The following supplement accompanies the article

Spatial community structure of groundfish is conserved across the Gulf of Alaska

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Supplement. Figures and other explanations providing additional data

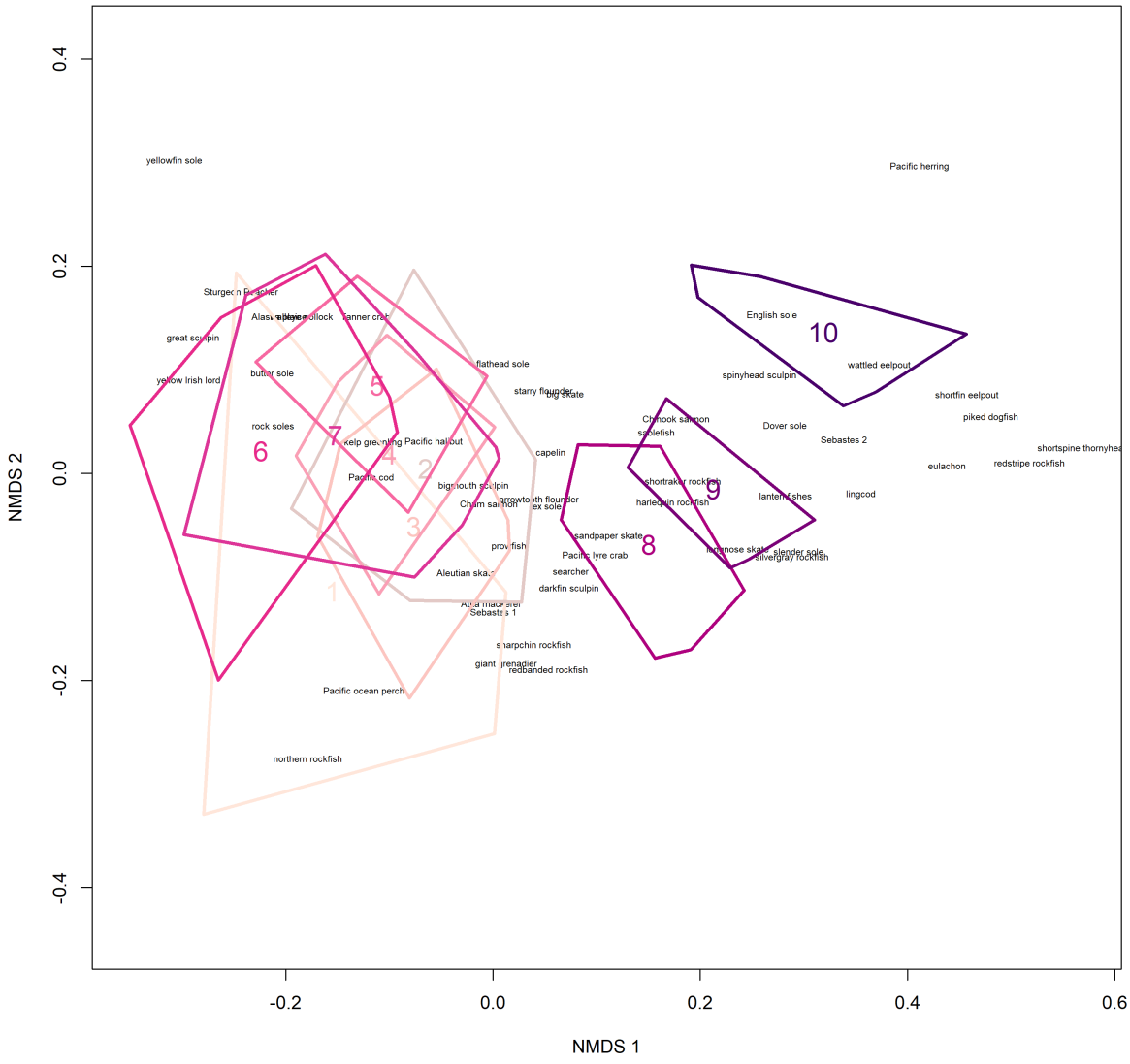

Fig. S1. *NMDS plot of community composition for the 10 study areas. Hulls connect or encircle the community composition in each year for a given study area. This plot uses the Hellinger transformed data.*

