Supplementary material

'Superbull' males: what role do they play and what drives their appearance within the *Doryteuthis gahi* Patagonian Shelf population?

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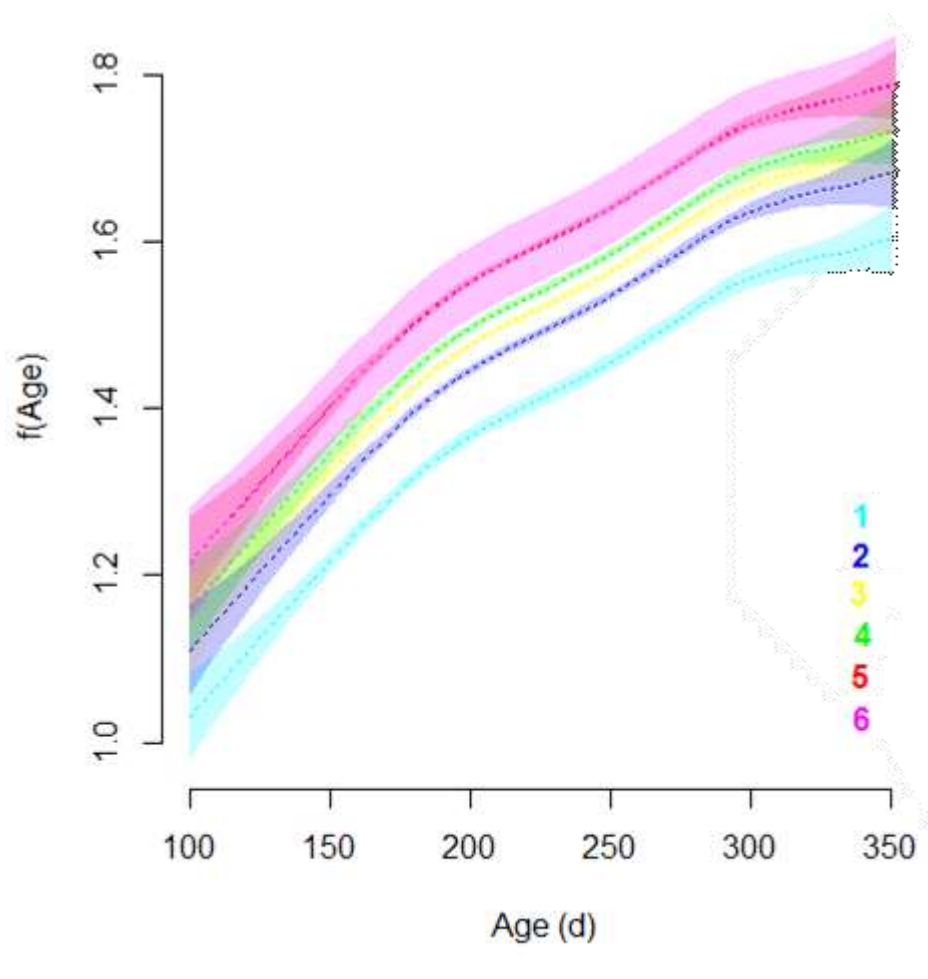[G]Corresponding author. Email: jjones@fisheries.gov.fk

Fig. S1. Random intercepts for each level of maturity for the smoothed effect of age (Model 9, Table 2).
