate of customary catch.

151. When allowing for customary interests the Minister must take into account any relevant mātaitai reserve or closures/restrictions under section 186A. There are four mātaitai reserves located in CRA 5 along the east coast of the South Island: the Wairewa/Lake Forsyth, Rapaki, Te Kaio and Koukourarata mātaitai reserves. The NRLMG notes the proposed CRA 5 customary allowance will adequately provide for the harvest of lobster likely to be taken from the mātaitai's within the QMA.

CRA 5 Allowance for Recreational Interests

152. Under Option 1, it is proposed that the current allowance for recreational interests would increase from 40 tonnes to 110.1 tonnes in CRA 5. The proposed allowance reflects the result of Working Group discussions on the relation between recreational catch and abundance, and is an output from the proposed management procedure based on observed CPUE.
153. In the 2010 CRA 5 stock assessment the Working Group estimated recreational catches after 1979 by scaling the 1994/96 recreational diary survey catch estimates to the spring-summer commercial CPUE from statistical area 917 (Kaikoura) only (rather than all of CRA 5 CPUE), as this is considered to be the area most representative of recreational effort. This procedure results in a recreational catch trajectory that shows a strong increasing trend since the mid-1990s and exceeds 100 tonnes since 2005. The proposed 110.1 tonne recreational allowance is generated from the harvest control rule in the proposed CRA 5 management procedure (which is based on an operating model that uses the scaling procedure described above for recreational catches).
154. Anecdotal reports also suggest recreational catch in CRA 5 has increased with increasing abundance of rock lobster in the fishery.
155. The NRLMG notes that information on recreational removals is highly uncertain. The current 40 tonne allowance is based on historical estimates of recreational catch and has not been altered since 1999. It is likely that the level of recreational catch is related to abundance; however, there is no quantitative information to accurately estimate this relationship. Although the NRLMG considers the results of the method used in the 2010 stock assessment to estimate recreational catch to represent best available information on current recreational take, the estimate has not been validated using actual catch data.

CRA 5 Allowance for Other Mortality

156. Under Option 1, it is proposed that the current allowance for other sources of fishing-related mortality (eg, illegal fishing) would increase from 37 tonnes to 52 tonnes. This is technical adjustment based on available information.
157. The Working Group agreed to use an estimate of 52 tonnes to represent other mortality for the 2010 CRA 5 stock assessment (a constant value of 52 tonnes is also used in the operation of the proposed CRA 5 Management Procedure). In determining an appropriate estimate for other mortality, the Working Group used available estimates for illegal catches from 1990, as provided by MFish compliance over a number of years. There is little confidence in the estimates of illegal

catch because the estimates cannot be verified, but anecdotal evidence from MFish indicates a possible upward trend in illegal extractions in the CRA 5 area.

TACC

158. Commercial fishers are legally obliged to report how much rock lobsters they take on a monthly basis. Figure 5 shows historical CRA 5 landings and the TACC since the 1990-91 fishing year. The CRA 5 TACC has been fully caught since 1993 and has been set at 350 tonnes since 1999.

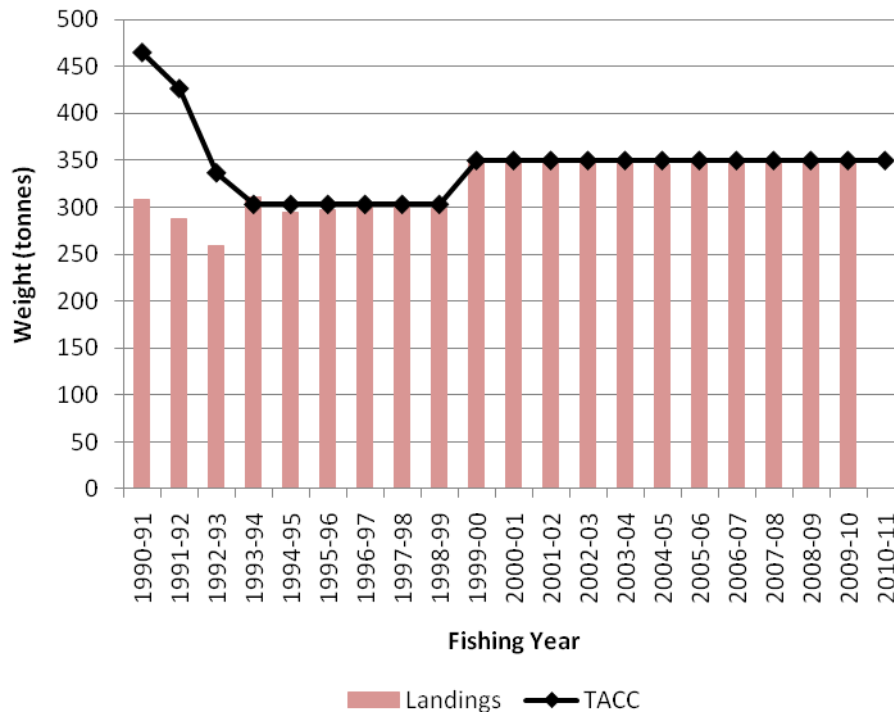


Figure 5: CRA 5 historical landings (from monthly harvest return reports) and TACC.
Note landings are not available for 2010-11 because the year is incomplete.

159. A graphic representation of the proposed CRA 5 Management Procedure is provided in Figure 6 and shows the form of the TACC component only (for further technical details on the proposed CRA 5 Management Procedure refer to Appendix 2). The graph shows the TACC in the next year as a function of offset year CPUE in the current year.

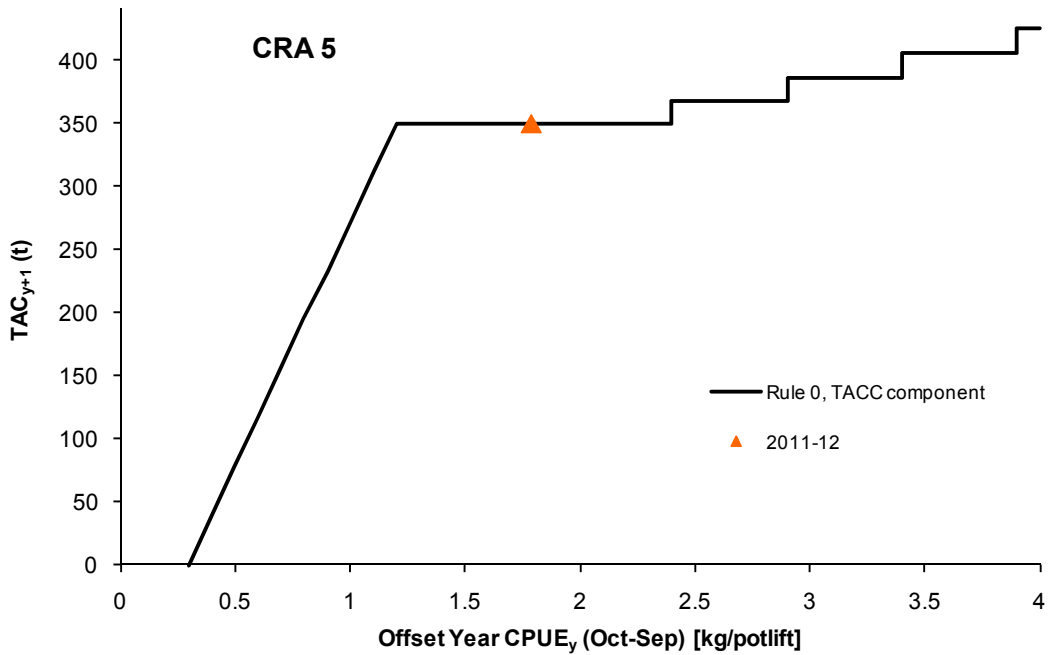


Figure 6: *Graphic representation of the CRA 5 Management Procedure. It shows the form of the TACC component only.*

160. The NRLMG proposes no change to the CRA 5 TACC for the next fishing year. This because the 2009-10 offset year CPUE for CRA 5 was 1.787 kg/potlift, giving a proposed TACC for the 2011-12 fishing year of 350 tonnes (this is shown by the orange triangle on the graph). In future years if CPUE increases above 2.4kg/potlift the management procedure will specify a TACC increase in steps (as shown in Figure 6 above).

CRA 5 Initial Position

161. Based on best available information and the analysis set out above, the NRLMG's preferred option is **Option 1**: increase the TAC for CRA 5 and alter the recreational and other mortality allowances as specified by the proposed CRA 5 Management Procedure. The NRLMG notes there was no agreement on how the customary allowance should be set.

REVIEW OF THE CRA 7 (OTAGO) ROCK LOBSTER FISHERY

Summary of CRA 7 Management Options

162. The NRLMG is seeking comments on three management options for setting TACs and allowances for CRA 7:

Stock	Option	TAC	TACC	Customary Allowance	Recreational Allowance	Other mortality
CRA 7	Option 1: Accept the proposed revised CRA 7 management procedure and then maintain the TAC based on its operation	104.5 tonnes	84.5 tonnes	10 tonnes	5 tonnes	5 tonnes
	Option 2: Reduce the TAC based on the operation of the agreed CRA 7 management procedure	95.7 tonnes	75.7 tonnes	10 tonnes	5 tonnes	5 tonnes
	Option 3: Retain the current TAC, TACC and allowances	104.5 tonnes	84.5 tonnes	10 tonnes	5 tonnes	5 tonnes

163. Under **Option 1**, the TAC for CRA 7 would be retained for the 2011-12 fishing year. This proposal results from the operation of the proposed revised CRA 7 Management Procedure (refer to Paper 1 titled – “*Proposal to use new management procedures to guide TAC setting in CRA 5 and CRA 7*”). The operation of the proposed new CRA 7 Management Procedure represents the best available information to guide TAC setting for the CRA 7 fishery in the 2011-12 fishing year.
164. Under **Option 2**, the TAC for CRA 7 would reduce from 104.5 tonnes to 95.7 tonnes from 1 April 2011, as specified by the current CRA 7 Management Procedure. Within this TAC it is proposed to decrease the TACC from 84.5 tonnes to 75.7 tonnes. It is proposed that the allowances set for customary Maori, recreational interests and other fishing mortality are not changed.
165. Under **Option 3**, the TAC for CRA 7 would be retained for the 2011-12 fishing year.

