Monthly trends in catch rates for the three main orange roughy aggregations

Anabela Brandão and Doug S. Butterworth

Marine Resource Assessment & Management Group (MARAM)
Department of Mathematics and Applied Mathematics
University of Cape Town
Rondebosch, 7701, Cape Town

February 2007

Continuation of the annual survey of the main orange roughy aggregations by an industry vessel is important to maintain time series of fishery-independent indices of abundance. The survey has always taken place at sometime in the July-August period, which corresponds to peak spawning aggregation and therefore offers both coverage of a greater portion of the population and estimates with lower variance. However this has the associated disadvantage of preventing the industry vessel from undertaking commercial fishing operations at a time when catch rates are highest so that economic returns from the fishery are best.

To provide a basis to quantify such considerations, two approaches are used to show monthly trends in catch rate (catch per distance towed). First Figs 1 to 3 plot monthly nominal catch rates (over the period 2000 to 2006, thus excluding the early years of appreciably higher catch rates which are less comparable with the present situation) for all sub-aggregations of *Johnies*, *Frankies* and *Rix* for which a minimum of 7 tows were made. These are shown separately for the *Southern Aquarius* and for the *Emanguluko*, as these are the two vessels possibly to be used for surveys.

Secondly Fig. 4 shows the monthly trend in CPUE as inferred from the GLM standardisation exercise (Brandão and Butterworth, 2007). Those analyses assume the month factor to be the same for all sub-aggregations. There are nevertheless some slight differences in monthly trends between sub-aggregations because month factors are estimated separately for the two components of the delta-lognormal standardisation approach, but these differences are too small to meaningfully impact the trend shown in Fig. 4.

Acknowledgements

Data were provided by NatMIRC for this study. Funding from the Namibian Deepwater Fishing Industry is gratefully acknowledged.

Reference

Brandão, A. and Butterworth, D.S. 2007. Updated GLM standardised CPUE abundance indices for orange roughy for known aggregations off Namibia from 1994 to 2006. Namibian Ministry of Fisheries and Marine Resources document: DWFWG/WkShop/Feb07/Doc 2.

