

Alternative calculation of catches per Area in the South Coast rock lobster fishery.

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Introduction

A method to separate the South Coast rock lobster annual catches by Area for the area-disaggregated assessments was described in WG/04/08/SCRL08. Concern was raised about an assumption made with respect to the calculation of those catches, namely that the spatial distribution for HBF was the same as for other companies over the period in which HBF under-reported catches (1997¹-2000). The calculations presented in this paper offer an alternative method of separating the annual catches, taking the concern raised above into account.

Data definitions

The catch series used in the assessment of this resource, C_y^{tot} , is shown in Table 1. It is made up of official annual catches ($C_y^{official}$) and undeclared catches ($C_y^{undeclared}$) as a result of illegal takings taken by HBF over the period 1991-2000. It should be noted that since 1984 it is assumed that the official annual catches are equivalent to the TAC, except in 2001 when only 290t was awarded.

In order to separate C_y^{tot} by Area, the data contained in the catch and effort database for this fishery are used since the Area fished may be identified by the grid block number that is recorded. For various reasons the annual catch obtained from this database is generally lower than that of C_y^{tot} , and these data are therefore used to calculate the proportions of the catch taken in each Area, and those proportions are then applied to C_y^{tot} in order to separate them by Area.

Algorithms applied to obtain Area-specific catches

The proportion of catch per Area excluding HBF records for the period 1991-2000 is derived by:

$$P_{y,A_i}^{db} = \frac{C_{y,A_i}^{db}}{\sum_{A_i} C_{y,A_i}^{db}} \quad i=1,2,3$$

¹ The previous exercise of separating the catches to Area excluded HBF from the proportion calculations for the period 1997-2000 (which is consistent with the HBF exclusions applied in the GLM analyses of the CPUE data for this resource). However, estimates of undeclared catch are available since 1991, and the full series is taken into account in the calculations reported here.

where C_{y,A_i}^{db} is the database annual catch per Area excluding HBF records for the period 1991-2000.

The proportion of catch per Area for HBF for the period 1991-2000 is derived by:

$$P_{y,A_i}^{db,HBF} = \frac{C_{y,A_i}^{db,HBF}}{\sum_{A_i} C_{y,A_i}^{db,HBF}}$$

where $C_{y,A_i}^{db,HBF}$ is the database annual HBF catch per Area for the period 1991-2000.

The undeclared catch is then be apportioned to Areas as follows:

$$C_{y,A_i}^{undeclared} = C_y^{undeclared} \times P_{y,A_i}^{db,HBF} \text{ for the period 1991-2000}$$

(i.e. it is assumed that all undeclared catch each year is taken in the same proportions by Area as the HFB catch declared and recorded in the database) and the official catch is apportioned to Areas as follows:

$$C_{y,A_i}^{official} = C_y^{official*} \times P_{y,A_i}^{db}$$

where

$$C_y^{official*} = C_y^{official} - \sum_{A_i} C_{y,A_i}^{db,HBF} \text{ for the period 1991-2000}$$

$$C_y^{official*} = C_y^{official} \text{ for all other years}$$

Hence:

$$C_{y,A_i}^{tot} = C_{y,A_i}^{official} + C_{y,A_i}^{undeclared} + C_{y,A_i}^{db,HBF} \text{ for the period 1991-2000}$$

$$C_{y,A_i}^{tot} = C_{y,A_i}^{official} \text{ for all other years}$$

The resulting revised catch series per Area are shown in Table 2 and Figure 1 (with the previously calculated catch (Ref Case) series also shown in the Figure for comparative purposes).

References

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**Table 1: Annual catches in the South Coast rock lobster fishery
(sources: WG/06/2004/SCL1 and WG/06/06/SCL3).**

Season	Catch tons tail mass	Undeclared tons tail mass	Total catch
1973	372		372
1974	973		973
1975	551		551
1976	712		712
1977	667		667
1978	461		461
1979	122		122
1980	176		176
1981	348		348
1982	407		407
1983	524		524
1984	450		450
1985	450		450
1986	450		450
1987	452		452
1988	452		452
1989	452		452
1990	477		477
1991	477	47.54	524.54
1992	477	52.96	529.96
1993	477	47.27	524.27
1994	452	55.89	507.89
1995	427	77.89	504.89
1996	415	27.69	442.69
1997	402	14.39	416.39
1998	402	114.03	516.03
1999	377	135.16	512.16
2000	365	58.4	423.4
2001	288		288
2002	340		340
2003	350		350
2004	382		382
2005	382		382

Table 1: Revised catches per Area

Year	Area 1	Area 2	Area 3
1973	No data available in the catch and effort database for these years.		
1974			
1975			
1976			
1977	245.68	254.76	166.56
1978	102.03	107.32	251.64
1979	31.89	29.92	60.19
1980	111.46	59.62	4.92
1981	138.26	169.32	40.42
1982	146.29	183.15	77.56
1983	125.16	280.90	117.94
1984	201.01	150.33	98.66
1985	85.52	200.30	164.17
1986	110.66	183.95	155.39
1987	106.23	146.37	199.40
1988	99.81	229.01	123.17
1989	112.36	241.00	98.64
1990	230.13	168.56	78.31
1991	183.06	204.02	137.46
1992	146.67	178.98	204.31
1993	191.22	242.92	90.13
1994	219.20	184.55	104.14
1995	122.68	249.99	132.23
1996	132.19	180.27	130.24
1997	105.57	156.72	154.10
1998	193.20	200.34	122.49
1999	248.62	157.99	105.55
2000	210.22	84.83	128.34
2001	108.53	111.05	68.41
2002	210.57	67.63	61.80
2003	207.18	123.88	18.94
2004	167.01	175.54	39.44
2005	173.67	134.14	74.19

Figure 1: Revised and Reference Case catches