Sustainability Indicators and Stock Status

166. A stock assessment was last performed for CRA 7 in 2006. No reliable estimate of *Bmsy* was calculated in this assessment. The MFish Plenary instead agreed to use a *Bmsy* proxy, *Bref*, which is the pre-season autumn-winter vulnerable biomass associated with the period 1979-81. 1979-81 was a period when the CRA 7 stock showed good productivity and was demonstrably safe.
167. *Bmin* for CRA 7 is considered to be one half of *Bref*.
168. The 2006 stock assessment results indicated stock size in 2005-06 was well above *Bmin* and was approximately 1.7 times *Bref*.

169. In 2008, *Bmsy* was subsequently identified for CRA 7³. The 2008 analysis provides a method of estimating the average biomass at which yield was maximised (ie, *Bmsy*). On this basis *Bref* appears to be larger than *Bmsy* and is therefore a more conservative reference level.
170. Standardised commercial CPUE is considered to be a reliable indicator of relative stock size in CRA 7 and is the abundance indicator used in the CRA 7 Management Procedure (in both the agreed and proposed procedures). The history of offset year (October through September) CPUE in CRA 7 is shown in Figure 7. Except for one year, CPUE increased continuously and strongly between 1998 and 2008; it declined by 56% in 2009 and increased by 9% in 2010.

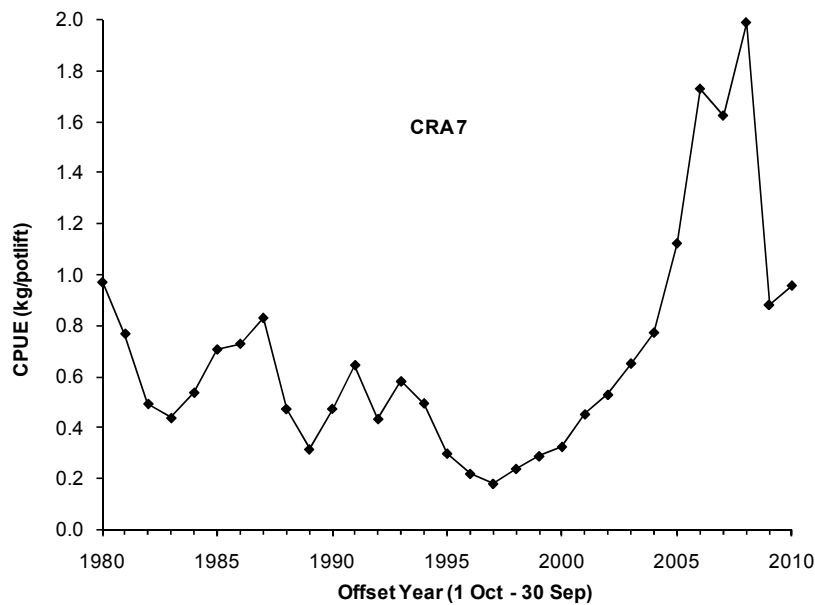


Figure 7: The history of offset year CPUE in CRA 7

Analysis of Management Options for CRA 7

171. An analysis of the setting of the TAC, non-commercial allowances and the TACC for CRA 7 is set out below.

TAC Setting

172. Best available information suggests the current CRA 7 stock is above *Bmsy* (and the agreed proxy, *Bref*). As such the Minister is able to set a TAC that maintains the stock at or above this level (section 13(2)(a)).
173. Three TAC options are proposed for CRA 7:

Option 1 – Retain the current TAC of 104.5 tonnes (as specified by the proposed revised CRA 7 management procedure)

174. Under Option 1, the current CRA 7 TAC of 104.5 tonnes would be retained for the 2011-12 fishing year. The proposed retention in TAC is specified by the proposed revised CRA 7 Management Procedure (refer Paper 1).
175. A graphic representation of the proposed revised CRA 7 Management Procedure is provided in Figure 8 (for further technical details on this procedure refer to Appendix 3). Operation of the

³ Refer CRA 7 and CRA 8 Supplementary Advice for April 2008 Sustainability Measures: <http://www.fish.govt.nz/en-nz/Consultations/Archive/2008/Rock+Lobster+7+and+8/default.htm>

proposed management procedure initially suggests a TAC increase from 104.5 tonnes to 114.8 tonnes (based on the most recent offset year standardised CPUE of 0.957 kg/potlift). However, the rule does not allow an increase if the TAC was adjusted the previous year. Because the CRA 7 TAC was reduced from 209 tonnes to 104.5 tonnes for the 2010-11 fishing year, no change is proposed to the CRA 7 TAC for the 2011-12 fishing year.

176. The NRLMG considers the proposed TAC variation, guided by the operation of the revised CRA 7 Management Procedure, enables the stock to be maintained above *B_{msy}*. This is because ongoing application of the CRA 7 Management Procedure is expected to meet HSS requirements and maintain the stock above the agreed proxy, *B_{ref}*, with higher than 50% probability and above *B_{min}* with greater than 90% probability; simulation testing indicates the revised CRA 7 Management Procedure would maintain the stock above *B_{ref}* with 85% probability and above *B_{min}* with 98% probability.
177. Overall the NRLMG considers the revised CRA 7 Management Procedure will result in improved biomass levels over the medium and long terms. The proposed procedure is expected to have a higher average CPUE compared with the current rule (Option 2), and, because of increased abundance, the procedure results in fewer years where stock biomass is predicted to be less than the agreed proxy, *B_{ref}*.

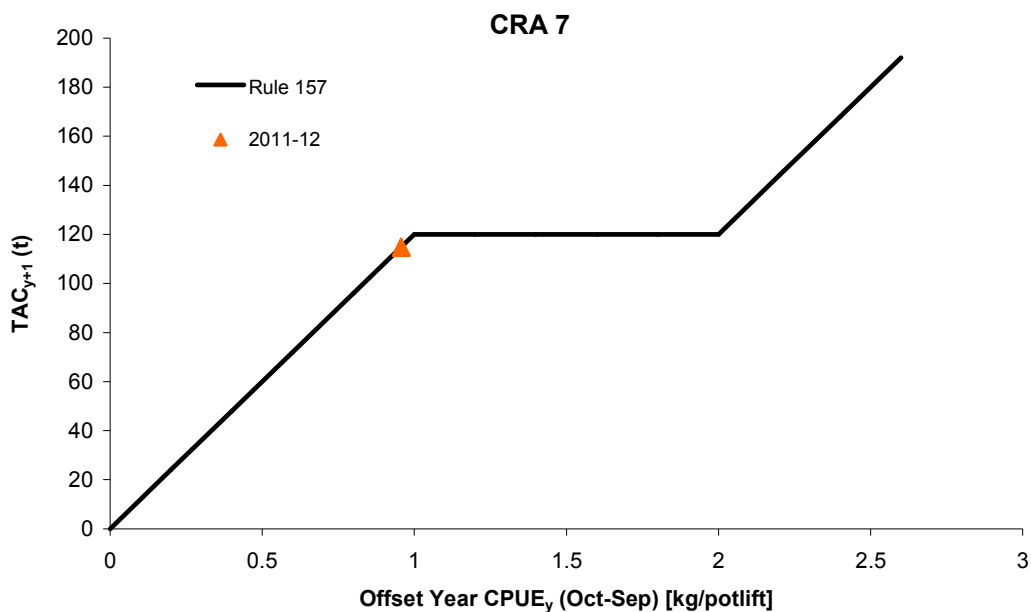


Figure 8: Graphic representation of the proposed 2010 CRA 7 Management Procedure.

178. Option 1 will maintain the current utilisation benefit of the fishery. The proposed revised CRA 7 Management Procedure would be expected to provide more stability in the TAC: there would be fewer dramatic changes in the TAC than under Option 2. Depending on allocation decisions, this option would likely benefit the commercial sector the most because it would enable them to stabilise (and potentially increase) their utilisation benefit. Utilisation benefits for customary Maori and recreational interests are likely to be improved or at least maintained under this option. This is because the ongoing application of the revised management procedure is expected to maintain the CRA 7 stock well above the reference level; therefore good fishing opportunities for all sectors are likely to be provided for in the future.