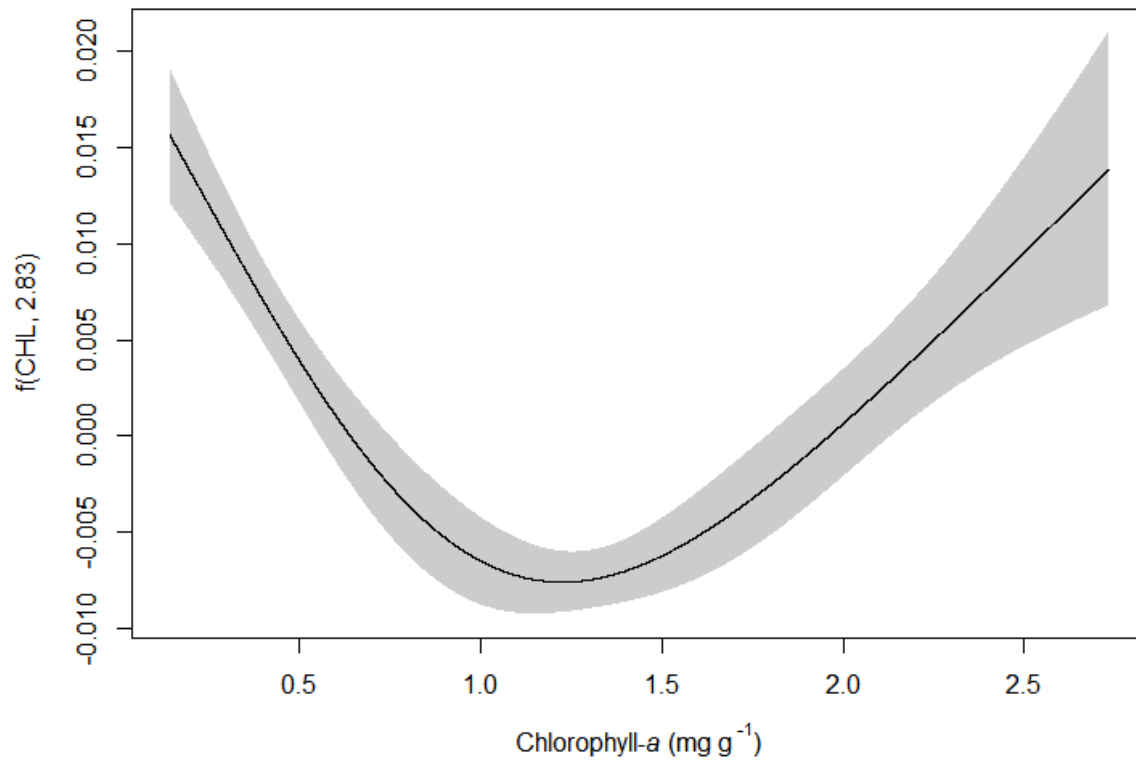
Fig. S2. Estimated smoothing curve from Model 5, Table 2 for chlorophyll-*a* (mg g^{-1}) and shaded point-wise 95% confidence intervals. Expected degrees