

Supplementary material

Geology is a significant indicator of algal cover and invertebrate species composition on intertidal reefs of Ngari Capes Marine Park, south-western Australia

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Table S1. Description of mean percentage cover and diversity of intertidal reef survey sites

Site name	Geology	Zone	Rugosity ± s.d.	Complexity ± s.d.	Diversity of invertebrates	Bare rock	Rock-turf matrix	Sand	Sand-turf matrix	Turf	Algal film	Low branching algae	High branching algae	Membranous-foliose algae	Crustose algae	Branched calcified-coraline algae	Wrack	Galeolaria	Barnacle casings
Yallingup	Limestone	Inner	2.65 ± 0.18	0.87 ± 0.17	0.78	5		40	8			26				15			
Yallingup	Limestone	Outer	2.76 ± 0.04	0.54 ± 0.29	1.28	6		9				75	10						
Cowaramup	Limestone	Inner	2.68 ± 0.07	0.84 ± 0.16	1.06			9	8	50		20	5						
Cowaramup	Limestone	Outer	2.39 ± 0.08	1.12 ± 0.25	1.23	16			5	6		20	47						
Ellenbrook	Limestone	Inner	2.84 ± 0.02	1.23 ± 0.31	1.36			5	29			18	21						27
Ellenbrook	Limestone	Outer	2.84 ± 0.01	0.89 ± 0.23	1.44			5				43	46						
Kilcarnup	Limestone	Inner	2.82 ± 0.03	1.20 ± 0.14	0.66			5	13	8			41	6					26
Kilcarnup	Limestone	Outer	2.80 ± 0.03	0.99 ± 0.16	1.33					10			63	13	9				
Gnarabup	Limestone	Inner	2.62 ± 0.05	0.38 ± 0.22	1.20			10	88										
Gnarabup	Limestone	Outer	2.45 ± 0.12	0.98 ± 0.17	0.63								38	12	45				
Foul Bay	Limestone	Inner	2.63 ± 0.11	0.91 ± 0.11	0.28			10	25			55							7
Foul Bay	Limestone	Outer	2.65 ± 0.09	0.74 ± 0.17	0.82				48			46							
Point Piquet	Granite	Boulders	2.77 ± 0.12	0.64 ± 0.18	1.18	70				20									6
Yallingup	Granite	Cobbles	2.47 ± 0.32	0.91 ± 0.16	1.36	33	48				16								
Yallingup	Granite	Boulders	2.17 ± 0.19	0.54 ± 0.37	1.60	86					5								
Canal Rocks	Granite	Boulders	2.32 ± 0.09	0.52 ± 0.24	1.05	71	15				5							6	
Cowaramup	Granite	Cobbles	2.19 ± 0.16	0.47 ± 0.33	1.05	75		7	8										
Cowaramup	Granite	Boulders	2.49 ± 0.05	0.50 ± 0.37	1.43	83						8	5						
Quarry Bay	Granite	Boulders	2.15 ± 0.30	0.84 ± 0.29	1.07	36	8		17	15	14								
Ringbolt Bay	Granite	Boulders	2.40 ± 0.13	0.64 ± 0.27	0.70	66				6	18		5						5
Flinders Bay	Granite	Cobbles	2.38 ± 0.11	0.90 ± 0.20	1.11	31		21	44										

Table S2. Species observed throughout all sites of the Ngari Capes Marine Park with quantity observed on each underlying geology

