



Preliminary Report on Analysis of CPUE data from Inaccessible Island

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5 July, 2006

The logbook data received for rock lobster operations off Inaccessible Island for the period 2000-2005 have been encoded. The first step required in moving towards a GLM-standardisation of these data to provide a CPUE index that is more comparable over time than the nominal index, as is required for improved population modeling, is specification of spatial strata. A wide variety of place names are used to indicate catch positions. At this stage these have been grouped into 11 strata fished by the mother vessel, and 8 covered by powerboats, though further discussions are needed to confirm these groupings and to include a remaining about 10% of the records for which the relationships between the place names given and the strata (or “areas”) identified thus far are not clear.

In the meantime, however, an initial analysis has been conducted for the mother vessel data for which identification has at this stage been made to the 11 spatial strata. The objective of this exercise is to ascertain whether these data immediately evidence a need for standardization of the nominal CPUE.

Fig. 1 shows annual CPUE data (in kg/trap) for each area, together with fitted exponential trends. Table 1 reports the annual increase rates for these trends, with the associated precision given in the form of standard error estimates. The Table also shows the estimated CPUE for 2002 for each area, as provided by the fitted trends. Table 2 shows the trend in effort (in terms of traps hauled) in each area over the six year period, first in a) in absolute terms, and then in b) in terms of the proportion of the total effort in a particular year in that area. The average and standard deviation of the distributions of these proportions for each area are reported in Table 1.

Clearly evident from Table 1 and Fig. 2b is that the proportion of fishing effort in each area can vary substantially from one year to the next. Table 1 also shows that measures of the average CPUE in each area differ appreciably amongst these areas. In these circumstances, nominal CPUE (simply aggregating total catch and dividing by total effort each year) can lead to biased perceptions of the trend in the overall CPUE over time. This can occur because, for example, one year with most effort in an area of lower catch rate, followed by the next with such effort preferentially in higher catch rate areas, can lead to a false impression of an increasing CPUE overall and hence increasing abundance.

This confirms that GLM-standardisation of these CPUE data is necessary to remove such potential biases. Note that this process will also adjust for the concern expressed by James Glass regarding Nightingale that recent high CPUE values might in part be a consequence of fishing now concentrated at the times when catch rates are highest.

An encouraging feature in the data is the very similar trends in the CPUE evidenced amongst the strata, as shown in Fig.1. The annual increase rate estimates for these strata listed in Table 1, together with their standard errors, are nearly all broadly compatible with an overall average annual rate of increase of about 20%, with the exception of Black Spot for which the catch rate has shown virtually no trend over time.

The GLM-standardization will be undertaken once all the recorded catch positions have been linked to the spatial strata identified (or possibly additional strata). These initial analyses clearly indicate the desirability of carrying this standardization exercise as far back in time as possible, so that it is **recommended** that the available logbook data for the fishery off Inaccessible prior to 2000 now also be encoded so that such analyses can be pursued.

Table 1: Summary of estimates of CPUE, its trend over time, and the proportion of fishing effort in each of the 11 spatial strata around Inaccessible in which the mother vessel fished.

Name	Area Number	Increase rate per annum (s.e.)	CPUE in 2002 kg/trap	Average Effort Proportion (St. Dev.)
Bank	1	0.27 (0.05)	4.39	33.7 (12.2)
Black Spot	2	-0.02 (0.08)	6.19	3.5 (1.1)
Blendon Hall	3	0.15 (0.04)	4.03	6.9 (1.5)
Blinder	4	0.20 (0.03)	4.18	7.9 (1.6)
East Point	5	0.14 (0.04)	5.28	11.4 (5.4)
North Point	6	0.12 (0.05)	4.90	25.0 (9.7)
Pyramid Rock	7	0.36 (0.05)	2.56	3.7 (3.5)
South Hill	8	0.16 (0.12)	2.19	1.6 (0.8)
Salt Beach	9	0.30 (0.32)	4.54	1.0 (0.7)
Toms Beach	10	0.17 (0.20)	3.41	2.0 (1.6)
West Point	11	0.23 (0.05)	3.99	10.6 (2.9)
Average	-	0.19	4.15	-

