**Figure S1 Relative contribution of each life stage to the annual number of strandings recorded in Cornwall and the Isles of Scilly from 2000 to 2020.** Adults are shown in blue, juveniles in green, pups in purple, and whitecoats in red. The mean and standard error are shown as predicted by the top ranked model 1b shown in Table 1.

**Figure S2 Temporal trend of grey seal strandings recorded in Cornwall and the Isles of Scilly from 2000 to 2020**. Adults are shown in blue in panel a), juveniles in green in panel b), pups in purple in panel c), and whitecoats in red in panel d). Males are shown as triangles and dotted lines, while females are shown as circles and solid lines. Each line denotes predictions from the top ranked model 3 presented in Table 1. Standard errors are shown by the grey shaded area in each panel for each line.

**Figure S3** **Relative contribution of males to each life stage to the annual number of strandings recorded in Cornwall and the Isles of Scilly from 2000 to 2020.** Adults are shown in blue, juveniles in green, pups in purple, and whitecoats in red. The mean and standard error are shown as predicted by the top ranked model 2b shown in Table 1.

**Figure S4 Average daily wave height (m) in Cornwall from 2000 to 2020.** Vertical white dashed lines are monthly means aggregated for all years. Hourly weather data were obtained from the European Centre for Medium-Range Weather Forecasts (ECMWF) ERA5 global reanalysis dataset (Berrisford et al., 2011). Wave height data were downloaded for a location north of Cornwall (50.5°N, -5.5°W), from which mean daily wave height and daily mean wave direction were calculated. This location was selected as it was near to the Wave Hub testing facility for wave energy devices and located close to known haul out and pupping sites for grey seals in Cornwall. It should be noted, however, that the ERA5 model is an ocean scale model and therefore does not account particularly well for the fine scale resolution of the coast.

**Figure S5 Average daily wave direction in Cornwall from 2000 to 2020.**  Hourly weather data were obtained from the European Centre for Medium-Range Weather Forecasts (ECMWF) ERA5 global reanalysis dataset (Berrisford et al., 2011). Wave direction data were downloaded for a location north of Cornwall (50.5°N, -5.5°W), from which mean daily wave height and daily mean wave direction were calculated. This location was selected as it was near to the Wave Hub testing facility for wave energy devices and located close to known haul out and pupping sites for grey seals in Cornwall. It should be noted, however, that the ERA5 model is an ocean scale model and therefore does not account for the fine scale resolution of the coast particularly well. Wave bearings were classified into eight categories for visualisation: North-East (22.5–67.5°), East (67.5–112.5°), South-East (112.5–157.5°), South (157.5–202.5°), South-West (202.5–247.5°), West (247.5–292.5°), North-West (292.5–337.5°), and North (337.5–360° and 0–22.5°). Wave direction was found to predominantly come from the west every month (n=4542 days, 59%)

**Figure S6 Average daily wind direction in Cornwall from 2000 to 2020.** Wind data were obtained from the Met Office Integrated Data Archive System (MIDAS) (Met Office, 2012) and included hourly observations of wind speed and wind direction recorded at RNAS Culdrose in Helston, Cornwall (50.0° N, 5.2° W). These sites were chosen as they held the most up to date and longest-spanning data sets for weather in Cornwall. Wind bearings were classified into eight categories for visualisation: North-East (22.5–67.5°), East (67.5–112.5°), South-East (112.5–157.5°), South (157.5–202.5°), South-West (202.5–247.5°), West (247.5–292.5°), North-West (292.5–337.5°), and North (337.5–360° and 0–22.5°). Wind direction was found to come predominantly from the south-west in all months (n=1944 days, 25%), but also coming from the west (n=1615, 21%), south-east (n=1064, 14%), and east (n=990, 13%), mostly in March, April and May.