Text S1. Supplementary information

The visualisation of the data assessed only one variable at a time and was useful to select proxies of flatback, green and loggerhead turtle nesting beach selection. However, in ecological systems, multiple factors influence behavioural processes such as nest site selection. We therefore proceeded with multivariate analyses using GLMs to allow the simultaneous inclusion of multiple variables (see main text).

Beach type (shoreline characteristics) strongly correlated with site type (Cramer's V = 0.68, Figure S4), and we excluded this variable from further analysis. Site type was kept over beach type because it contained fewer variables, which were clearer to distinguish from each other. Additionally, during data visualisation, site type indicated a stronger importance over beach type (Figure S2). The Mantel test confirmed no spatial autocorrelation between nesting beaches (Table S3).

Table S1. Mantel Test results assessing spatial autocorrelation across nesting sites along the east coast of Queensland, Australia, for all variables.

Variable	P-value	Correlation
Site type	0.03	0.06576663
Elevation	0.46	0.001041518
Exposure	0.01	0.3365081

Table S2. AICc results for the 17 models built for flatback turtles across the east coast of Queensland, Australia, with binomial distribution using all possible combinations of the chosen 4 variables characteristic of flatback nesting beach selection, including interactions for the top model.

Model	AICc	Variable Combination
1.1	169.879614	Site_type*Latitude
1	177.937186	Site_type + Latitude
2	180.034695	Site_type + Elevation + Latitude
3	180.486903	Site_type + Exposure + Latitude
4	182.628379	Site_type + Exposure + Elevation + Latitude
5	206.414746	Exposure + Latitude
6	207.340249	Exposure + Elevation + Latitude
7	210.642774	Site_type + Exposure
8	211.921556	Site_type + Exposure + Elevation
9	215.681567	Elevation + Latitude
10	216.938813	Latitude
11	221.333526	Exposure + Elevation
12	221.783266	Exposure
13	230.482293	Site_type + Elevation
14	231.575466	Site_type
15	257.40009	Elevation
16	268.941106	1

Table S3. AICc results for the 16 models built for green turtles across the east coast of Queensland, Australia, with binomial distribution using all possible combinations of the chosen 4 variables characteristic of green nesting beach selection, including interactions for the top model.

Model	AICc	Variable Combination
1	180.985285	Site_type
2	181.197333	Site_type + Latitude
3	182.586019	Site_type + Elevation
4	183.158997	Site_type + Elevation + Latitude
5	184.473422	Site_type + Exposure + Latitude
6	184.970124	Site_type + Exposure
7	186.46936	Site_type + Exposure + Elevation + Latitude
8	186.658725	Site_type + Exposure + Elevation
9	205.68667	Exposure + Latitude
10	207.475387	Exposure + Elevation + Latitude
11	223.541874	Exposure
12	223.618949	Elevation + Latitude
13	223.721555	Latitude
14	225.612959	Exposure + Elevation
15	226.815911	Elevation
16	268.941106	1

Table S4. AICc results for the 19 models built for loggerhead turtles across the east coast of Queensland, Australia, with binomial distribution using all possible combinations of the chosen 4 variables characteristic of loggerhead nesting beach selection, including interactions for the top model.

