

Appendix G.1

Species richness in intertidal areas

I compared the species richness for both shorebirds and elasmobranchs (i.e., sharks and rays) for the largest 100 intertidal areas in the world. I determined the largest intertidal areas based on the data from Murray *et al.* 2019. I then overlapped each area with the distribution maps (based on IUCN and BirdLife maps) of all shorebird, shark and ray species to create a species list for each area. I manually excluded species for which intertidal habitat use was impossible and unlikely (e.g., shorebirds associated with deserts or pelagic and deep-water shark and ray species). I determined the proportion of species in each IUCN Red List category and the species richness of shorebirds and elasmobranchs for each tidal area. I then used a Poisson generalized linear model to determine if areas with high elasmobranch species richness also have a high richness in shorebirds. Lastly, I determined if the occurrence of shorebird and ray families are correlated and, thus, which families are associated with one another.

Burrowing depths

I used the Ocean Biodiversity Information System (OBIS, 2023) dataset (accessed through the R-package ‘robis’) to create a list of endobenthic families for each of the 100 largest intertidal areas in the world (based on Murray *et al.* 2019). I then matched each of these families with the burrowing depth ranges described in the trait database of Clare *et al.* (2022) with additional records from Kristensen and Kostka (2005). This resulted in 584 unique families being recorded in all of these largest intertidal areas, of which 43% (n = 250) were matched with a presence for each of the sediment layers. For the predators I performed a small literature study (i.e., combining search terms ‘burrowing depth’, ‘excavation depth’ with ‘ray’, and ‘probing depth’ with ‘shorebird’ or ‘wader’)

to describe the maximum reported probing or burrowing depth for shorebirds and rays respectively (Table 1). As this is a preliminary analysis, likely, not all reported probing and burrowing depths of shorebirds and rays in intertidal habitats around the world are included.

Table 1. Overview of studies describing the probing (shorebirds) and burrowing (rays) depths.

Group	Species	Abb.	Area	Max depth (mm)	Reference
Short-billed Shorebirds	<i>Calidris canutus</i>	<i>Cal can</i>	Wadden Sea, NLD	40	Zwarts & Blomert 1992
Short-billed Shorebirds	<i>Calidris canutus</i>	<i>Cal can</i>	Banc d'Arguin, MAU	40	van Gils et al. 2016
Short-billed Shorebirds	<i>Calidris canutus</i>	<i>Cal can</i>	Bragantian Peninsula, BRA	38	Kober et al. 2009
Long-billed Shorebirds	<i>Haematopus ostralegus</i>	<i>Hae ost</i>	Eastern Europe	91	Sarychev & Mischenko 2014
Long-billed Shorebirds	<i>Haematopus ostralegus</i>	<i>Hae ost</i>	Wadden Sea, NLD	70	Wanink & Zwarts 1985
Short-billed Shorebirds	<i>Calidris tenuirostris</i>	<i>Cal ten</i>	Roebuck Bay, AUS	45	Tulp & Goeij 1994
Long-billed Shorebirds	<i>Recurvirostra avosetta</i>	<i>Rec avo</i>	Haringvliet, NLD	58	Dirksen et al. 1992
Short-billed Shorebirds	<i>Calidris alpina</i>	<i>Cal alp</i>	Sivash, Ukraine	30	Verkuil et al. 1993
Short-billed Shorebirds	<i>Calidris alpina</i>	<i>Cal alp</i>	NLD	30	Van der Voet 1967
Long-billed Shorebirds	<i>Limosa limosa</i>	<i>Lim lim</i>	Haringvliet, NLD	97	Dirksen et al. 1992
Long-billed Shorebirds	<i>Limosa lapponica</i>	<i>Lim lap</i>	Haringvliet, NLD	85	Dirksen et al. 1992
Long-billed Shorebirds	<i>Numenius arquata</i>	<i>Num arq</i>	Wadden Sea, NLD	125	Zwarts & Esselink 1989
Short-billed Shorebirds	<i>Calidris alba</i>	<i>Cal alb</i>	Wadden Sea, NLD	27	Gerritsen & Meiboom 1986
Short-billed Shorebirds	<i>Calidris alba</i>	<i>Cal alb</i>	Bragantian Peninsula, BRA	25	Kober et al. 2009
Short-billed Shorebirds	<i>Calidris alba</i>	<i>Cal alb</i>	Bodega Bay, USA	25	Myers et al. 1980
Short-billed Shorebirds	<i>Pluvialis squatarola</i>	<i>Plu squ</i>	Bay of Heist, BE	30	Tassie et al. 2011
Short-billed Shorebirds	<i>Pluvialis squatarola</i>	<i>Plu squ</i>	Bragantian Peninsula, BRA	35	Kober et al. 2009
Short-billed Shorebirds	<i>Calidris ferruginea</i>	<i>Cal fer</i>	Sivash, Ukraine	38	Verkuil et al. 1993
Short-billed Shorebirds	<i>Calidris falcinellus</i>	<i>Cal fal</i>	Sivash, Ukraine	30	Verkuil et al. 1993
Short-billed Shorebirds	<i>Tringa totanus</i>	<i>Tri tot</i>	Ythan Estuary, UK	41	Goss-Custard 1969
Short-billed Shorebirds	<i>Charadrius semipalmatus</i>	<i>Cha sem</i>	Bragantian Peninsula, BRA	11	Kober et al. 2009
Short-billed Shorebirds	<i>Arenaria interpres</i>	<i>Are int</i>	Bragantian Peninsula, BRA	27	Kober et al. 2009
Short-billed Shorebirds	<i>Calidris pusilla</i>	<i>Cal pus</i>	Bragantian Peninsula, BRA	18	Kober et al. 2009

