The following supplement accompanies the article

Real-time species distribution models for conservation and management of natural resources in marine environments

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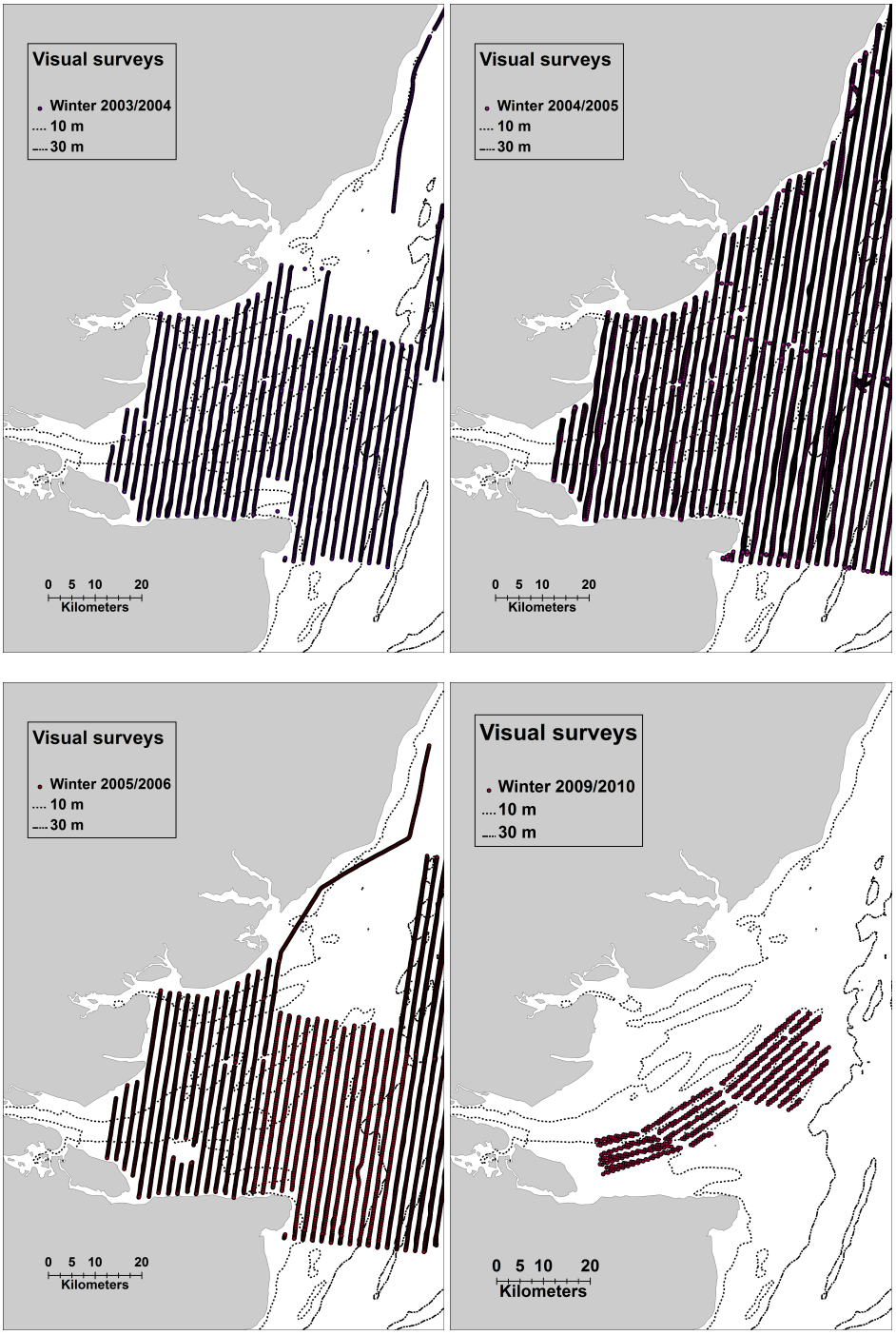
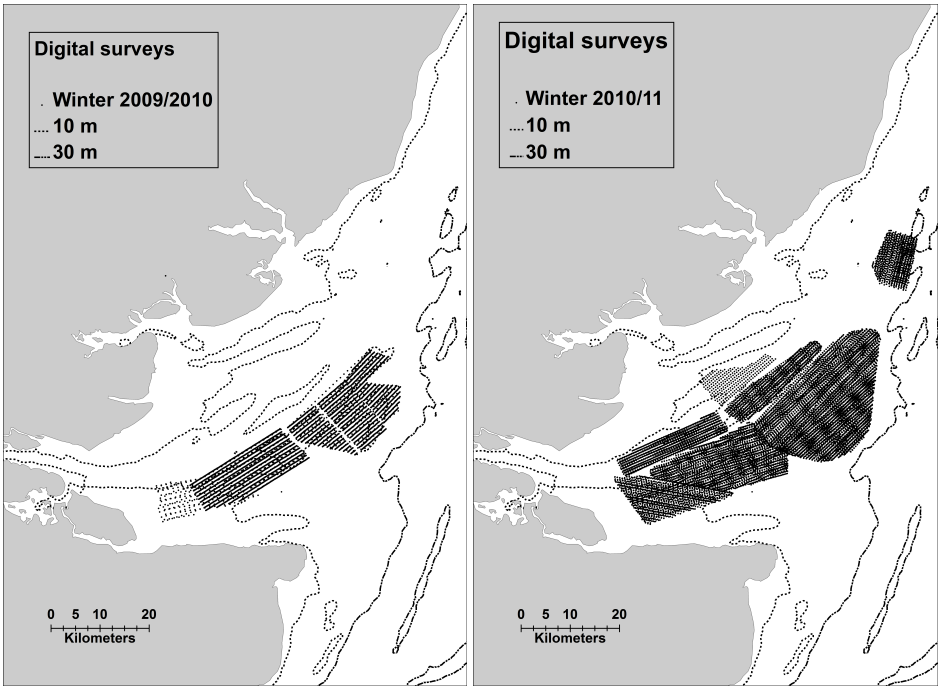
Table S1. List of predictor variables

