

Attachment 2

SPANNER CRAB FISHERY
ANNUAL QUOTA DETERMINATION

For the period 1 June 2001 - 31 May 2002

- 1 For information of all C2 (Spanner Crab) licence-holders

February 2001

Disclaimer

This submission has been prepared by the Queensland Department of Primary Industries. The views and opinions expressed in this publication are those of the authors and do not necessarily reflect those of the Department of the Environment and Heritage, the Minister for the Environment and Heritage or the Commonwealth Government. The Commonwealth does not accept responsibility for the accuracy or completeness of the contents, and shall not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on, the contents of this publication.

Introduction

Effective management of a fishery requires periodic assessments of the status of the resource on which the fishery operates. Such assessments rely upon a process of stock or resource monitoring, which estimates the value(s) of one or more ‘performance indicators’ – often indices of stock abundance. Stock assessment is the examination and interpretation of a time-series of performance-indicator values. Translating the trends revealed by stock assessment into a specific management action can be achieved through the application of decision rules. These rules compare the performance indicators with pre-determined reference points, and if certain conditions are met, will automatically trigger certain management changes.

The *Fisheries (Spanner Crab) Management Plan 1999* includes specific requirements for the review of the Queensland commercial spanner crab annual quota (or Total Allowable Commercial Catch, as it is more often known). Full details of the relevant Sections of the Plan (Sections 75, 76 and 77) are provided in Appendix 1. The Plan calls for an annual review of the fishery by 1 March to fix the quota for the forthcoming quota year, which commences on 1 June.

The recognised scientific method to measure stock abundance is based on the analysis of annual catch-per-unit-effort (CPUE) statistics from the fishery.

Trends in CPUE over the five most recent assessment years are calculated by regression analysis separately for each of the five Fishery Assessment Regions in Managed Area A. These provide separate Regional ‘performance indicators’ or indices of change in population density. A ‘pooled’ index is then calculated for all except the ‘best-performing’ region. The best-performing region is excluded from the pooled index to ensure that the assessment is conservative and in line with the precautionary principle. The various performance indicators are then subjected to a number of decision or review rules, which determines whether the annual quota is to remain as before or (if not) by how much and in which direction it will change.

The Chief Executive sought the advice of the Crab Management Advisory Committee and its Stock Assessment Group¹ in conducting this annual review. In accordance with the requirements of the Plan, the SAG reviewed the Queensland spanner crab fishery in January 2001, and recommended that the annual quota for the quota year 1 June 2001 to 31 May 2002 be decreased. This SAG recommendation for a decrease was endorsed by the CrabMAC in Feb 2001.

¹ Mr D Mitchell (Independent Chairman)
Mr L Gwynne (Manager, Resource Management QFS)
Dr D Mayer (Principal Biometrician, AFFS)
Ms C Dichmont (Stock Assessment Scientist, CSIRO)
Mr R Freeman (Commercial Fishery)
Mr R Doyle (Commercial Fishery)
Dr I Brown (Principal Fisheries Scientist, AFFS)
Mr S Hansford (Snr Policy Officer, QFS)
Mr W Corten (Recreational Fishery)

Review Rules

The Review (or decision) Rules used to determine the annual quota are detailed in Appendix 2. These Review Rules have been provided to all C2 licence holders in accordance with Section 76 of the Management Plan.

Assessment Regions

The Assessment Regions within Managed Area A used in this quota-setting process are shown in Figure 1.

Assessment Data Series

Catch, effort and CPUE summaries for Managed Area A were derived from CFish data for the period to 20 December 2000 (the end of the 2000 spawning closure). The data are analysed by 'assessment' year, which runs from 21 December to the following 20 December. Only records where reported effort (net lifts) is greater than zero have been included, but any records with zero catch are included as legitimate data.

The data used to calculate the various performance indicators (i.e. total catch, effort and derived CPUE by region and assessment year) are shown in Table 1. Comparative trends in catch rate between assessment regions over the entire time-period are shown in Figure 2.