Option 2 – Reduce the TAC to 95.7 tonnes

179. Under Option 2, the CRA 7 TAC would be set at 95.7 tonnes. The proposed decrease in TAC is specified by the current CRA 7 Management Procedure that the Minister agreed to use in March 2008 to guide TAC setting in the fishery until the 2012-13 fishing year.
180. A graphic representation of the CRA 7 Management Procedure is provided in Figure 9 (for further technical details on the current CRA 7 Management Procedure refer to Appendix 3). The graph shows the TAC in the next year as a function of offset-year CPUE in the current year. It also shows the CPUE values (coloured shapes) that generated the TAC proposals for the 2008-09, 2009-10, 2010-11 and 2011-12 fishing years. Although offset year CPUE increased in the last year (from 0.803 kg/potlift to 0.957 kg/potlift) the operation of the current CRA 7 management procedure has resulted in a proposed 8.8 tonne reduction to the TAC. This is because for the previous fishing year (2010-11) the TAC decrease could have been larger, but it was limited by the 50% maximum change threshold of the management procedure.
181. The NRLMG considers the proposed TAC variation, guided by the operation of the current CRA 7 Management Procedure, enables the stock to be maintained above *B_{msy}*. This is because ongoing application of the CRA 7 Management Procedure is expected to meet HSS requirements and maintain the stock above the agreed proxy, *B_{ref}*, with higher than 50% probability and above *B_{min}* with greater than 90% probability; simulation testing indicates the current CRA 7 Management Procedure would maintain the stock above *B_{ref}* with 80% probability and above *B_{min}* with 99% probability.

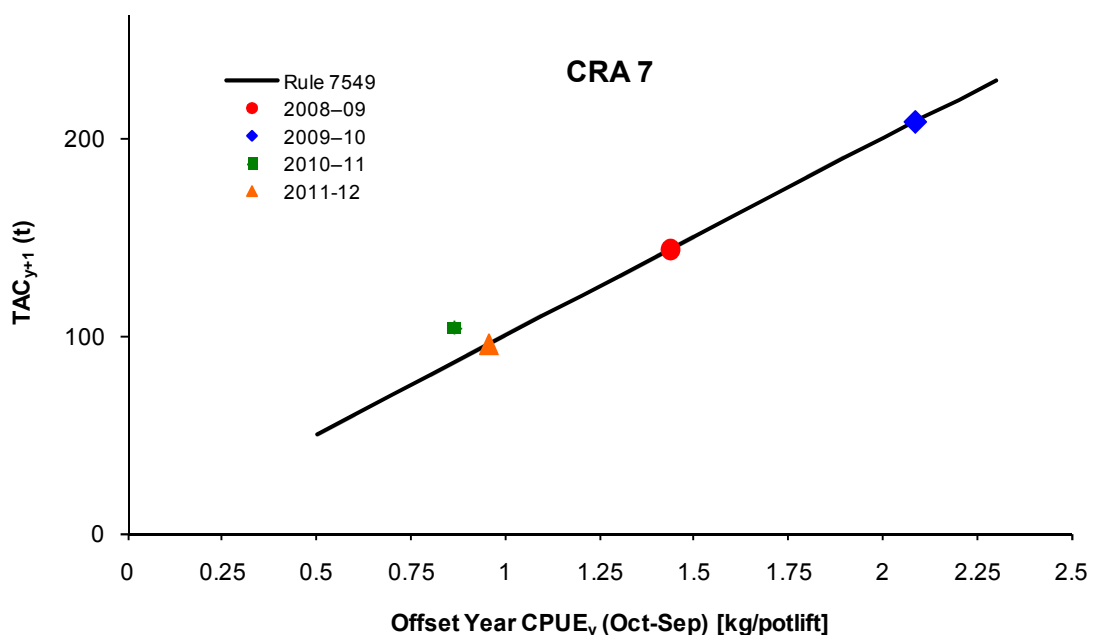


Figure 9: Graphic representation of the “current” CRA 7 Management Procedure.

182. Option 2 will reduce the current utilisation benefit of the fishery. Depending on allocation decisions, the commercial sector may be most affected by the proposed TAC decrease from the loss of opportunity costs.
183. Utilisation benefits for customary Maori and recreational interests are likely to be improved or at least maintained under this option. This is because the ongoing application of the current CRA 7 management procedure is expected to maintain the stock well above the reference level; therefore good fishing opportunities for all sectors are likely to be provided for in the future.

Option 3 – Retain the current TAC of 104.5 tonnes

184. Under Option 3, the current CRA 7 TAC of 104.5 tonnes would be retained for the 2011-12 fishing year. In comparison to Option 1, the proposed retention of the current CRA 7 TAC is not guided by any management procedure.
185. Option 3 will maintain the current utilisation benefit of the fishery; however the NRLMG considers this is a suitable option only if the management procedures described in Option 1 and 2 are not suitable.

Setting of Non-commercial Allowances and the TACC

186. Changes to CRA 7 non-commercial allowances and the TACC are discussed only for Option 2 because no TAC change is proposed under the alternative Options 1 and 3. The Minister may adopt different allowances and TACCs than those proposed.

Allowances for customary Maori, recreational interests and other mortality

187. Current allowances and estimated catches for customary Maori, recreational interests and other sources of fishing-related mortality (eg, illegal fishing) are outlined in Table 3 below for CRA7.

CRA 7	Customary	Recreational	Other mortality
Current allowances	10 tonnes	5 tonnes	5 tonnes
Catch estimates (from 2006 CRA 7 stock assessment ⁴)	1 tonne	4.51 tonnes	1 tonne

Table 3: *Current CRA 7 allowances and estimated catches for non-commercial*

188. Under Option 2, where the TAC would be reduced by 8.8 tonnes, the NRLMG proposes that no change is made to current allowances for customary Maori, recreational interests and other mortality. Although uncertain, best available information suggests existing CRA 7 customary Maori and recreational allowances are sufficient to cover recreational and customary catch.
189. When allowing for customary interests the Minister must take into account any relevant mātaihai reserve or closures/restrictions under section 186A. There are two mātaihai reserves located in CRA 7, the Puna wai-Toriki (Otago) and Moeraki mātaihai reserves. The NRLMG considers the CRA 7 customary allowance adequately provides for the harvest of lobster likely to be taken from the mātaihai within the QMA.

TACC

190. Commercial fishers are legally obliged to report how much rock lobsters they take on a monthly basis. Figure 10 shows historical CRA 7 landings and the TACC since the 1990-91 fishing year. From 1990 through to 2003, on average only 73% of the TACC was caught. The CRA 7 TACC has been fully caught from 2004 onwards except for 2009. The TACC has increased/decreased based on guidance from the operation of management procedures since 1996.

⁴ Refer to the Mid-Year Stock Assessment Plenary report (Annex 3 of the 2010 NRLMG Annual Report).

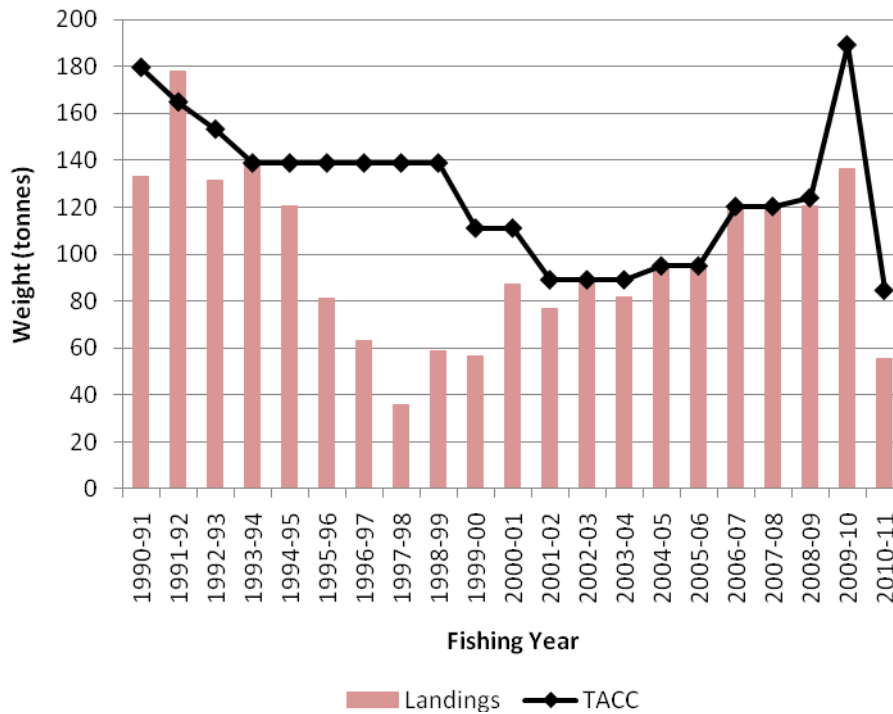


Figure 10: CRA 7 historical landings (from monthly harvest return reports) and TACC.
 Note that landings may be incomplete for the CRA 7 2010-11 year which ended 19 November 2010
 (data extracted 5 December 2010)

- 191. The NRLMG proposes reducing only the CRA 7 TACC under Option 2 because it considers there is greater certainty of benefit to the stock associated with a reduction to the TACC. This is because catch from the commercial sector can be more directly controlled and existing customary Maori and recreational allowances/catch estimates form a small component of the TAC. CRAMAC 7 has also agreed in the past to receive both increases and decreases in commercial catch (as shown in Figure 10 from 1999 onwards).
- 192. The NRLMG advises, based on average 2010 landing price information, that the proposed 8.8 tonne decrease in commercial catch of rock lobster has the potential to reduce the earnings for the commercial sector by approximately \$487 thousand based on current and predicted prices for CRA 7 landings.

CRA 7 Initial Position

- 193. Based on best available information and the analysis set out above, the NRLMG’s preferred option is **Option 1**: retain the TAC, TACC and allowances for CRA 7 based on the operation of the proposed revised CRA 7 management procedure.
- 194. The NRLMG has identified no reason why the Minister should not use the results of the proposed revised CRA 7 management procedure to guide statutory TAC setting decisions.