Predictor	Description	Rationale for inclusion
Slope	Slope (in degrees) of sea floor	Interaction with frontal dynamics which concentrate prey
Water level	Water depth (m)	Diving depth/ Pelagic food resource
Distance to land max 5 km	Euclidian distance (m) to shore of maximum 5 km	Disturbance
Densities of ships	Number of ships/year/km^2	Disturbance
Current gradient	Local horizontal gradient of currents (m/s/m) at 5 m depth	Hydrodynamic structure concentrating prey
U velocity	Local E-W current velocity component (m/s) at 5 m depth	Water mass characteristics
Vorticity	Eddy activity measured as the local vorticity (m/s/m) of the flow at 5 m depth	Water mass characteristics
V velocity	Local N-S current velocity component (m/s) at 5 m depth	Water mass characteristics
Vertical velocity (W)	Local upwelling/downwelling measured as vertical velocity (m/s, positive for upward flow) at 5 m depth	Hydrodynamic structure concentrating prey
Current speed	Local magnitude of horizontal current (m/s) at 5 m depth	U and V velocity components combined
X and Y co-ordinates	An interaction term between X and Y coordinates	Account for unexplained spatial structure

Fig. S1. Survey coverage for visual and digital datasets. The 10 m and 30 m depth contours are indicated.



Visual


Digital surveys
Winter 2009/2010
10 m
30 m
0 5 10 20
Kilometers
Digital surveys
Winter 2010/11
10 m
30 m
0 5 10 20
Kilometers

Digital

Fig. S2. Simplified vector maps for the four current scenarios.

