1   **Distribution and life history trait models indicate vulnerability of skates**

2

3   Supplementary information

4   Table S1: Summary table of the total number of hauls for each species per gear and

5   season. GNS = Set gillnets, GTR = Trammel nets, OTB = Otter beam trawls, OTT =

6   Otter twin trawls, SDN = Danish seine nets.

| Species	Gear	Autumn	Spring	Summer	Winter
Raja undulata	GNS	134	216	166	152
	GTR	1051	1562	1178	816
	OTB	688	512	831	329
	OTT	28	121	59	27
Raja clavata	GNS	380	221	275	316
	GTR	1272	1760	1225	921
	OTB	2293	1829	2895	1332
	OTT	260	172	215	131
	SDN	454	287	272	148
Raja montagui	GTR	708	996	776	481
	OTB	1179	888	898	722
	OTT	446	484	578	359
	SDN	113	152	217	103
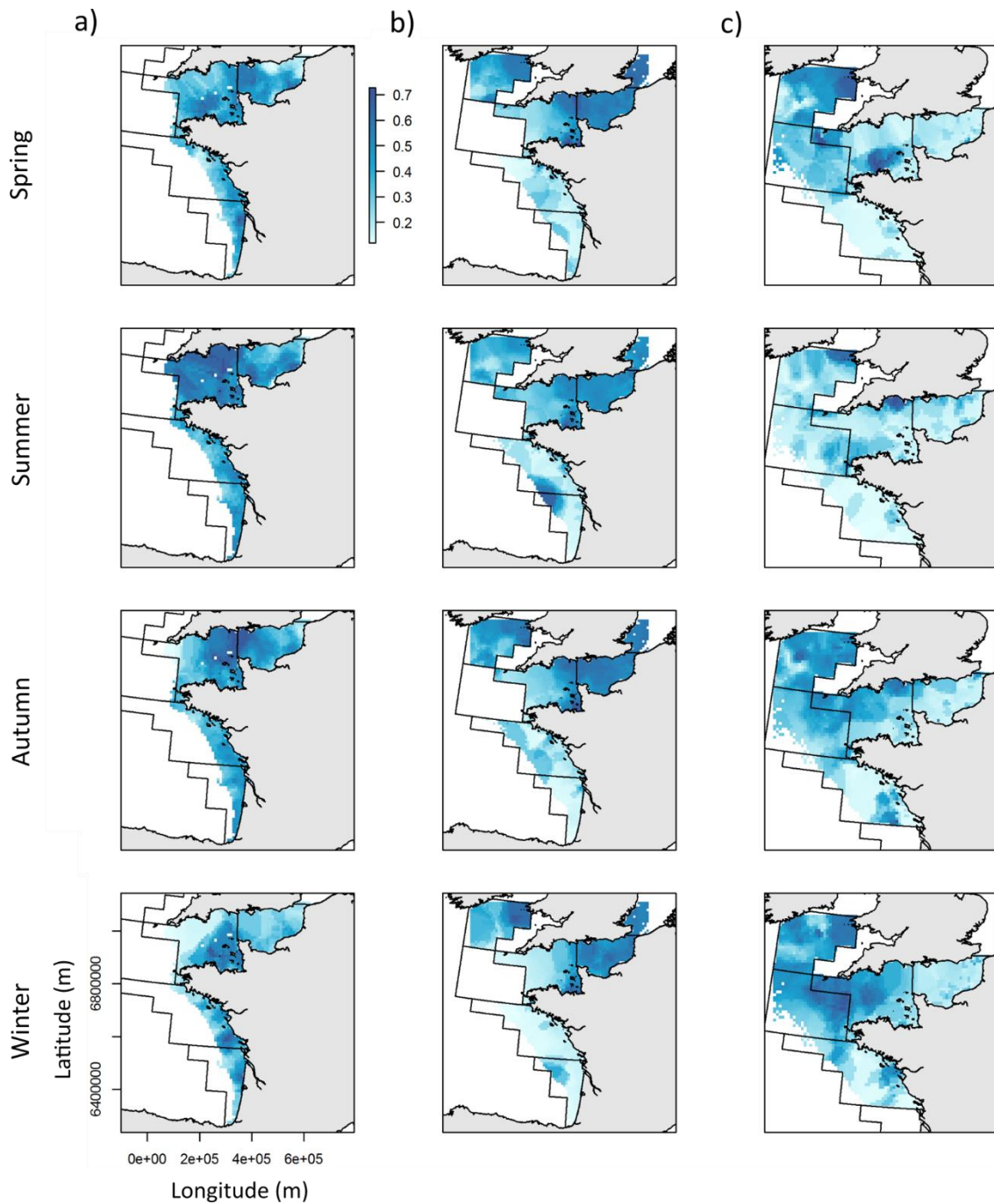
Fig. S1. Prediction error maps (10 km^2) per season (three-month period) for a) *Raja undulata* b) *Raja clavata* and c) *Raja montagui* Lighter shades of blue indicate lower prediction error, darker blue shades represent higher modelled prediction error. Black solid lines delineate ICES statistical divisions.