of freedom given in smoothing term.
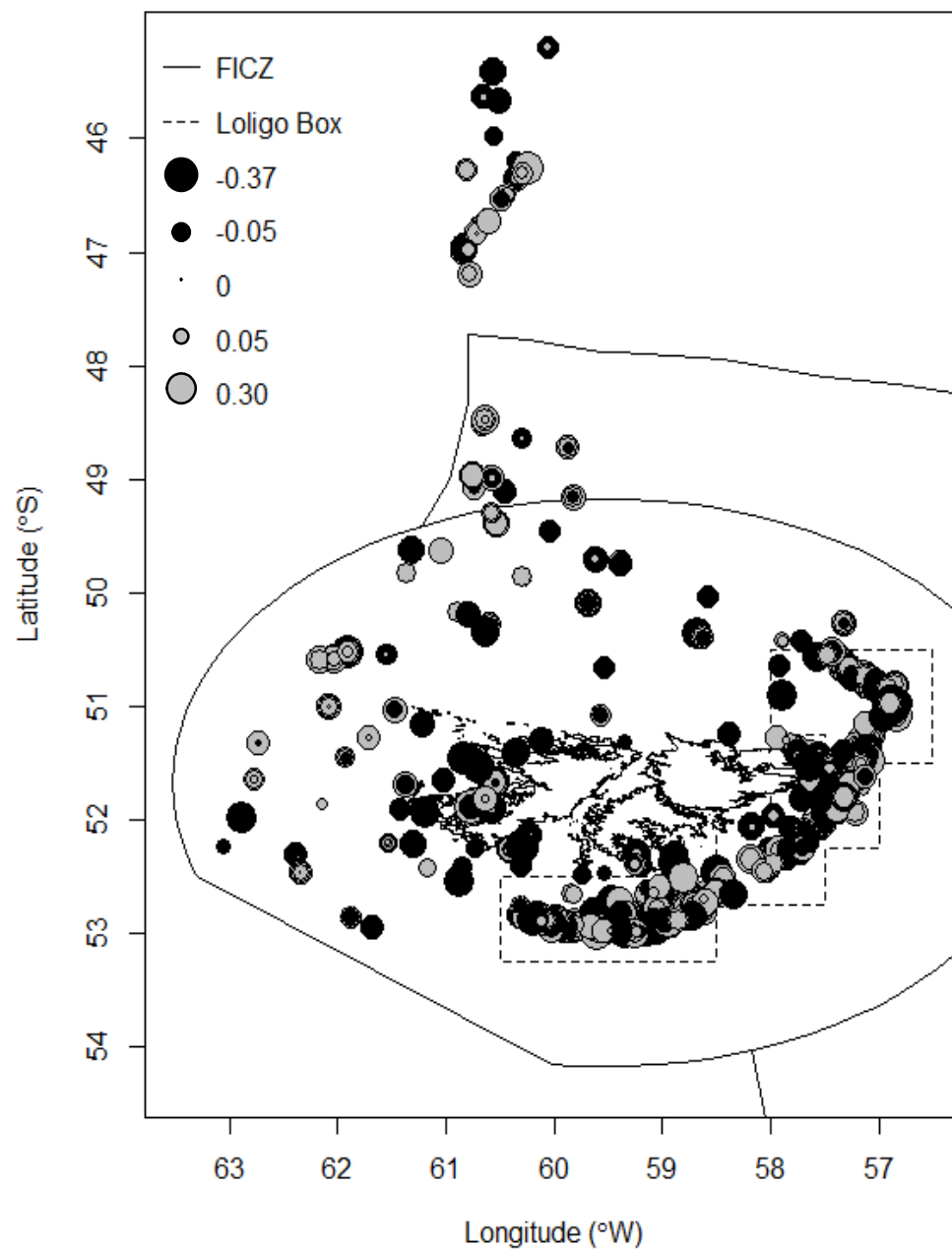
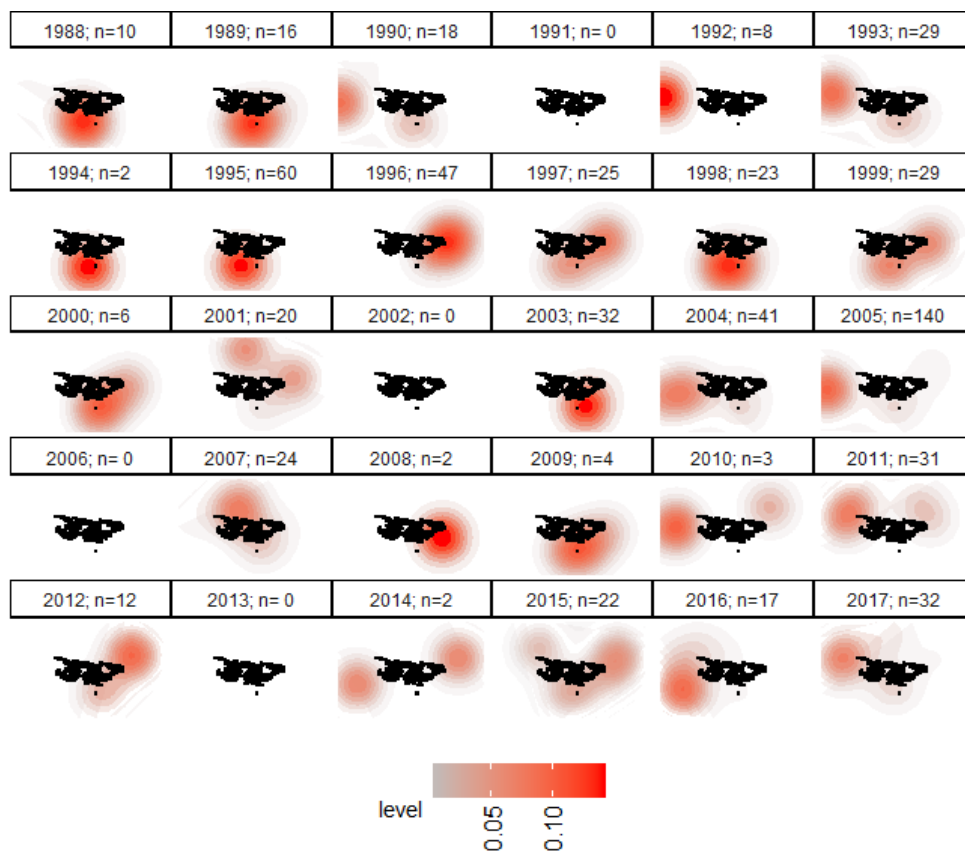**Fig. S3.** Residuals of Model 4 plotted against location of sample collection.

