Update on analyses of West Coast rock lobster Recreational Telephone Survey data to include the 2015[1] season

S.J. Johnston and D.S. Butterworth

Summary

The telephone survey for the 2015 season indicates a recreational catch appreciably greater than expected under the past relationship estimated between recreational take and season length. This relationship is revised given the new data. If the recreational allocation is to remain the same for the 2016 as the 2015 season, then either or both of a reduction in the length of the current recreational season or a limitation on the number of recreational permits sold will need to be imposed.

Introduction

Recreational Take calculation for 2015

The current OMP document (FISHEREIS/2015/AUG/SWG-WCRL/27) states the following:

"For the Recreational sector, the adjustment will be effected by changing the duration of the season by the same proportion as the allocation is changed, starting from a baseline of 80 days for the 2007-2009 allocations each of 257 tons. This will be kept under review in the light of telephone survey and permit sale records, and adjusted if necessary in proportion to changes in these."

Thus for the 2015 season, where a recreational take of 69.2 tons was recommended, the season length for 2015 was calculated as 69.2*(80/257)=21 days (as was done for the 2014 season).

However, in 2014 when an updated assessment was conducted, a document was produced (FISHERIES/2014/JUN/SWG/WCRL/01) where the authors investigated how one could estimate the recreational take using telephone survey data. The following model was recommended:

Recreational take = a(season length)^b where a=1.181 and b = 1.176.

This was used to estimate the recreational take for the 2013 season (54 tons).

For the 2014 season the assumption was made that the recreational take was as "set" by the OMP (69.2tons). It seems timeous that this work is re-examined in the light of the new information provided by the recent telephone survey (for the 2015 season).

[1] Here the split season 2013/14 is referenced by the first year "2013" only

Modelling analyses

In recent years, a telephone survey has been conducted in order to estimate the total take of rock lobsters for the west coast rock lobster recreational sector. No telephone survey was conducted for the 2013 or 2014 seasons. This document updates available statistics reported in FISHERIES/2014/JUN/SWG-WCRL/01), and extrapolates these statistics to estimate the recreational take for the 2015 season compared with the estimate obtained from the recent telephone survey.

The recreational take each year depends mainly on two factors:

i) the season length i.e. the number of days allocated to recreational fishers; and
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) to the number of rock lobster permits sold in the season. FISHERIES/2014/JUN/SWG-WCRL/01 explored a number of models which where fitted to telephone survey data using either the season length or the number of permits sold (or both) as the independent variables. The authors concluded that season length was the best measure to use in estimating the recreational take, so that this method is used to update the analyses reported here.

Table 1 reports the available statistics relating to the recreational sector since 2008.

Methods

The model assumes recreational take depends on the season length (in days).

The model has the form:

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

where *x* is "season length" and y^{model} is estimated recreational take, and *a* and *b* are estimated parameters.

The –*ln*L is minimized for which

$$SS = \sum_{t=2008}^{2012+2015} (ln\ y_t^{obs} - ln\ y_t^{model})^2 \tag{3}$$

$$-lnL = n\ ln\sigma + \frac{SS}{2\sigma^2} \tag{4}$$

$$\sigma = \sqrt{SS/n} \tag{5}$$

[Note n=6, 2008-2012+2015].

In Figure 1, the top plot shows the fitted relationship between the recreational take (as estimated by the telephone survey) and the season length – the dots being the observations and the curve being the model fitted. The bottom plot shows the estimated recreational takes, along with the telephone survey

values. The green triangles represent the model estimated recreational take for the 2014 and 2015 seasons (which have a season length of 21 days).

Results

Table 2 reports the model results for the model which fits telephone survey estimates to season length. This model estimates for recreational take for the 2014 and 2015 seasons (where the season length was 21 days) is 92 tons. **According to the model estimated here, a season length of 12 days is estimated to be required to lead to a recreational take of 69 tons.**

Recommendation

The data indicate that the shortened 2015 season led to more intensive catching by recreational fishers. Assuming that the intended take by recreational fishers for the 2016 season is set similar to the value implemented for the 2015 season, there are two options which will need to be considered:

a) an appreciable shortening of the 2015 recreational season which comprised 21 days; and/or
b) a limitation on the number of recreational permits issued.

Table 1: West coast recreational sector statistics at hand.

Season	Season length (# days)	# permits sold	Telephone survey estimate of total rock lobster take (MT)
2008	79	40011	243.78
2009	81	30416	215.61
2010	40	23277	101.30
2011	66	38947	125.57
2012	56	35870	122.84
2013	26	23728	-
2014	21	-	-
2015	21	28983	113.70

Table 2: Model output for the model used to fit telephone survey to season length (and to provide estimates of the 2014 and 2015 recreational takes). Values in parentheses are Hessian-based standard errors.

Determining Factor	**a**	**b**	**-lnL**	σ	**2014 and 2015 estimated recreational take (MT)**
Season length	20.19 (16.64)	0.499 (0.205)	-5.67	0.236	92 (19.31)

Figure 1: The top plot shows the fitted relationships between the recreational take (as estimated by the telephone survey) and the season length. The bottom plot shows the estimated recreational takes for the models, along with the telephone survey values. The green triangles represent the intended recreational take for the 2014 and 2015 seasons.