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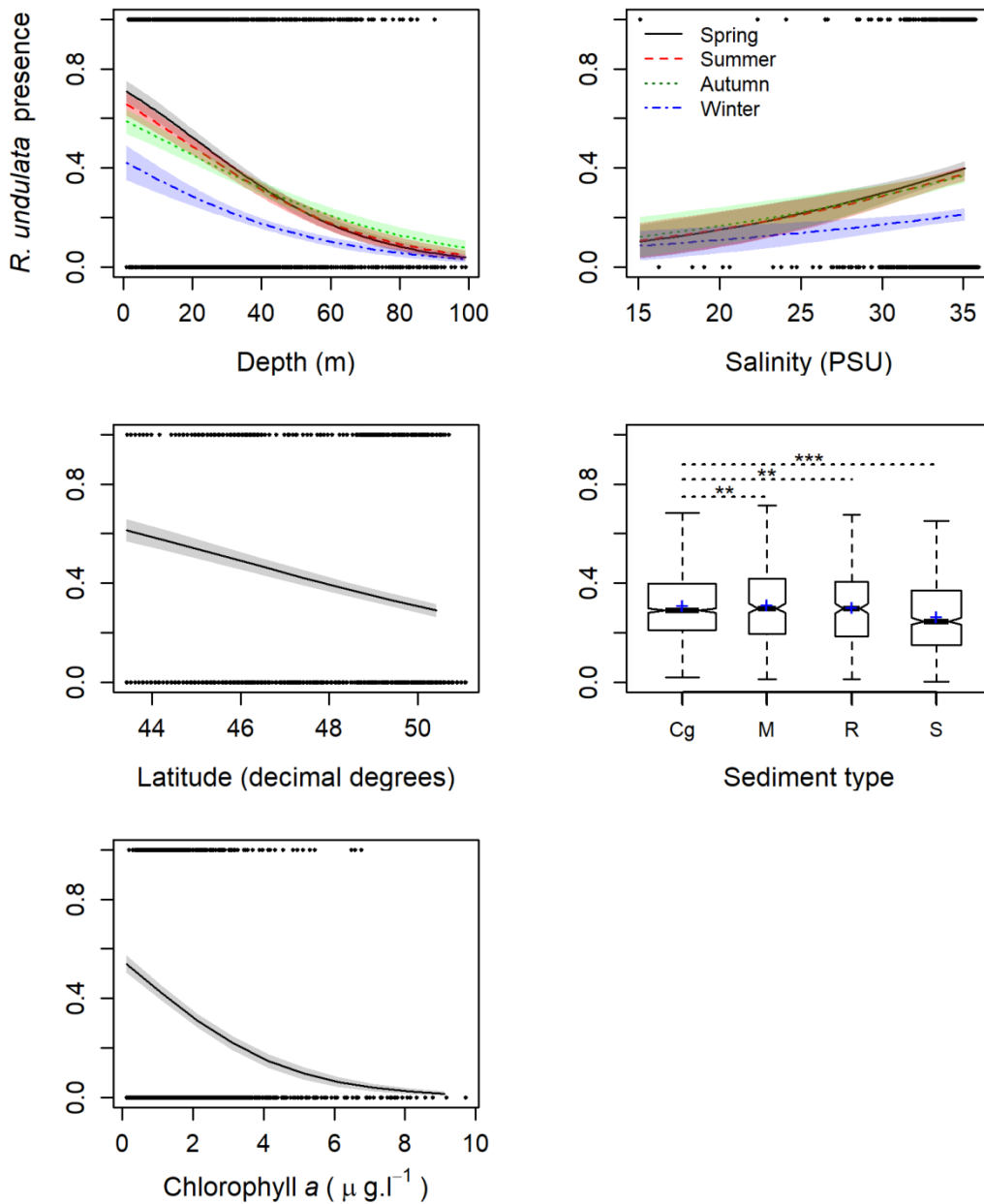
Fig. S2. The effects of the model of best fits behaviour on *Raja undulata*