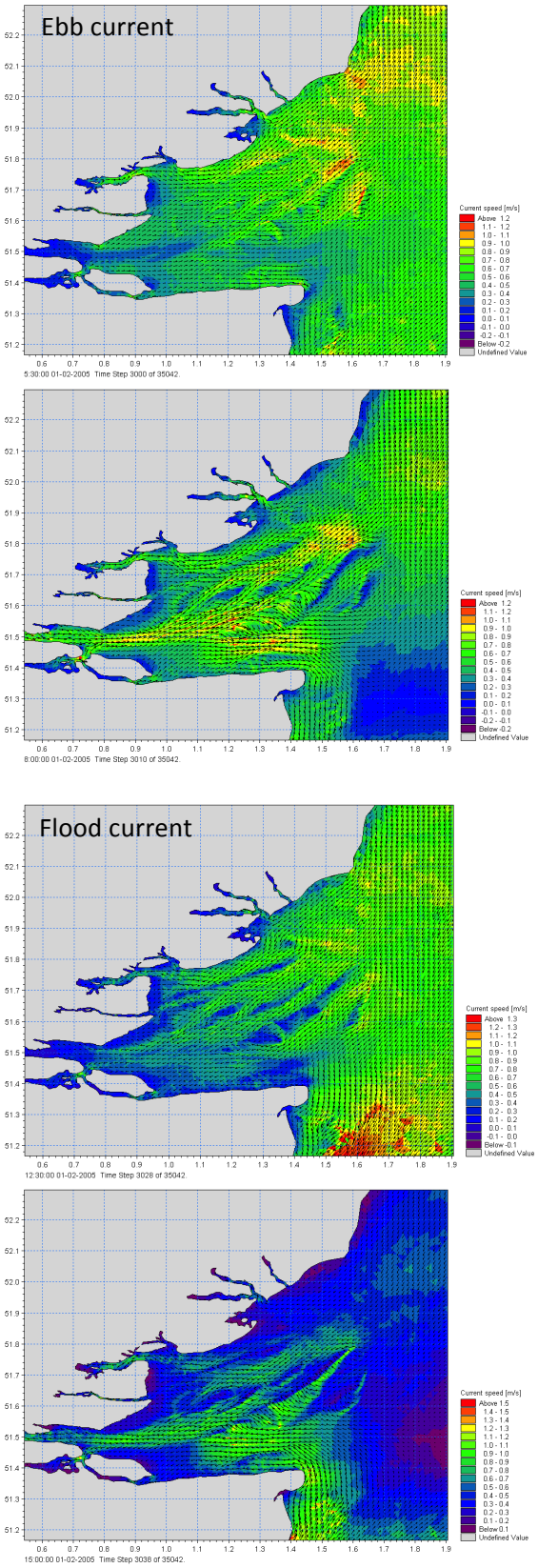


Fig. S3. Observations of divers during the visual/digital surveys of 2009-2010. The 10 m and 30 m depth contours have been indicated.