REVIEW OF THE CRA 8 (SOUTHERN) ROCK LOBSTER FISHERY

Summary of CRA 8 Management Options

195. The NRLMG is seeking comments on two management options for setting TACs and allowances for CRA 8:

Stock	Option	TAC	TACC	Customary Allowance	Recreational Allowance	Other mortality
CRA 8	Option 1: Reduce the TAC based on the operation of the agreed CRA 8 management procedure	1053 tonnes	962 tonnes	No change	No change	No change
	Option 2: Retain the current TAC, TACC and allowances	1110 tonnes	1019 tonnes	30 tonnes	33 tonnes	28 tonnes

196. Under **Option 1**, the TAC for CRA 8 would reduce from 1110 tonnes to 1053 tonnes from 1 April 2011, as specified by the CRA 8 Management Procedure. Within this TAC it is proposed to decrease the TACC from 1019 tonnes to 962 tonnes. It is proposed that the allowances set for customary Maori, recreational interests and other fishing mortality are not changed.
197. Under **Option 2**, the current CRA 8 TAC and allowances would be retained for the 2011-12 fishing year, beginning 1 April 2011.

Sustainability Indicators and Stock Status

198. A stock assessment was last performed for CRA 8 in 2006. No reliable estimate of *Bmsy* was calculated in this assessment. The MFish Plenary instead agreed to use a *Bmsy* proxy, *Bref*, which is the vulnerable stock size associated with the period 1979-80 to 1981-82. This was a period when the CRA 8 stock showed good productivity and was demonstrably safe: the stock subsequently declined to lower levels and then recovered.
199. *Bmin* for CRA 8 is considered to be one half of *Bref*.
200. The 2006 stock assessment results indicated that stock size in 2005-06 was well above *Bmin* and was approximately twice *Bref*.
201. In 2008, *Bmsy* was subsequently identified for CRA 8⁵. The 2008 analysis provides a method of estimating the average biomass at which yield was maximised (ie, *Bmsy*). On this basis *Bmsy* appeared to be slightly larger than *Bref* (at 1.14 times *Bref*) and *Bmsy* is therefore a more conservative reference level.
202. Standardised CPUE is considered to be a reliable indicator of relative stock size in CRA 8 and is the abundance indicator used in the agreed CRA 8 Management Procedure. The history of commercial offset year (October through September) CPUE in CRA 8 is shown in Figure 11. CPUE increased in every year between 1999 and 2009, sometimes strongly, but decreased by 16% in 2010.

⁵ Refer CRA 7 and CRA 8 Supplementary Advice for April 2008 Sustainability Measures: <http://www.fish.govt.nz/en-nz/Consultations/Archive/2008/Rock+Lobster+7+and+8/default.htm>

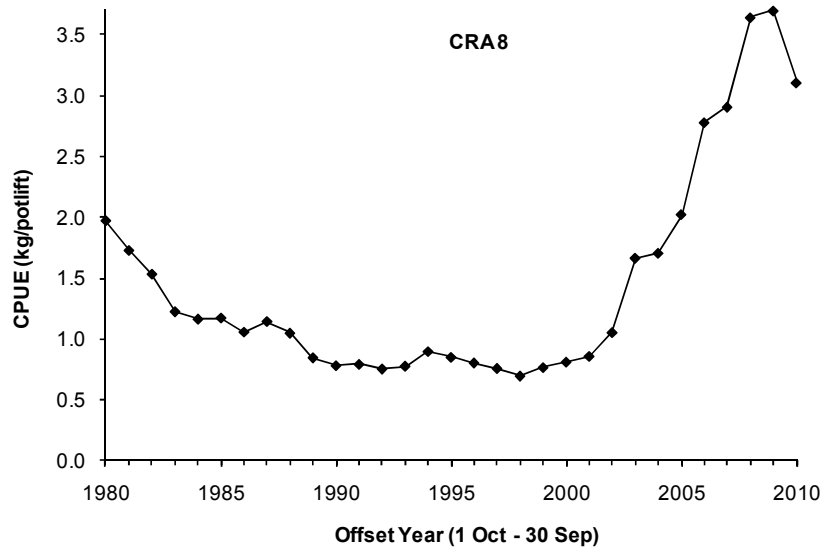


Figure 11: The history of offset year CPUE in CRA 8

Analysis of Management Options for CRA 8

203. An analysis of the setting of the TAC, non-commercial allowances and the TACC for CRA 8 is set out below.

TAC Setting

204. Best available information suggests the current CRA 7 stock is above *Bmsy* (and the agreed proxy, *Bref*). As such the Minister is able to set a TAC that maintains the stock at or above this level (section 13(2)(a)).
205. Two TAC options are proposed for CRA 8:

Option 1 – Reduce the TAC to 1053 tonnes

206. Under Option 1, the CRA 8 TAC would be set at 1053 tonnes. The proposed decrease in TAC is specified by the CRA 8 Management Procedure that the Minister agreed to use in March 2008 to guide TAC setting in the fishery until the 2012-13 fishing year. The NRLMG notes the proposed decrease in TAC is due to the conservative nature of the management procedure and is not due to sustainability concerns.
207. A graphic representation of the CRA 8 Management Procedure is provided in Figure 12 (for further technical details on the CRA 8 Management Procedure refer to Appendix 4). The graph shows the TAC in the next year as a function of offset-year CPUE in the current year. It also shows the CPUE values (coloured shapes) that generated the TAC proposals for the 2008-09, 2009-10, 2010-11 and 2011-12 fishing years. Offset year CPUE decreased in the last year (from 3.781 kg/potlift to 3.107 kg/potlift). This decrease, through the operation of the management procedure, has resulted in the proposed 57 tonne reduction to the TAC.
208. It is the NRLMG's view that the proposed TAC variation, guided by the operation of the CRA 8 Management Procedure, enables the stock to be maintained above *Bmsy*. This is because ongoing application of the CRA 8 Management Procedure is expected to meet HSS requirements and maintain the stock above the agreed proxy, *Bref*, with higher than 50% probability and above *Bmin* with greater than 90% probability; simulation testing indicates the CRA 8

Management Procedure would maintain the stock above *Bref* with 99% probability and above *Bmin* with 99% probability.

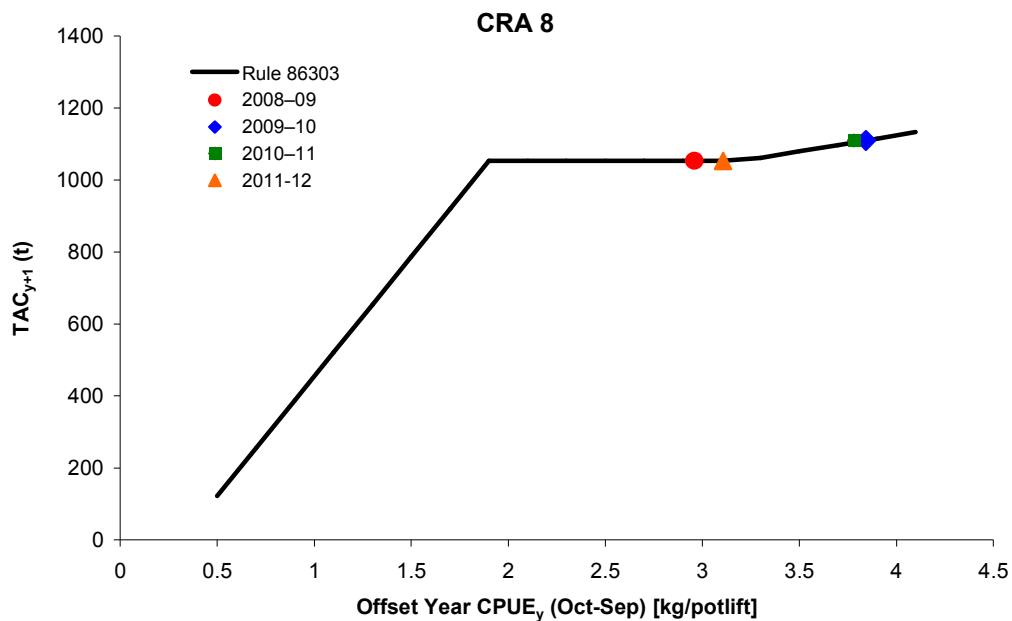


Figure 12: Graphic representation of the CRA 8 Management Procedure.

209. Option 1 will reduce the current utilisation benefit of the fishery. Depending on allocation decisions, the commercial sector may be most affected by the proposed TAC decrease from the loss of opportunity costs. Utilisation benefits for customary Maori and recreational interests are likely to be maintained under this option because the current CRA 8 stock size is well above the reference level and consequently there is a high availability of lobsters. However, because the ongoing application of the management procedure is expected to maintain the CRA 8 stock well above the reference level, good fishing opportunities for all sectors are likely to be provided for in the future.

Option 2 – Retain the current TAC of 1110 tonnes

210. Under Option 2, the current CRA 8 TAC of 1110 tonnes would be retained for the 2011-12 fishing year. The NRLMG advises that maintaining the current TAC could result in stock size declining further. A reduced stock size may also affect utilisation benefits by reducing fishing opportunities in the non-commercial and commercial fisheries.
211. Additionally, not responding to changes in CRA 8 stock size in a timely manner (as proposed under Option 1) could create uncertainty in future stock size, which could also affect utilisation benefits obtained from the fishery by all fishing sectors.