occurrence with the model fitted lines and the shaded area indicating ±95%
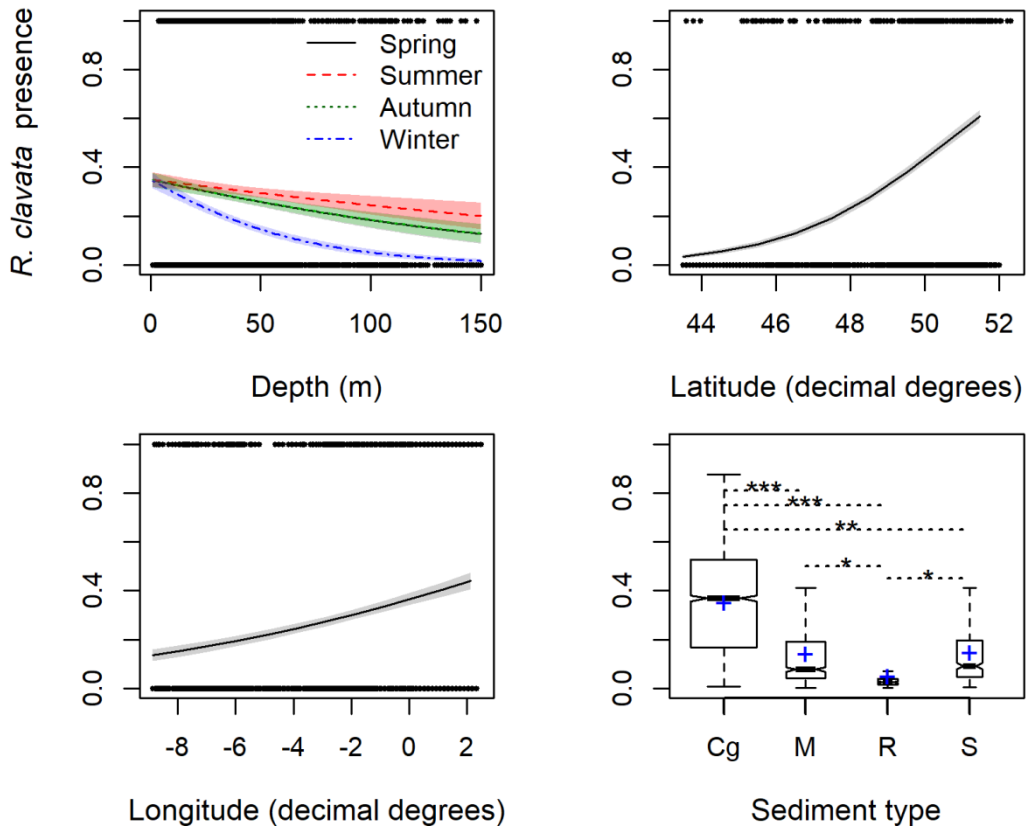
confidence intervals. Boxplots notch displays the confidence interval around the

median, blue crosses represent the mean for each sediment type. Dotted

horizontal lines with * refer to Tukey test P-value significance between sediment

types. Cg = coarse grain; M = mud; R = rock; S = sand.