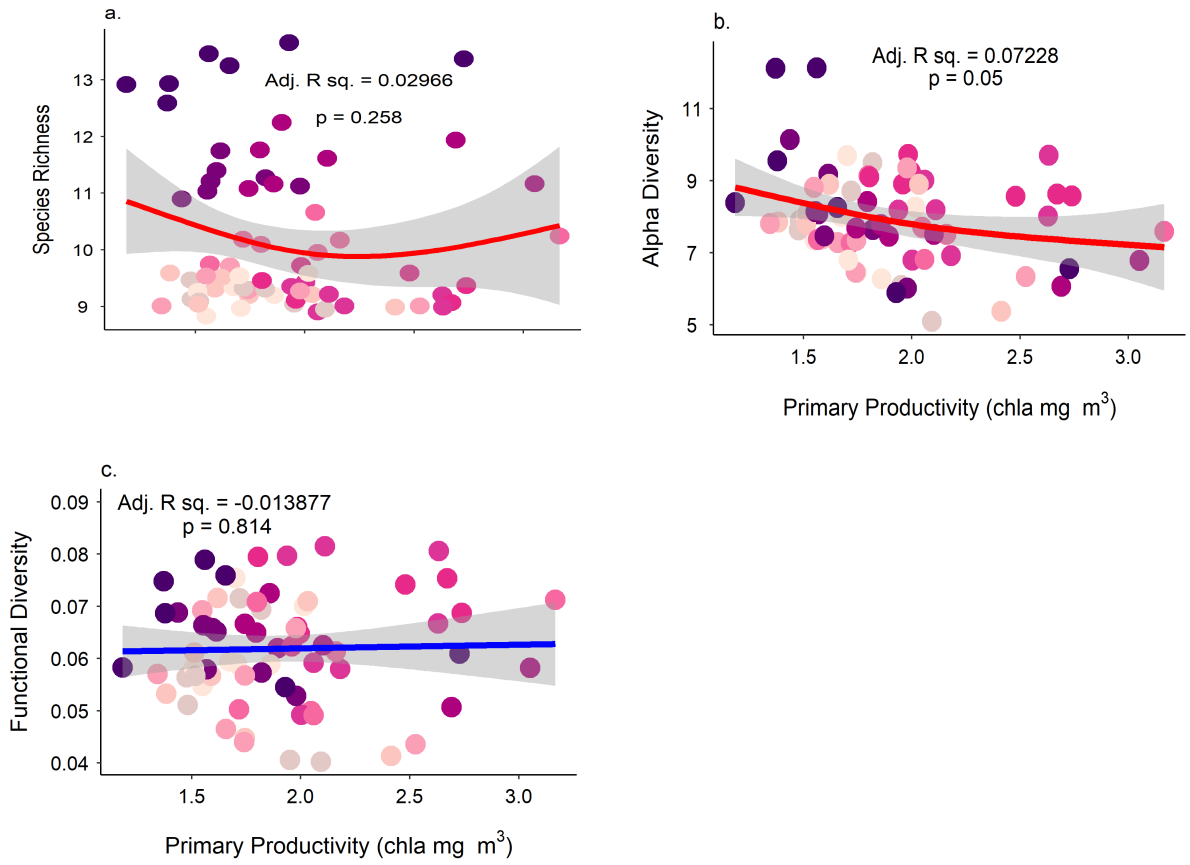

Fig. S2. *Changes in diversity metrics as a function of fishing pressure (metric tons km^{-2} of fish removed) or primary productivity (mg m^3 chlorophyll a). Dot colors indicate study area. Red lines indicate Generalized Additive Model fits, and blue lines indicate Linear Model fits. Only statistically non-significant relationships are shown. Adjusted R^2 (Adj. R sq.) and p values are included in each plot.*