Setting of Non-commercial Allowances and the TACC

212. Changes to CRA 8 non-commercial allowances and the TACC are discussed only for Option 1 because no TAC change is proposed under the alternative Option 2. The Minister may adopt different allowances and TACCs than those proposed.

Allowances for customary Maori, recreational interests and other mortality

213. Current allowances and estimated catches for customary Maori, recreational interests and other sources of fishing-related mortality (eg, illegal fishing) are outlined in Table 4 below.

CRA 8	Customary	Recreational	Other mortality
Current allowances	30 tonnes	33 tonnes	28 tonnes
Catch estimates (from 2006 CRA 8 stock assessment ⁶)	2 tonnes	20.1 tonnes	18 tonnes

Table 4: *Current CRA 8 allowances and estimated catches for non-commercial*

214. Under Option 1, where the TAC would be reduced by 57 tonnes, the NRLMG proposes that no change be made to current allowances for customary Maori, recreational interests and other mortality. Although uncertain, best available information suggests existing CRA 8 customary Maori and recreational allowances are not being caught at this time.
215. When allowing for customary interests the Minister must take into account any relevant mātaihai reserve or closures and restrictions under section 186A. There are six mātaihai reserves located in CRA 8: the Tumu Toka (Waikawa Harbour), Oreti (Oreti Beach), Te Whaka Te Wera (Paterson Inlet, Stewart Island), Pikomamaku (Womens Island), Horomamae (Owen Island, Stewart Island), and Kaihuka (Kaihuka Island, Stewart Island) mātaihai reserves. The NRLMG considers the CRA 8 customary allowance adequately provides for the harvest of lobster likely to be taken from the mātaihai's within the QMA.

TACC

216. Commercial fishers are legally obliged to report how much rock lobsters they take on a monthly basis. Figure 13 shows historical CRA 8 landings and the TACC since the 1990-91 fishing year. The CRA 8 TACC has been fully caught since 1999, but has increased or decreased based on guidance from the operation of management procedures since 1996.

⁶ Refer to the Mid-Year Stock Assessment Plenary report (Annex 3 of the 2010 NRLMG Annual Report).

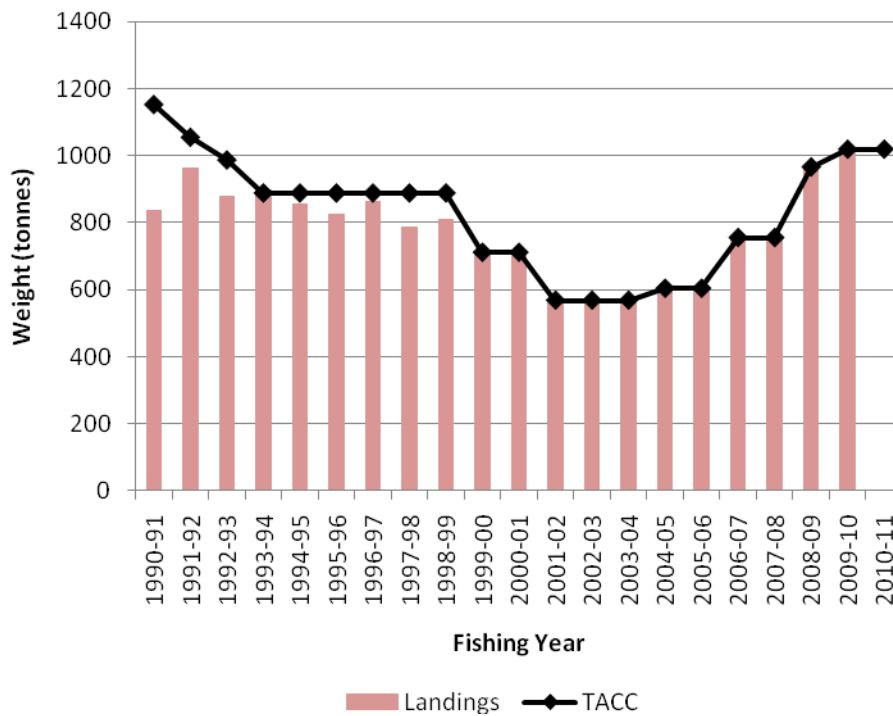


Figure 13: CRA 8 historical landings (from monthly harvest return reports) and TACC. Note that landings are not available for 2010-11 because the year is incomplete.

217. The NRLMG proposes to reduce only the CRA 8 TACC because it considers there is greater certainty of benefit to the stock associated with a reduction to the TACC. This is because catch from the commercial sector can be more directly controlled and existing customary Maori and recreational allowances/catch estimates form a small component of the TAC.
218. The CRA 8 rock lobster fisheries commercial stakeholder organisation (CRAMAC 8) has also agreed in the past to receive both increases and decreases in commercial catch (as shown in Figure 13 from 1999 onwards). Commercial members to the NRLMG note that CRAMAC 8 supports the proposed TACC variation as guided by the CRA 8 Management Procedure.
219. The NRLMG advises, based on average 2010 landing price information, that the proposed 57 tonne decrease in commercial catch of rock lobster has the potential to reduce the earnings for the commercial sector by approximately \$3.16 million based on current and predicted prices for CRA 8 landings. The proposed TACC decrease also has the potential to affect export returns for processors and exporters of rock lobster which will compound the overall financial impact.

CRA 8 Initial Position

220. Based on best available information and the analysis set out above, the NRLMG’s preferred option is **Option 1**: reduce the TAC for CRA 8 as specified by the CRA 8 Management Procedure by reducing only the TACC.
221. The NRLMG has identified no reason why the Minister should not use the results of the agreed CRA 8 Management Procedure to guide statutory TAC setting decisions.

4. REVIEW OF DEEMED VALUE RATES FOR SPINY AND PACKHORSE ROCK LOBSTER

SUMMARY

222. Table 1 summarises the NRLMG’s proposals for deemed value rate changes for spiny and packhorse rock lobster stocks presented in this paper. These proposals were developed in accordance with the principles outlined in the Ministry of Fisheries 2007 Deemed Value Standard.

Option	Annual deemed value rate	Interim deemed value rate	Differential
Option 1: Maintain current rock lobster deemed values (status quo)	\$100 per kg	\$75 per kg	Standard
Option 2: Change the current rock lobster deemed values (NRLMG preferred option)	Increase to \$110 per kg	Increase to \$99 per kg (increased to 90% of annual rate)	Standard

Table 1: Summary of proposed changes to deemed value rates for CRA 1 – 9 (inclusive) and PHC 1 rock lobster stocks

INTRODUCTION

223. The purpose of the deemed value framework is to provide an incentive for fishers to acquire sufficient annual catch entitlement (ACE) to balance against catch, for stocks managed under the Quota Management System. The catch balancing regime is a key fisheries management tool, contributing to both sustainability and utilisation objectives. The sustainability objectives are achieved when deemed value rates encourage fishers to balance catch with available ACE and in so doing encourage harvesting to remain within the Total Allowable Commercial Catch (TACC). Incorrectly set deemed value rates have contributed to catches in excess of the TACC in some fisheries in the past, which may have sustainability implications.
224. Utilisation objectives are achieved by providing flexibility for commercial operators to manage unexpected and small overruns in ACE holdings by allowing periodic rather than continuous balancing. In the long term, the sustainability implications that may result from overfishing could result in TACC reductions, which also impact on utilisation objectives.
225. Interim deemed value rates are charged each month to individual fishers for every kilogram of fish landed in excess of ACE. If the fisher sourced enough ACE to cover his or her catch by the end of the fishing year, the interim deemed value rates paid are reimbursed. If the fisher did not source enough ACE, the difference between the interim and annual deemed value rates is charged for all catch in excess of ACE. Differential deemed value rates are charged at the end of the fishing year if the fisher harvested well in excess of his or her ACE holdings (e.g. more than 20% in excess of ACE).

ANALYSIS

Inclusion in the review of deemed value rates

226. The MFish 2007 Deemed Value Standard (the Standard) sets out criteria that indicate if a fish stock should be considered for a deemed value rates review. After applying these criteria, the Deemed Value Review Group⁷ identified all spiny (CRA 1 – 9) and packhorse (PHC 1) rock lobster stocks for a review of their deemed value rates. The New Zealand Rock Lobster Industry Council (NZ RLIC) did not object to the MFish including the review of rock lobster deemed value rates in the NRLMG's review of sustainability measures and other management controls for rock lobster fisheries for the fishing year beginning 1 April 2011.
227. CRA 1 – 9 and PHC 1 have been included in this review because the landed and ACE prices have increased. This is a criterion that can trigger a review of deemed value rates under the Standard.
228. Other criteria for inclusion in the review are catch in excess of the TACC and catch in excess of an individual's ACE holdings while ACE remains unused. However, over the course of the last fishing year (2009-10), CRA 3 was the only stock for which reported catch exceeded the TACC (if only marginally, by 15 kg); reported catch for other rock lobster stocks was below their respective TACCs by a range of 72 kg (CRA 5) to 52,502 kg (CRA 7).