| Model	AICc	Variable Combination
1.1	117.86338	Site_type + Exposure*Latitude
1.3	120.898704	Site_type*Latitude + Exposure
1	126.258949	Site_type + Exposure + Latitude
1.2	128.368736	Site_type*Exposure + Latitude
2	128.411859	Site_type + Exposure + Elevation + Latitude
3	130.627441	Site_type + Latitude
4	132.734772	Site_type + Elevation + Latitude
5	141.089889	Exposure + Elevation + Latitude
6	141.467665	Exposure + Latitude
7	160.961063	Elevation + Latitude
8	164.303953	Latitude
9	166.148778	Site_type + Exposure
10	166.8401	Site_type + Exposure + Elevation
11	176.016682	Exposure + Elevation
12	178.413143	Exposure
13	209.95139	Site_type + Elevation
14	213.455658	Site_type
15	239.063394	Elevation
16	268.941106	1
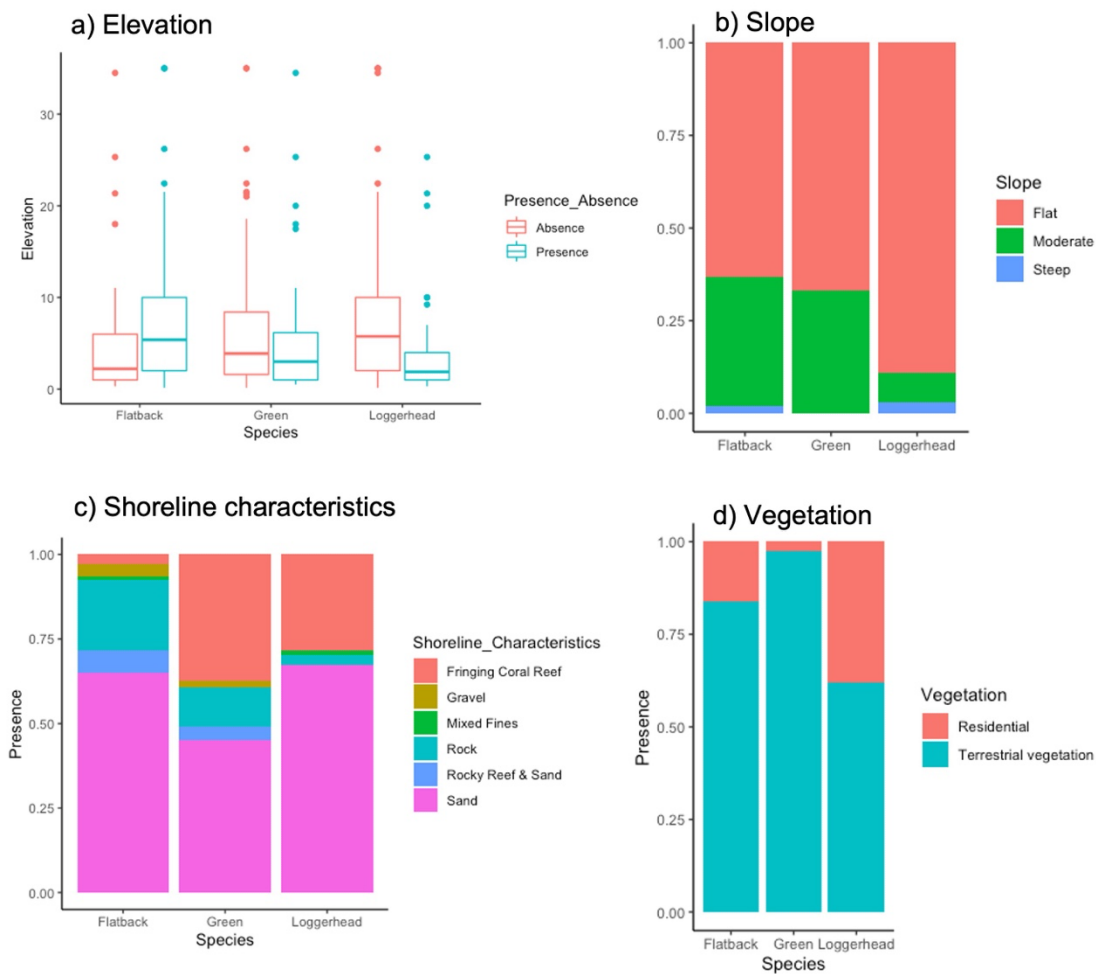
Figure S1. Boxplot for elevation (a) that were investigated as variables characteristic of flatback (F), green (G) and loggerhead (L) nesting beach selection across the east coast of Queensland, Australia. Histogram plots for each environmental and topographic variable characteristic of F, G and L nesting beach