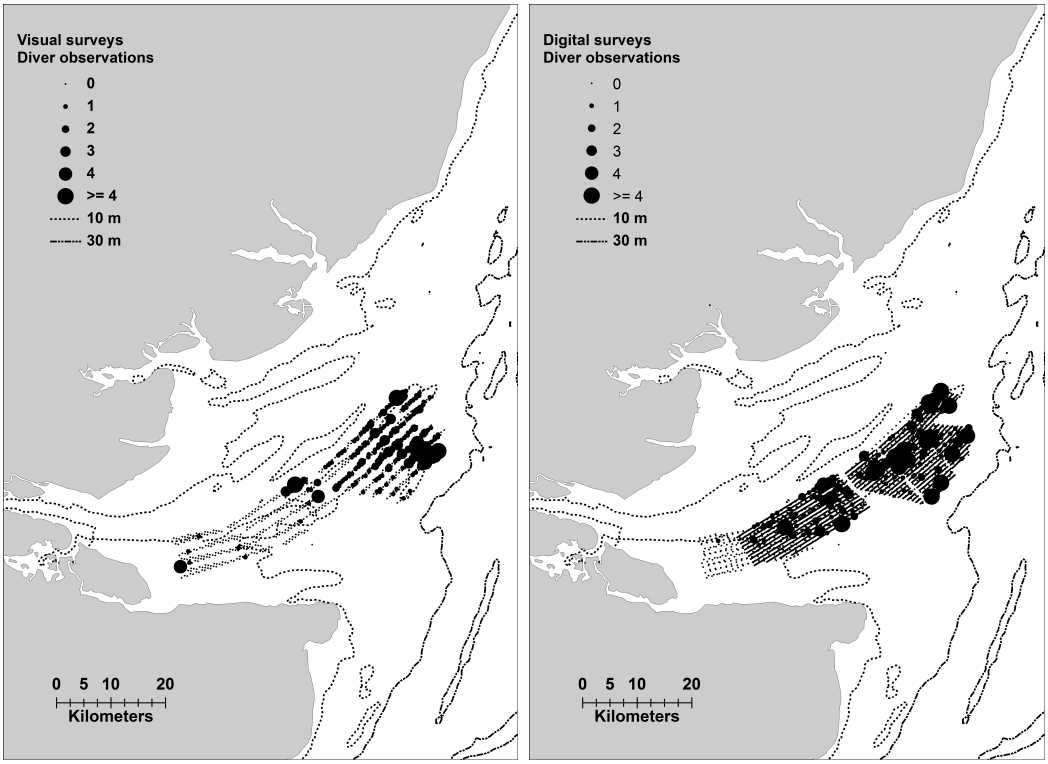


Fig. S4. Plot of estimated densities from visual surveys (left) and digital surveys (right). The 10 m and 30 m depth contours, as well as the perimeter of the planned London Array offshore wind farm (LAL) are indicated.

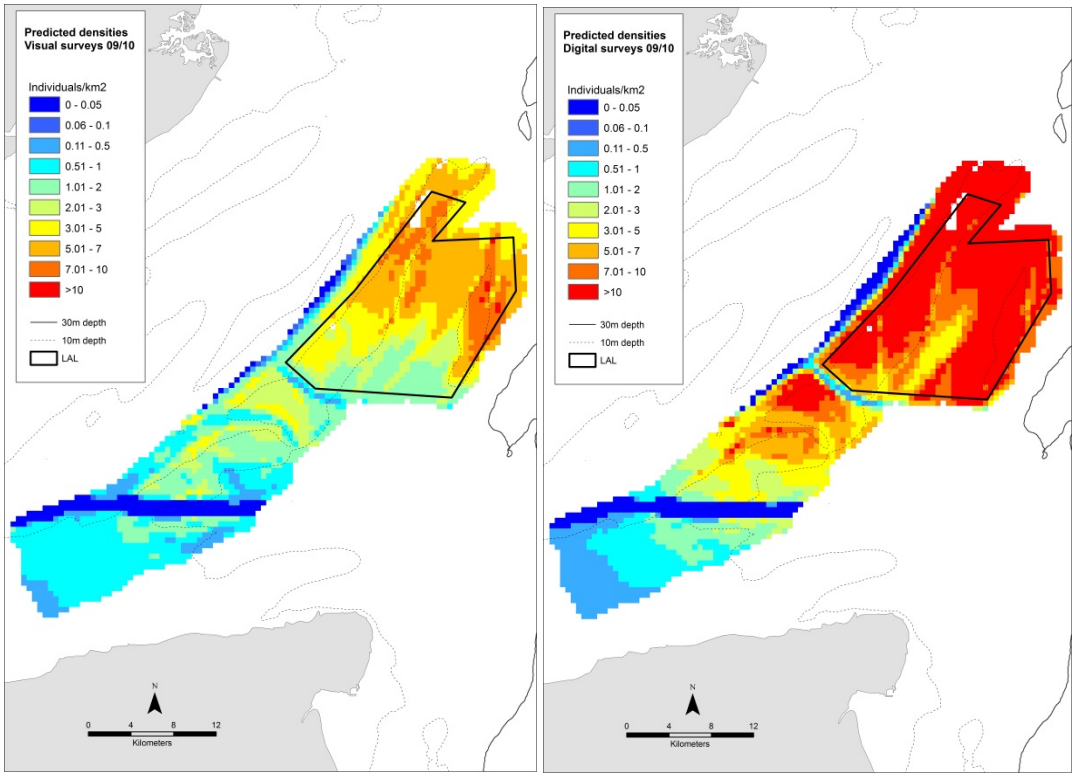


Fig. S5. Partial GAM plots for the visual surveys (left) and digital surveys (right) during the comparative surveys. Upper panel shows results for the binary part, and the lower panel shows results for the positive part. The values of the environmental variables are shown on the X-axis and the probability on the Y-axis in logit scale. The degree of smoothing is indicated in the legend of the Y-axis. The dotted lines and shaded areas show ±1standard errors. For the 2-d term (X,Y) a perspective plot is shown, with the degree of smoothing indicated as a label to the Z-axis.