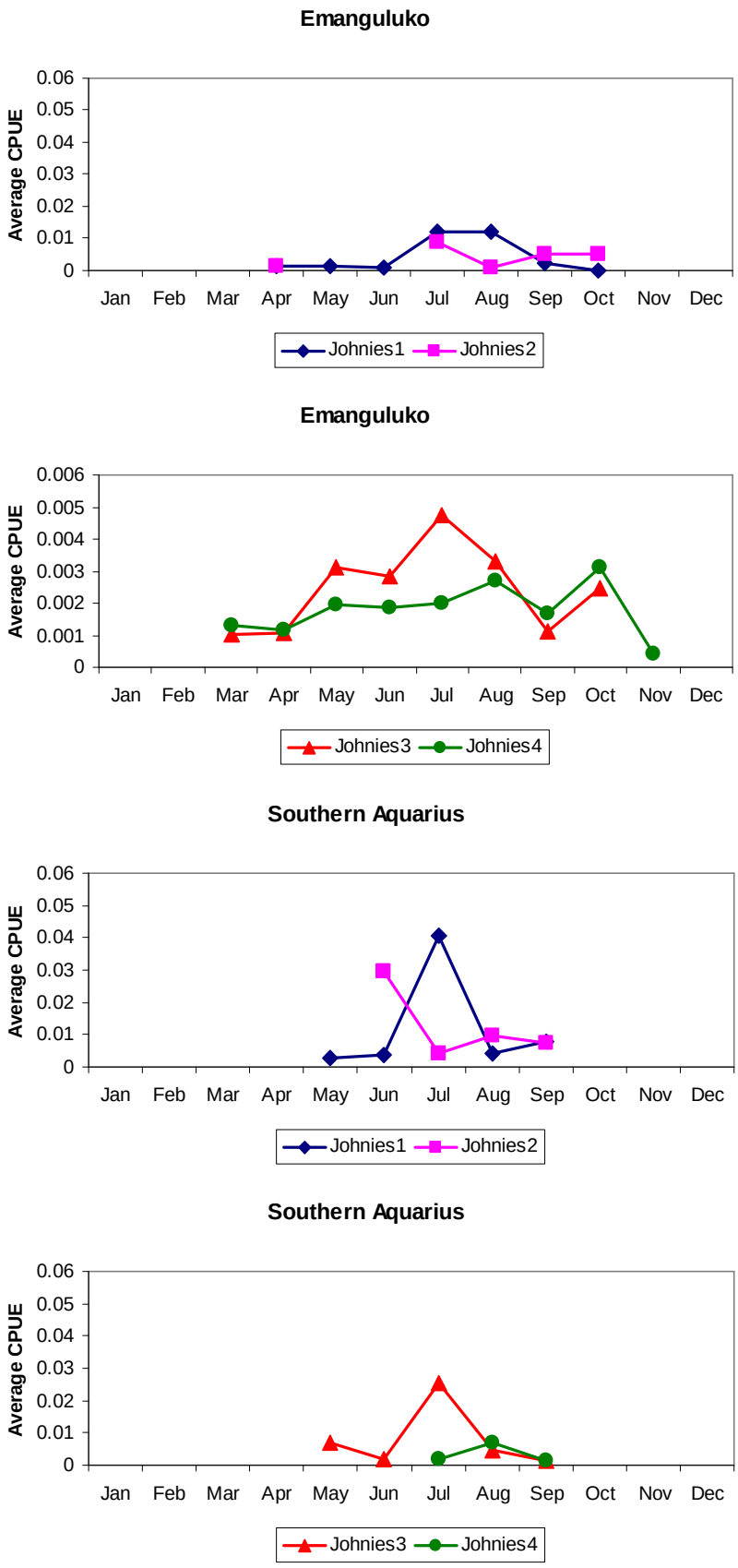

Figure 1. Monthly nominal CPUE series for the vessels *Emanguluko* (top two) and *Southern Aquarius* (bottom two) for the *Johnies* sub-aggregations. The monthly nominal CPUE is calculated for the period 2000 to 2006, except for the *Southern Aquarius* which did not operate in 2000 and in 2004. Note that for clarity, the second plot from the top has a different vertical axis scale.

