Yalata/Fowlers Bay Bush Blitz

Marine invertebrates and fish

22nd November- 3rd December 2021

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Nomenclature and taxonomy used in this report is consistent with:

The Australian Faunal Directory (AFD)

http://www.environment.gov.au/biodiversity/abrs/online-resources/fauna/afd/home

and World Register of Marine Species (WoRMS) https://www.marinespecies.org

Contents

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List of contributors to this report.			
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Abstract

Six hundred and fifty specimen lots[1] of marine invertebrates were collected from soft sediment habitats, subtidal hard coral/rocky reefs, and intertidal rocky reef habitats during the Yalata/Fowlers Bay Bush Blitz and were identified to the lowest taxonomic unit possible. We identified 136 already described invertebrate species; however, 58% of the material remains to be identified below genus level. Specimens from this poorly-documented region have been accessioned into the collections of the South Australian Museum. Importantly, the hard corals *Turbinaria* cf. *mesenterina, Plesiastrea versipora*, *and Coscinaraea mcneilli* were confirmed as new records for the region and samples were collected for molecular analyses to look for any genetic variation in the species in this location. In addition, we used baited cameras to survey and quantify fish assemblages and identified 57 fish species across four sites. This included new records for the region to be uploaded to the Atlas of Living Australia.

In summary, marine invertebrate and fish collections undertaken during the Fowlers Bay Bush blitz have contributed significant data to the records of species distributions along this section of the Great Australian Bight. The data and specimens gathered will form an important reference collection for the South Australian Museum and will be available for further research, with the data being made publicly available through uploads to the Atlas of Living Australia.

1. Introduction

The southern coast of the Australian continent is the longest east-west shoreline in the southern hemisphere, with a high marine biodiversity arising from its unique geological history and evolution of endemic species (O'Hara and Poore 2000). Four unexplored sites of remnant hard coral reefs had been identified by the South Australian Research and Development Institute (SARDI) and South Australian Museum staff, and through consultation with regional Indigenous Rangers, around the Fowlers Bay, eastern Great Australian Bight (GAB). These small patches of unsurveyed hard coral reefs are of significant scientific interest because they are thought to consist of species that are typically found in the warm Indian Ocean rather than the cool-temperate waters of the GAB. It is likely that the Leeuwin Current, which brings warm water from the west coast to southern Australia, may be influencing the distribution of warm-water species along the coast. Despite their scientific importance, these sites have never been comprehensively surveyed and the extent and size of the hard coral reefs, coral species, and fauna communities inhabiting these reefs are currently unknown.

SARDI and CSIRO have previously done systematic surveys of the infaunal and epifaunal marine invertebrates on the shelf and deep sea in the Great Australian Bight (Ward et al. 2006; Currie et al. 2009; Williams et al. 2018). Faunal biodiversity has also been assessed on the nearby islands of Nuyts Archipelago (Bryars et al. 2016). However nearshore coastal habitats have received little to no attention, leading to the far west coast of the Eyre Peninsula and coast along the Nullarbor being one of the least explored coastal and marine areas in Australia. Newly collected specimens will provide important and invaluable data to the South Australian Museum collections.

Marine sediments (including beaches to 10 m water depths) can host species-rich communities of invertebrates, which are also diverse at the level of phyla represented. Macroinvertebrates play important roles in marine ecosystems but are

[1] A 'specimen lot' = one or more of the same species (or order or family) from the same site

often overlooked and underrepresented in conservation efforts and assessments for the IUCN Red List (Snelgrove 1998; Hutchings and Ponder 2003; Chen 2021). With intensifying cumulative pressures on marine and coastal environments (Halpern et al. 2019), including shifts in the distribution ranges of species due to climate change induced tropicalisation (Vergés et al. 2014), more baseline data are needed on the occurrence and abundance of marine invertebrates.

The Fowlers Bay region sits in the transition zone between the southeast and southwest Australian marine bioregions. As such, it is an important region where mixing of warm and cool water species can occur and potentially result in assemblages of fish and invertebrates that are unique within the broader GAB. Being quite remote, opportunities to undertake biological surveys in this region are rare so the opportunity to survey and collect fresh specimens of invertebrates and collect fish species assemblage data from this region is a highly valuable exercise for the SA Museum.

In this report, we describe the surveys and collection undertaken between 22nd November and 3rd December 2021 from Davenport Creek (near Ceduna) to Head of Bight. We used diverse surveying methods including diving, hand collecting, coring and Baited Remote Underwater Video Systems (BRUVS), to characterise coastal and marine communities across a broad range of habitats, including sub-tidal rocky reefs, soft sediments, and rocky shores.

2. Methods

2.1 Site selection

Offshore surveys:

Three hard coral reef sites were selected based on historical records from SARDI and the SA Museum where hard corals had been detected or sighted. These were Wandilla Bay, Scott Bay, and eastern Fowlers Bay (Figure 1). Eastern Point Fowler was also added to the list after consultation with Indigenous Rangers and local residents who reported hard corals at that location.