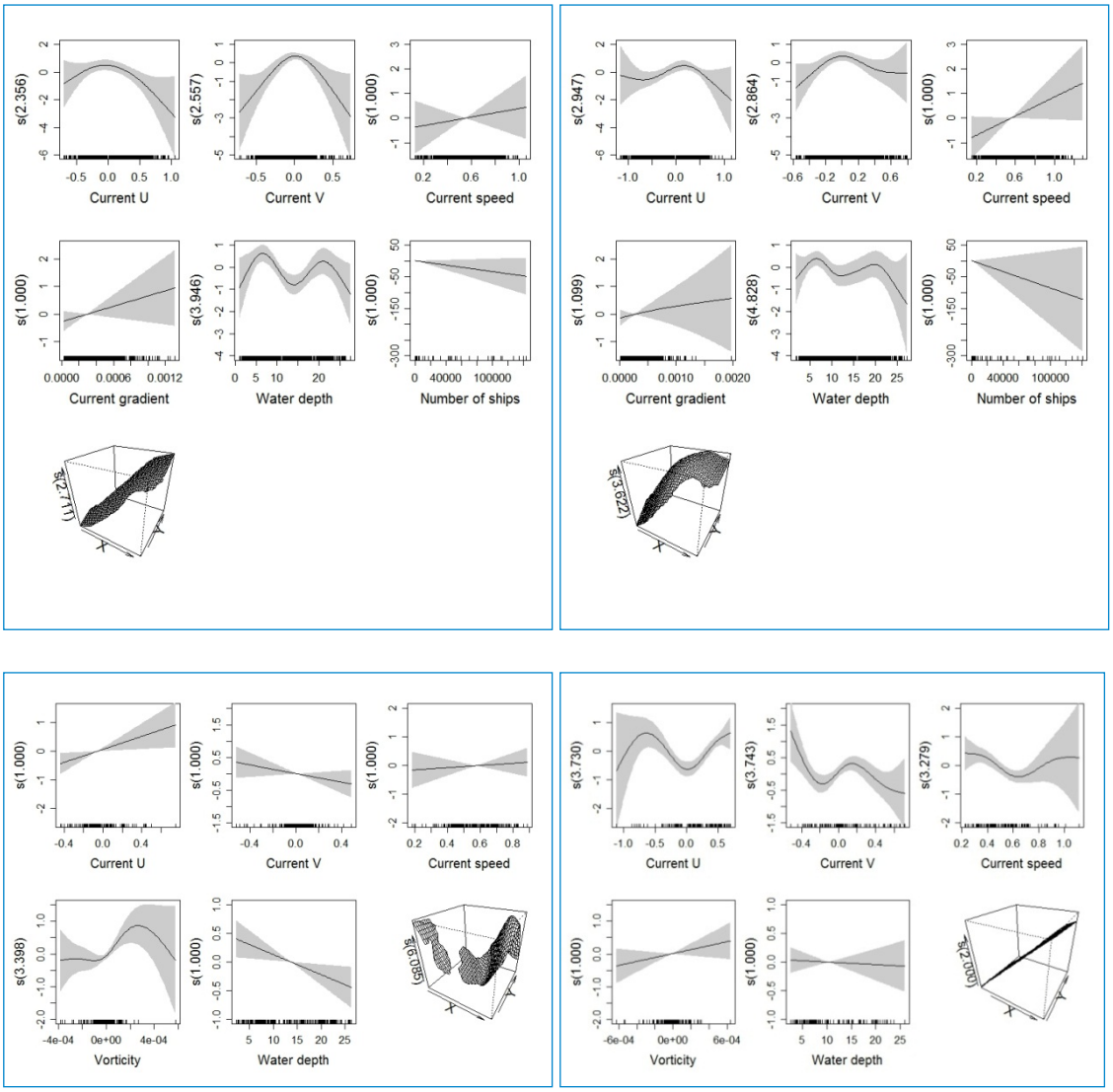


Fig. S6. Partial GAM plots for presence/absence (left) and positive (right) parts for model 2. The values of the environmental variables are shown on the X-axis and the probability on the Y-axis in logit scale. The degree of smoothing is indicated in the legend of the Y-axis. The dotted lines and shaded areas show ±1 standard errors. For the 2-d term (X,Y) a perspective plot is shown, with the degree of smoothing indicated as a label to the Z-axis.