Annual deemed value rates

High value single species fisheries⁸

229. The Standard also specifies a set of principles to be applied when setting deemed value rates. One of these principles relates to high value single species fisheries, like rock lobster.
230. In these fisheries, the nature of the harvest activity means that any breach of the TACC is likely to be deliberate. Furthermore, rock lobster is a highly valuable species to both commercial and non-commercial fishers. Thus, it is necessary to provide a very strong incentive to catch only the amount for which fishers have ACE.
231. According to the Standard, this is accomplished by setting the annual deemed value rate at approximately twice the average landed price. A fisher would suffer a large loss on any catches in excess of ACE. By setting the deemed value rate at twice the landed price, it is unlikely that even if prices increase during a fishing year that any incentive would arise to land catch in excess of ACE.
232. The annual deemed value rates for CRA 1 – 9 and PHC 1 were considered by the Minister of Fisheries in October 2008 and were increased to the current \$100 per kg to account for increases in the landed price at the time. This decision was consistent with the principle of setting annual deemed value rates at twice the average landed price.
233. NRLMG commercial members advise that average landed prices from 1 October 2009 to 30 September 2010 were \$55.40 per kg for all CRA and PHC stocks and across all market grades. Similarly, MFish landed price surveys in the last year report landed prices for CRA stocks have increased from \$38.53 to \$56.61 and PHC 1 landed prices have increased from \$27.12 to \$48 between 2008-09 and 2010-11.

⁷ The Deemed Value Review Group is made up of Ministry of Fisheries and Seafood Industry Council staff members.

⁸ Although spiny red and packhorse rock lobster are two different species, they are treated as a single species fishery for the purpose of deemed value rate setting.

234. The proposed deemed value rates in this paper are based on an average landed price of \$55 per kg. The NRLMG considers it important to continue the strategy of setting the annual deemed value rate at twice the landed price. It therefore proposes to increase the annual deemed value rates to \$110 per kg.

Avoiding incentives to misreport

235. When two adjacent Quota Management Areas (QMAs) for the same species have substantially different deemed value rates, there may be an incentive to misreport origin and attribute the catch to the area where the lower deemed value rates prevail. This creates a risk when vessels fish across more than one QMA on one trip.
236. Following a request from the Seafood Industry Council in 2008, the recent approach when setting deemed value rates for rock lobster stocks has been to have the same deemed value rates across all CRA and PHC 1 stocks. This is because prices paid for rock lobster are on average the same across QMAs. As a consequence, setting the same deemed value rates across rock lobster QMAs eliminates any incentive to misreport catch to take advantage of lower deemed value rates in adjacent QMAs.

Interim deemed value rates

237. There is a risk that setting interim deemed value rates too low will delay the balancing of catch until the end of the fishing year. This may lead to a race for ACE and insufficient ACE to cover all catch at the end of the fishing year, potentially leading to the TACC being exceeded. Prior to the Standard, interim deemed value rates were generally set at 50% of the annual rate. The Standard states that the interim deemed value rates should remain at 50% of the annual rates for most stocks, recognising that higher interim deemed value rates for some stocks may be appropriate.
238. Following previous requests from commercial stakeholders, rock lobster interim deemed value rates are currently set at 75% of the annual deemed value rate to encourage fishers to balance their catch with ACE regularly instead of paying interim deemed value rates. However, given the desire to ensure commercial fishers secure sufficient ACE prior to commencing fishing, and in order to be consistent with the approach signalled in the MFish draft 2011 Deemed Value Standard⁹, the NRLMG proposes that interim deemed value rates be increased to 90% of the annual rate.

Differential deemed value rates

239. Differential deemed value rates are used as an additional deterrent to not catch fish in excess of ACE by increasing the deemed value rate for an individual as more and more catch is taken in excess of the ACE held. Differential deemed value rates can also build in buffers that manage risk of future uncertainty in economic variables such as landed price, export price and foreign exchange rates.
240. The term 'standard differentials' refers to the most frequently used differential deemed value rate schedule. Those standard differentials increase the deemed value rate by 20% over the annual rate when catch equals more than 120% of ACE, by 40% when catch is more than 140% of ACE, by 60% when catch is more than 160% of ACE, by 80% when catch is more than 180% of ACE, and by 100% when catch is more than 200% of ACE. Prior to the Standard, standard differentials were the norm when differential deemed value rates were implemented.

⁹ In the draft 2011 Deemed Value Standard, the Ministry of Fisheries proposes that interim deemed value rates be set at 90% of the annual deemed value rate. Except for the interim deemed value rate, the draft 2011 Standard is not used as the basis for this review of rock lobster deemed value rates.

241. The NRLMG proposes to continue setting standard differentials for rock lobster stocks. The differential deemed value rates for all CRA and PHC 1 stocks would be adjusted to match the approved annual deemed value rate, in accordance with the standard schedule.

NRLMG RECOMMENDATION

242. The NRLMG proposes to change the deemed value rates for all spiny and packhorse rock lobster stocks for the 2011-12 fishing year as follows:

- a) increase the annual deemed value rate from \$100.00 per kg to \$110.00 per kg;
- b) increase the interim deemed value rate from 75% to 90% of the proposed annual deemed value rate, thus from \$75.00 per kg to \$99.00 per kg; and
- c) adjust the differential deemed value rates as outlined in Table 2 below:

Current differential rates		Proposed differential rates	
Catch in excess of ACE holdings	Current deemed value rate	Catch in excess of ACE holdings	Proposed deemed value rate
0-20 %	\$ 100.00 per kg	0-20 %	\$ 110.00 per kg
> 20 %	\$ 120.00 per kg	> 20 %	\$ 132.00 per kg
> 40 %	\$ 140.00 per kg	> 40 %	\$ 154.00 per kg
> 60 %	\$ 160.00 per kg	> 60 %	\$ 176.00 per kg
> 80 %	\$ 180.00 per kg	> 80 %	\$ 198.00 per kg
> 100 %	\$ 200.00 per kg	> 100 %	\$ 220.00 per kg

Table 2: Proposed differential deemed value rates for CRA 1 – 9 and PHC 1 rock lobster stocks

ATTACHMENT 1: SPECIFICATIONS OF THE CRA 4 MANAGEMENT PROCEDURE

This CRA 4 Management Procedure (rule E170) is based on the work of (Breen & Kim 2006b) and is specified as follows:

a)

$$TACC_{y+1} = 500 \left(\frac{I_y}{0.9} \right)^{1.4}$$

where $TACC_{y+1}$ is the TACC (in tonnes) in year $y+1$ and I_y is standardised CPUE from the most recent autumn-winter season. The rule is shown in *Figure A*.

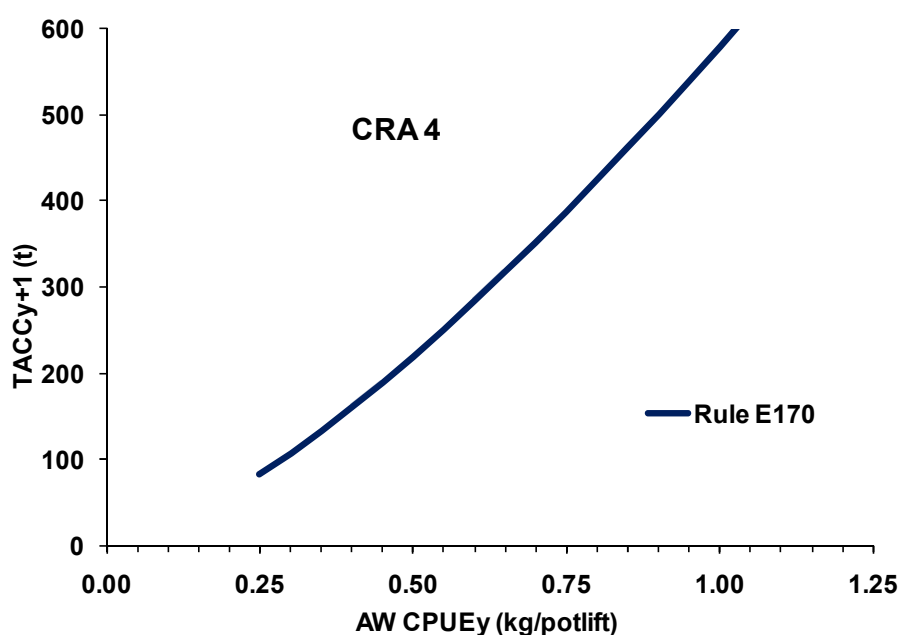


Figure A: The CRA 4 management procedure, showing TAC in year $y+1$ as a function of AW CPUE in year y .

- b) The output variable is TACC (tonnes) and that standardised CPUE (kg/pot) is to be used as the input variable;
- c) The management procedure is to be evaluated every year (there is no “latent year”¹⁰);
- d) If the procedure results in a TAC that changes by less than 5%, no change will be made; and
- e) If the procedure results in a TAC that changes by more than 75%, the TAC will be changed by 75%.

¹⁰ The original MPEs described by Breen & Kim (2006b) used an asymmetric latent year, in which a decrease could be made, but not an increase, in a year following a change. The latent year was dropped before a rule was adopted, at the request of NZ RLIC Ltd., after examination of the performance of the rule without a latent year.

The history of the CRA 4 Management Procedure is shown in *Table A* below.

Year	Applied to fishing year	AW CPUE (kg/potlift)	Rule result: TACC (tonnes)	Operational limit (tonnes)	TACC (tonnes)
2006	2007-08	0.656	321.1	339	577
2007	2008-09	0.515	228.9	240	577
2008	2009-10	0.573	265.9	266	266
2009	2010-11	0.871	465.5		415.6
2010	2011-12 (proposed)	0.857	466.9	<i>To be determined</i>	<i>To be determined</i>

Table A: History of the CRA 4 Management Procedure, showing proposed limits to the commercial fishery. The “operational limit” shows the level of voluntary shelving achieved for the 2007-08 and 2008-09 fishing years. “Rule result” is the result of the management procedure after operation of all its components including thresholds.