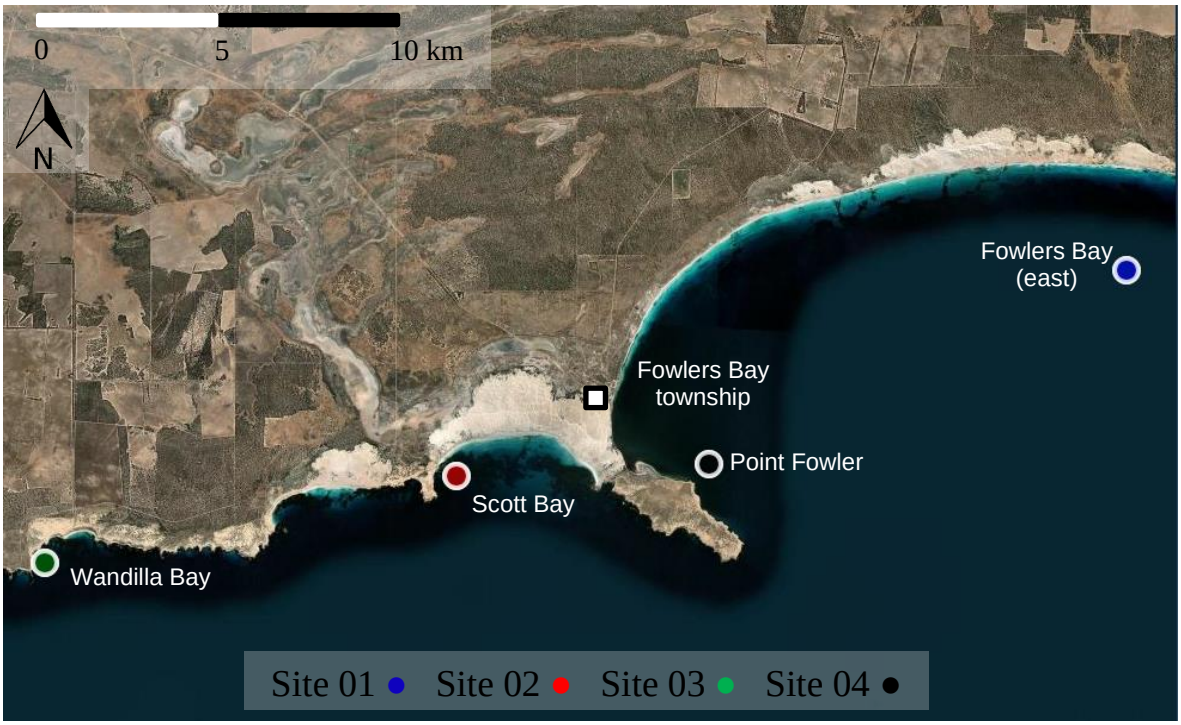

Figure 1. Map of offshore survey and dive locations (sites 1–4).

***Onshore surveys and collections*:**

A range of habitats was surveyed to capture the greatest diversity of soft sediment macroinvertebrates possible (Table 1). This included sites in the immediate vicinity of the Fowlers Bay township in a more exposed setting, compared to sheltered coastal embayments near Davenport Creek and Ceduna (Figure 2). In Fowlers Bay, sampling also followed a depth gradient from the shore into the subtidal waters of the bay to about 10 m water depth. Soft sediment sites included beaches, intertidal mudflats, and subtidal sediments in Fowlers Bay and Davenport Creek/Tourville Bay. A sheltered seagrass lagoon was also sampled at Clare Bay. In addition to soft sediments, fouling communities were collected from the jetty in Fowlers Bay and from the floating docks at the boat ramp in Ceduna/Thevenard.

Table 1. Sampling sites and dates for soft sediment macroinvertebrate collections.

Site ID	Site name	Latitude	Longitude	Sampling date	Water depth
YFB_SS1	Fowlers Beach	-31.985986	132.4395	22/11/2021	exposed to 0.5 m
YFB_SS2	Fowlers Beach	-31.985986	132.4395	23/11/2021	exposed to 0.5 m
YFB_SS3	Point Fowler	-32.005748	132.4411	24/11/2021	exposed to 0.7 m
YFB_SS4	Fowlers Jetty	-31.989776	132.438	25/11/2021	exposed to 0.5 m
YFB_SS5	Offshore Point Fowlers	-32.01801	132.4738	25/11/2021	10 m
YFB_SS6	Offshore Fowlers Bay	-32.00859	132.4627	25/11/2021	5 m
YFB_SS7	Davenport Creek	-32.18440	133.5081	27/11/2021	3-6 m
YFB_SS8	Davenport Creek	-32.16103	133.481	27/11/2021	1-4 m
YFB_SS9	Davenport Creek	-32.14780	133.4355	27/11/2021	2-3 m
YFB_SS10	Ceduna boat ramp	-32.137627	133.6644	27/11/2021	0.5 m
YFB_SS11	Denial Bay	-32.106204	133.6704	27/11/2021	exposed mudflat
YFB_SS12	Windmill Beach	-31.93852	132.5125	28/11/2021	exposed beach
YFB_SS13	Clare Bay	-31.95124	132.6907	30/11/2021	1 m

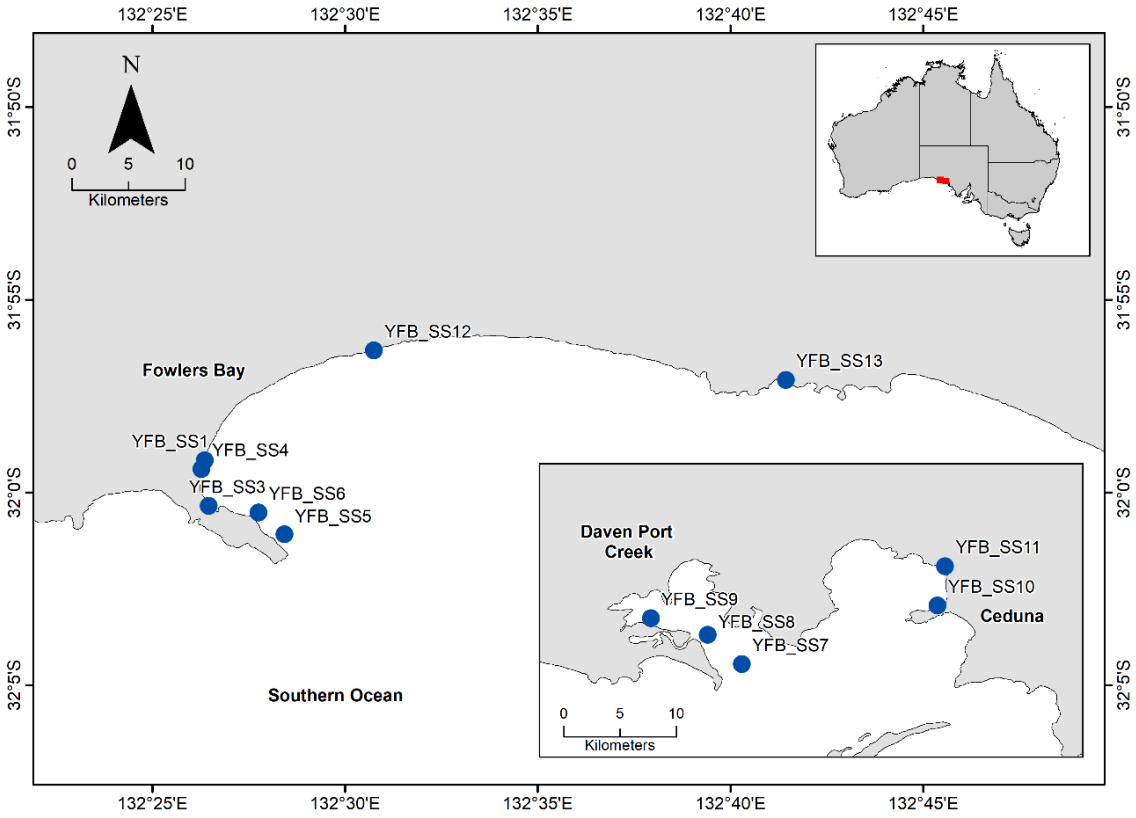

Figure 2. Location of the sites which were surveyed for soft sediment macroinvertebrates and fouling communities during the Bush blitz in November 2021. See Table 1 for site details.