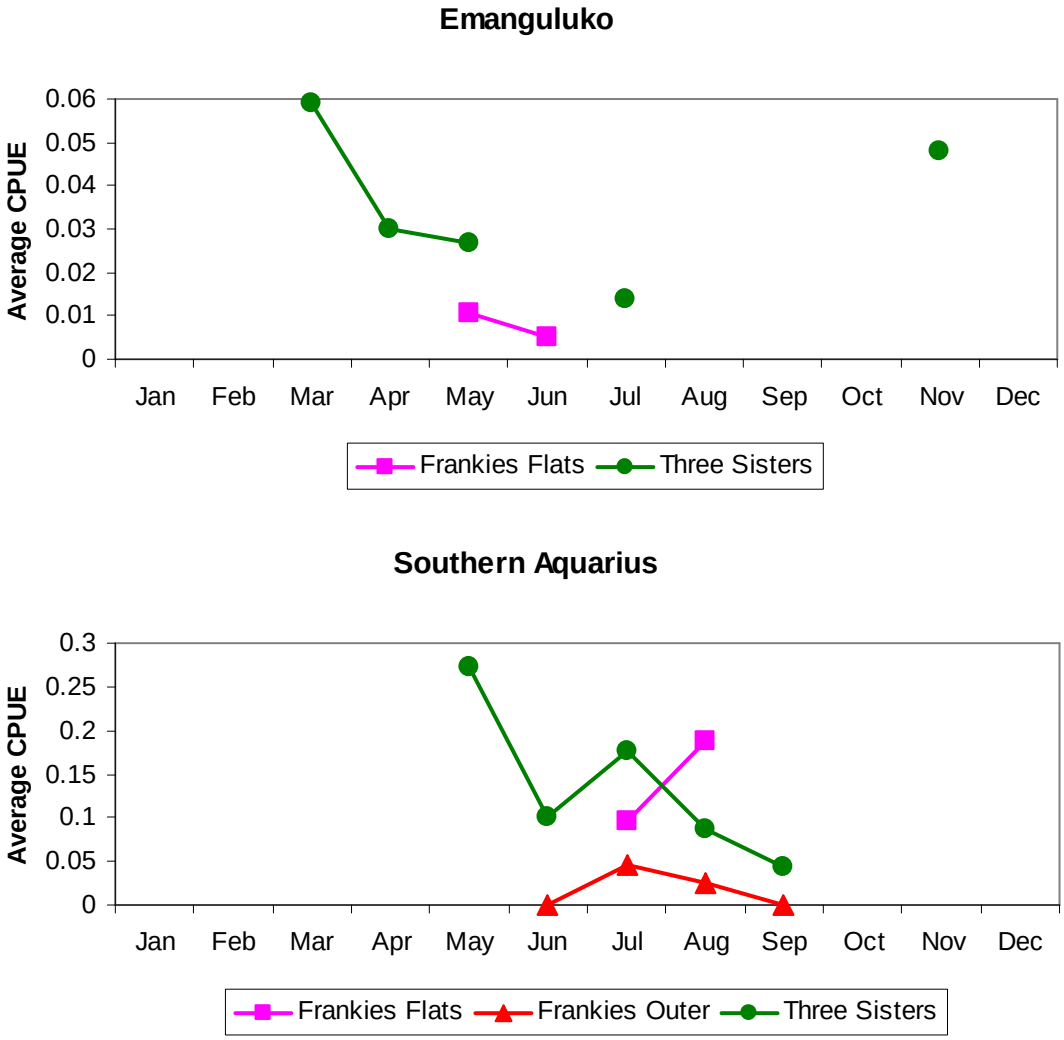

Figure 2. Monthly nominal CPUE series for the vessels *Emanguluko* and *Southern Aquarius* for the *Frankies* sub-aggregations in which 7 or more tows took place. The monthly nominal CPUE is calculated for the period 2000 to 2006, except for the *Southern Aquarius* which did not operate in 2000 and in 2004. Note that for clarity, the bottom plot has a different vertical axis scale.