Performance Indices and Quota-Setting

A summary of the statistical calculations leading to the several performance indices and ultimately to the application of the Review Rules and calculation of next year's quota appears in Table 2. The 5-year trends were negative in four regions (2, 3, 4, and 5), and positive only in Region 6 (See also Figure 3). Rule 4 was triggered because the CPUE in two individual regions (2 and 3) declined by more than 25%. Rule 2 was also triggered because the pooled index was higher than -50% but lower than -10%. Rules 1, 6 and 7 were not triggered because (i) the pooled index was higher than -50%, (ii) the three most recent pooled indices have not all been negative, and (iii) at this stage there is no reliable indication that the current assessment method is *not* in the interests of sustainable management and the precautionary approach.

Annual Quota Determination

In accordance with the agreed procedure, and the recommendations of the CrabMAC and its SAG given that Review Rule 2 has precedence over Review Rule 4, the annual quota for 2001-2002 will be decreased by the amount of the pooled index i.e. -21.14% or 592 tonnes to a total of 2,208 tonnes.

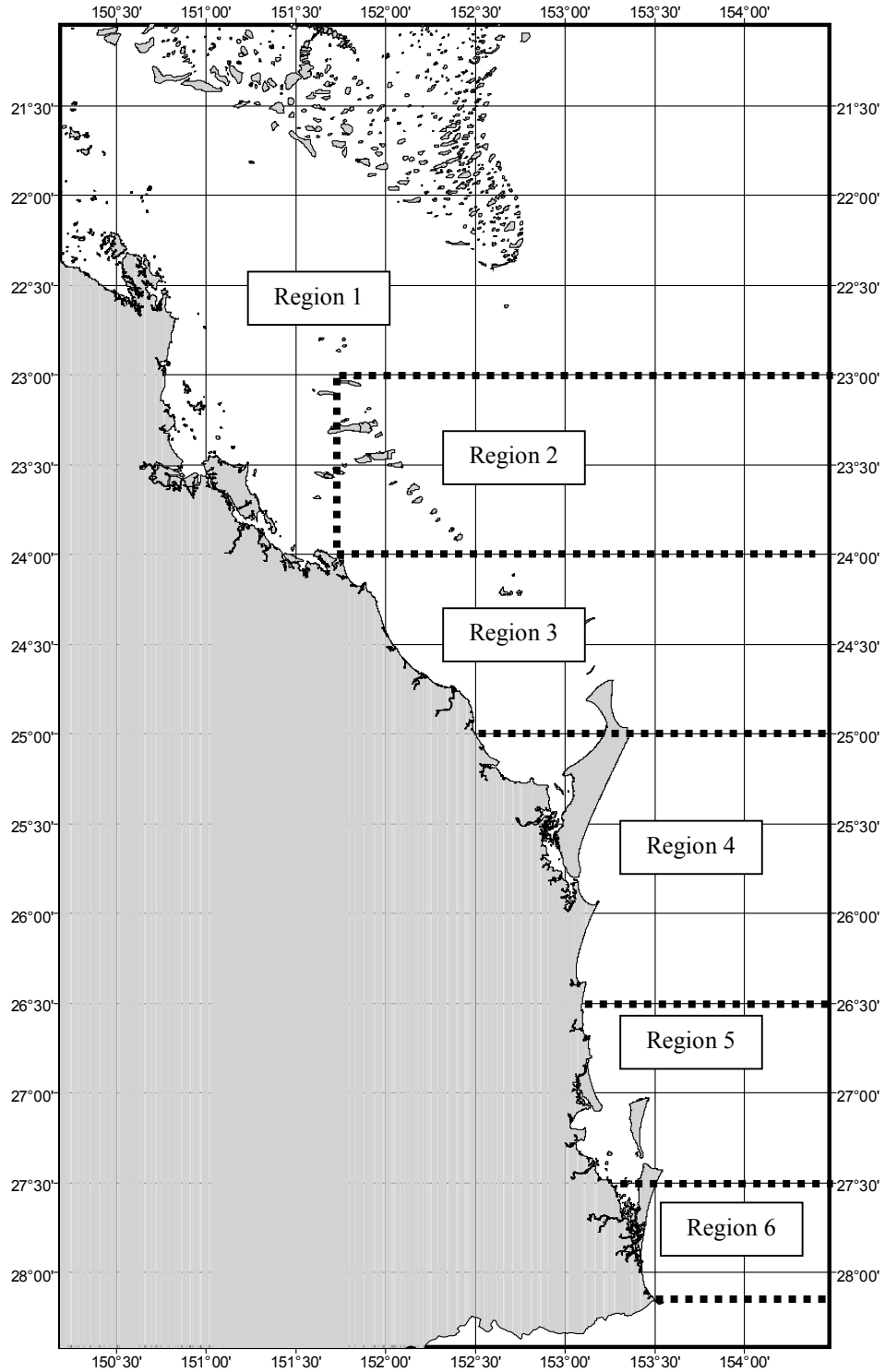


Figure 1 Queensland spanner crab fishery Assessment Regions. Note that Region 1 is in Managed Area B (not subject to annual quota) while Regions 2-6 incl. comprise Managed Area A, subject to annual quota.

Table 1 Total annual catch (A), effort (B) and mean CPUE (C) for each assessment region. Note that Region 1 comprises Managed Area B, and Region 7 represents the NSW border area.

A: Total weight (t)		Region						
Assmt Yr	1	2	3	4	5	6	7	Grand Total
1988	0.05	0.05	6.70	31.05	232.52	84.66	17.36	372.39
1989	0.56	0.42	138.16	35.41	115.36	69.70	73.92	433.52
1990	0.25		236.57	31.77	118.51	80.96	43.02	511.07
1991		39.17	322.70	44.64	239.53	100.35	48.15	794.53
1992	1.11	21.27	582.71	67.58	363.74	157.83	52.14	1246.37
1993	54.56	125.43	908.29	265.86	490.10	180.07	39.07	2063.37
1994	230.80	467.10	1274.94	386.71	651.61	202.61	52.38	3266.15
1995	101.57	341.78	818.47	543.52	678.54	260.01	49.04	2792.93