Rocky reef collection sites were selected using google maps. Based on our initial site identification and following discussions with the Yalata and Fowlers Bay Indigenous Rangers, we selected 10 accessible rocky shore habitats for collections (Table 2).

Table 2. Sampling sites and dates for rocky shore invertebrate collections

Site code	Site description	Latitude (Dec.)	Longitude (Dec.)	Date Visited
YFB_RS01	Cape Nuyts	-32.017749	132.340327	23/11/2021
YFB_RS02	Wandilla Bay. Rocky horizontal platform with multiple rocky outcrops jutting into sea.	-32.031294	132.266845	24/11/2021
YFB_RS03	Wandilla Bay. Sloped rocky platform with many rock pools	-32.028946	132.254805	24/11/2021
YFB_RS04	Cheetima Beach. Rocky platform with headlands & few rock pools.	-32.014854	132.175077	25/11/2021
YFB_RS05	Cape Adieu. Rocky shore in outcrop, highly eroded. Many rock pools.	-32.003519	132.164628	25/11/2021
YFB_RS06	Clare Bay. Sandy bay with extensive rocky outcrops and rock pools.	-31.952403	132.699079	27/11/2021
YFB_RS07	Cactus Bay. Surf beach with rocky platforms containing small pools.	-32.084461	132.983963	28/11/2021
YFB_RS08	Windmill Beach. Rocky platforms.	-31.940409	132.502617	29/11/2021
YFB_RS09	Dog Fence Beach. Sandy beach with extensive algal wrack.	-31.77186	131.842048	30/11/2021
YFB_RS10	Head of Bight. Sandy beach with a steep rocky outcrop.	-31.464338	131.13707	30/11/2021

2.2 Survey techniques

Offshore operations:

RV *Tethys* (6.1m half cabin vessel) was used to dive and deploy Baited Remote Underwater Video System (BRUVS).

Diving was attempted at the eastern side of Fowlers Bay, in Scott Bay, and in Wandilla Bay to survey the size of the remnant coral reef, and hand-collect specimens of dominant coral species and associated invertebrates. Unsuitable diving depth at the Fowlers Bay site and weather conditions resulted in only two sites being accessible around Fowlers Point. Specimens of dominant corals and other invertebrates were hand-collected into 0.5 mm mesh bags and buckets and were transported to the laboratory in plastic tubs.

The BRUVS unit consists of a waterproofed video camera mounted to a frame, with a bait bag at the front to attract fish into the view of the camera. The unit is deployed into the water from a boat and is left on the seabed to record for a predetermined time before being retrieved (Miller et al. 2017). BRUVS are a popular method for assessing fish assemblages (Whitmarsh et al., 2017; Langlois et al 2020) and have successfully been used for a wide variety of studies including the assessment of the efficacy of marine protected areas, effects of anthropogenic impacts, or spatial variation in fish assemblages (Folpp et al., 2013; Kelaher et al., 2014; Whitmarsh et al., 2014; Whitmarsh et al., 2018; Clarke et al., 2019; Whitmarsh et al., 2019). Studies comparing BRUVS to other sampling methods have shown that BRUVS is well suited to sample mobile species but may underrepresent small, cryptic species (Langlois et al., 2010; Harvey et al., 2012; Harvey et al., 2013; Whitmarsh et al., 2017; Whitmarsh et al., 2018). Twelve BRUVS replicates were deployed at each site (total 48 deployments), with replicates deployed ~400 m away from each other to avoid double counting the same individual fish across replicates (Langlois et al 2020). BRUVS were set up with high-definition GoPro Hero7 BlackTM video cameras on steel frames. These cameras were selected due to their relative low cost, ability to record in high definition, long battery life, wide-angle viewing, and image quality in low light conditions. The units were baited with 500 g of minced sardines (*Sardinops sagax*). Units were set to continuous recording and deployed for a minimum of 1 hour before retrieval.

Onshore operations:

The survey methods used for collecting invertebrates were standard methods for benthic ecology, and applicable for collections from different substrates and surface/sediment structure (Table 3). Standard methods for soft sediment sampling in benthic ecology involve the collection of sediment (10–20 cm sediment depths) from which macroinvertebrates are separated by sieving through 0.5 mm mesh size. In intertidal and shallow subtidal sediments, a hand-held PVC corer (83 cm^2 surface area) was used. At greater water depths, a box corer (225 cm^2 surface area) was deployed off the RV *Tethys*. On beaches and exposed mudflats, samples were also obtained by hand collection from the sediment surface or digging into the sediment with a shovel. The epifauna associated with seagrass in shallow water was collected by using a sieve (0.5 mm mesh size) to sweep through the seagrass canopy. The fouling community from jetty pylons and floating docks was scraped off with a paint scraper or shovel into a collection bag.

Rocky shore invertebrate collections were done by hand using timed searches of no more than 30 minutes. Sessile taxa were scraped off hard surfaces using scrapers or knives. Non-sessile taxa were collected by hand. Both collections were placed directly in containers with seawater. Mesh bags (0.5 mm) were also used to collect invertebrates from seaweed and sediment.

Table 3. Methods of sampling collection and sampling conditions at the sites and dates for soft sediment macroinvertebrate collections during the Fowlers Bay Bushblitz November 2021.

Site ID	Site name	Collection type	Sampling method	Site characteristics and comments
YFB_SS1	Fowlers Beach	Soft Sediment	PVC corer	Fine sandy beach to the left of the Jetty
YFB_SS2	Fowlers Beach	Soft Sediment	PVC corer	Fine sandy beach to the left of the Jetty
YFB_SS3	Point Fowler	Soft Sediment	PVC corer	Fine sandy beach to the right of the Jetty
YFB_SS4	Fowlers Jetty	Fouling community	Scrapings	Jetty pylon scrapings
YFB_SS5	Offshore Point Fowlers	Subtidal	Box corer	Windy and choppy, fine sediment
YFB_SS6	Offshore Fowlers Bay	Subtidal (seagrass)	Box corer	Windy and choppy, seagrass
YFB_SS7	Davenport Creek	Soft Sediment	Box corer	Sunny and flat, fine sand and seagrass
YFB_SS8	Davenport Creek	Soft Sediment	Box corer	Sunny and flat, fine sand and seagrass
YFB_SS9	Davenport Creek	Soft Sediment	Box corer	Sunny and flat, medium to coarse sand and seagrass
YFB_SS10	Ceduna boat ramp	Fouling community	Scrapings	Boat ramp scrapings
YFB_SS11	Denial Bay	Intertidal	Shovel	Muddy flat
YFB_SS12	Windmill Beach	Intertidal	Shovel	Very fine white sand and rocky pools
YFB_SS13	Clare Bay	Intertidal	Sieve scoping and shovel	Sandy beach, seagrass patches

2.2.1 Methods used at standard survey sites

There were no standard survey sites in the coastal or marine surveys and collections.