Figure 1. CPUE vs year for each area: data shown by dots with fitted exponential trends by dashed lines

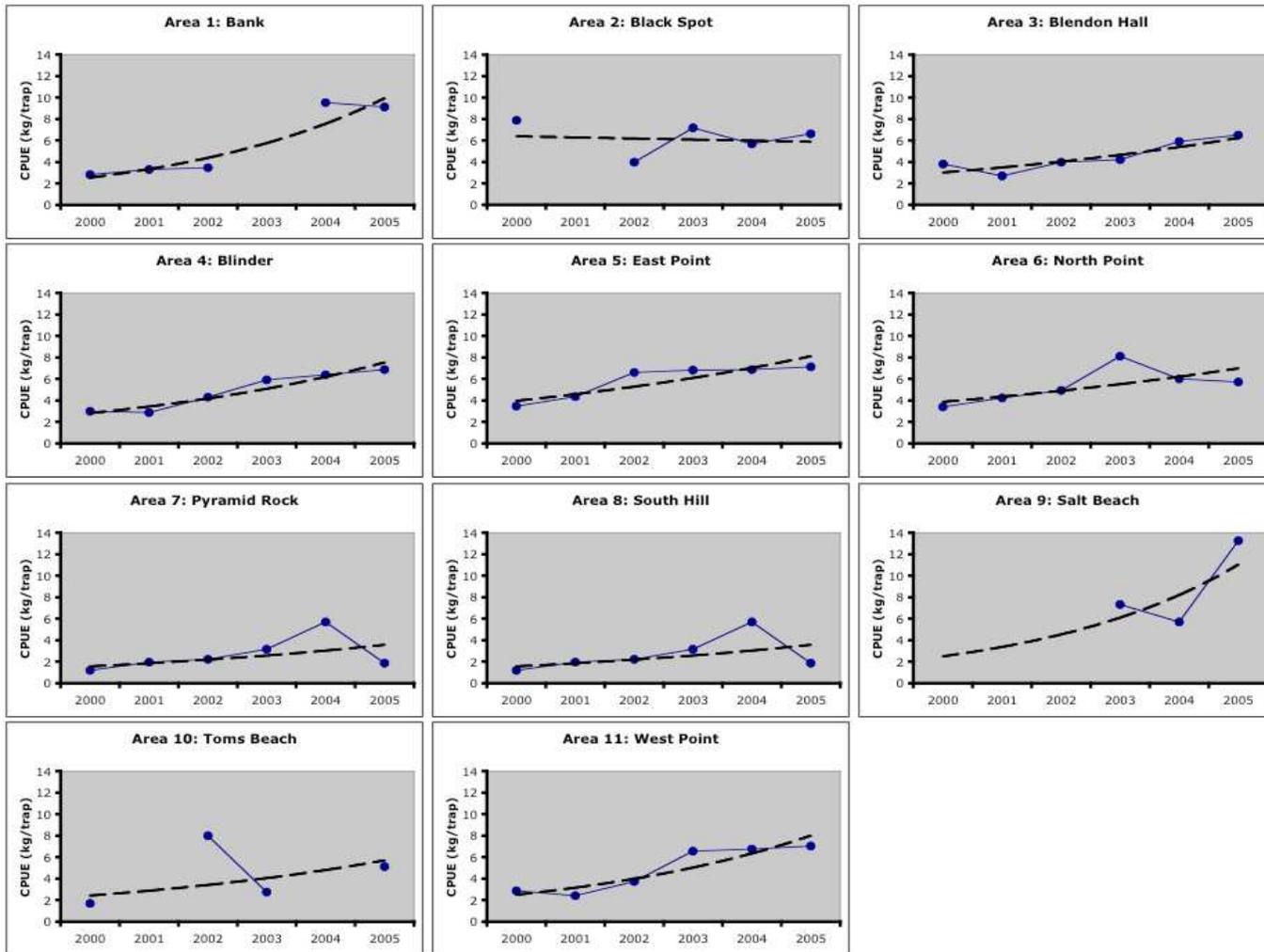


Figure 2a. Effort (total number of traps hauled) vs year for each area (note different scales for each area)