1996	139.25	466.51	1149.86	615.51	405.06	171.50	16.96	2964.65
1997	44.93	493.32	1306.40	659.85	573.53	156.47	14.27	3248.76
1998	11.50	387.75	663.47	551.00	276.82	134.40	1.04	2025.97
1999	41.52	269.21	680.17	422.19	308.37	106.37	0.18	1828.00
2000	79.05	305.42	900.34	394.50	322.12	136.35	0.71	2138.49
Grand Total	705.14	2917.42	8988.76	4049.61	4775.79	1841.26	408.24	23686.21

B: Total effort (lifts)		Region						
Assmt Yr	1	2	3	4	5	6	7	Grand Total
1988	100	47	11689	54924	332089	72835	8551	480235
1989	6163	325	76077	74136	199929	85336	85577	527543
1990	3072		117594	48136	168790	102794	47280	487666
1991		16120	220602	59086	271442	88036	49796	705082
1992	321	15964	338508	71185	376616	142948	47334	992876
1993	36969	70966	575465	206286	570928	206244	37978	1704836
1994	183444	419353	1259065	380410	1013231	227830	48352	3531685
1995	73962	336161	779091	641861	1063657	286091	40041	3220864
1996	167828	408220	1052300	577350	675621	210815	22852	3114986
1997	39716	389356	1070679	516310	712555	167114	18607	2914337
1998	10190	329161	613881	405139	373542	148554	1580	1882047
1999	28332	276460	739620	345182	430522	113544	290	1933950
2000	74080	399829	1208310	406910	559737	155326	456	2804648
Grand Total	624177	2661962	8062881	3786915	6748659	2007467	408694	24300755
Sum '96-'00		1803026	4684790	2250891	2751977	795353		

C: Mean CPUE (kg/net lift)		Region						
Assmt Yr	1	2	3	4	5	6	7	Mean
1988	0.500	1.021	0.573	0.565	0.700	1.162	2.030	0.775
1989	0.090	1.295	1.816	0.478	0.577	0.817	0.864	0.822
1990	0.080		2.012	0.660	0.702	0.788	0.910	1.048
1991		2.430	1.463	0.756	0.882	1.140	0.967	1.127
1992	3.442	1.332	1.721	0.949	0.966	1.104	1.102	1.255
1993	1.476	1.767	1.578	1.289	0.858	0.873	1.029	1.210
1994	1.258	1.114	1.013	1.017	0.643	0.889	1.083	0.925
1995	1.373	1.017	1.051	0.847	0.638	0.909	1.225	0.867
1996	0.830	1.143	1.093	1.066	0.600	0.813	0.742	0.952
1997	1.131	1.267	1.220	1.278	0.805	0.936	0.767	1.115
1998	1.129	1.178	1.081	1.360	0.741	0.905	0.656	1.076
1999	1.465	0.974	0.920	1.223	0.716	0.937	0.621	0.945
2000	1.067	0.764	0.745	0.970	0.575	0.878	1.557	0.762
Grand Mean	1.130	1.096	1.115	1.069	0.708	0.917	0.999	0.975

