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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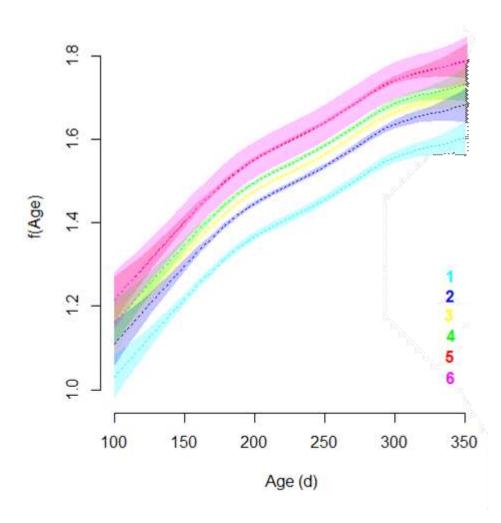


Fig. S1. Random intercepts for each level of maturity for the smoothed effect of age (Model 9, Table 2).

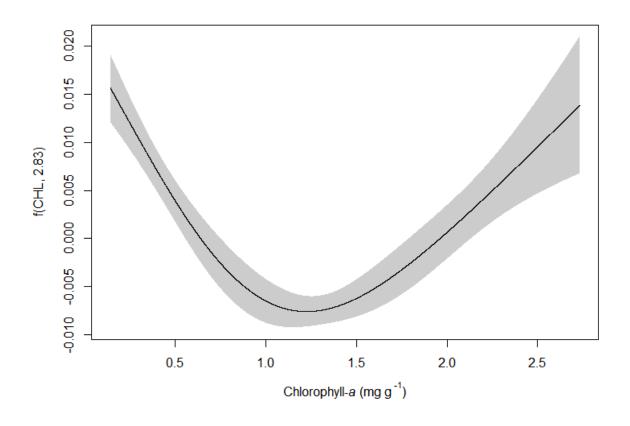


Fig. S2. Estimated smoothing curve from Model 5, Table 2 for chlorophyll-a (mg g⁻¹) and shaded pointwise 95% confidence intervals. Expected degrees of freedom given in smoothing term.

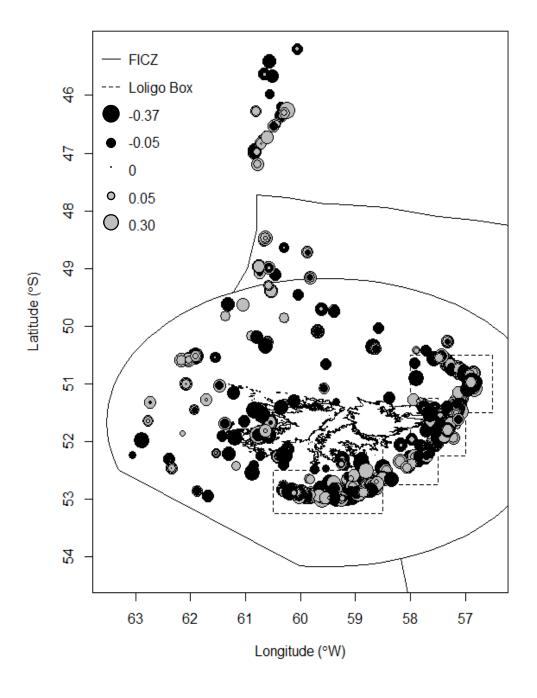


Fig. S3. Residuals of Model 4 plotted against location of sample collection.

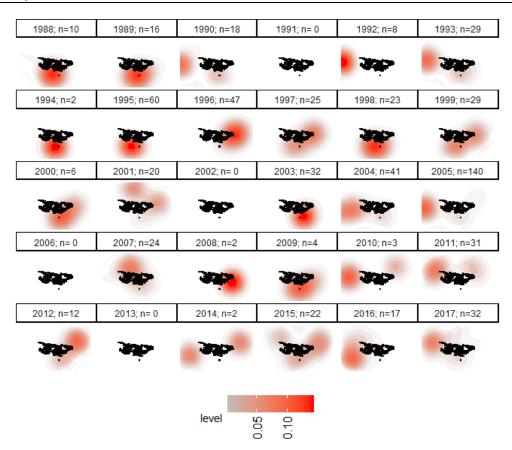


Fig. S4. Abundance and distribution by year of super-bull male squid >25-cm dorsal mantle length from the first fishing season using kernel density estimation.