2.3 Identifying the collections

Offshore surveys:

BRUVS videos were analysed using the specialised SeaGIS EventMeasure software (SeaGIS Pty Ltd, Bacchus Marsh, VIC, Australia; seagis.com.au/event.html). On each replicate, taxa were identified to species where possible using the references Kuiter, 1996; Gomon et al., 2008; and counted using the relative abundance measure, MaxN. MaxN is the maximum number of individual fish (for each species or taxon) observed in a single frame throughout the deployment duration. MaxN is thus a conservative estimate of abundance, particularly where large fish numbers are present or there is a large turnover of individuals during deployment (Priede et al., 1994; Ellis and DeMartini, 1995; Willis, 2001). Most species were easily recognisable but taxa were grouped into genus or family if they could not be reliably identified to species level, e.g., two trevally species could not be differentiated and thus were grouped as *Pseudocaranx* spp.

Fish communities were analysed through PRIMER (version 7, PRIMER-E Ltd, Plymouth, UK; Clarke and Gorley 2015) with the PERMANOVA+ add-on (PRIMER-E Ltd; Anderson et al. 2008) to compare fish diversity and abundance among sites and habitats. We used shade plots to determine the need for transformation (Clarke et al. 2014), and subsequently used a dispersion weighting transformation to account for the schooling tendencies of highly abundant species (Clarke et al. 2006). Analyses were performed using the Bray-Curtis dissimilarity index between pairs of samples on multivariate community assemblage data. Similarity percentage (SIMPER) analysis was used to investigate the similarity (or lack thereof) in assemblages observed from each sampling site and determine which species contributed most to dissimilarity between sites. A canonical analysis of principal coordinates (CAP) was used to identify and visualise differences in assemblages observed from BRUVS across the four sampling sites and habitats.

Invertebrate specimens collected during dives were sorted back in the field laboratory. Large individual specimens (>2 cm) were removed by hand and sorted to broad groups on sorting trays. Once large specimens were taken out of the tubs, the tubs were elutriated in seawater and poured onto a 500-micron sieve, then sieved specimens were transferred to ethanol dishes to be further sorted to the lowest taxonomic unit with microscopes and sorting loupes, and subsequently stored in discrete specimen lots. Molecular samples were taken from specimens of interest (e.g. hard corals) and preserved in DNA-grade ethanol.

On-shore surveys:

Soft sediment samples were sieved in the field and transferred to the laboratory in bags and buckets filled with seawater. Macroinvertebrates were extracted live while sorting through the material with microscopes. Organisms were transferred into separate petri dishes for each taxon prior to further identification done to a level possible during the field trip. The level of taxonomic identification during the Bush blitz varied from species level to phyla.

Rocky reef samples were transported back to the lab in containers and buckets and were live sorted, identified to the lowest taxonomic level possible, and fixed in 98% ethanol or 10% formalin as quickly as possible.

Subsequent to the survey field work, Peter Hunt (SA Museum volunteer in mollusc biology) reviewed identifications of molluscs collected in soft sediment and rocky shore collections at the SA Museum.

References used for marine invertebrate identifications included Edgar (2008), Gowlett-Holmes (2008), Marsh and Fromont (2020), Fauchald (1977), Poore (2004), and Shepherd and Thomas (1982 and1989). Mollusc references used were Grove (2019), Hunt (2018), Lamprell and Whitehead (1992), Lamprell and Healy (1998) and Wilson (2002).

3. Results and Discussion

Appendix 1 lists all fish species sighted by BRUVS during the Yalata/Fowlers Bay Bush Blitz. Sighting data captured during the Bush Blitz will result in 57 species records being added to publicly-accessible databases (via ALA submission).

Appendix 2 lists all marine invertebrate species from soft sediments and rocky shores collected during the Yalata/Fowlers Bay Bush Blitz. Collections made during this Bush Blitz will result in 650 specimen lots (>136 species) being added to public collections and an equivalent number of records added to publicly accessible databases.