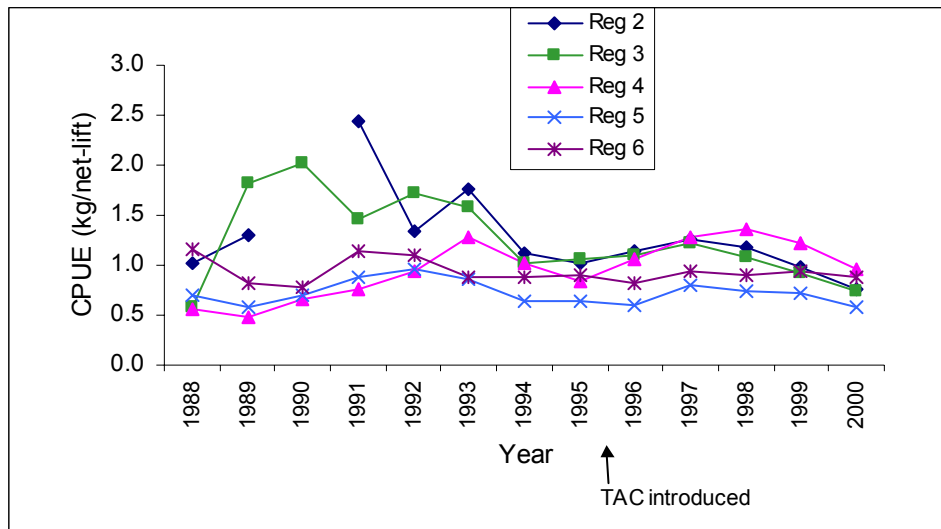


Figure 2. Comparison of trends in annual spanner crab catch-per-unit-effort (CPUE) (kg/net-lift) in the five Assessment Regions comprising Managed Area A over the period for which commercial logbook data are available.

Table 2 Spanner crab TACC-setting for the quota year 2001-2002, based on analysis of commercial catch and effort data for the assessment period 1996-2000 and the application of the review rules.

Run date: 24/01/2001

Previous TACC (1 June 2000 to 31 May 2001):	2800 t
---	--------

Ass.Year*	Year No	Region 2	Region 3	Region 4	Region 5	Region 6
1996	1	1.14279	1.09271	1.06610	0.59954	0.81350
1997	2	1.26702	1.22016	1.27801	0.80489	0.93628
1998	3	1.17800	1.08077	1.36003	0.74106	0.90472
1999	4	0.97377	0.91961	1.22310	0.71626	0.93684
2000	5	0.76387	0.74512	0.96951	0.57548	0.87783
Regres a		1.3804174	1.310393	1.2537793	0.728469	0.855067023
Regres b		-0.1051094	-0.0995723	-0.0248097	-0.0136741	0.012922981
Fitted yr 1	1	1.275308	1.2108207	1.2289696	0.7147948	0.867990004
Fitted yr 5	5	0.8548704	0.8125313	1.1545406	0.6737724	0.906758947
Relative change		-0.3296753	-0.3289417	-0.0605621	-0.0573904	0.044665195
% change		-32.967532	-32.894169	-6.0562098	-5.7390447	4.466519485

* Assessment year ends on 20 Dec and includes the period 21-31 Dec from the previous year.

