LAYMAN'S SUMMARY

Inclusion of skipper effect in the GLM standardisation of the CPUE abundance indices for orange roughy off Namibia

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In principle skipper information should be included in the standardisation of CPUE to infer resource abundance trends. This has been attempted for orange roughy off Namibia, but the results obtained are not particularly clear. This is because there are problems in distinguishing the effects of different skippers from those of different vessels and of changes in real abundance over time in this particular case. Though GLM's are structured to be able to make these distinctions, they can do so only provided the data offer sufficient by way of contrasts, and the difficulties that arise in this case are related to factors such as skippers operating only for short periods in the fishery and often on one vessel only, and those with and without previous experience tending to have operated early and late in the fishery when fish densities on aggregations were respectively higher and lower.

Two plots summarise the few perhaps more reliable features of such results that were obtained. First Fig. A shows estimates of the relative abilities of skippers, listed from left to right in order of their appearance in the fishery. The difference between the two plots reflects whether or not attempts are made to factor in changing local abundance (fish density) over time. Evident from this plot is that there is no particularly clear difference in performance between skippers with and without orange roughy experience prior to their fishing off Namibia. The ordering of abilities changes for the two analyses (see Table A), but there are some consistent features with Smith and Grano being at or near the top, and Chapman and Rinquest similarly at or near the bottom in both cases.

Fig. B compares results for standardised trends for each aggregation between using vessel as a factor as in the past, or instead using skipper. In all cases the extent of the overall downward trend is greater when skipper is used. This is somewhat surprising, as with the change from skippers with previous experience in orange roughy fishing to those with none, one might have expected more recent CPUE's to have been artificially depressed over more recent years. The results obtained are likely a reflection in part of the analysis failing to detect much difference overall in the average efficiencies of these two groups. The estimates of high efficiency for the skippers entering the fishery most recently (see Fig. A) certainly contribute to the lower standardised CPUE in recent years for the "skipper" results in Fig. B, but the reliability of this result naturally depends on how successfully the GLM has been able to distinguish trends in true abundance from changing skipper efficiencies.

Table A. Skippers ordered from most to least effective in the orange roughy fishery for two GLMS fitted: *skipper+strata* and *skipper+strata+year*.

Model	
skipper+strata	***skipper +strata+year***
Pope*	Grano
Smith*	Smith*
Grano	Couto*
Franz	Mackabee
Couto*	Brosnan
Connely*	Jenner
Paz	Watt*
Mackabee	Pope*
Jenner	Paz
Brosnan	Franz
Watt*	Connely*
Chapman*	Chapman*
Rinquest	Rinquest

* Previous experience in other orange roughy fisheries.

