Table 1. Details of threat categories considered in this study, pressure related to each threat and taxa affect, and details and source of spatial layers.

Threat category	Pressure spatial layers	Taxa potentially affected	Details/justification	Source
Oil spill	Offshore O&G wells Offshore O&G pipelines Offshore O&G platforms Active Petroleum Titles 2020 Petroleum Acreage Release Shipping Ports	All	*O&G wells and pipelines*: Intensity was considered the number of structures in a 10 x 10 km grid. *O&G platforms*: A multi buffer layer (2km = high exposure; 50 km = moderate to low exposure) was created around each platform to estimate the region of potential high (intensity value of 1) or medium-low (intensity value of 0.5) exposure *Petroleum Titles and Acreage*: Only active titles were included in the analysis. Title holders are allowed to explore and prospect oil and gas from an active title at any point in time and therefore the presence of a title was given the value of 1. Successful bids are given an offshore petroleum exploration permit. As this layer is a proxy for future oil and gas exploration pressures, the presence of a acreage release was given a value of 0.5. *Shipping*: Individual ship tracks summed in each n10km grid cell to create a layer of shipping intensity per grid cell. Includes all vessels of 300 and greater gross tonnage. Does not include fishing and recreational boating. *Ports*: A multi buffer layer (2km = high exposure; 30 km = moderate to low exposure) was created around each platform to estimate the region of potential high (intensity value of 1) or medium-low (intensity value of 0.5) exposure.	NOPTA[1] AMSA[2]

			All layers with an intensity value were normalising grid values (O&G wells and pipeline counts, and shipping) between 1 (highest density) and 0 (no activity present). Layers representing presence/absence (O&G platforms, Petroleum titles and acreage, ports) had a value >0 to indicate the structure was present and 0 if the activity was absent.	
Underwater nose	Offshore O&G platforms Active Petroleum Titles 2020 Petroleum Acreage Release Shipping Ports Boat ramps Boat charters Trap Fisheries Trawl fisheries	All	*O&G platforms*: as above *Petroleum* Titles and Acreage: as above *Shipping*: as above *Ports*: as above *Public boat ramps*: Location of public boat ramps was used as proxy to recreational boating. Based on Western Australia boating regulation (5 nm), a 9 km buffer was created around each boat ramp. The density of closest population centres (values between 1-0) was assigned to each boat ram buffer as a proxy to intensity of recreational boating based on population density. *Boat charters (WA only)*: Western Australia: Fishing effort as number of licences that fished in 10 x 10 NM grids. The grid cell values were normalised between 0 (no boats in a grid cell) and 1 (highest number of boats in a grid cell). We did not used the most recent effort data (2020-2021) due to effect of COVID-19 on human activity (Huveneers et al. 2021) instead used the data provided for 2019.	NOPTA AMSA[2] Australian Bureau of Statistics[3] DOT[4] WA Fisheries NERP[4]

			Commercial Fisheries (Trap and Trawl): Commercial fishing effort as number of boats in 10 x 10 and 60 x 60 NM grids (WA) and number of vessels by commercial fisheries from logbook data in a 10 x 10 km grid (NT). Commercial fisheries data were used to create 2 fishing layers split by fishing gear type (Trawl or Trap) and the number of boats operating in each grid cell was summed. The number of boats for cells that contain less than 3 are not reported, therefore, the lowest number of fishing boat in a grid cell was considered to be 3. The grid cell values were normalised between 0 (no fishing boat in a grid cell) and 1 (highest number of fishing boats in a grid cell). We did not used the most recent effort data (2020-2021) due to effect of COVID-19 on human activity (Huveneers et al. 2021), instead used the data provided for 2019. All layers with an intensity value were normalising grid values (shipping, public boat ramps, boat charters and commercial fisheries) between 1 (highest density) and 0 (no activity present). Layers representing presence/absence (O&G platforms, Petroleum titles and acreage, ports) had a value >0 to indicate the structure was present and 0 if the activity was absent.	
Strike	Ports Public boat ramps Shipping Boat charters	All	*Ports*: as above *Public boat ramps*: as above *Shipping*: as above *Boat charters*: as above	AMSA[2] Australian Bureau of Statistics[3]

	Commercial Fisheries		*Commercial Fisheries*: as above	DOT[4] WA Fisheries NERP[4]
Bycatch	Commercial Fisheries	Marine turtles	*Commercial Fisheries*: as above	WA Fisheries NERP[4]
Entanglement	Public boat ramps Boat charters Commercial Fisheries Aquaculture	All	*Public boat ramps*: as above. Proxy to recreation fishing *Boat charters*: as above. Proxy to recreational fishing *Commercial Fisheries*: as above *Aquaculture*: as The spatial area of aquaculture titles polygons was obtained as polygons from the WA Fisheries; the presence of a aquaculture title was given the intensity value of 1.	Australian Bureau of Statistics[3] DOT[4] WA Fisheries NERP[4]
Artificial light	Artificial night sky radiance	All	The atlas of artificial night sky brightness reports zenith radiance data in (mcd/m^2) based on the VIIRS Day Night Band in a 30 arcsecond grid. Artificial light cumulative threat was calculated using the artificial sky radiance map only as the data represents radiance from all sources of artificial light (ships, ports, population density, platforms). Intensity values were normalised between 0 (no artificial light) and 1(highest intensity of artificial light in the study region).	Falchi et al. 2016a, b

			We used the available map of the artificial night sky brightness in our analysis instead of combining all the activity layers (offshore O&G platforms, active Petroleum Titles, 2020 Petroleum Acreage Release, shipping, ports, public boat ramps,and population density) related to the threat as we did for others because this spatial layer represents a direct measure of the intensity for this pressure.	
Coastal habitat degradation	Ports Public boat ramps Commercial Fisheries Population density Aquaculture Acute nutrient risk Sediment resuspension risk	Coastal species (marine turtles and humpback whales) or coastal movements of migratory species (whale sharks and blue whales)	*Ports*: as above *Public boat ramps*: as above *Commercial Fisheries (Trawling)*: as above *Population density*: Usual Resident Population (URP) count in 1 km² grid cells across Australia were calculated form the 2008 census. A 30 km buffer was created around population centres with >100 people and population numbers summed in each buffer. *Aquaculture*: as above *Acute nutrient risk*: Gridded acute nutrient risk at 10 x 10 km grid. Risk value was reclassified as high=1, medium =0.75, low=0.5. Details of how the layer was constructed are described by Canto et al. (2016) *Sediment resuspension risk*: Gridded Sediment resuspension risk at 10 x 10 km. Risk value was reclassified as high = 1, medium = 0.75, low = 0.5. Details of how the layer was constructed are described by Canto et al. (2016)	Australian Bureau of Statistics[3] DOT[4] WA Fisheries NERP[4] Canto et al. 2016

			All layers with an intensity value were normalising grid values (public boat ramps, commercial fisheries., population density) between 1 (highest density) and 0 (no activity present). Layers representing presence/absence (ports, aquaculture, presence of nutrient and resuspension risk categories) had a value >0 to indicate the structure was present and 0 if the activity was absent.	

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