Triggers for Rule 4	1	1	0	0	0
Triggers for Rule 5	0	0	0	0	0

BY REGION			RANKED BY % CHANGE		
Region	%change	Lifts	Region	%change	Lifts
2	-32.9675324	1803026	6	4.4665195	795353
3	-32.894169	4684790	5	-5.7390447	2751977
4	-6.05620979	2250891	4	-6.0562098	2250891
5	-5.73904466	2751977	3	-32.894169	4684790
6	4.46651948	795353	2	-32.967532	1803026

4 worst-case regions	Region	%change	Lifts	%C*Lifts
from above	5	-5.7390447	2751977	-15793719
for	4	-6.0562098	2250891	-13631868
weighting	3	-32.894169	4684790	-154102274
	2	-32.967532	1803026	-59441318
	Sum		11490684	-242969179

Pooled index (weighted mean) = -21.144884 %

Rule 1 triggered?	no		0 %
Rule 2 triggered?	yes	Decrease TAC by	-21.144884 %
Rule 3 triggered?	no		0 %
Rule 4 triggered?	yes	Decrease TAC by 5%	
Rule 5 triggered?	no		
Rule 6 triggered?	no		
Rule 7 triggered?	no		
			-21.144884

New TACC (1 June 2001 to 31 May 2002):	2207.9433 t
--	-------------

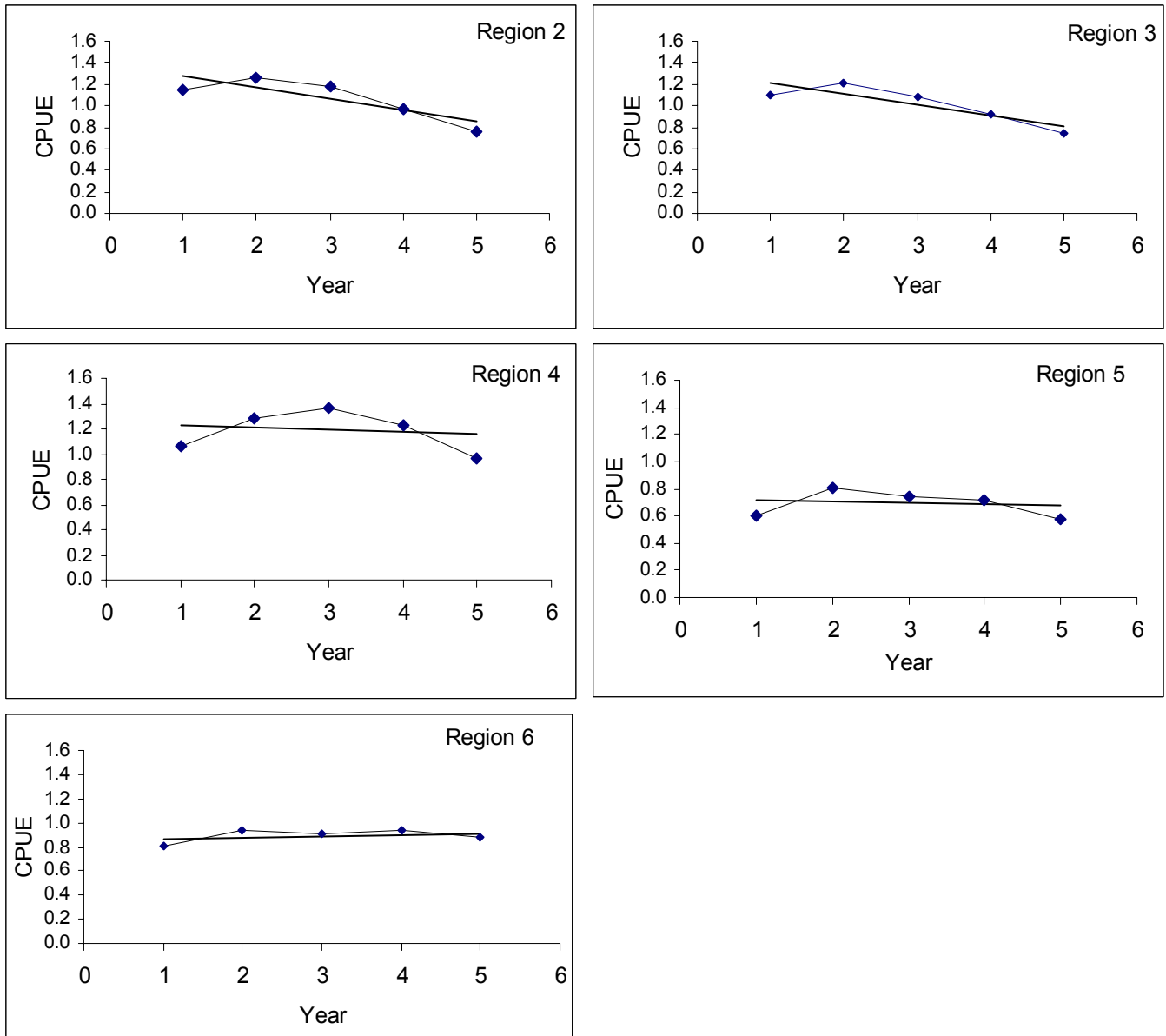


Figure 3 Changes in spanner crab CPUE over the past five Assessment Years (1996-2000 incl.) in each of the five assessment regions comprising Managed Area A. Individual mean CPUEs as well as the fitted regression lines are shown in each case. The data are a subset from the complete (filtered) catch, effort and CPUE data shown in Table 2.

*Fisheries (Spanner Crab) Management Plan
1999*

**PART 7—ABORIGINES' AND TORRES STRAIT
ISLANDERS' FISHERY**

Aboriginal and Torres Strait Islander rights not affected

74. This plan does not limit an Aborigine's or Torres Strait Islander's right to take, use or keep spanner crabs under Aboriginal tradition or Island custom.¹⁷

PART 8—REVIEW, AMENDMENT OR REPEAL

2 Division 1—Annual quota reviews

Annual quota reviews

75.(1) The chief executive must in each year after this plan commences conduct a review (an “**annual review**”) to fix a proposed amount for the annual quota for the next quota year to start after the year.

(2) Each annual review must end before 1 March in the year of the review.

Review rules

76.(1) In conducting an annual review, the chief executive must make rules (“**review rules**”) for it to fix the proposed amount for the annual quota for the next year.

(2) Review rules must be based on the representative stock abundance of spanner crabs in managed area A, worked out by a recognised scientific method.

¹⁷ For the right of Aborigines or Torres Strait Islanders to take fisheries resources, see section 14 (Aborigines' and Torres Strait Islanders' rights to take fisheries resources etc.) of the Act.

*Fisheries (Spanner Crab) Management Plan
1999*