Phylum	Class	Family	Species	CAAB code	Quantity – limestone	Quantity – granite	
Annelida	Polychaeta	Polynoidae	<i>Lepidonotus</i> sp.			2	
		Serpulidae	<i>Galeolaria</i> sp.	22 085 907		7	
			<i>Serpula</i> sp.	22 085928		1	
		Terebellidae	Unknown terebellid sp			1	
			Unknown bristle worm			1	4
Arthropoda	Hexanauplia	Tetraclitidae	<i>Tesseropora rosea</i>	27 552 003		127	
		Unknown barnacle sp.				1	
	Malacostraca	Atyidae	<i>Paratya australiensis</i>	28 736 016		8	
		Callianassidae	<i>Biffarius ceramicus</i>	28 803 006		1	
		Dromiidae	<i>Metadromia wilsoni</i>	28 852 004		1	
		Lomisidae	<i>Lomis hirta</i>	28 829 001		11	
		Majoidea	Unknown decorator crab			6	
		Paguroidea	Unknown hermit crab			71	44
			<i>Guinusia chabrus</i>	28 935 002			23
	Portunidae	Unknown shore crab				2	
		Unknown crab sp.				7	
	Maxillopoda	Austrobalanidae	<i>Austrominius modestus</i>	27 553 008		14	
		Balanidae	<i>Austromegabalanus</i> sp.	27 560 902		32	
		Iblidae	<i>Ibla quadrivalvis</i>	27 526 001		118	
			Unknown stalked barnacle				1
Bryozoa	Ascidiacea	Bryozoan			2		
Chordata		Unknown solitary ascidian			4		
		Unknown colonial ascidian			1	7	
Cnidaria	Anthozoa	Actiniidae	<i>Actinia tenebrosa</i>	11 232 001	113	25	
			<i>Aulactinia veratra</i>	11 232 003		8	
			<i>Oulactis mcmurrichi</i>	11 232 021		40	
		Zoanthidea	Unknown zoanthid			26	
			Unknown anemone sp.1			51	
			Unknown anemone sp.2				10
Echinodermata	Asteroidea	Asteriidae	<i>Coscinasterias muricata</i>	25 154 011	3	14	
		Asterinidae	<i>Meridiastra occidens</i>	25 140 042		3	
			<i>Meridiastra</i> sp.	25 140 909		1	
	Echinoidea	Echinometridae	<i>Heliocidaris erythrogramma</i>	25 247 001	5	17	
		Temnopleuridae	<i>Holopneustes porosissimus</i>	25 241 011	2		
	Holothuroidea	Cucumariidae	<i>Cercodemus anceps</i>	25 408 007		5	
		Holothuriidae	<i>Holothuria atra</i>	25 416 003		4	

Phylum	Class	Family	Species	CAAB code	Quantity – limestone	Quantity – granite
			Unknown holothurian sp.			4
		Stichopodidae	<i>Australostichopus mollis</i>	25 417 009		127
		Synaptidae	<i>Leptosynapta dolabrifera</i>	25 431 002		6
	Ophiuroidea		Unknown brittle star			11
Hemichordata	Enteropneusta	Ptychoderidae	<i>Balanoglossus</i> sp.	36 117 901		2
Mollusca	Bivalvia	Lucinidae	<i>Anodontia perplexa</i>	23 305 025		1
		Lucinoidea	Unknown Lucinid sp.		1	
		Mytilidae	<i>Brachidontes ustulatus</i>	23 220 081		30
			<i>Modiolus areolatus</i>	23 220 008		1
			<i>Septifer bilocularis</i>	23 220 029	8	283
		Ostreidae	<i>Saccostrea scyphophilla</i>	23 257 004		3
		Spondylidae	<i>Spondylus tenellus</i>	23 272 001		2
	Cephalopoda		Octopus		1	
	Gastropoda	Campanilidae	<i>Campanile symbolicum</i>	24 090 001	26	10
		Cerithiidae	<i>Rhinoclavis bituberculata</i>	24 076 048	7	1
		Chilodontidae	<i>Granata imbricata</i>	24 051 002	2	9
			<i>Herpetopoma annectans</i>	24 051 003	1	
		Chromodorididae	Unknown nudibrach sp.1		1	
		Colubrariidae	<i>Colubraria</i> sp.	24 202 920	1	
		Columbellidae	<i>Euplica bidentata</i>	24 203 045	3581	10
			<i>Euplica scripta</i>	24 203 051	234	5
			<i>Mitrella austrina</i>	24 203 027	47	2
			<i>Mitrella lincolnensis</i>	24 203 002	2	
			<i>Mitrella menkeana</i>	24 203 025	7	
			<i>Mitrella semiconvexa</i>	24 203 003	1	
		Conidae	<i>Conus anemone</i>	24 222 010	3	
			<i>Conus doreensis</i>	24 222 044	54	7
			<i>Conus klemae</i>	24 222 066	1	
		Cypraeidae	<i>Monteria caputserpentis</i>	24 155 018	1	
		Epitoniidae	<i>Opalia granosa</i>	24 191 006		2
		Fissurellidae	<i>Emarginula dilecta</i>	24 040 034		4
			<i>Scutus antipodes</i>	24 040 053		8
		Haliotidae	<i>Haliotis roei</i>	24 038 005	30	20
		Hipponicidae	<i>Hipponix australis</i>	24 130 001	8	17
		Littorinidae	<i>Austrolittorina unifasciata</i>	24 095 001		3
		Lottiidae	<i>Lottia onychitis</i>	24 010 008	47	618
			<i>Patelloida alticostata</i>	24 010 002	19	2950