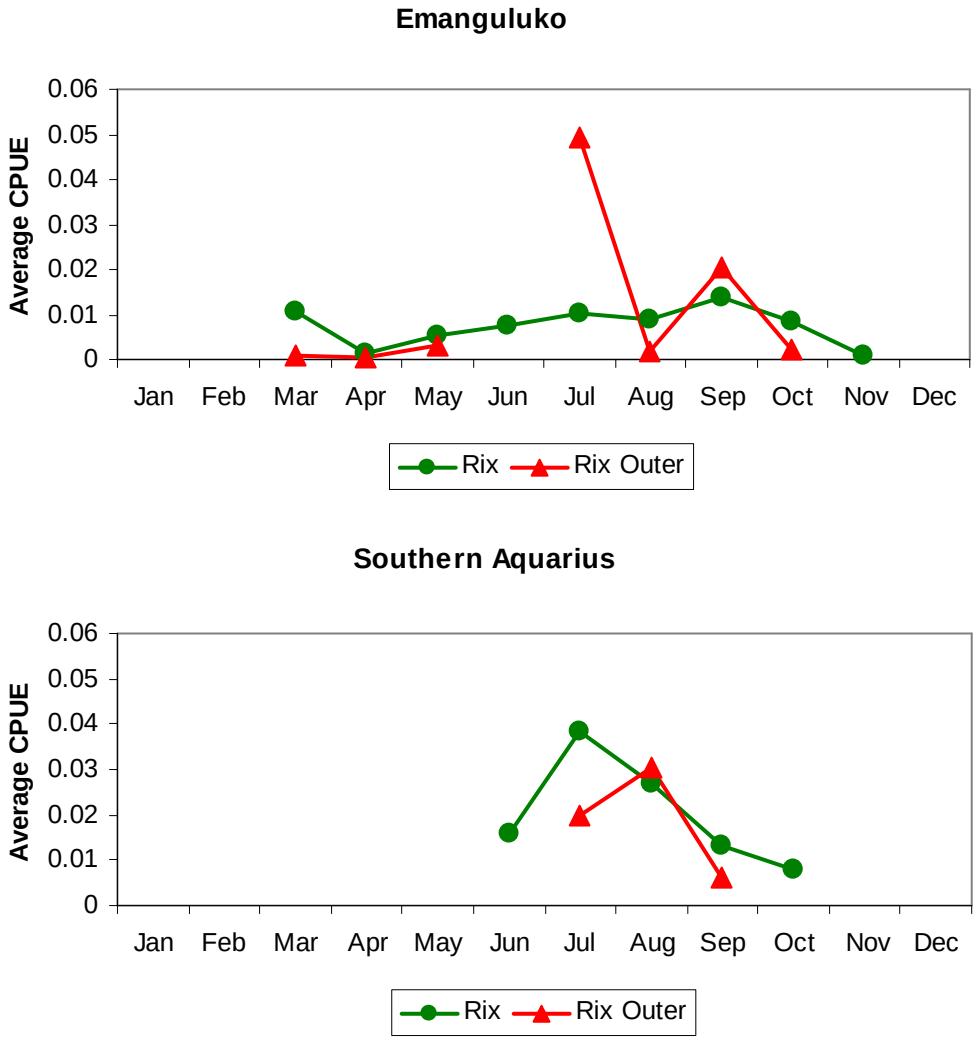

Figure 3. Monthly nominal CPUE series for the vessels *Emanguluko* and *Southern Aquarius* for the *Rix* sub-aggregations. The monthly nominal CPUE is calculated for the period 2000 to 2006, except for the *Southern Aquarius* which did not operate in 2000 and in 2004.

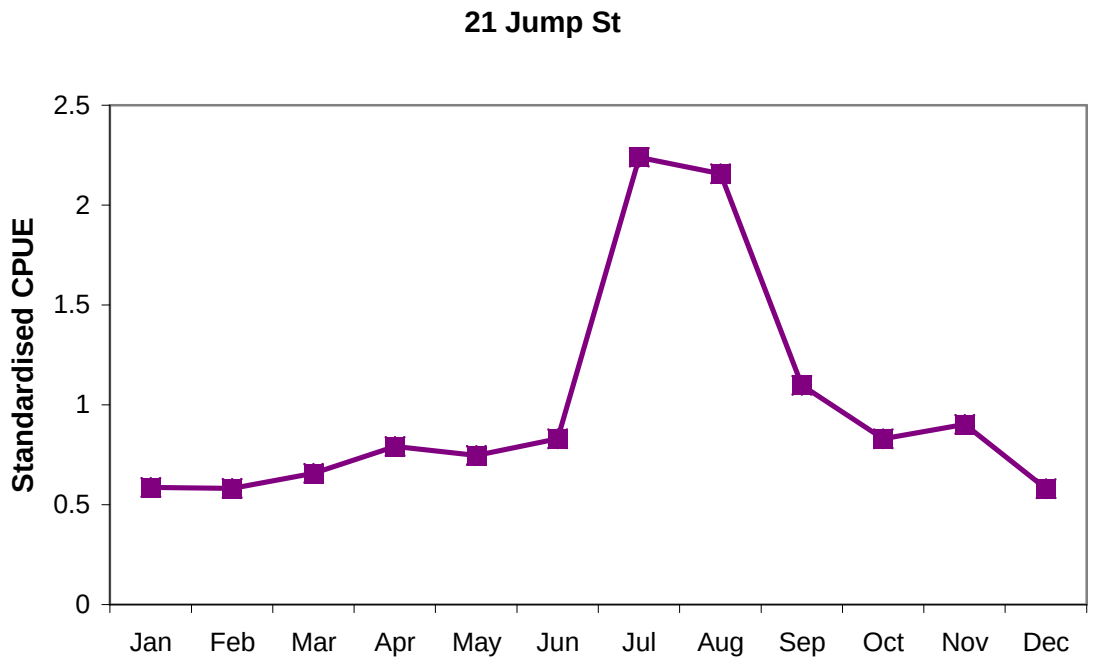

Figure 4. The monthly trend in orange roughy CPUE indicated by the GLM standardisation process (Brandão and Butterwort, 2007). The actual results presented refer to the *21 Jump St* sub-aggregation of *Frankies* (normalised to its mean over the twelve months) obtained from fitting the delta-lognormal model assuming binomial errors for the proportion positive, but patterns for the other aggregations are virtually identical (see text for the reasons for these differences).