Fig. S4. Abundance and distribution by year of super-bull male squid >25-cm dorsal mantle length from the first fishing season using kernel density estimation.
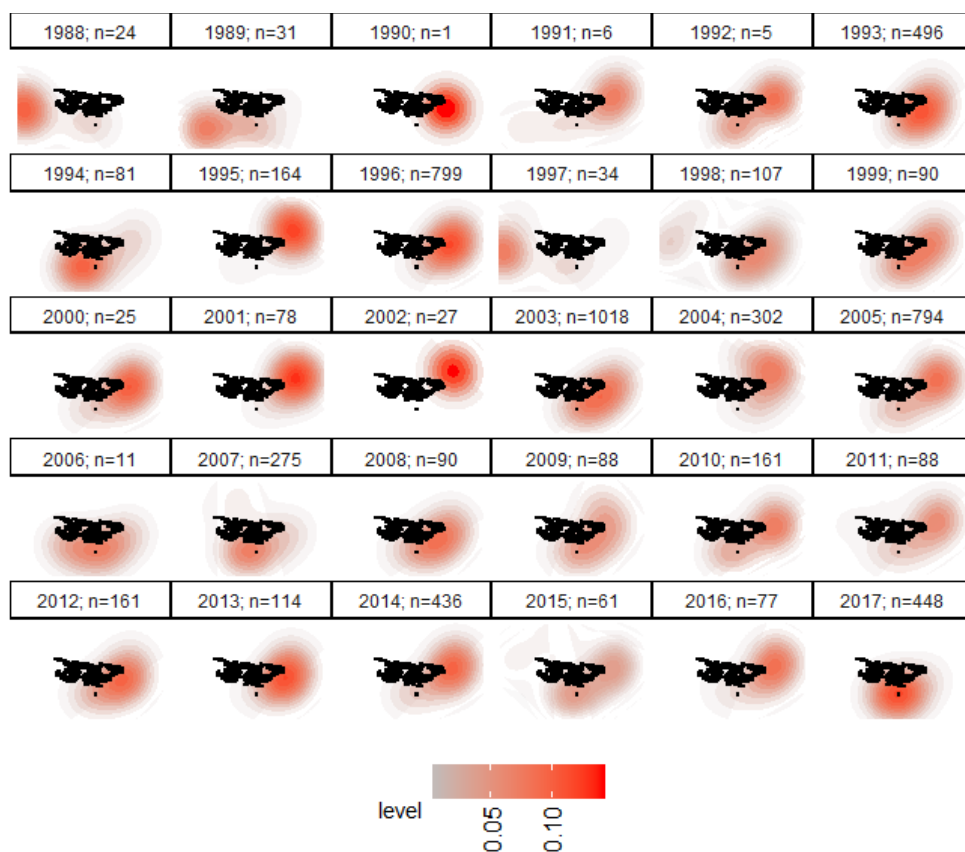
Fig. S5. Abundance and distribution by year of super-bull male squid >25-cm dorsal mantle length from the second fishing season using kernel density estimation.