Offshore survey results

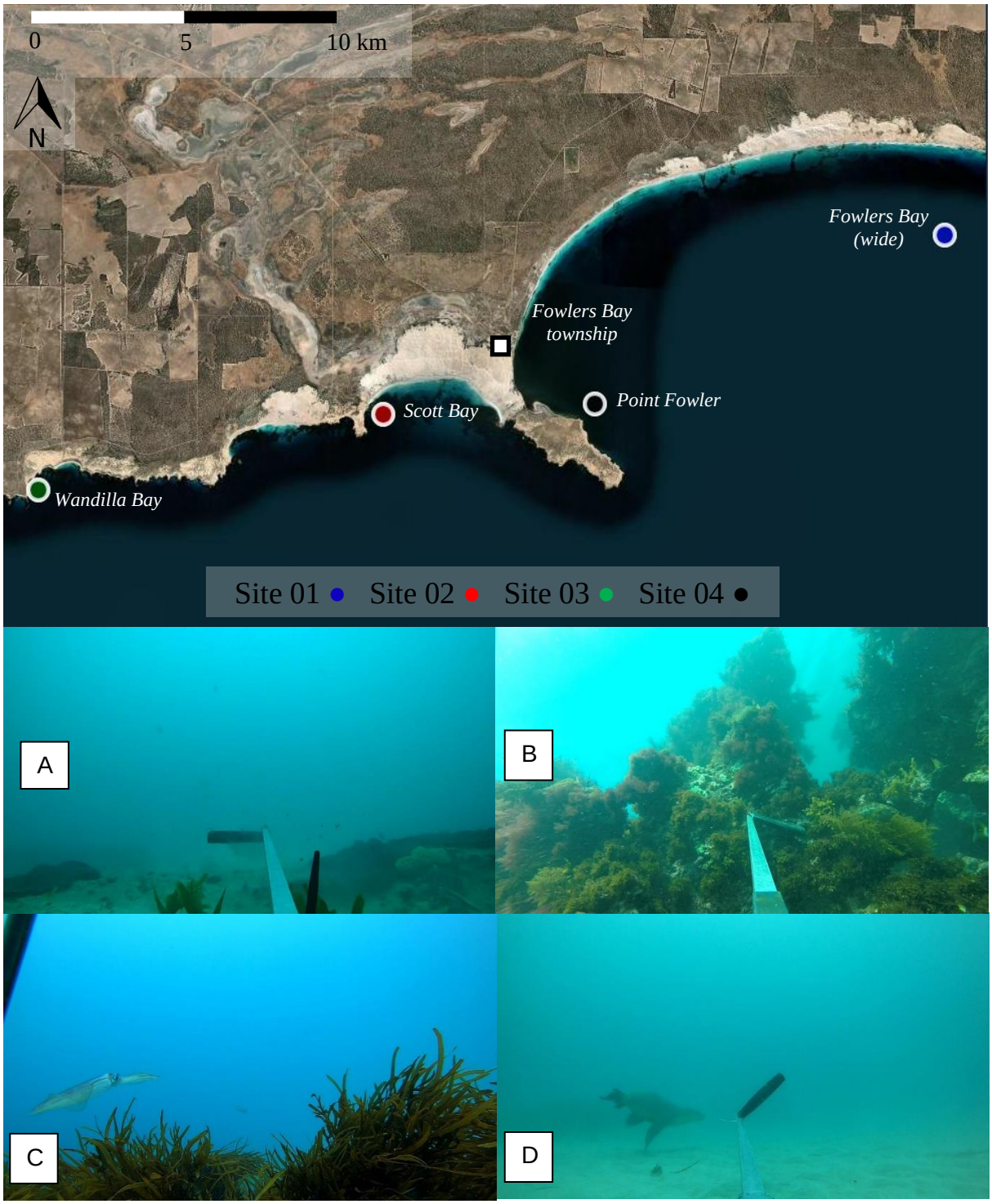

Figure 3. A) Location of Baited Remote Underwater Video Station sites sampled during Fowlers Bay Bush Blitz in November 2021, with examples of B) flat coral/rubble, C) reef, D) seagrass, and E) sand habitats. Fowlers Bay township is indicated by white square.

BRUVS results

Five BRUVS camera stopped recording prematurely, resulting in 43 BRUVS deployment used for analyses. Overall, 57 species were observed from 43 BRUVS deployments across four off-shore sites (Figures 1,3,4). Of these species, four were observed at all sampling sites: six-spine leatherjacket *Meuschenia freycineti*, southern eagle ray *Myliobatis tenuicaudatus*, brownspotted wrasse *Notolabrus parilus*, and trevally *Pseudocaranx* sp. In addition to teleosts, chondrichthyans (e.g., gummy shark *Mustelus antarcticus*, southern eagle ray *M. tenuicaudatus*), pinnipeds (Australian sea lion *Neophoca cinerea*), cetaceans (bottlenose dolphin *Tursiops* sp.), and crustaceans (common sand crab *Ovalipes australiensis*) were also observed and included in subsequent analyses.

Site 1 (Fowlers Bay east) was characterised by a rubble and flat coral habitat that was observed on all deployments at this site, but at no other sampling sites (Figure 3B). Site 1 was also the deepest site, with replicates deployed between 29.7 – 33.6 m. This site was characterised by barber perch *Caesioperca rasor*, southern Māori wrasse *Ophthalmolepis lineolata*, and southern eagle ray *Myliobatis tenuicaudatus*. Six species observed at Site 1 were not observed at any other site (e.g., pink snapper *Chrysophrys auratus*, school shark *Galeorhinus galeus*, and southern fiddler ray *Trygonorrhina dumerilii*) (Figure 4). Assemblages were the most unique, with fish communities at this site distinct from all other sites (Figure 5; SIMPER dissimilarity 83.7 – 88.6%).

Substrate of Site 2 (Scott Bay) was mostly reef and sand, with BRUVS deployed between 6 – 14.5 m depth (Figure 3C, E). Assemblages at this site were characterised by the southern Māori wrasse *O. lineolatus*, brownspotted wrasse *N. parilus*, and Australian herring *Arripis georgianus* (Figure 4). Fish communities from Site 2 were most similar to Site 3 (Wandilla Bay, SIMPER dissimilarity 74.3% (Figure 5), sharing nine species that occurred at both sites (Figure 4). However, 10 species were only observed at Site 2 (e.g., yellowtail kingfish *Seriola lalandi*, moonlighter *Tilodon sexfasciatus*, and western talma *Chelmonops curiosus*), but at no other sites (Figure 4).

Site 3 (Wandilla Bay) was also characterised by sand and reef, with BRUVS deployed in 7.5 – 14.7 m (Figure 3C,E). Assemblages at this site were characterised by brownspotted wrasse *N. parilus*, southern school whiting *Sillago bassensis*, and southern Maori wrasse *O. lineolatus*. The slender weed whiting *Siphonognathus attenuatus* was the only species unique to Site 3 (Figure 4).

Seagrass and sand were the main substrate types of Site 4 (Point Fowler), with deployments being in 4.5 – 13.2 m (Figure 3D,E). Site 4 had different fish communities compared to the other sites (81 – 88.63% SIMPER dissimilarity), but more closely resembled Sites 2 and 3 (81.36 and 85.11%, respectively) than Site 1 (88.63% dissimilarity, Figure 5). Site 4 was characterised by abundances of six-spine leatherjacket *M. freycineti*, sea trumpeter *Pelsartia humeralis*, and Australian herring *A. georgianus*. Nine species were observed only at Site 4, including Australian sea lion *N. cinerea*, sea trumpeter *Pelsartia humeralis*, and snook *Sphyraena novaehollandiae* (Figure 4).