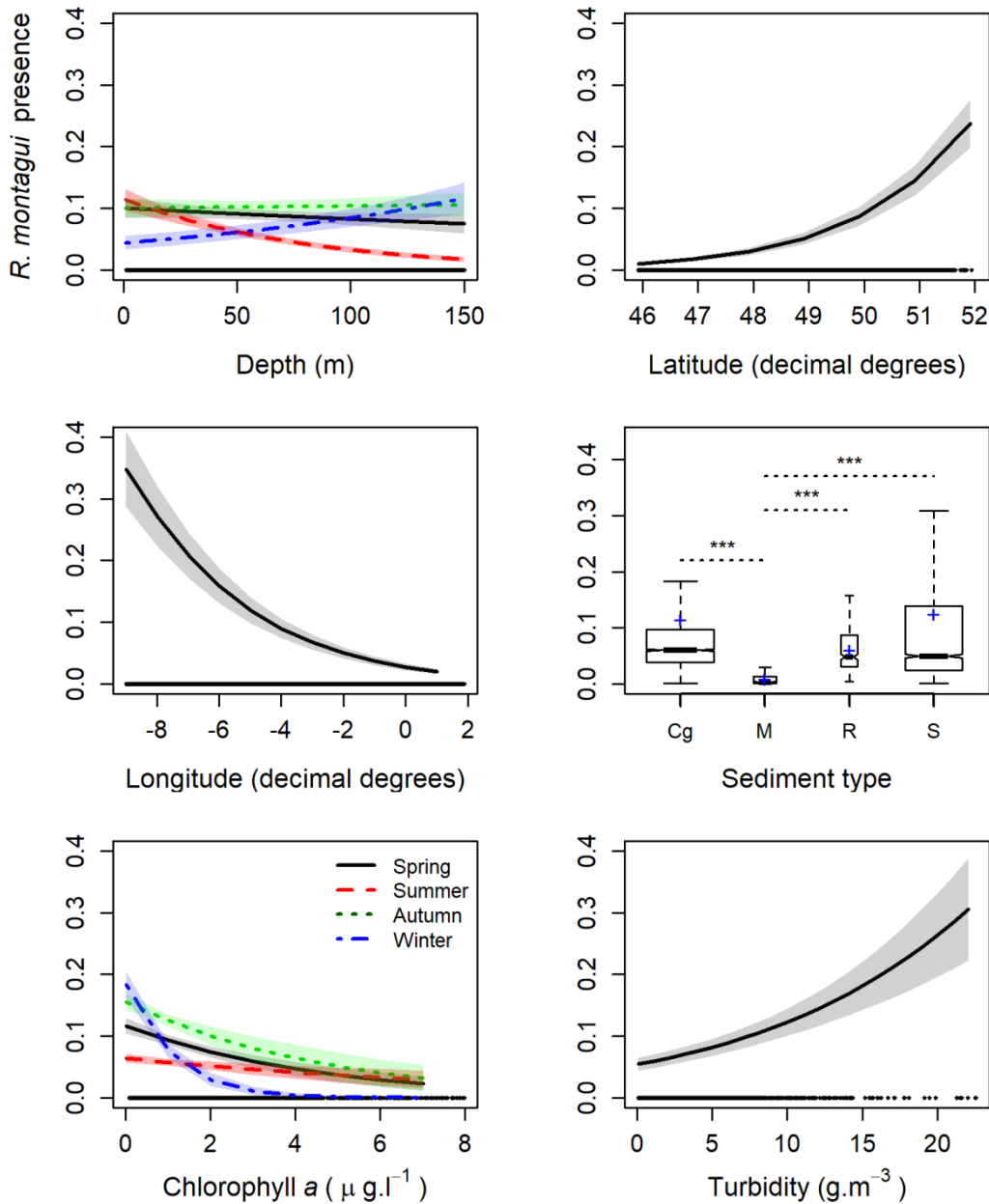Fig. S3. The effects of the model of best fits behaviour on *Raja clavata* occurrence, with the model fitted lines and the shaded area indicating ±95% confidence intervals. Boxplots notch displays the confidence interval around the median, blue crosses represent the mean for each sediment type. Dotted horizontal lines with * refer to Tukey test P-value significance between sediment types.