Long-billed Shorebirds	<i>Limnodromus griseus</i>	<i>Lim gri</i>	Bragantian Peninsula, BRA	62	Kober et al. 2009
Long-billed Shorebirds	<i>Tringa semipalmata</i>	<i>Tri sem</i>	Bragantian Peninsula, BRA	59	Kober et al. 2009
Long-billed Shorebirds	<i>Limosa fedoa</i>	<i>Lim fed</i>	Bragantian Peninsula, BRA	126	Kober et al. 2009
Long-billed Shorebirds	<i>Numenius phaeopus</i>	<i>Num pha</i>	Bragantian Peninsula, BRA	104	Kober et al. 2009
Eagle and Cownose Rays	<i>Myliobatis tenuicaudatus</i>	<i>Myl ten</i>	Manukau Harbour, NWZ	150	Thrush et al. 1991
Eagle and Cownose Rays	<i>Myliobatis tenuicaudatus</i>	<i>Myl ten</i>	Manukau Harbour, NWZ	200	Hines et al. 1997
Stingrays	<i>Pastinachus ater</i>	<i>Pas ate</i>	Ningaloo Reef, AUS	56	O'Shea et al. 2012
Stingrays	<i>Himantura spp.</i>	<i>Him spp</i>	Ningaloo Reef, AUS	56	O'Shea et al. 2012
Stingrays	<i>Taeniura lymma</i>	<i>Tae lym</i>	Ningaloo Reef, AUS	56	O'Shea et al. 2012
Stingrays	<i>Urogymnus asperrimus</i>	<i>Uro asp</i>	Ningaloo Reef, AUS	56	O'Shea et al. 2012
Stingrays	<i>Himantura australis</i>	<i>Him aus</i>	Lucinda, AUS	41	Crook et al. 2021
Stingrays	<i>Pastinachus ater</i>	<i>Pas ate</i>	Lucinda, AUS	41	Crook et al. 2021
Stingrays	<i>Hemitrygon akajei</i>	<i>Hem aka</i>	Ariake Sound, JAP	204	Takeuchi & Tamaki 2014
Eagle and Cownose Rays	<i>Rhinoptera bonasus</i>	<i>Rhi bon</i>	Chesapeake Bay, USA	100	Glaspie & Seitz 2017
Eagle and Cownose Rays	<i>Myliobatis californica</i>	<i>Myl cal</i>	La Choya, MEX	66	Lynn-Myrick & Flessa 1996
Stingrays	<i>Urobatis halleri</i>	<i>Uro hal</i>	La Choya, MEX	66	Lynn-Myrick & Flessa 1996
Stingrays	<i>Hypanus americanus</i>	<i>Hyp ame</i>	Debidue Flat, USA	50	Grant 1983
Stingrays	<i>Hypanus sabina</i>	<i>Hyp sab</i>	Debidue Flat, USA	50	Grant 1983
Stingrays	<i>Hypanus americanus</i>	<i>Hyp ame</i>	St. Joseph Bay, USA	200	Valentine et al. 1994
Stingrays	<i>Hypanus sabina</i>	<i>Hyp sab</i>	St. George Sound, USA	150	Reidenauer & Thistle 1981
Stingrays	<i>Fontitrygon margaritella</i>	<i>Fon mar</i>	Bijagos Archipelago, GB	170	Nauta et al. 2023
Eagle and Cownose Rays	<i>Rhinoptera bonasus</i>	<i>Rhi bon</i>	Chesapeake Bay, USA	400	Smith & Merriner 1985