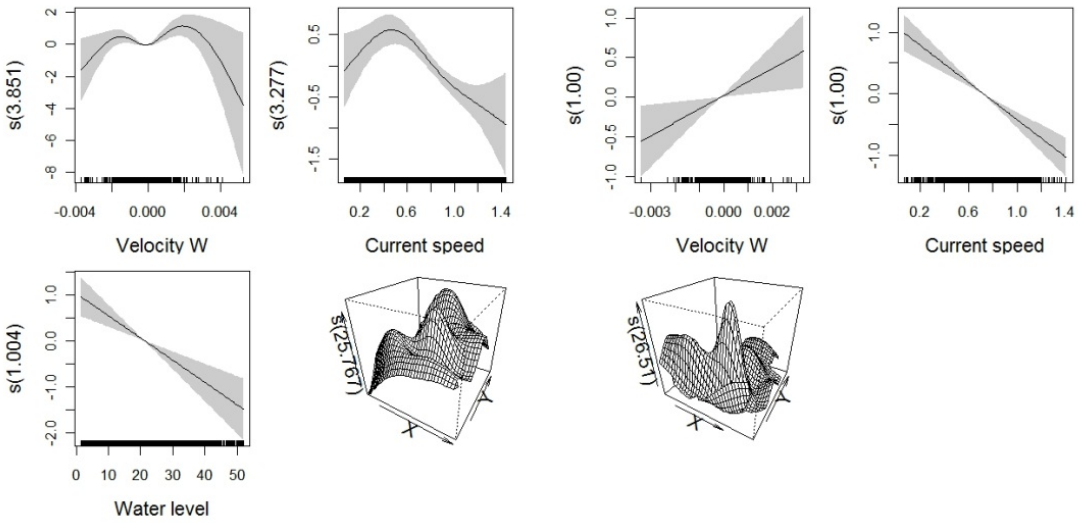


Fig. S7. Partial GAM plots for presence/absence (upper) and positive (lower) parts for model 3. The values of the environmental variables are shown on the X-axis and the probability on the Y-axis in logit scale. The degree of smoothing is indicated in the legend of the Y-axis. The dotted lines and shaded areas show ±1 standard errors. For the 2-d term (X,Y) a perspective plot is shown, with the degree of smoothing indicated as a label to the Z-axis.