In late 2006, the rule delivered a specified catch limit of 321 tonnes. Not all quota owners shelved the requisite ACE, resulting in an operational limit of 339 tonnes, a 41% reduction from the TACC.

In late 2007, the rule delivered a specified catch limit of 228.9 tonnes. Not all quota owners shelved the requisite ACE, resulting in an operational limit of 245 tonnes, a 57% reduction from the TACC.

In late 2008, the rule delivered a specified catch limit of 265.9 tonnes. The Minister formally accepted the rule to guide statutory TAC setting in CRA 4 from the 2009-10 fishing year. This resulted in an operational limit of 266 tonnes, a 55 % reduction from the TACC.

In late 2009, the rule delivered a specified catch limit of 477.59 tonnes. This would represent an increase of 79.5%. However, the maximum change allowed under the rule is +/- 75%, thus the proposed TACC for 2010-11 was 465.5 tonnes. A number of stakeholders, including industry participants, were against an increase of this size. The majority of CRA 4 industry participants were in favour of banking some of the recommended increase to buffer against future recruitment variability. The Minister set the TACC at 415 tonnes and not 465.5 tonnes as first proposed.

In late 2010, the rule delivered a specified catch limit of 446.9 tonnes, a 12% increase in the TACC.

The NRLMG recommends that a review of the current and proposed CRA 4 management procedure should take place in 2011. This is because management procedures should not remain in place for longer than about five years without a review, because in five years the operating model used to evaluate management procedures will be obsolete and fishery performance should be re-evaluated.

ATTACHMENT 2: SPECIFICATIONS OF THE CRA 5 MANAGEMENT PROCEDURE

A proposed new management procedure was developed for CRA 5 in 2010. The proposed management procedure was based on a 2010 stock assessment and incorporates elements of the voluntary ACE-shelving rule that the CRA 5 industry has used since 2009.

The proposed CRA 5 management procedure specifies that:

- a) The output variable is TAC (tonnes) and that standardised CPUE (kg/pot) is to be used as the input variable;
- b) Standardised CPUE is to be based on the offset year from 1 October;
- c) CPUE is to be standardised according to the recent usage described in annual Fishery Assessment Reports (FARs), using a data extract obtained in November to ensure that sufficient data from the most recent AW season have been entered;
- d) The proposed new management procedure delivers a TAC result that consists of three separate components: a component for TACC, a component for recreational catch and a component for non-size-limited catches (customary and illegal).
- e) The TACC component is based on the offset-year CPUE in the preceding year. The form of the TACC component, as a function of this CPUE, is shown in *Figure B*. Below a CPUE of 0.3 kg/potlift, the TACC is zero; between a CPUE of 0.3 and 1.2 kg/potlift, TACC increases linearly with CPUE to a plateau of 350 t, which extends to a CPUE of 2.4 kg/potlift. As CPUE increases above 2.4 kg/potlift, TACC increases in steps; which have a width of 0.5 kg/potlift and a height of 5% of the preceding TACC.
- d) The TACC component of the proposed rule is specified as follows:

$$\begin{aligned}
 TACC_{y+1} &= 0 && \text{for } I_y \leq 0.3 \\
 TACC_{y+1} &= 388.89(I_y - 0.3) && \text{for } 0.3 < I_y \leq 1.2 \\
 TACC_{y+1} &= 350 && \text{for } 1.2 < I_y \leq 2.4 \\
 TACC_{y+1} &= 350 \left(1.05^{\text{int}((I_y - 2.4)/0.5) + 1} \right) && \text{for } I_y > 2.4
 \end{aligned}$$

where $TACC_{y+1}$ is the TACC (in tonnes) in year $y+1$ and I_y is offset-year CPUE (in kg/potlift) in year y . The TACC component of the rule has no latent year and no thresholds for minimum and maximum change.

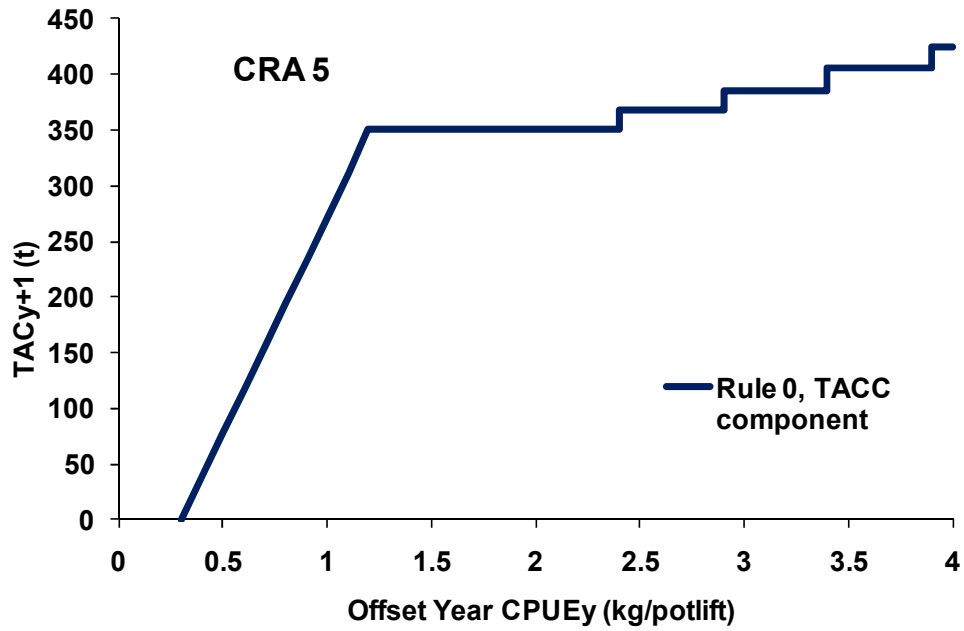


Figure B: The proposed TACC harvest control rule, a component of the proposed CRA 5 management procedure, showing TAC in year y+1 as a function of offset year CPUE in year y.

- f) The recreational catch component of the proposed new management procedure is a multiplier on the previous year offset-year CPUE, reflecting a belief that recreational catch changes linearly in response to changes in abundance and that abundance is reflected in CPUE. These beliefs were incorporated into both the stock assessment and the management procedure evaluations. The recreational component of the proposed rule, $C_{y+1}^{recreational}$ in tonnes, is specified as follows:

$$C_{y+1}^{recreational} = 61.6I_y$$

The other component of the proposed rule in tonnes is:

$$C_{y+1}^{customary+illegal} = 62$$

- g) The management procedure is to be evaluated every year (no “latent year”);
 h) There is no limit to the amount by which a TAC may change.

ATTACHMENT 3: SPECIFICATIONS OF THE CRA 7 MANAGEMENT PROCEDURES

The current and proposed CRA 7 management procedure specifies that:

- The output variable is TAC (tonnes) and that standardised CPUE (kg/pot) is to be used as the input variable,
- Standardised CPUE is to be based on the offset year from 1 October;
- CPUE is to be standardised according to the recent usage described in annual Fishery Assessment Reports (FARs), using a data extract obtained in November to ensure that sufficient data from the most recent AW season have been entered.

The Current CRA 7 Management Procedure

The current management procedure for CRA 7 (rule 7549) was accepted by the Minister for the 2008-09 fishing year.

In addition to the specifications listed above for both procedures, the current CRA 7 management procedure also specifies that:

- The TAC is to be set at 100 times the standardised CPUE (*Figure C*);
- The management procedure is to be evaluated every year (no “latent year”);
- If the procedure results in a TAC that changes by less than 5%, no change will be made; and
- If the procedure results in a TAC that changes by more than 50%, the TAC will be changed by 50%.

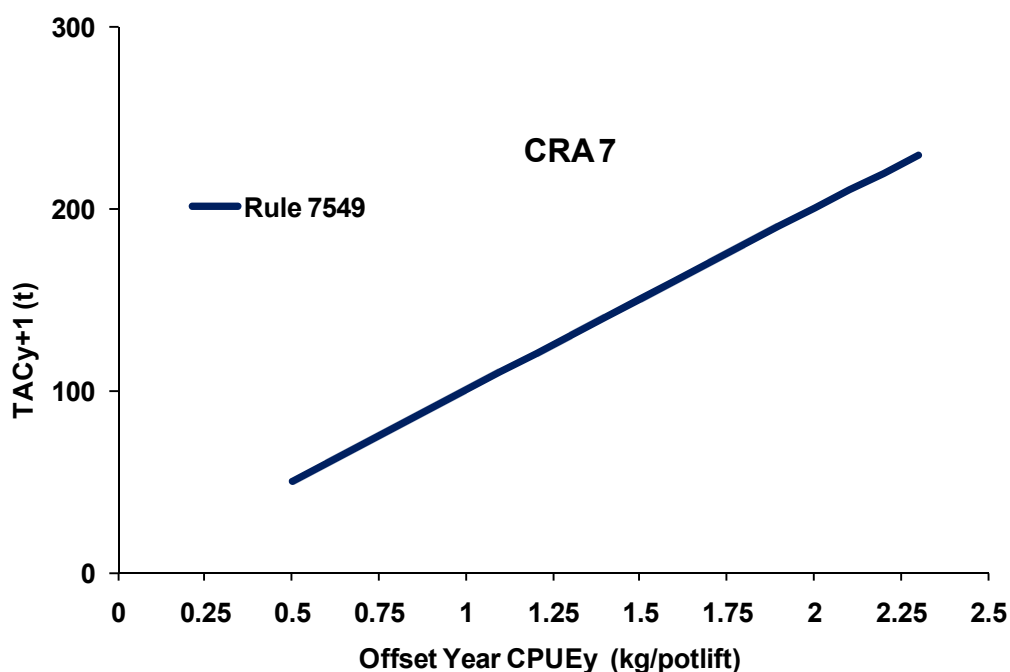


Figure C: The CRA 7 management procedure, showing TAC in year $y+1$ as a function of offset year CPUE in year y .

