Supporting Information S1

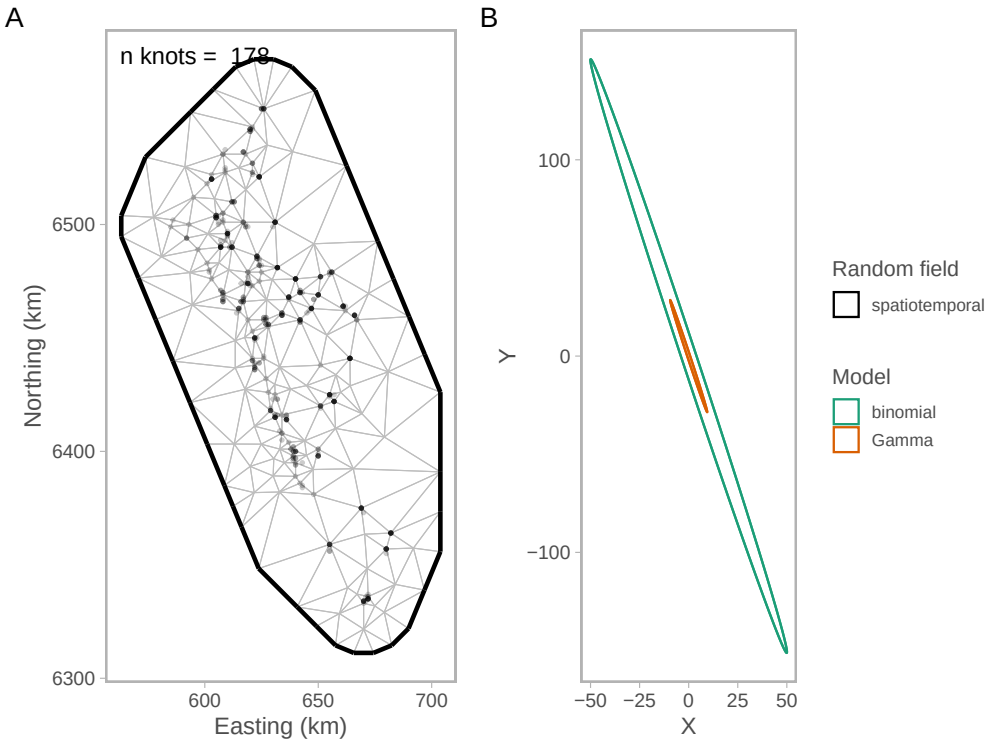

Figure S1: Panel A depicts the SPDE mesh for the litter model, and in panel B, the ellipses depict the spatiotemporal range (the distance at which correlation is effectively independent) for the two model components (green = binomial, orange = Gamma).

Table S1: AIC and ΔAIC (AIC for the model relative to the model with the lowest AIC) for all spatial and spatiotemporal GLLMs fitted to litter density data. In model 1, we use a spatial random field for the binomial and Gamma components of the delta-model, in model 2, we replace the spatial random field with a spatiotemporal AR1 random field, and in model 3 we use a spatial random field for the binomial model and a spatiotemporal AR1 random field for the Gamma model.

Model	**binomial**	**Gamma**	**AIC**	**ΔAIC**
1	Spatial	Spatial	4287	8
2	Spatiotemporal	Spatiotemporal	4279	0
3	Spatial	Spatiotemporal	4281	2