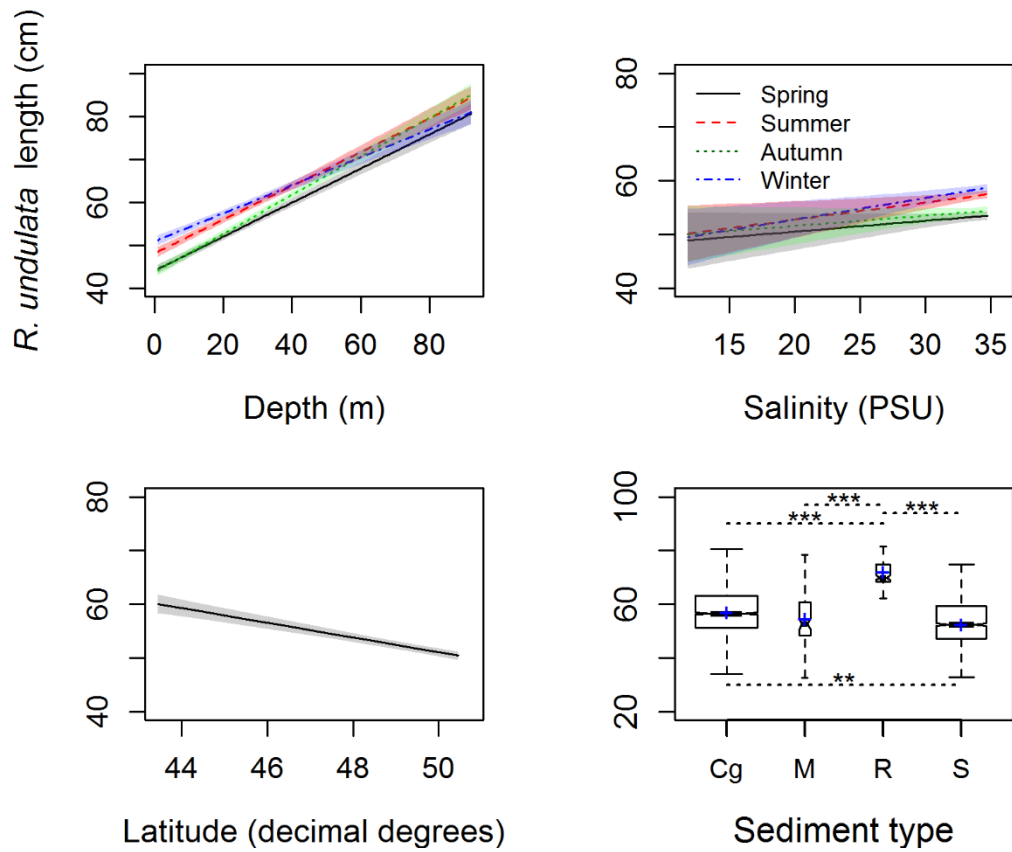
Fig. S4. The effects of the model of best fit behaviour for *Raja montagui*, with the model fitted lines and the shaded area indicating ±95% confidence intervals. Boxplots notch displays the confidence interval around the median, blue crosses represent the mean for each sediment type. Dotted horizontal lines with * refer to Tukey test P-value significance between sediment types.