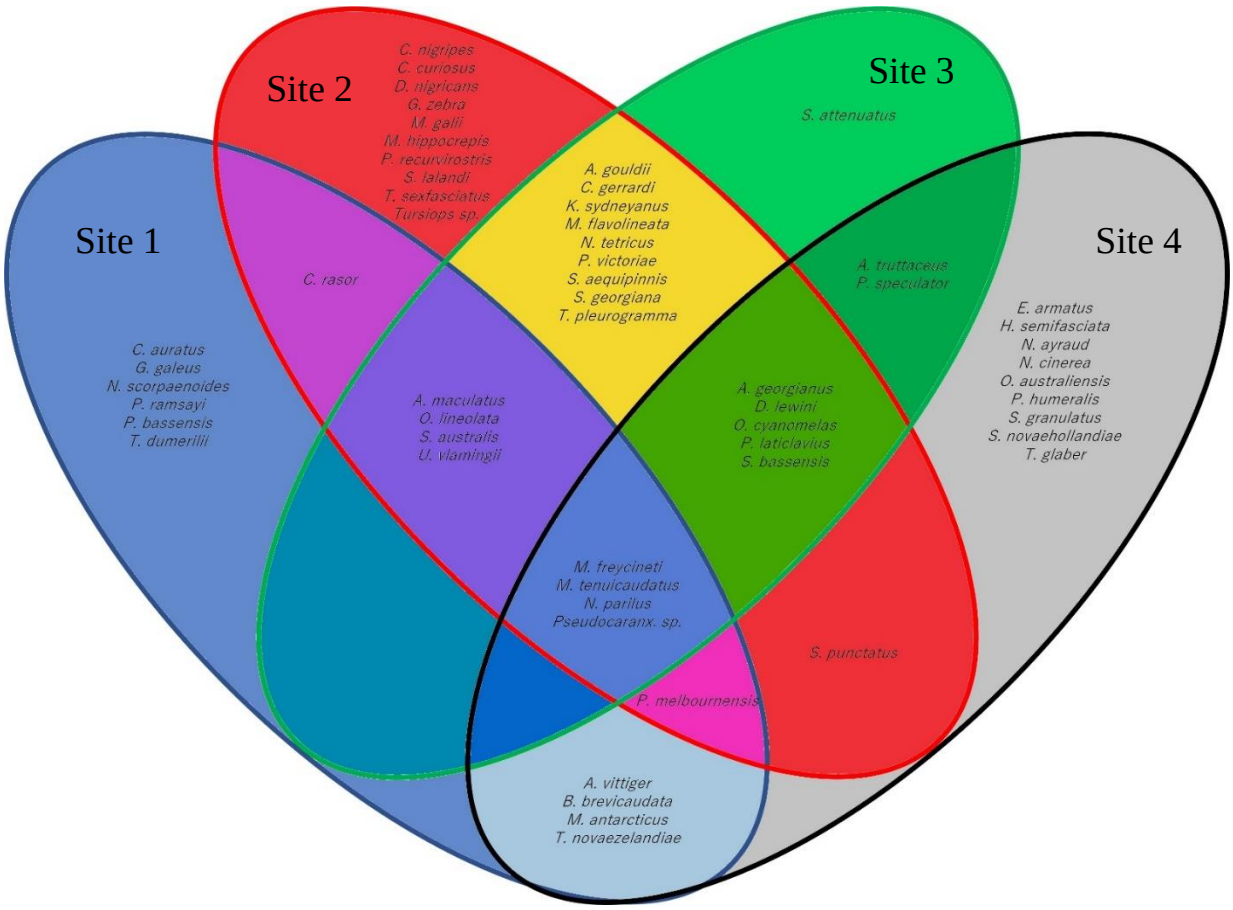

Figure 4. Summary of species observed across four sampling sites from Baited Remote Underwater Video Stations during Bush Blitz in Fowlers Bay.

Summary of fish assemblages

BRUVS deployments at four sites across the Fowlers Bay region resulted in the recording of an assemblage of macro-ichthyological fauna that is largely typical to the surrounding substrates across the Great Australian Bight region. It should be noted that the school shark (*Galeorhinus galeus*) was sighted at BRUVS Site 1, and this species is currently listed as Conservation Dependent (*EPBC Act 1999*) and also at Site 1 pink snapper (C*hrysophrys auratus*) was sighted and this species is currently part of a closed fishery within South Australia (until Jan 2023). It should also be noted that several species recorded here (i.e. *Pelsartia humeralis, Siphonognathus attenuates, Chelmonops curiosus, and Seriola lalandi*) have only a handful of records in the western GAB (via ALA) and so our BRUVS data comprise important regional records. We also suggest that future research in the area target smaller, benthic (demersal) fish to gain a better understanding of any biogeographical differences in fish fauna in this under-surveyed area.

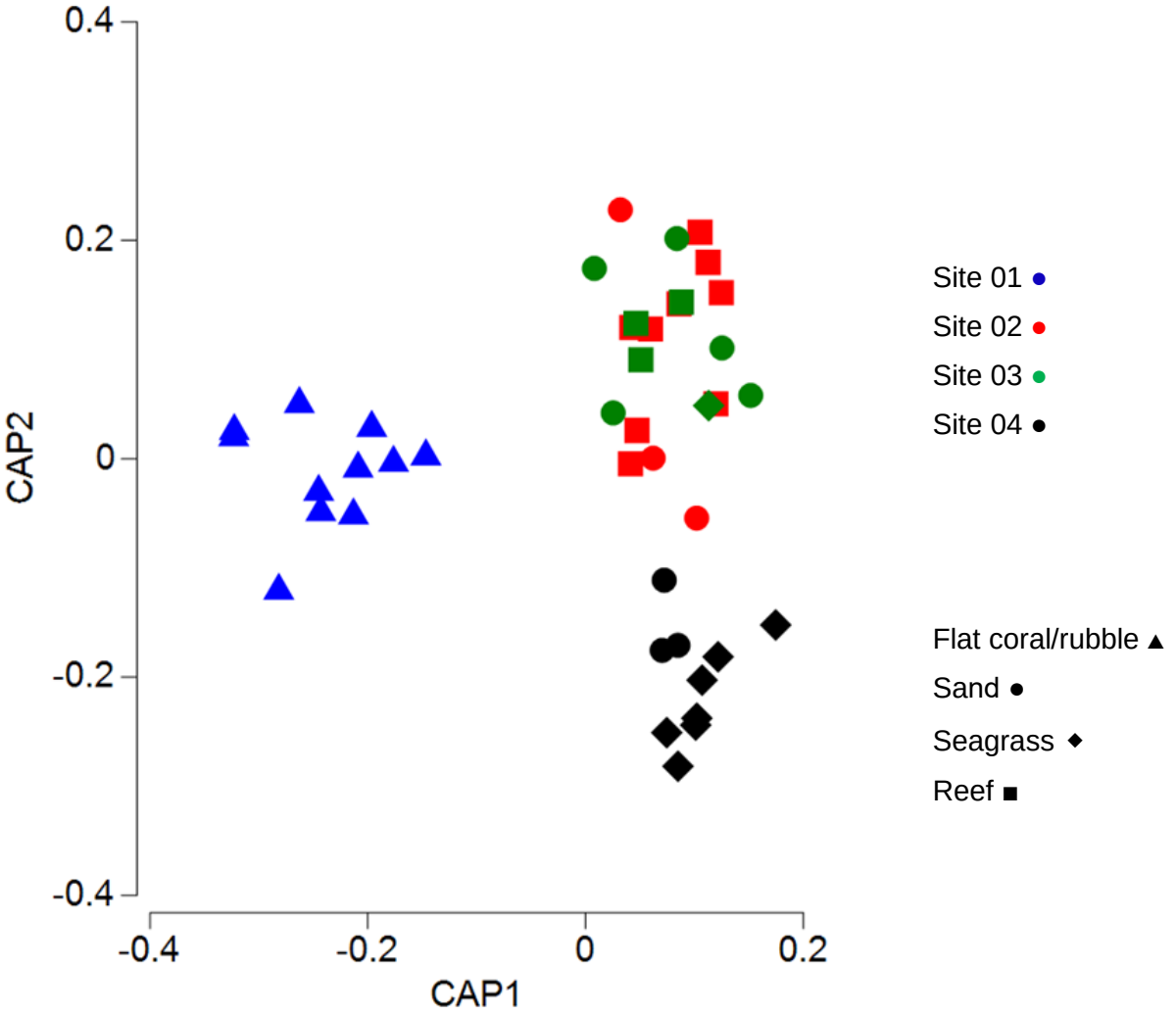

Figure 5. Canonical Analysis of Principal coordinates visualising fish communities observed from Baited Remote Underwater Video Stations during Bush Blitz, Fowlers Bay. Sampling sites are indicated by colours, and habitat types are represented by symbols.