(3) Before the start of the annual review the chief executive must give a copy of the review rules for the next year to each person who holds a ‘C2’ licence.

Notice of result of review

77.(1) The chief executive must, as soon as practicable after each annual review, give a notice to each person who holds a ‘C2’ licence.

(2) The notice must state—

- (a) the outcome of the review; and
- (b) whether the chief executive proposes to amend this plan to decrease or increase the amount of the annual quota for the next year; and
- (c) by how much the chief executive proposes to decrease or increase the amount.

Spanner Crab Fishery Annual Quota Review

Managed Area A Review Rules

- A. The Chief Executive will determine the representative stock abundance of spanner crabs in Managed Area A during the period 21 December 1999 to 20 December 2000 by the calculation of a five-year trend index* based on the fishery's catch-per-unit-effort as recorded by the Chief Executive.
- B. The Chief Executive must review the amount of the Annual Quota on a yearly basis no later than 28 February of the year in which the Annual Quota commences.
- C. In reviewing the Annual Quota, the Chief Executive must apply the following **Review Rules**:
1. If the pooled index is -50% or less, the Chief Executive must declare the Annual Quota be nil; or
 2. If the pooled index is between -10% and -50% , the Chief Executive must declare the Annual Quota for the forthcoming year to be less than its value in the previous year by the amount of the index; or
 3. If the pooled index is $+10\%$ or more, the Chief Executive must declare the Annual Quota for the forthcoming year to be more than that in the previous year by half the amount of the index.
 4. Notwithstanding Rule 3, if the index for any individual assessment region is between -25% and -50% , the Chief Executive must declare the Annual Quota for the forthcoming year to be 5% less than that in the previous year.
 5. Notwithstanding Rules 3 and 4, if the index for any individual assessment region is -50% or less, the Chief Executive must declare the Annual Quota for the forthcoming year to be at least 10% less than that in the previous year.
 6. If the index is between 0% and -10% in each of the three (3) most recent consecutive years, the Chief Executive must review the Annual Quota for the forthcoming year.

If and when any new information becomes available indicating that the above process and decision rules are not in the interest of sustainable management and the precautionary approach, the Chief Executive must review the assessment process and decision rules.