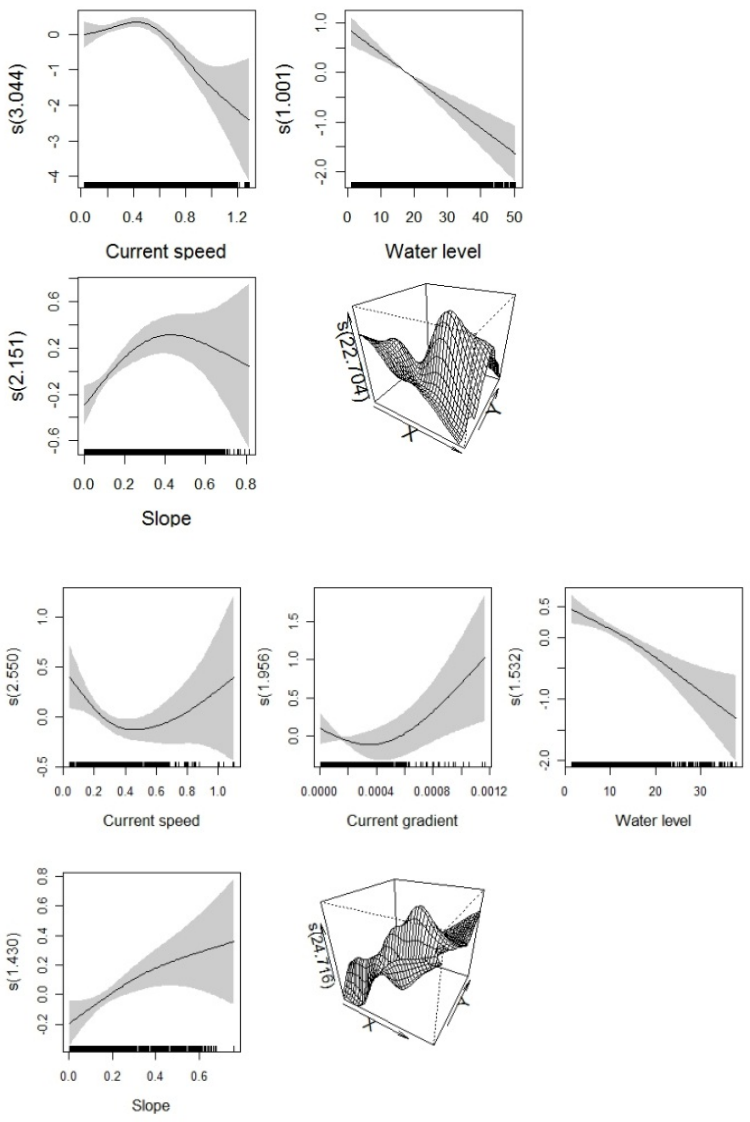


Fig. S8. Partial GAM plots for presence/absence (left) and positive (right) parts for model 2. The values of the environmental variables, depth and current speed (CS) are shown on the X-axis and the probability on the Y-axis in logit scale. The degree of smoothing is indicated in the legend of the Y-axis. The dotted lines and shaded areas show ±1 standard errors. For the 2-d term (X,Y) a perspective plot is shown, with the degree of smoothing indicated as a label to the Z-axis.

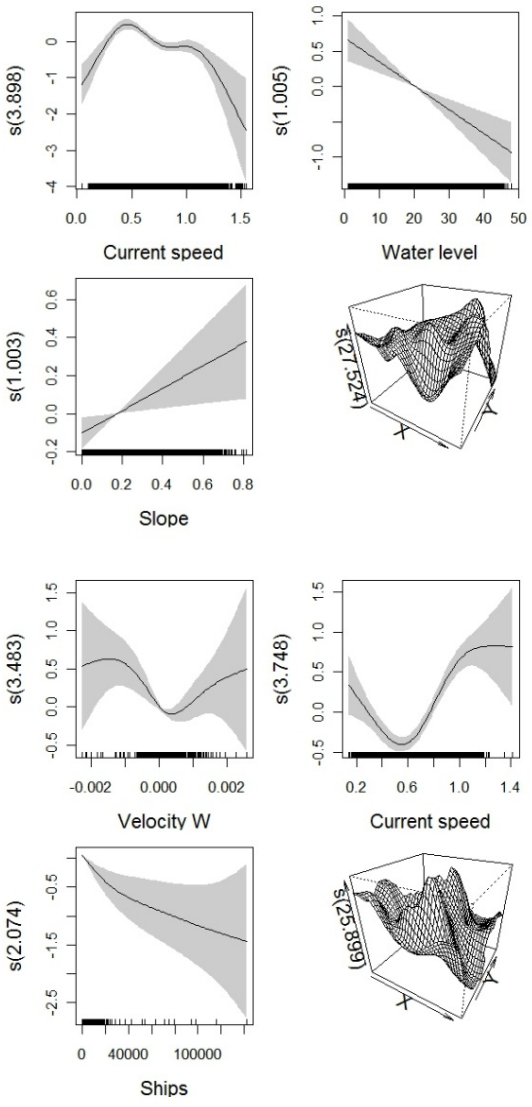


Fig S9. Partial GAM plots for presence/absence (upper) and positive (lower) parts for model 3. The values of the environmental variables are shown on the X-axis and the probability on the Y-axis in logit scale. The degree of smoothing is indicated in the legend of the Y-axis. The dotted lines and shaded areas show ±1 standard errors. For the 2-d term (X,Y) a perspective plot is shown, with the degree of smoothing indicated as a label to the Z-axis.