Diving operations

Due to weather and marine conditions, diving operations were only able to be conducted on 28 – 29th November at Point Fowler (eastern and southern sites). An incidental collection also occurred on 25th at the Point Fowler site from BRUVS operations (sponge entangled in the BRUVS gear). Hard coral species were identified at both sites, but the dominant substrate was rocky reef with scattered hard corals. Therefore, no detailed coral reef surveys were undertaken (i.e. Reef Watch transect method) and hand-collection of hard corals and invertebrates was prioritised instead.

At the coral reef sites, Porifera, Cnidaria and Echinodermata accounted for most of the species collected (Figure 7) and more than 150 OTUs (operational taxonomic units) were identified. The two reef sites had the highest number of invertebrate phyla present, with species of 11 different phyla found. More specifically, at the eastern reef site (Reef_ST_1) three hard coral species were identified (*Plesiastrea versipora*, *Turbinaria* cf. *mesenterina*, and *Culicia hoffmeisteri*), along with soft corals, ascidians, sea stars, bivalve and gastropod molluscs, crinoids, sponges,

sea cucumbers, decapods, amphipod and isopod crustaceans, brittle stars, polychaete worms, and bryozoans. At the southern reef site (Reef_ST_2) three hard coral species were identified (*Coscinaraea mcneilli*, *Plesiastrea versipora*, and *Culicia hoffmeisteri*), along with two soft coral species, ascidians, sea stars, bivalve and gastropod molluscs, crinoids, sponges, sea cucumbers, decapod, amphipod, isopod and tanaid crustaceans, brittle stars, polychaete worms, bryozoans, and pycnogonids.

Onshore survey results

Over 260 OTUs of macroinvertebrates were collected from the soft sediment and fouling communities based on the current status of identifications. Annelida, Mollusca, and Arthropoda accounted for most of the species in these habitats (Figure 6).

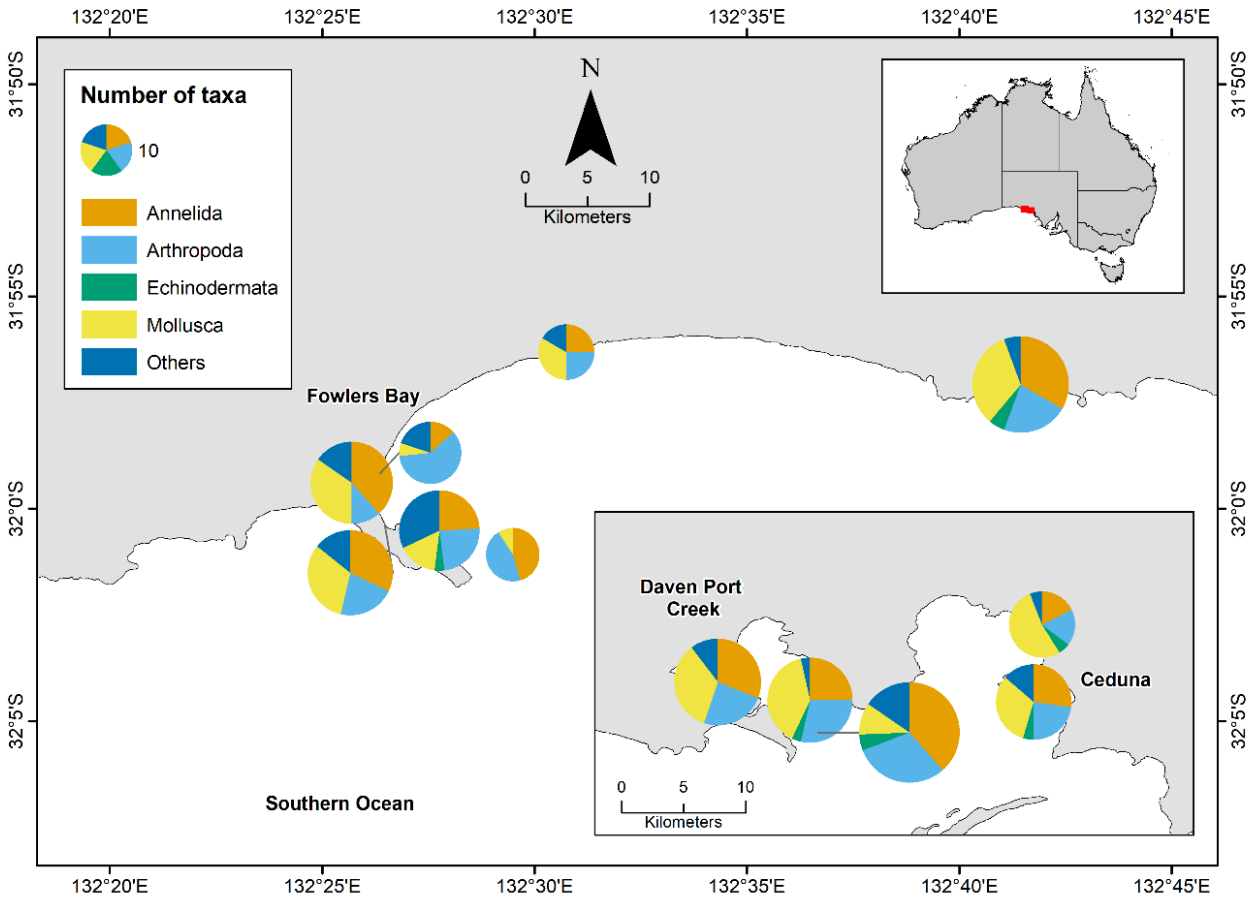

Figure 6. Composition of macroinvertebrates by major phyla found at the soft sediment and fouling community sampling sites during the Bush Blitz November 2021.