Phylum	Class	Family	Species	CAAB code	Quantity – limestone	Quantity – granite
			<i>Patelloida insignis</i>	24 010 003	8	22
			<i>Patelloida nigrosulcata</i>	24 010 022	4	14
			Unknown limpet sp.1			25
			Unknown limpet sp.2			29
			Unknown limpet sp.3			8
			Unknown limpet sp.4			8
		Mitridae	<i>Mitra carbonaria</i>	24 211 007	1	
			<i>Mitra chalybeia</i>	24 211 011	2	
			<i>Mitra</i> sp.	24 211 904	2	
		Muricidae	<i>Cronia avellana</i>	24 200 005	199	2
			<i>Dicathais orbita</i>	24 200 008	63	114
		Neritidae	<i>Nerita atramentosa</i>	24 057 001		833
			<i>Nerita</i> sp.			17
		Patellidae	<i>Scutellastra laticostata</i>	24 005 003	1	34
			<i>Scutellastra peronii</i>	24 005 004	1	1239
		Phasianellidae	<i>Phasianella solida</i>	24 042 004	1	
		Ranellidae	<i>Monoplex exaratus</i>	24 176 005	5	
			<i>Ranella australis</i>	24 176 002	1	4
		Siphonariidae	<i>Siphonaria jeanae</i>	24 488 006		217
			<i>Siphonaria kurracheensis</i>	24 488 007	3	98
			<i>Siphonaria zelandica</i>	24 488 002	11	297
		Trochidae	<i>Austrocochlea rudis</i>	24 046 071		2191
			<i>Cantharidus pulcherrimus</i>	24 046 095	229	
			<i>Clanculus limbatus</i>	24 046 017		3
			<i>Clanculus maxillatus</i>	24 046 131	1	
			<i>Clanculus ringens</i>	24 046 134	1	
			<i>Clanculus</i> sp.	24 046 915	4	
			<i>Lunella torquata</i>	24 045 003	101	
			<i>Notogibbula lehmanni</i>	24 046 091	6	4
			<i>Prothalotia lehmanni</i>	24 046 094	11	1
			<i>Stomatella impertusa</i>	24 046 068	17	10
		Turbinidae	<i>Bellastraea aurea</i>	24 045 013	1	
			<i>Turbo kenwilliamsi</i>	24 045 052	17	7
		Vermetidae	<i>Thylacodes siphon</i>	24 150 002	3	49
			Unknown vermetid worm	24 150 000		4
		Unknown	Unknown gastropod sp.1		10	
			Unknown gastropod sp.2		4	

Phylum	Class	Family	Species	CAAB code	Quantity – limestone	Quantity – granite
			Unknown gastropod sp.3			1
	Polyplacophora	Chitonidae	<i>Liolophura hirtosa</i>	23 118 005	7	746
			<i>Rhyssoplax torriana</i>	23 118 023	1	
			Unknown chiton sp.		18	
		Cryptoplacidae	<i>Cryptoplax striata</i>	23 121 006	2	
		Ischnochitonidae	<i>Ischnochiton cariosus</i>	23 115 023	3	
			<i>Ischnochiton lineolatis</i>	23 115 035		1
			<i>Ischnochiton torri</i>	23 115 044	1	
		Mopaliidae	<i>Plaxiphora albida</i>	23 117 002	7	
Platyhelminthes			Unknown flatworm			1
Sipuncula	Phascolosomatidae	Aspidosiphonidae	Unknown sipunculid worm		2	2