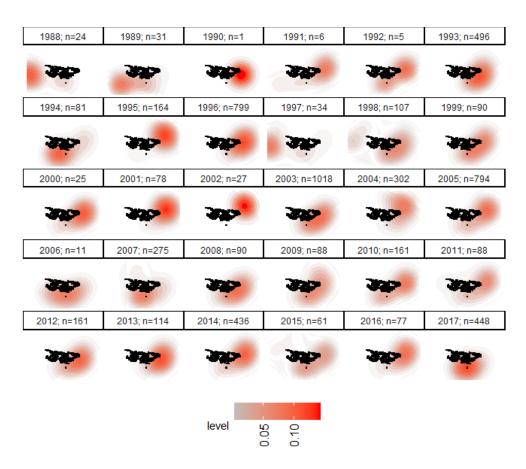


Fig. S5. Abundance and distribution by year of super-bull male squid >25-cm dorsal mantle length from the second fishing season using kernel density estimation.

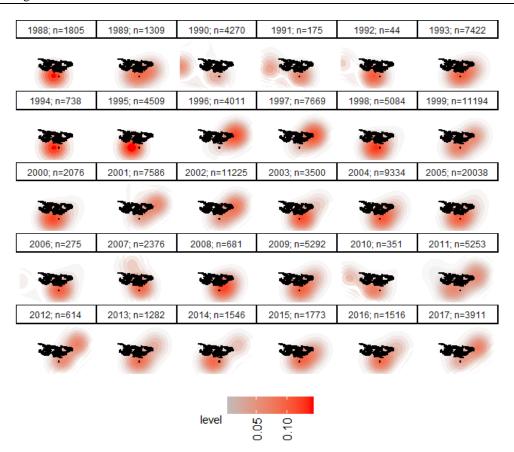


Fig. S6. Abundance and distribution by year of normal-sized male squid <25-cm dorsal mantle length from the first fishing season using kernel density estimation.

1988; n=31424	1989; n=22153	1990; n=76796	199 <mark>1</mark> ; n=18194	1992; n=19115	1993; n=8146
382	322	322	322	300	342
1994; n=89288	1995; n=130638	1996; n=178623	1997; n=52611	1998; n=159704	1999; n=132201
342	342	342	342	342	-
2000; n=128137	2001; n=167305	2002; n=110505	2003; n=150687	2004; n=118869	2005; n=192519
347	342	347	347	347	342
2006; n=40216	2007; n=179393	2008; n=21910	2009; n=53456	2010; n=100889	2011; n=51744
335	372	392	372	392-	315
2012; n=25767	2013; n=120682	2014; n=70954	2015; n=60329	2016; n=85044	2017; n=152034
312	32	322	382	322	385
level 0.025					

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.

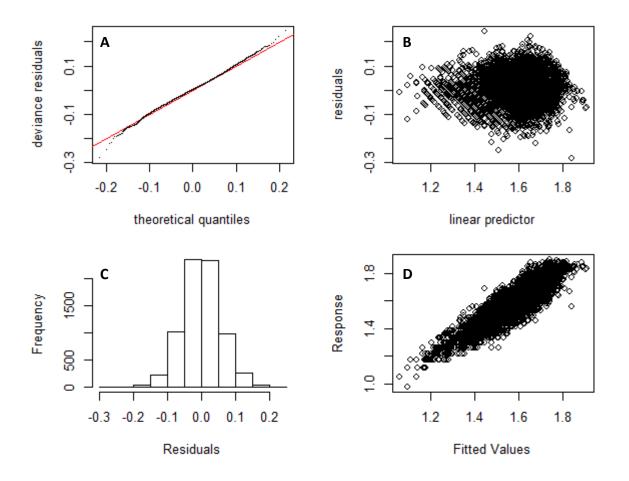


Fig. S8. Model validation graphs for the optimal generalised additive mixed model (Model 9, Table 2). (A) Q-Q plot; (B) residuals *v*. linear predictor; (C) histogram of residuals; and (D) response *v*. fitted values.