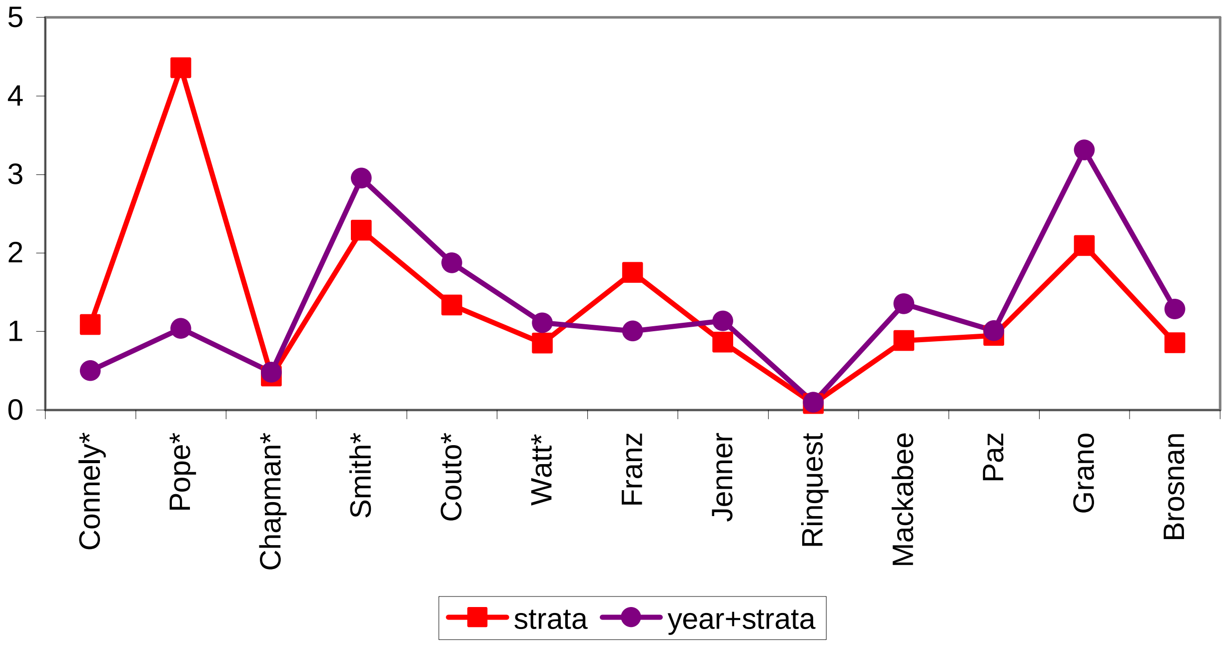

Figure A. The skipper effect (i.e. exp($\gamma_{captain}$)) for two GLMS fitted: *skipper+strata* and *skipper+strata+year*. Each series is normalised to its geometric mean. Skippers are listed in order of appearance in the fishery; those with asterisks had previous experience in other orange roughy fisheries.

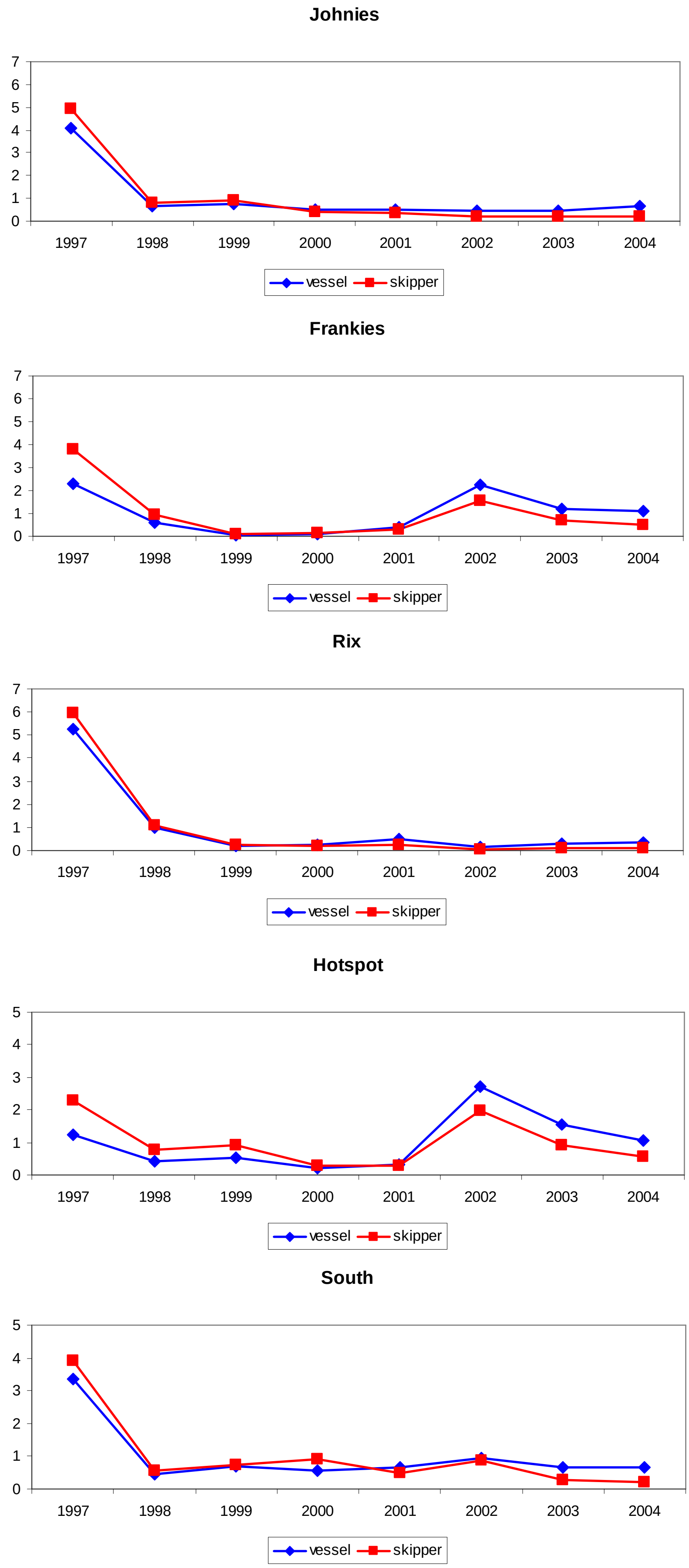

Figure B. Standardised CPUE indices normalised to their mean for each aggregation. The GLM fitted is: *year+agg+month+year.agg* together with either a main effect for skipper or for vessel.