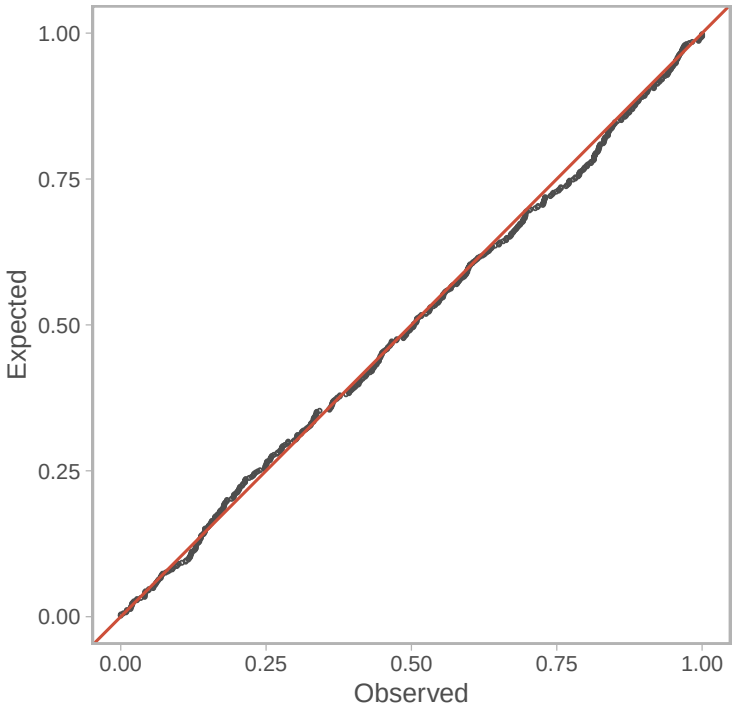

Figure S2: QQ-plots based on simulated quantile residuals for the combined predictions of the litter density models where fixed effects are held at their maximum likelihood estimate and random effects taken from a single approximate posterior sample.

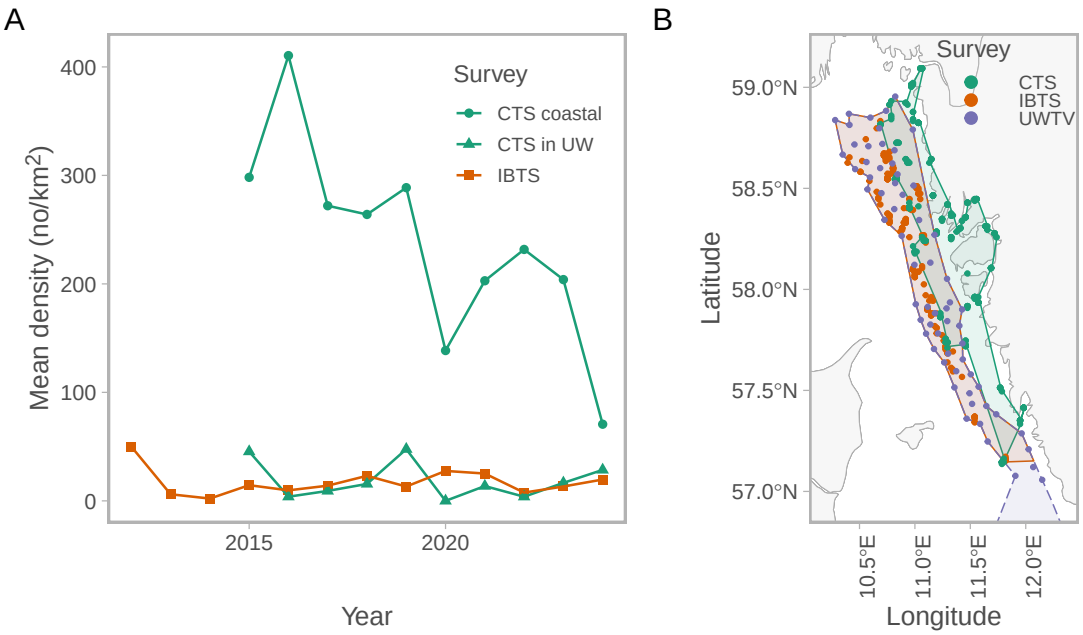

Figure S3: Mean litter densities (A) by survey (green = CTS, orange = IBTS), over time, and location of samples (B) with polygons depicting concave hulls of the survey extent. Note the CTS is split in two, where CTS in the UW/IBTS polygon is denoted CTS offshore (triangles) and coastal data are denoted CTS coastal (points), to illustrate that the differences in mean litter between CTS and IBTS is due to spatial differences in litter density and sampling area (see also Fig S4 and Fig 5).