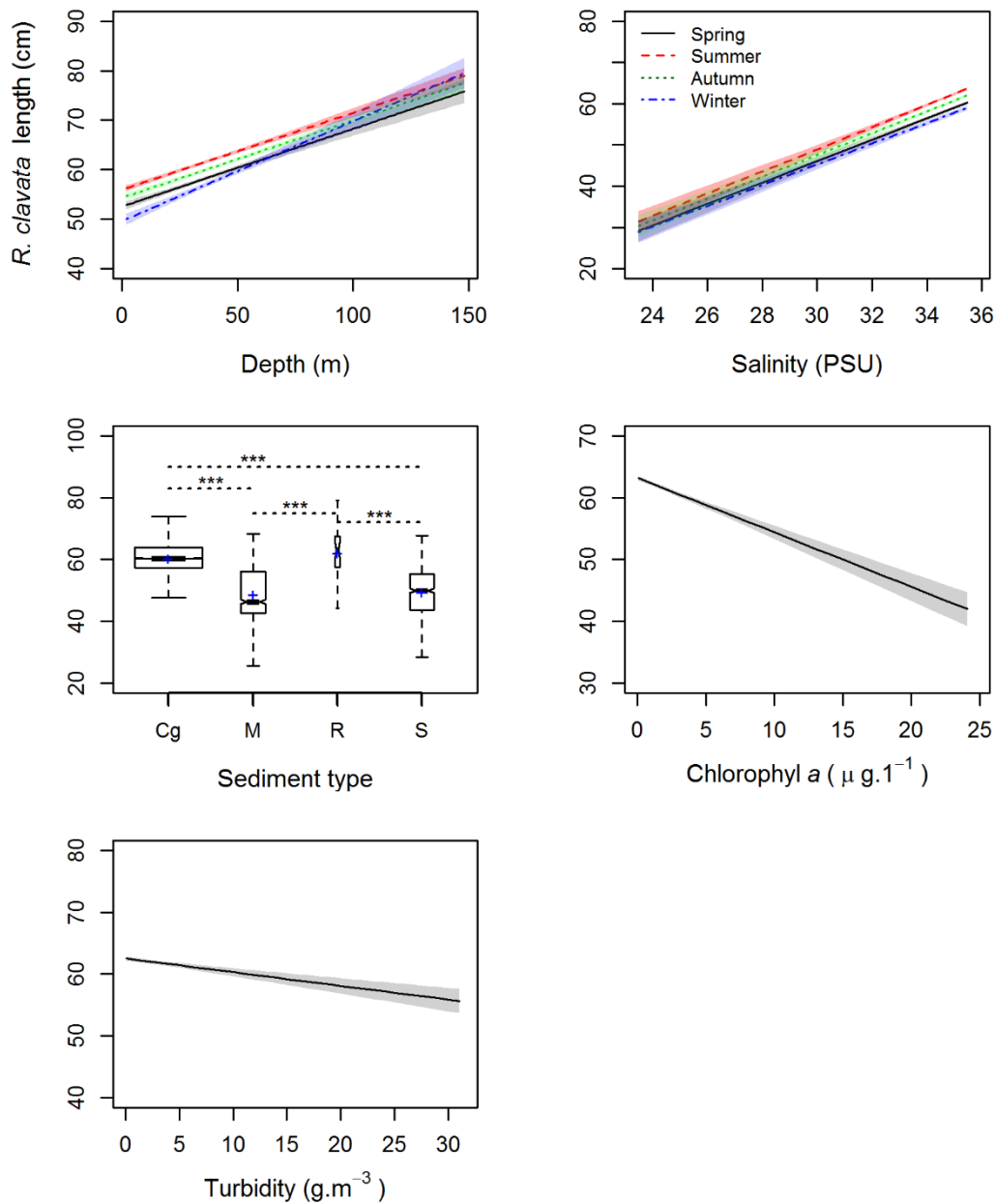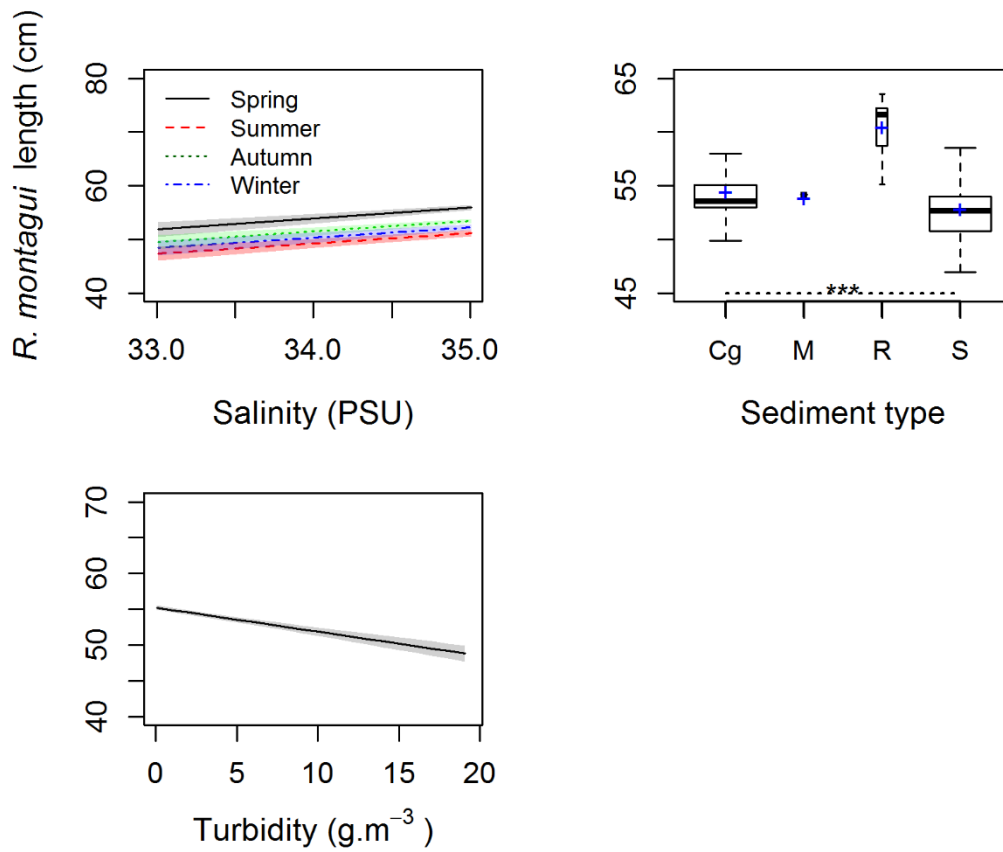
Fig. S5. The effects of the model of best fit behaviour for *Raja undulata* length, with the model fitted lines and the shaded area indicating ±95% confidence intervals. Boxplots notch displays the confidence interval around the median, blue crosses represent the mean for each sediment type. Dotted horizontal lines with * refer to Tukey test P-value significance between sediment types.