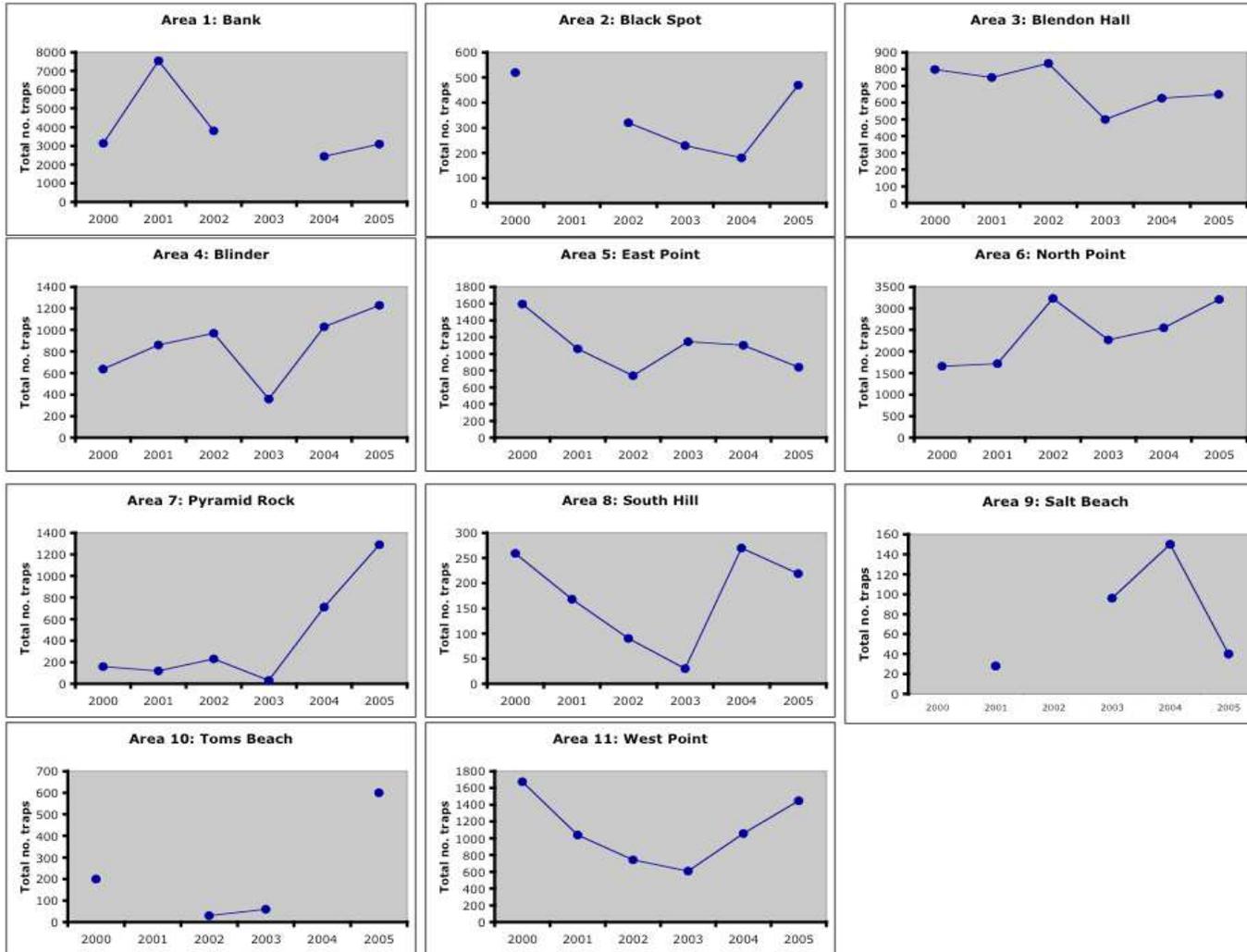


Figure 2b. Proportion of effort (traps hauled) each year for each area vs year

