

New Zealand Fisheries
Assessment Report
2008/55
September 2008
ISSN 1175-1584

Review of the NSS decision rule for stocks
CRA 7 and CRA 8 and development of
new operational management procedures

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**Published by Ministry of Fisheries
Wellington
2008**

ISSN 1175-1584

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**Ministry of Fisheries
2008**

Breen, P.A.; Haist, V.; Smith, A.N.H.; Starr, P.J. (2008).
Review of the NSS decision rule for stocks CRA 7 and CRA 8 and
development of new operational management procedures.
New Zealand Fisheries Assessment Report 2008/55. 71 p.

This series continues the informal
New Zealand Fisheries Assessment Research Document series
which ceased at the end of 1999.

EXECUTIVE SUMMARY

Breen, P.A.; Haist, V.; Smith, A.N.H.; Starr, P.J. (2008). Review of the NSS decision rule for stocks CRA 7 and CRA 8 and development of new operational management procedures.

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This document describes a review of the NSS decision rule that operated to manage TACs in CRA 7 and CRA 8 from 2002 through 2007. The review was a component of the management procedure that was agreed when the rule was adopted by the Minister of Fisheries.

The document describes conversion of the multi-stock length-based assessment model to an operating model for the two stocks, using 2006 assessment results. It describes work designed to measure the productivity characteristics of the operating model stocks, and four families of candidate harvest control rules. Preliminary, intermediate and final testing of the rules is described, and indicators are summarised from base case runs and sensitivity trials. Final rule choices are discussed.

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1. INTRODUCTION

This document describes a scheduled review of the NSS decision rule. The work was conducted by the rock lobster stock assessment team contracted by the New Zealand Rock Lobster Industry Council (NZ RLIC Ltd) to conduct Objective 4 of Ministry of Fisheries (MFish) contract CRA2006-01, Rock Lobster Stock Assessment.

The NSS decision rule is an operational management procedure used to set catch limits for the CRA 7 and CRA 8 (Otago and Southern) stocks of red rock lobsters (*Jasus edwardsii*). The operational management procedure approach was developed in South Africa (Butterworth et al. 1997, Cochrane et al. 1998), was adopted by the International Whaling Commission (Kirkwood 1997), and is now reasonably widespread. Johnston & Butterworth (2005) described choosing management procedures to manage South African rock lobsters (*Jasus lalandii*).

Management procedures are also called “decision rules”, but the latter term includes much simpler rules that have not been extensively evaluated with an operating model. Management procedures specify how management changes will be made in response to changes in specified fishery data. A management procedure is “a fully specified feedback control system applied as part of a fishery management system” (McAllister et al. 1999) and specifies what data will be collected, how they will be collected and processed, what estimates will be made from the data, and how those estimates will determine harvest controls. Good reviews were provided by Butterworth & Punt (1999) and McAllister et al. (1999).

The NSS decision rule, which is described in recent Reports from the Plenary, was proposed by the National Rock Lobster Management Group (NRLMG) and accepted by the Minister of Fisheries in 1996 (Starr et al. 1997). It resulted in TAC and TACC decreases in 1999 and 2001. A revised management procedure was proposed and accepted in 2002 after extensive evaluation of alternatives (Bentley et al. 2003). The evaluations considered a number of different stock and recruitment hypotheses across a series of management strategies and evaluated a family of “harvest control rules” operating within a generic procedure to set an annual TAC. Both the old and new management procedures are rebuilding rules designed to achieve a specific target CPUE within a specified number of years.

The decision rule evaluates how well observed CRA 8 CPUE tracks the rebuilding trajectory (through a “status” indicator) and how well the CPUE trend compares with the increasing target trajectory (through a “gradient” indicator). The harvest control rule represents a compromise between fishery harvest goals and stock risk goals while staying within the rebuilding time frame. The criteria used to select this specific harvest control rule were presented in Bentley et al. (2003), along with the rule’s performance relative to other evaluated rules.

The NSS decision rule currently applies to the entire NSS substock (i.e., CRA 7 and CRA 8), but uses only data from CRA 8; this arrangement was agreed because CRA 7 quota holders wanted the option of adopting a different management procedure at some later date. In the interim, CRA 7 stakeholders agreed in 2002 to abide by the results from the NSS management procedure.

This review was scheduled when the current rule was adopted in 2002 by the NRLMG, who specified that the rule should be reviewed after five years. The NRLMG agreed that Objective 4 of the contract, which normally involves producing a stock assessment for a nominated stock or group of stocks, would be addressed in 2007 by conducting a review of the NSS decision rule (or operational management procedure).

Table 16: The final set of rules evaluated for CRA 8. Asterisks indicate a final candidate.

Stock	Rule	rule family							min	max	latent switch
		par1	par2	par3	par4	par5	par6	par7			
CRA 8	85011	5	275	1.9	-	-	-	-	0.05	0.25	1
CRA 8	*85029	5	325	1.9	-	-	-	-	0.05	0.25	1
CRA 8	85033	5	325	1.9	-	-	-	-	0.05	0.50	2
CRA 8	85037	5	350	1.9	-	-	-	-	0.05	0.25	0
CRA 8	*85040	5	350	1.9	-	-	-	-	0.05	0.50	0
CRA 8	85041	5	350	1.9	-	-	-	-	0.05	0.50	1
CRA 8	85089	5	600	1.9	-	-	-	-	0.05	1.00	1
CRA 8	86013	6	987	1.9	2.0	4.0	1.5	1.00	0.05	0	0
CRA 8	86038	6	1137	1.9	2.0	4.0	1.0	1.50	0.05	0	0
CRA 8	86113	6	987	1.9	2.0	4.0	1.5	1.00	0.05	0	1
CRA 8	86119	6	1137	1.9	2.0	4.0	1.0	1.50	0.05	0	1
CRA 8	86207	6	987	1.9	2.0	4.0	1.4	0.30	0.05	0	0
CRA 8	86208	6	1050	1.9	2.0	4.0	1.4	0.30	0.05	0	0
CRA 8	86209	6	987	1.9	2.0	4.0	1.4	0.60	0.05	0	0
CRA 8	86210	6	1050	1.9	2.0	4.0	1.4	0.60	0.05	0	0
CRA 8	86211	6	987	1.9	2.0	4.0	1.4	0.80	0.05	0	0
CRA 8	86212	6	1050	1.9	2.0	4.0	1.4	0.80	0.05	0	0
CRA 8	86301	6	987	1.9	1.9	3.2	1.2	0.22	0.05	0	0
CRA 8	*86302	6	987	1.9	1.9	4.0	1.2	0.30	0.05	0	0
CRA 8	*86303	6	1053	1.9	1.9	3.2	1.2	0.16	0.05	0	0
CRA 8	86304	6	1053	1.9	1.9	4.0	1.2	0.22	0.05	0	0
CRA 8	86305	6	987	1.9	1.9	3.2	1.2	0.28	0.05	0	0
CRA 8	86306	6	987	1.9	1.9	4.0	1.2	0.40	0.05	0	0
CRA 8	86307	6	1053	1.9	1.9	3.2	1.2	0.22	0.05	0	0
CRA 8	86308	6	1053	1.9	1.9	4.0	1.2	0.31	0.05	0	0
CRA 8	*86309	6	987	1.9	1.9	3.2	1.2	0.35	0.05	0	0
CRA 8	86310	6	987	1.9	1.9	4.0	1.2	0.50	0.05	0	0
CRA 8	86311	6	1053	1.9	1.9	3.2	1.2	0.29	0.05	0	0
CRA 8	*86312	6	1053	1.9	1.9	4.0	1.2	0.40	0.05	0	0