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45 Fig. S6. The effects of the model of best fit behaviour for *Raja clavata* length, with

46 the model fitted lines and the shaded area indicating ±95% confidence intervals.

47 Boxplots notch displays the confidence interval around the median, blue crosses

48 represent the mean for each sediment type. Dotted horizontal lines with * refer to

49 Tukey test P-value significance between sediment types.

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Fig. S7. The effects of the model of best fit behaviour for *Raja montagui* length, with the model fitted lines and the shaded area indicating ±95% confidence intervals. Boxplots notch displays the confidence interval around the median, blue crosses represent the mean for each sediment type. Dotted horizontal lines with * refer to Tukey test P-value significance between sediment types.
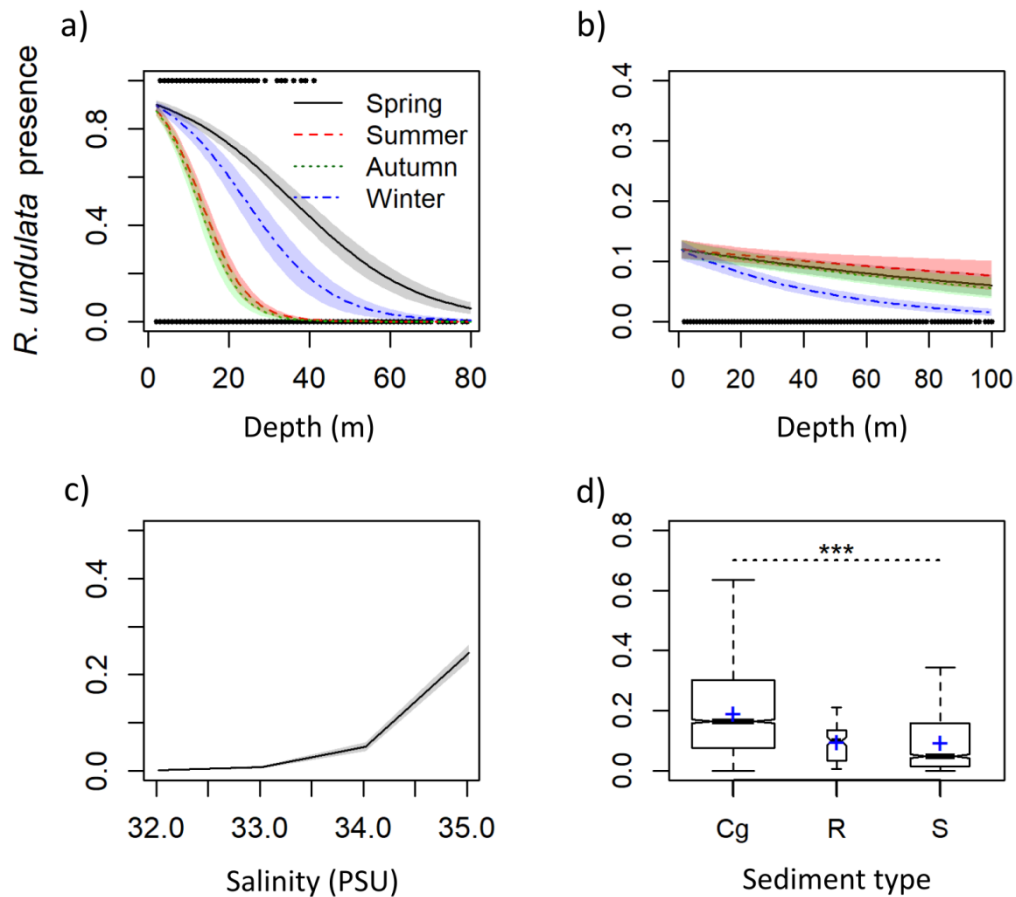
Fig. S8. a) Juvenile and b-d) mature *Raja undulata* presence absence model
behaviour with the model fitted lines and the shaded area indicating ±95%
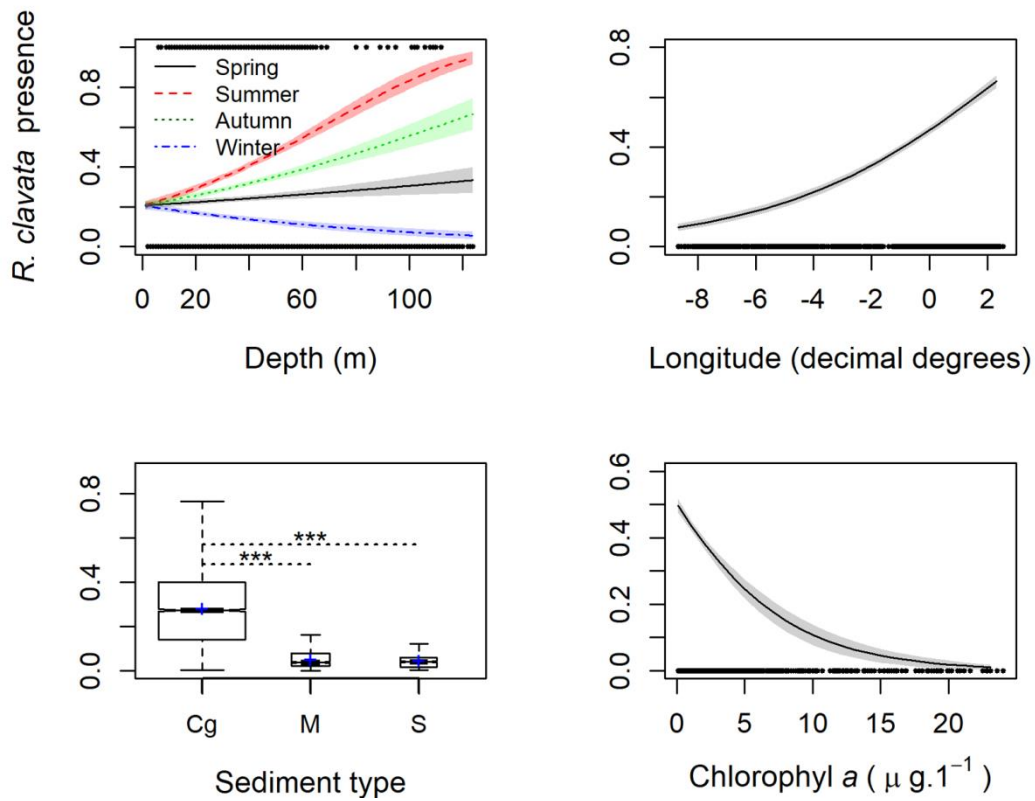confidence intervals. Boxplots notch displays the confidence interval around the
median, blue crosses represent the mean for each sediment type. Dotted
horizontal lines with * refer to Tukey test P-value significance between sediment
types. Cg = coarse grain; M = mud; R = rock; S = sand.
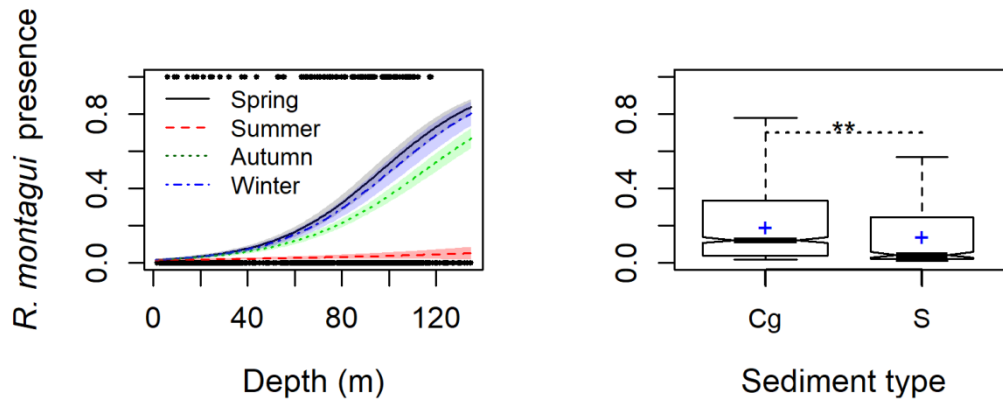
Fig. S9. Mature *Raja clavata* presence absence model behaviour with the model fitted lines and the shaded area indicating ±95% confidence intervals. Boxplots notch displays the confidence interval around the median, blue crosses represent the mean for each sediment type. Dotted horizontal lines with * refer to Tukey test P-value significance between sediment types. Cg = coarse grain; M = mud; S = sand.