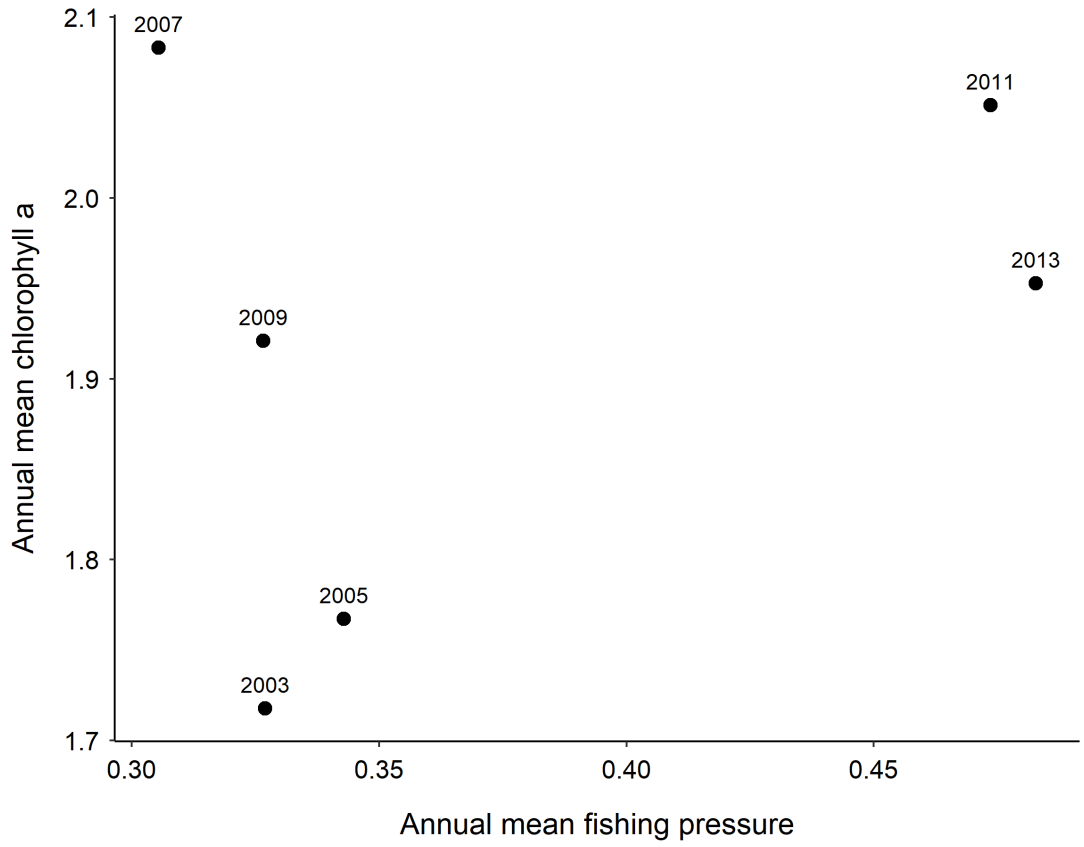

Fig. S3. *Correlation between fishing pressure and primary productivity. Each dot represents the entire community in a given year.*

Supplementary comments on spatial model smoothing for diversity metrics:

The consequences of spatial models for smoothing patterns of diversity are conceptually similar to those of single-species. For a single species, using a model that accounts for spatial correlation will yield a smoother surface than simply examining the raw observed biomass (or count) at each location. For a single species, the degree to which the model estimate is smoother depends both on the range parameter, the spatial variance, and, importantly, the effect of any environmental covariates included in the model. The value of the spatial range is frequently fairly small, but the spatial range only affects the correlation of the gaussian random field component of the model and does not include correlations induced by the covariates in the model, such as water depth. The realized correlation among locations is a combination of both factors. The patterns of spatial range suggest that for most species there is some variation to be explained by the spatial field once the information from covariates is accounted for.

As richness and diversity measures are combinations of the individual species models - richness is a sum of individual species occurrence, other diversity metrics are weighted combinations of individual species - metrics of diversity derived from spatial models will be smoother than their equivalent derived from single-sample observations. Essentially, using spatial models in a diversity context acknowledges that there is stochasticity in the observation of individual species and that this stochasticity propagates through the community to affect patterns of richness and diversity.