West Coast Rock Lobster:

The 2013/2014 Recreational Season

By

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Introduction

The telephone survey of recreational West Coast rock lobster fishers has been carried out since the 1991/1992 season. Currently this is the only survey conducted to monitor the recreational fishers. No telephone survey was conducted during the 2013/2014 season due to budget constraints.

During the 2013/14 WCRL recreational season fishers were permitted to catch their bag limit of four lobsters per day during the period 15th November 2013 – 17th November 2013, 14th December 2013 to 31st December 2013 and from the 18th April 2014 to 21st April 2014 (a total of 26 fishing days).

This document reports available statistics, and suggests a possible method of extrapolating these statistics to estimate the recreational take for the 2013 season.
The recreational take each year depends mainly on two factors:

    i)   the season length i.e. the number of days allocated to recreational fishers

    ii)   the number of actual recreational fishers.

The number of recreational fishers can be estimated by assuming these to be linked (either directly or proportionally in some way) to the number of rock lobster permits sold in the season.

Table 1 reports the available statistics relating to the recreational sector since 1991. The missing value is the 2013 telephone survey estimate of recreational take.

Methods

Three different models are examined here to fit the available telephone survey data from 2008-2012. The aim being to use the "best" model to estimate the 2013 recreational take, given the 2013 values of season length and number of permits sold.

Model 1 and Model 2

These models explore the dependence of the recreational take estimates on either

    i)   number of days in the recreational season (Model 1)

    ii)   number of permits sold (Model 2)

The models have the form:

$$y^{model} = ax^b \tag{1}$$

where *x* is either "season length" or "# permits", y^{model} is the estimated recreational take, and *a* and *b* are estimable parameters, and are constrained to be positive.

Model 3

This model has the form:

$$y^{model} = a(x_1^b)(x_2^c) \tag{2}$$

where x_1 is "season length" and x_2 is "# permits", y^{model} is estimated recreational take, and *a*, *b* and *c* are estimable parameters (which are constrained to be positive).

For each model, a –*ln*L is minimized for which

$$SS = \sum_{t=2008}^{2012}(ln\ y_t^{obs} - ln\ y_t^{model})^2 \tag{3}$$

$$\sigma = \sqrt{SS/n} \tag{4}$$

$$-lnL = n\ ln\sigma + \frac{SS}{2\sigma^2} \tag{5}$$

In Figure 1, the left hand plots show the fitted relationships between the recreational take (as estimated by the telephone survey) and either the season length (Model 1) or # permits sales (Model 2) – the dots being the observations and the line being the model fitted. The red vertical arrow shows the 2013 observation. The right hand plots show the estimated recreational takes for the three alternate models, along with the telephone survey values. The green triangles represent the model estimated recreational take for the 2013 season for each Model

Results

Table 2 reports the model results for the three models explored. Model 1 provides a much better fit to the data (-lnL = -6.67) versus Model 2 (-lnL = -3.40). Model 3, which allows both season length and permit numbers to be incorporated into the model in order to estimate the recreational take, results in giving zero weight to the permit numbers data and full weight to the season length. This indicates that season length is a better measure to use in estimating the recreational take. The estimated recreational take for 2013 using Models 1 and Model 3 is 54 MT.

Recommendation

Based on these analyses, it is recommended that the recreational take for the 2013 season be estimated as 54 tons.

Table 1: Summary of recreational catch estimates (in kgs) as reported in telephone survey reports and used as an OMP input. Recreational season length in days is also reported.

Season	Analyst	Total Catch estimate (kgs)	Total number of permits sold	Season Length in days
1991/92	DSI	**159 229**	44 469	150
1992/93	DSI	**469 257**	59 202	240
1993/94	DSI	**391 137**	57 590	195
1994/95	DSI	**336 017**	54 160	195
1996/97	DSI	**495 617**	65 617	165
1997/98	DSI	**339 560**	44 383	165
1998/99	DSI	**258 264**	39 982	165
2000/01	DSI	**314 169**	47 063	146
2001/02	Anchor	**336 964**	53 704	91
2003/04	Enviro	**340 596** (135 053[#])	55 077	78
2004/05	Enviro	**178 730** (156 408[#])	28 902	107
2005/06	Enviro	**292 657** (275 063[#])	47 325	99
2006/07	Enviro	**211 771** (162 092[#])	34 245	108
2007/08	Enviro	**260 823** (170 676[#])	42 177	80
2008/09	Anchor	**243 775**	40 011	79
2009/10	Enviro	**215 611**	30 416	81
2010/11	Capfish	**101 304**	23277	40
2011/12	Anchor	**125 570**	38947	66
2012/13	Do Mar Enviro	**122 844**	35 870	56
2013/14	Estimate?	**45 993**	23 728	26

Table 2: Model output for three alternate models to estimate the 2013 recreational take.

Values in parentheses are Hessian standard deviations.

	Determining Factor	a	b	c	-lnL	σ	2013 estimated recreational take (MT)
Model 1	Season length	1.181 (1.344)	1.176 (0.275)	-	-6.684	0.159	54 (13.7)
Model 2	# permits	0.049 (0.348)	0.774 (0.687)	-	-3.400	0.307	118 (31.4)
Model 3	Season length and # permits	1.181 (1.344)	1.176 (0.275)	0.000 (0.000)	-6.684	0.159	54 (13.7)

Figure 1: The left hand plots show the fitted relationships between the recreational take (as estimated by the telephone survey) and either the season length (Model 1) or # permits sales (Model 2). The right hand plots show the estimated recreational takes for the three alternate models, along with the telephone survey values. The green triangles represent the model estimated recreational take for the 2013 season for each Model.