

## Supplementary Material

**Table S1.** Type 1, Type 2, Type 3, and Type 4 Diversity for mangroves along a ria coast in the Kimberley region, with a focus on *Avicennia marina* for Type 3 and Type 4 Diversity (information simplified from [42–44]).

Type 1 Diversity—15 species of mangroves (see Figure 4C)	1. <i>Scyphiphora hydrophylacea</i> , 2. <i>Xylocarpus granatum</i> , 3. <i>Bruguiera parviflora</i> , 4. <i>Camptostemon schultzei</i> , 5. <i>Lumnitzera racemosa</i> , 6. <i>Xylocarpus moluccensis</i> , 7. <i>Sonneratia alba</i> , 8. <i>Excoecaria agallocha</i> , 9. <i>Osbornia octodonta</i> , 10. <i>Aegiceras corniculatum</i> , 11. <i>Bruguiera exaristata</i> , 12. <i>Ceriops tagal</i> , 13. <i>Aegialitis annulata</i> , 14. <i>Rhizophora stylosa</i> , 15. <i>Avicennia marina</i>
Type 2 Diversity—mangrove floristic assemblages selected by the six macro-habitats (tidal flat, tidal creek, spit/chenier, rocky shore, hinterland margin, high-tidal alluvial fan)	<p>tidal flat: mainly 10 mangrove species in this habitat, zoned across the tidal flat—<i>Aegiceras corniculatum</i>, <i>Aegialitis annulata</i>, <i>Avicennia marina</i>, <i>Bruguiera exaristata</i>, <i>Bruguiera parviflora</i>, <i>Ceriops tagal</i>, <i>Excoecaria agallocha</i>, <i>Lumnitzera racemosa</i>, <i>Rhizophora stylosa</i>, <i>Sonneratia alba</i></p> <p>tidal creek: mainly 5 mangrove species in this habitat, zoned from the creek bank—<i>Aegiceras corniculatum</i>, <i>Aegialitis annulata</i>, <i>Avicennia marina</i>, <i>Camptostemon schultzei</i>, <i>Rhizophora stylosa</i></p> <p>spit/chenier: mainly 7 mangrove species in this habitat, zoned across the spit shore—<i>Aegialitis annulata</i>, <i>Avicennia marina</i>, <i>Bruguiera exaristata</i>, <i>Ceriops tagal</i>, <i>Excoecaria agallocha</i>, <i>Osbornia octodonta</i>, <i>Rhizophora stylosa</i></p> <p>rocky shore: mainly 5 mangrove species in this habitat, zoned across the tidal interval—<i>Aegialitis annulata</i>, <i>Avicennia marina</i>, <i>Bruguiera exaristata</i>, <i>Ceriops tagal</i>, <i>Rhizophora stylosa</i></p> <p>hinterland margin: mainly 6 mangrove species in this habitat—<i>Aegialitis annulata</i>, <i>Avicennia marina</i>, <i>Bruguiera exaristata</i>, <i>Ceriops tagal</i>, <i>Excoecaria agallocha</i>, <i>Lumnitzera racemosa</i></p> <p>high-tidal alluvial fan: mainly 7 mangrove species in this habitat, zoned across the fan—<i>Aegialitis annulata</i>, <i>Avicennia marina</i>, <i>Bruguiera exaristata</i>, <i>Ceriops tagal</i>, <i>Lumnitzera racemosa</i>, <i>Xylocarpus granatum</i>, <i>Xylocarpus moluccensis</i></p>
Type 3 Diversity (using <i>Avicennia marina</i> within tidal flat habitat and spit/chenier habitat as examples)— <i>Avicennia marina</i> physiognomy and structure variable across the habitat determined by intra-habitat features	<p>seaward mangroves on tidal flat at Mean Sea Level (MSL): closed low forest of columnar trees or recumbent gnarled trees</p> <p>middle of mangroves on tidal flat at Mean High Water Neap (MHWN): closed scrub or low forest of single-trunked to multi-stemmed plants</p> <p>landward mangroves on tidal flat at Mean High Water Spring (MWHS): closed scrub or heath of multi-stemmed plants</p> <p>seaward mangroves on spit at MSL: closed scrub or low forest of single-trunked to multi-stemmed plants</p> <p>middle of mangroves on spit at MHWN: closed scrub or low forest of single-trunked to multi-stemmed plants</p> <p>landward mangroves on spit at MWHS: closed scrub or heath of multi-stemmed plants</p>