The history of the current CRA 7 Management Procedure is shown in *Table C* below.

Year	Applied to fishing year	AW CPUE (kg/potlift)	Rule result: TACC (tonnes)	TACC (tonnes)	TAC (tonnes)
2007	2008-09	1.439	143.9	123.9	143.9
2008	2009-10	2.090	209.0	189.0	209.0
2009	2010-11	0.803	104.5	84.5	104.5
2010	2011-12	0.957	95.7	<i>To be determined</i>	<i>To be determined</i>

Table C: History of the current CRA 7 Management Procedure, showing proposed limits to the commercial fishery. The “Rule result” is the result of the management procedure after operation of all its components including minimum and maximum change thresholds.

The Proposed CRA 7 Management Procedure

In 2010, the CRA 7 rock lobster fisheries commercial stakeholder organisation requested exploration of a revised management procedure to replace the apparent volatility of the CRA 7 TACC.

The proposed management procedure is shown in *Figure D*. It has a plateau of 120 t TAC between CPUE values of 1.0 and 2.0 kg/potlift, and increases linearly with increasing CPUE at the same slope above and below these values. It is expected that the TACC will be determined by subtracting the non-commercial allowances, which are currently 20 t.

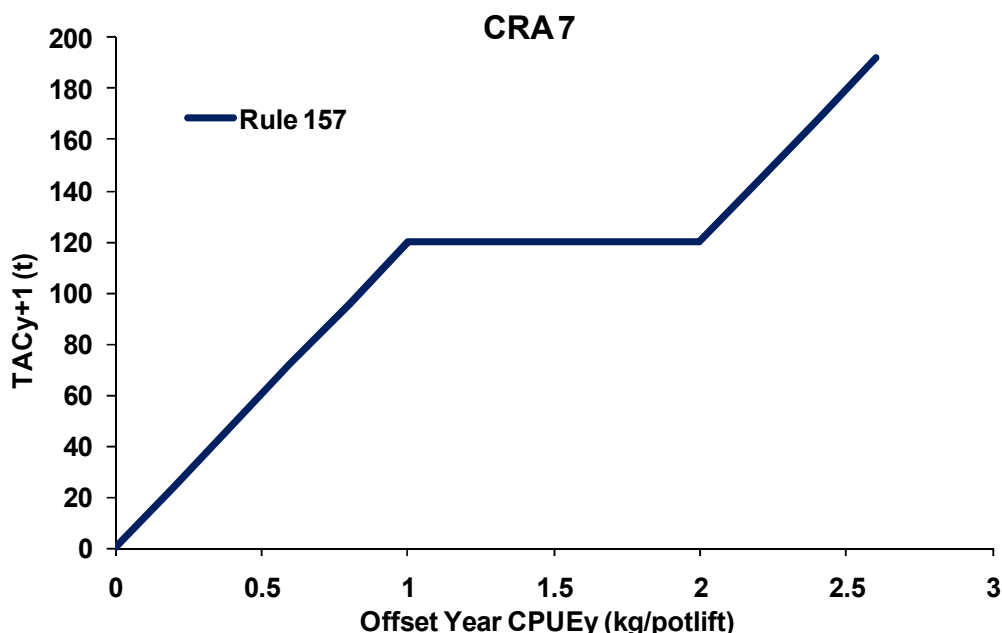


Figure D: The proposed new CRA 7 management procedure, showing TAC in year $y+1$ as a function of offset year CPUE in year y .

The rule is specified by:

a)

$$\begin{aligned}TAC'_{y+1} &= 120I_y && \text{for } I_y < 1.0 \\TAC'_{y+1} &= 120 && \text{for } 1.0 \leq I_y < 2.0 \\TAC'_{y+1} &= 120(1 + (I_y - 2.0)) && \text{for } I_y \geq 2.0\end{aligned}$$

where TAC'_{y+1} is the rule's specified TAC for the next fishing year, before the operation of minimum and maximum change thresholds, and I_y is standardised CPUE from the most recent offset year.

- b) 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).
- c) If the TAC change would be less than 10%, no change is made.
- d) If the TAC change would be greater than 50%, the TAC is changed by 50% only.

The NRLMG recommends that a review of the current and proposed CRA 7 management procedures should take place in 2012. This is because management procedures should not remain in place for longer than about five years without a review, because in five years the operating model used to evaluate management procedures will be obsolete and fishery performance should be re-evaluated.

ATTACHMENT 4: SPECIFICATIONS OF THE CRA 8 MANAGEMENT PROCEDURE

The current management procedure for CRA 8 (rule 86303) was accepted by the Minister in 2008, and he used it to set catch limits for the 2008-09 fishing year.

The CRA 8 management procedure specifies that:

- The output variable is TAC (tonnes) and that standardised CPUE (kg/pot) is to be used as the input variable;
- Standardised CPUE is to be based on the offset year from 1 October;
- CPUE is to be standardised according to the recent usage described in annual Fishery Assessment Reports (FARs), using a data extract obtained in November to ensure that sufficient data from the most recent AW season have been entered;
- The relation between CPUE, indicated by I_y , and the rule's specified TAC before the operation of the minimum change threshold, indicated by TAC'_{y+1} , is given in *Figure E* and in the equations below:

$$TAC'_{y+1} = \begin{cases} \max\left(0, \left(1053 - 1.2(1.9 - I_y) \frac{1053}{1.9}\right)\right), & \text{for } I_y < 1.9, \\ 1053, & \text{for } 1.9 \leq I_y \leq 3.2, \\ 1053 + 0.16(I_y - 3.2) \frac{1053}{1.9}, & \text{for } I_y > 3.2. \end{cases}$$

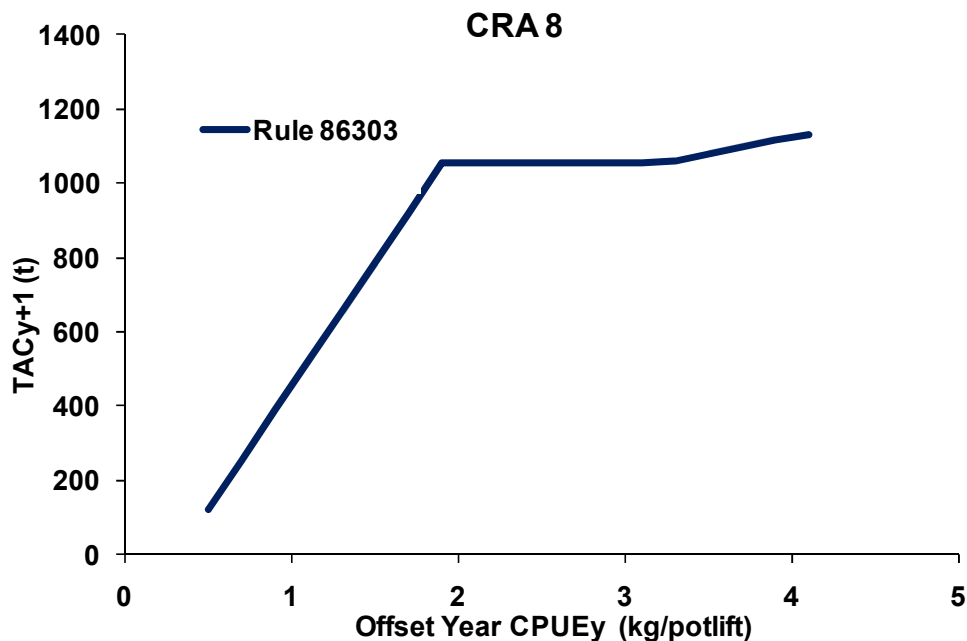


Figure E: The CRA 8 management procedure, showing TAC in year $y+1$ as a function of offset year CPUE in year y .

- e) The management procedure is to be evaluated every year (no “latent year”);
- f) If the procedure results in a TAC which changes by less than 5%, no change will be made;
- g) There is no limit to the amount by which a TAC may change.

The history of the current CRA 8 Management Procedure is shown in Table E below.

Year	Applied to fishing year	AW CPUE (kg/potlift)	Rule result: TACC (tonnes)	TACC (tonnes)	TAC (tonnes)
2007	2008-09	2.960	1053	966	1053
2008	2009-10	3.844	1110	1019	1110
2009	2010-11	3.781	1110	1019	1110
2010	2011-12 (proposed)	3.107	1053	<i>To be determined</i>	<i>To be determined</i>

Table E: History of the current CRA 8 Management Procedure, showing proposed limits to the commercial fishery. The “Rule result” is the result of the management procedure after operation of all its components including minimum and maximum change thresholds.

The NRLMG recommends that a review of the management procedure should take place in 2012. This is because management procedures should not remain in place for longer than about five years without a review, because in five years the operating model used to evaluate management procedures will be obsolete and fishery performance should be re-evaluated. Such a review was written into the 2002 NSS Management Procedure (Bentley et al. 2003).