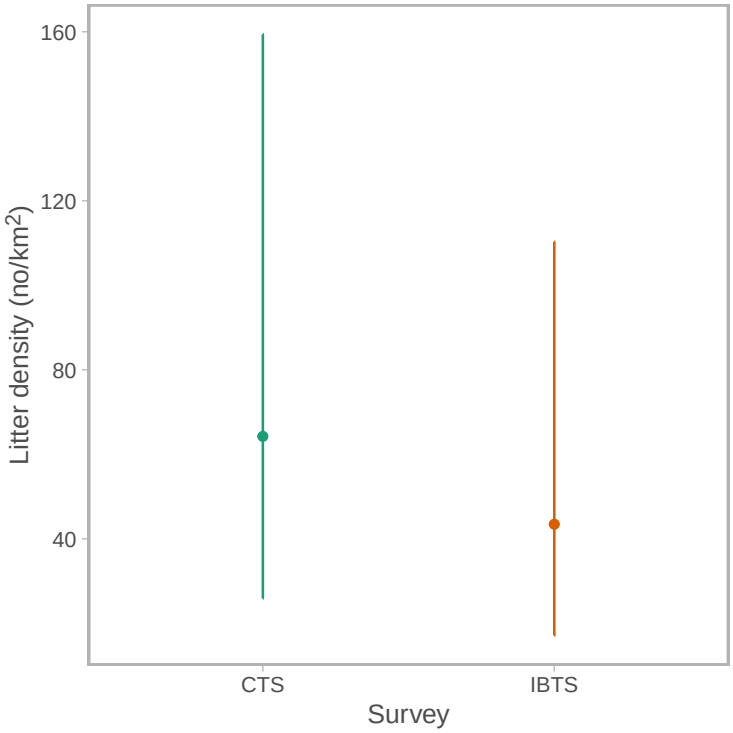

Figure S4: Effect of survey on litter density from the spatiotemporal model.

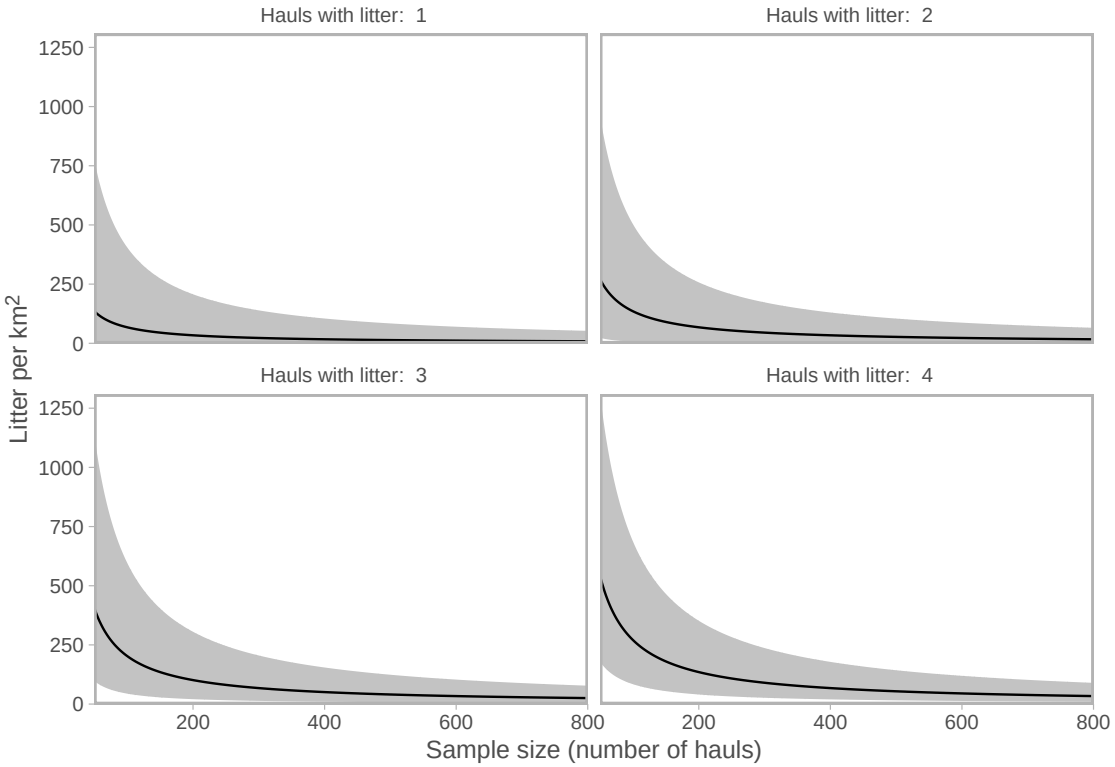

Figure S5: Litter density estimates and 95% CI for varying sample sizes (number of hauls) and number of hauls with litter per sample size using the Agresti-Coull method (note a haul with litter can only contain one litter object in this hypothetical example). Haul area: 0.000148 km². The solid line depicts the mean and the ribbon covers the 95% confidence interval.