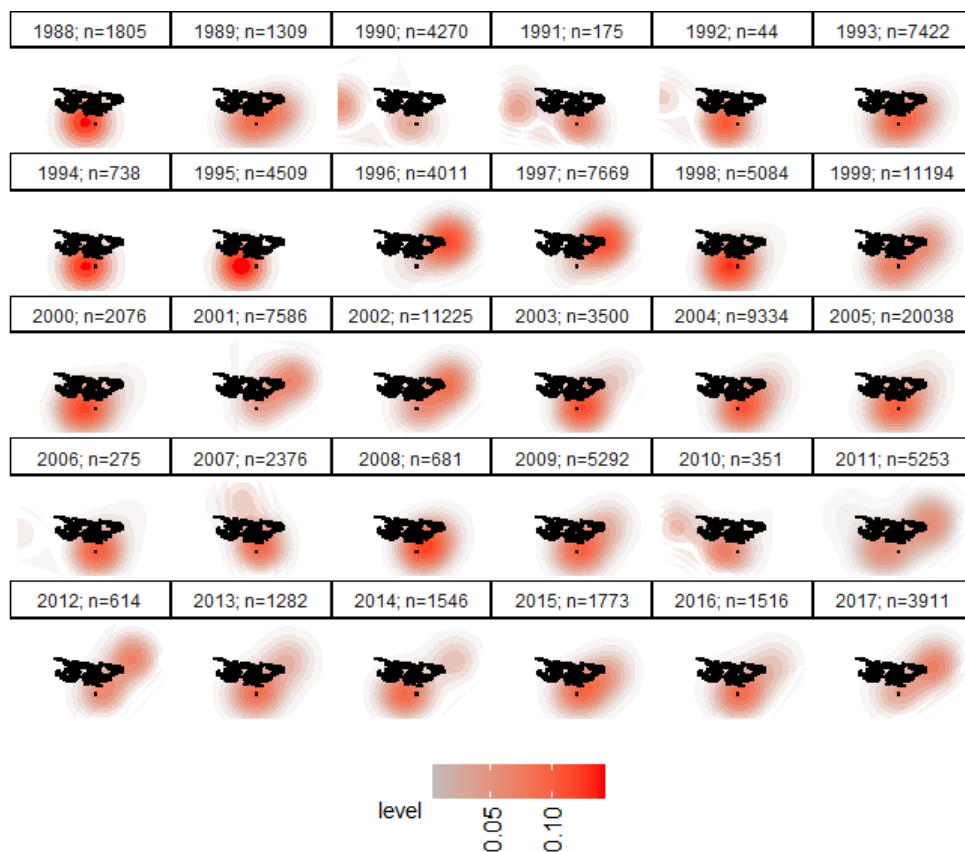
Fig. S6. Abundance and distribution by year of normal-sized male squid <25-cm dorsal mantle length from the first fishing season using kernel density estimation.
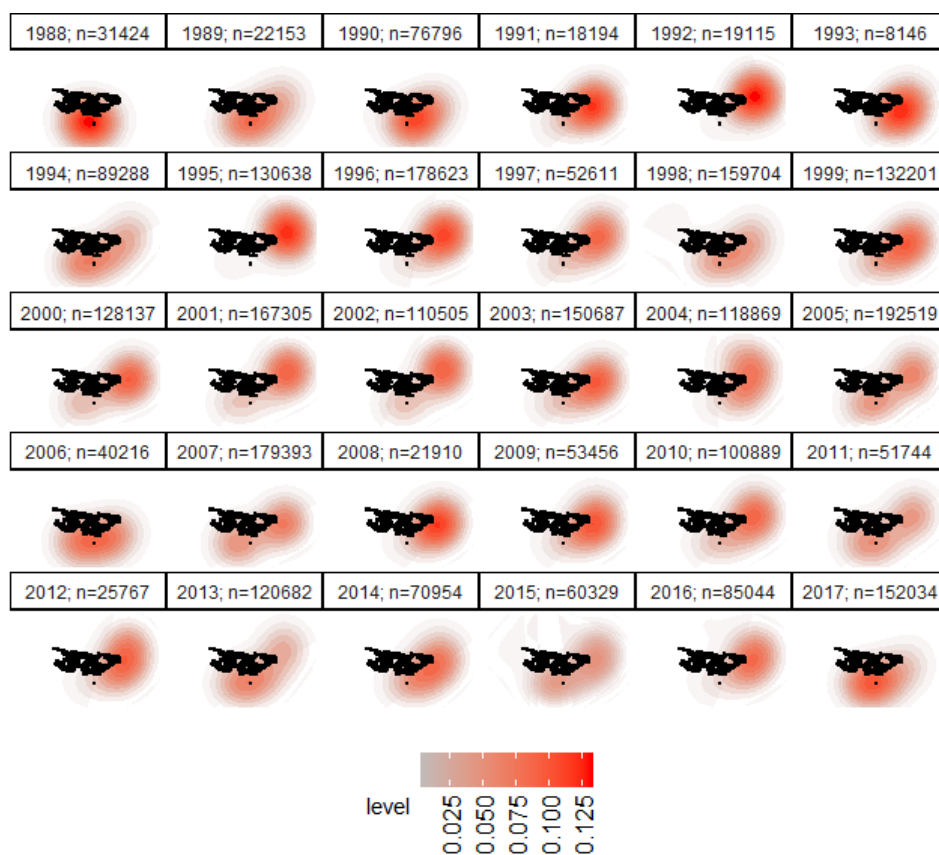
Fig. S7. Abundance and distribution by year of normal-sized male squid <25-cm dorsal mantle length from the second fishing season using kernel density estimation.