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78 Fig. S10. Mature *Raja montagui* presence absence model behaviour with the model

79 fitted lines and the shaded area indicating ±95% confidence intervals. Boxplots

80 notch displays the confidence interval around the median, blue crosses represent

81 the mean for each sediment type. Dotted horizontal lines with * refer to Tukey

82 test P-value significance between sediment types. Cg = coarse grain; S = sand.

83
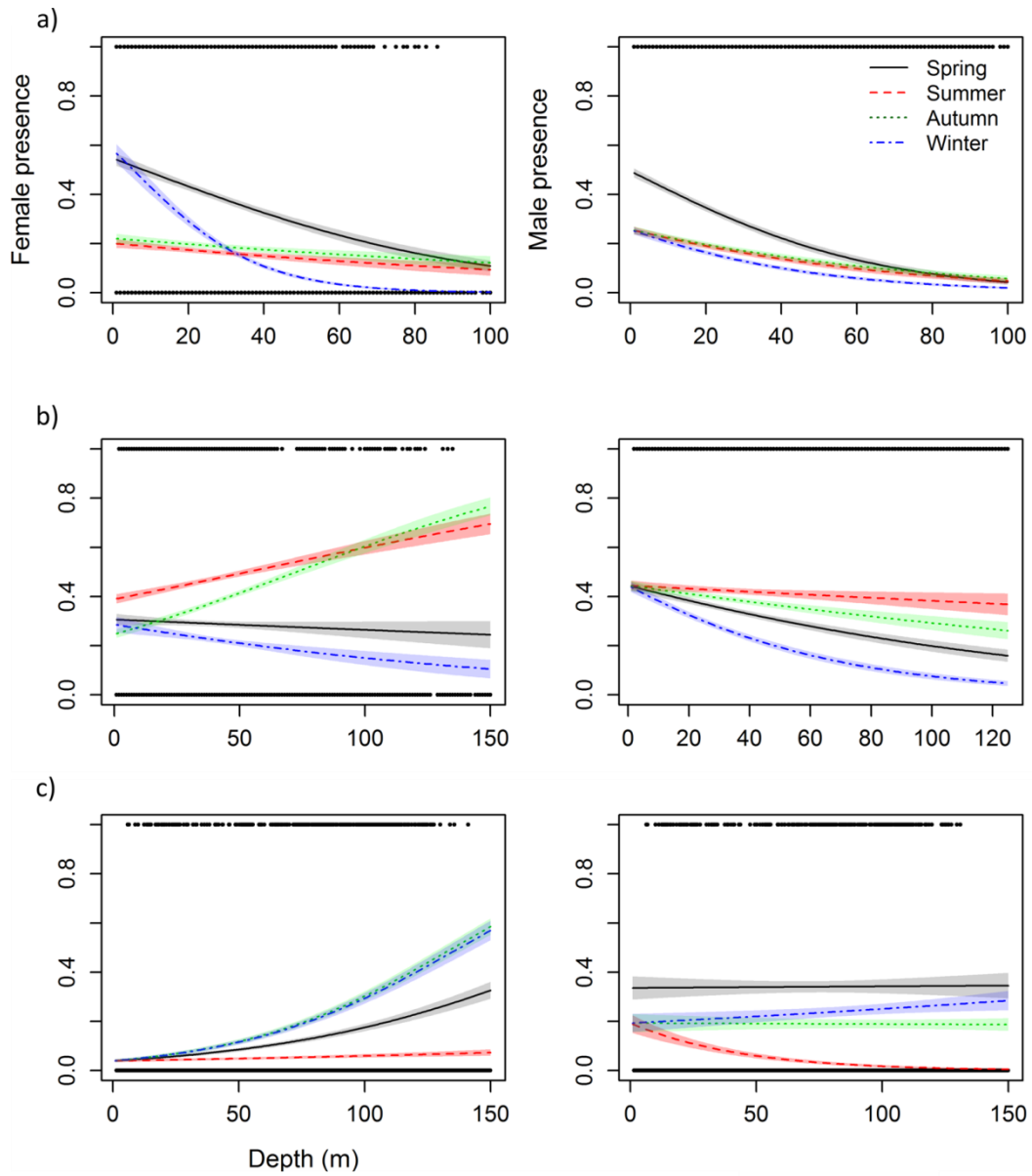
84

85 Fig. S11. Female and male a) *Raja undulata* b) *Raja clavata* c) *Raja montagui*

86 presence absence depth season interaction with the model fitted lines and the

87 shaded area indicating ±95% confidence intervals.

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