selection that were investigated include slope (b), shoreline characteristics (c) and vegetation (d) with the presence of F, G and L turtles (x-axis) for each nesting beach across the study area. The y-axis shows the proportion of sites with F, G and L turtles present/absent. N = number of nesting sites. These plots represent the data for the importance of each variable by comparing the presence of F turtles with the presence of G and L turtles (x-axis). The closer in similarity each variable was between each species the less important the variable was considered.
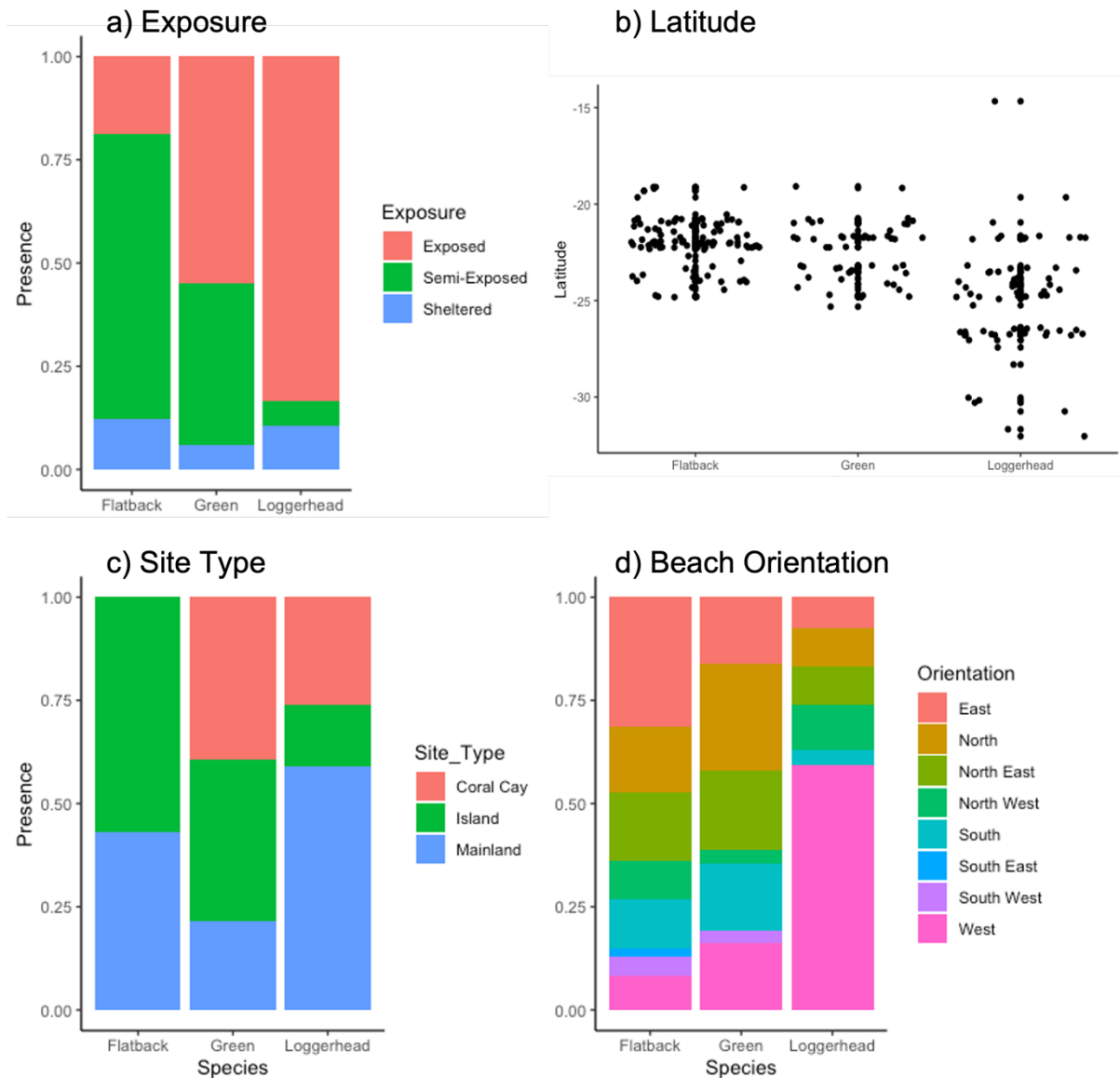
Figure S2. Histogram plots for each environmental and topographic variable characteristic of flatback, green and loggerhead nesting beach selection that was investigated across the east coast of Queensland, Australia. These variables include exposure (a), site type (c) and beach orientation (d) with the presence of flatback, green and loggerhead turtles (x-axis) for each nesting beach across the study area. The y-axis shows the proportion of sites with flatback, green and loggerhead turtles present. Latitude (b) includes the presence of flatback, green and loggerhead turtles (x-axis) with latitude (y-axis).