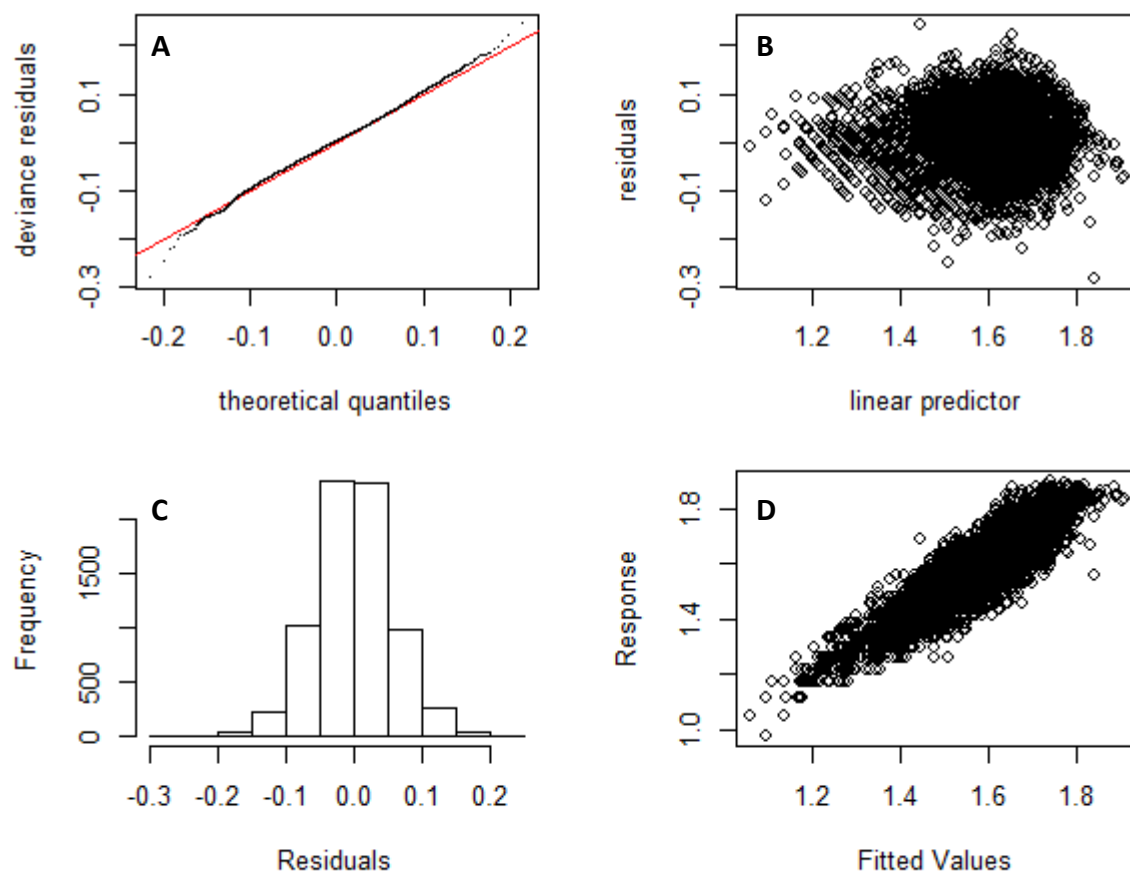
Fig. S8. Model validation graphs for the optimal generalised additive mixed model (Model 9, Table 2). (A) Q-Q plot; (B) residuals *v.* linear predictor; (C) histogram of residuals; and (D) response *v.* fitted values.