**Table S1. Cont.**

Type 4 Diversity (using <i>Avicennia marina</i> within tidal flat habitat and spit/chenier habitat as examples)— <i>Avicennia marina</i> physiognomy, foliage, and reproductive strategy variable across the habitat determined by intra-habitat features	seaward mangroves on tidal flat at MSL: large elliptical leaves, dominantly asexual reproduction, biomass dominantly above ground landward mangroves on tidal flat at MWHS: small oval to elliptical leaves, dominantly asexual reproduction, biomass dominantly below ground seaward mangroves on spit at MSL: large elliptical leaves, asexual reproduction and sexual reproduction, biomass dominantly above ground landward mangroves on spit at MWHS: small oval to elliptical leaves, asexual reproduction and sexual reproduction, biomass dominantly above ground
--	--

**Table S2.** Type 1, Type 2, Type 3, and Type 4 Diversity for mangroves along a ria coast in the Pilbara region, with a focus on *Avicennia marina* for Type 3 and Type 4 Diversity (information simplified from [26,43,44]).

Type 1 Diversity—7 species of mangroves (see Figure 4C)	9. <i>Osbornia octodonta</i> , 10. <i>Aegiceras corniculatum</i> , 11. <i>Bruguiera exaristata</i> , 12. <i>Ceriops tagal</i> , 13. <i>Aegialitis annulata</i> , 14. <i>Rhizophora stylosa</i> , 15. <i>Avicennia marina</i>
Type 2 Diversity—mangrove floristic assemblages selected by the six macro-habitats (tidal flat, tidal creek, spit/chenier, rocky shore, hinterland margin, high-tidal alluvial fan)	tidal flat: mainly 5 mangrove species in this habitat, zoned across the tidal flat— <i>Aegialitis annulata</i> , <i>Avicennia marina</i> , <i>Bruguiera exaristata</i> , <i>Ceriops tagal</i> , <i>Rhizophora stylosa</i> tidal creek: mainly 4 mangrove species in this habitat, zoned from the creek bank— <i>Aegiceras corniculatum</i> , <i>Aegialitis annulata</i> , <i>Avicennia marina</i> , <i>Rhizophora stylosa</i> spit/chenier: mainly 6 mangrove species in this habitat, zoned across the spit shore— <i>Aegialitis annulata</i> , <i>Avicennia marina</i> , <i>Bruguiera exaristata</i> , <i>Ceriops tagal</i> , <i>Osbornia octodonta</i> , <i>Rhizophora stylosa</i> rocky shore: mainly 3 mangrove species in this habitat, zoned across the tidal interval— <i>Aegialitis annulata</i> , <i>Avicennia marina</i> , <i>Rhizophora stylosa</i> hinterland margin: mainly 2 mangrove species in this habitat— <i>Avicennia marina</i> , <i>Ceriops tagal</i> high-tidal alluvial fan: mainly 3 mangrove species in this habitat, zoned across the fan— <i>Aegialitis annulata</i> , <i>Avicennia marina</i> , <i>Ceriops tagal</i> seaward mangroves on tidal flat at MSL: closed low forest of columnar trees or recumbent gnarled trees middle of mangroves on tidal flat at MHWN: closed scrub or low forest of single-trunked to multi-stemmed plants

Table S2. Cont.

Type 3	landward mangroves on tidal flat at MWHS: closed scrub or heath of multi-stemmed plants
Diversity (using <i>Avicennia marina</i> within tidal flat habitat and spit/chenier habitat as examples)— <i>Avicennia marina</i> physiognomy and structure variable across the habitat determined by intra-habitat features	seaward mangroves on spit at MSL: closed scrub or low forest of single-trunked to multi-stemmed plants
	middle of mangroves on spit at MHWN: closed scrub or low forest of single-trunked to multi-stemmed plants
	landward mangroves on spit at MWHS: closed scrub or heath of multi-stemmed plants
Type 4	seaward mangroves on tidal flat at MSL: large elliptical leaves, dominantly asexual reproduction, biomass dominantly above ground
Diversity (using <i>Avicennia marina</i> within tidal flat habitat and spit/chenier habitat as examples)— <i>Avicennia marina</i> physiognomy, foliage, and reproductive strategy variable across the habitat determined by intra-habitat features	landward mangroves on tidal flat at MWHS: small oval to elliptical leaves, dominantly asexual reproduction, biomass dominantly below ground
	seaward mangroves on spit at MSL: large elliptical leaves, asexual reproduction and sexual reproduction, biomass dominantly above ground
	landward mangroves on spit at MWHS: small oval to elliptical leaves, asexual reproduction and sexual reproduction, biomass dominantly above ground