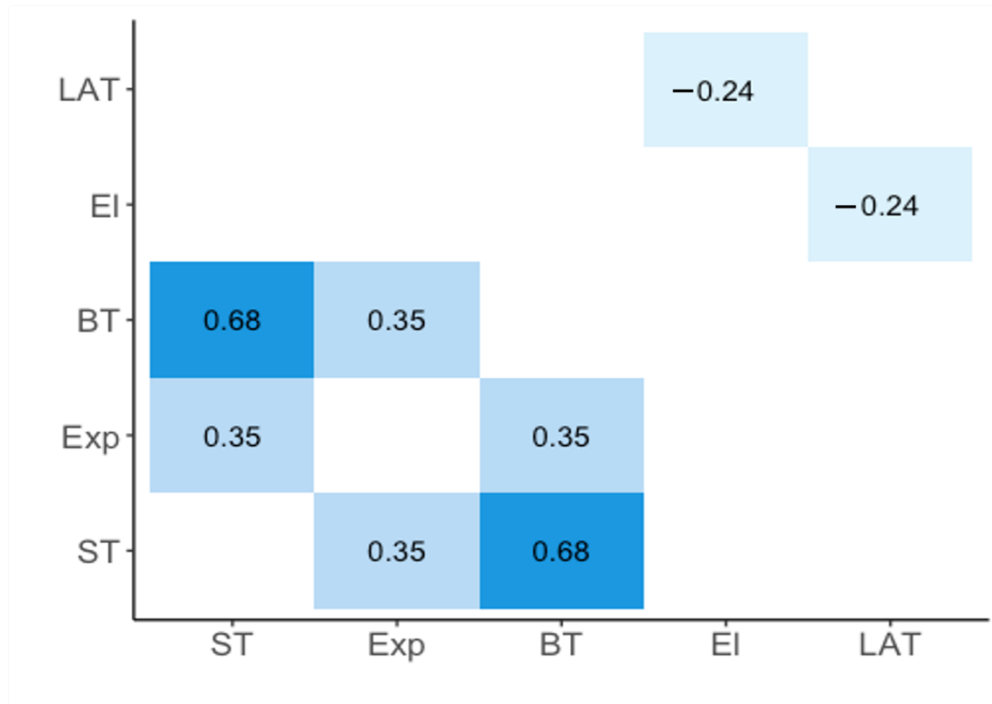
Figure S3. Correlation test results between all categorical and numerical variables considered for generalised linear models (GLMs) of presence/absence of nesting female flatback, green and loggerhead turtles across the east coast of Queensland, Australia. Colour indicates correlation strength, from light (weak) to dark (strong). Beach type (shoreline characteristics) had a strong correlation with site type and was therefore excluded from further analysis. Axis label abbreviations: ST = site type, Exp = exposure, BT = beach type (shoreline characteristics), El = elevation, LAT = latitude.
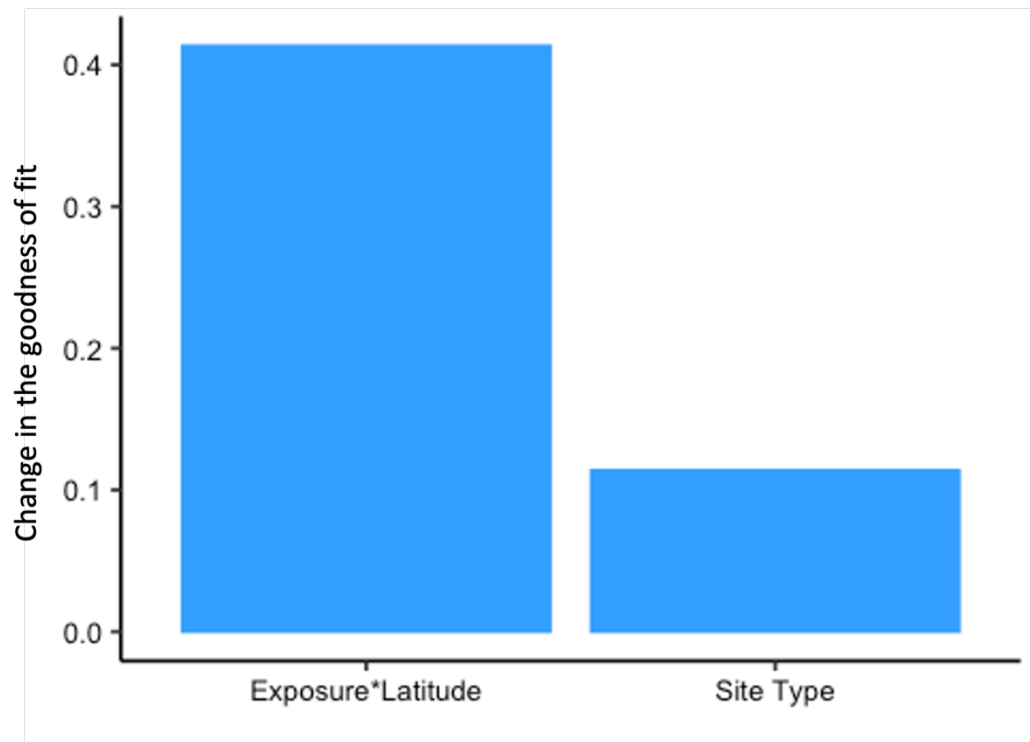
Figure S4. Variable importance for model fit for loggerhead turtles shown as absolute change in goodness of fit for the top-ranked generalised linear model. Exposure interacting with latitude is most important for model fit, followed by site type.