At the coral reef sites, Porifera, Cnidaria, and Echinodermata accounted for most of the species collected. The two reef sites had the highest number of phyla present, with species of 11 different phyla found. A high number of 10 different phyla was also recorded from subtidal sediments in Fowlers Bay (SS6) and from the outer bay site in Davenport Creek (SS7) (Figure 7).

The numbers of taxa recorded at sites located in sheltered bays were higher than at sites located in exposed settings (Figures 2, 7). The mudflat in Denial Bay (SS11) was only visited briefly en route which could explain the lower number of taxa

found. The coral reef sites had the highest number of species, nearly twice as many as the nearshore soft sediment sites (Figure 7).

In the exposed setting of Fowlers Bay, the total number of taxa found showed no clear pattern with water depth, as the numbers were low at the beach sites (SS1/2 and SS12), higher in the mudflat (SS3) and at 6 m water depths (SS6) but low again at the deeper water site (SS5, 10 m depths) (Figures 2, 7). This contrasts with a decrease in the number of taxa from the outer to the inner bay at the sheltered setting of Davenport Creek (SS7 to SS9). The presence of seagrass could have contributed to the higher number of taxa found at the 6 m depths in Fowlers Bay (SS6), the outer bay at Davenport Creek (SS7), and also at the seagrass bed in the lagoon in Clare Bay (SS13).

Across both of the fouling community sampling sites, nine phyla were found, six at the jetty scrapings in Fowlers Bay (SS4) and seven phyla at the floating dock boat ramp in Ceduna (SS10) (Figure 7). Fouling communities in ports often include marine invasive species transported by hull fouling (Hewitt et al. 2004; Ashton et al. 2014), but based on the current level of identification, no invasive species were found on the boat ramp or jetty.

The sampling across exposed and sheltered locations and a range of substrate types revealed that habitat diversity is important for the overall diversity in a region as the macroinvertebrate fauna differed across the habitats. The relevance of habitat diversity for macroinvertebrates, including occurrence of rare species, has been highlighted before (Wildsmith et al. 2005; Ellingsen et al. 2007). The species accumulation curve did not flatten, indicating that further sampling efforts will find more species at the sites surveyed in this Bush blitz.

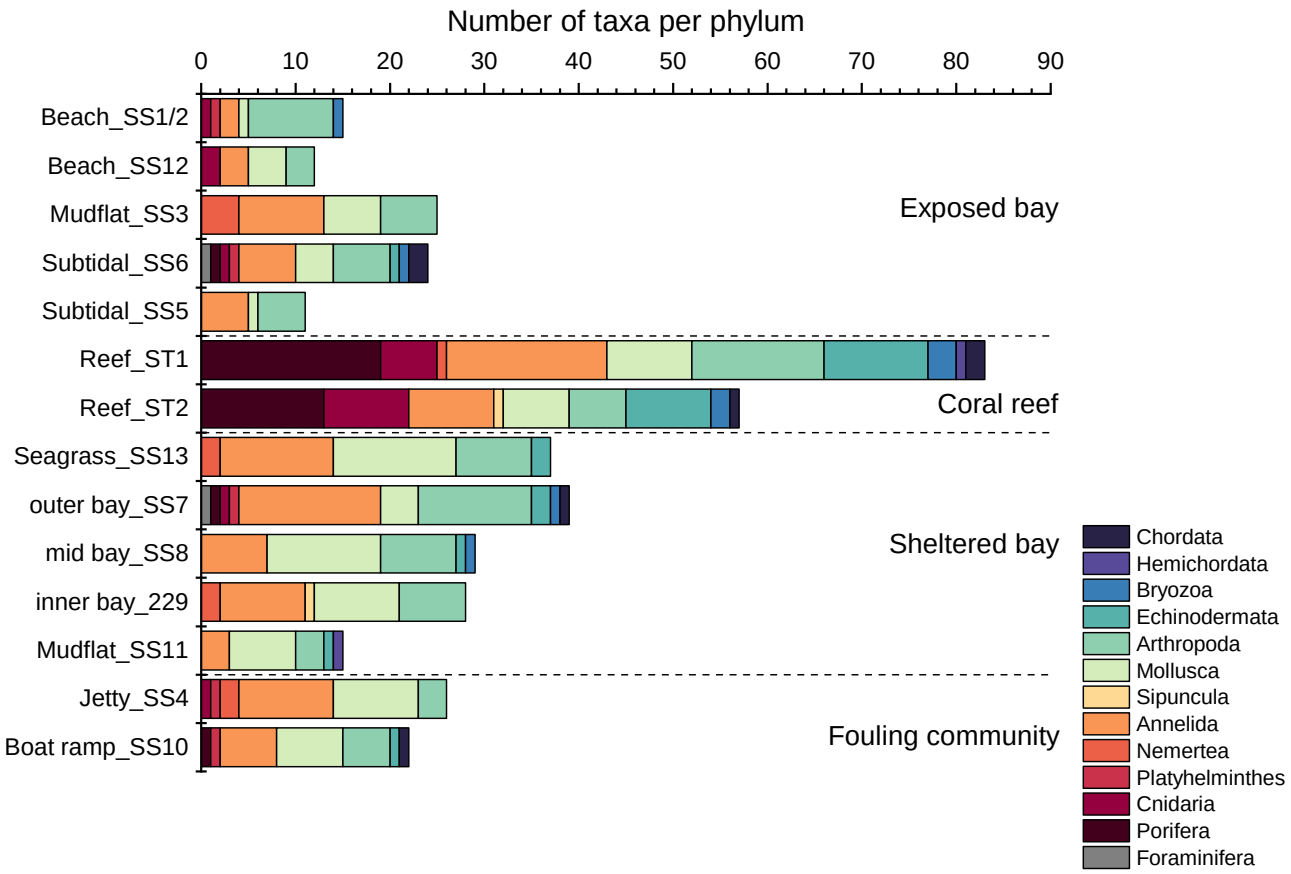

Figure 7. Taxonomic composition at the sampling sites for macoinvertebrates from soft sediments in exposed and sheltered bays, and from fouling communities and subtidal reefs. See Table 1 for site details.

Over 200 separate OTUs of marine invertebrates were collected from 10 rocky shore habitats during the Bush Blitz survey. Molluscs and arthropods were the dominant groups within these habitats, with gastropod species being the largest group identified (Figure 8). It must be noted that some of the broadly identified taxonomic groups (particularly the smaller, more cryptic crustacean taxa: Isopoda, Tanaidacea, and Amphipoda, as well as polychaetes) were not able to be identified to lower taxonomic units in time for reporting. It is possible that there are many additional species within that material, which could significantly expand species lists and diversity counts. This material will remain within the collections of the South Australian Museum until experts can access the material for further identifications.

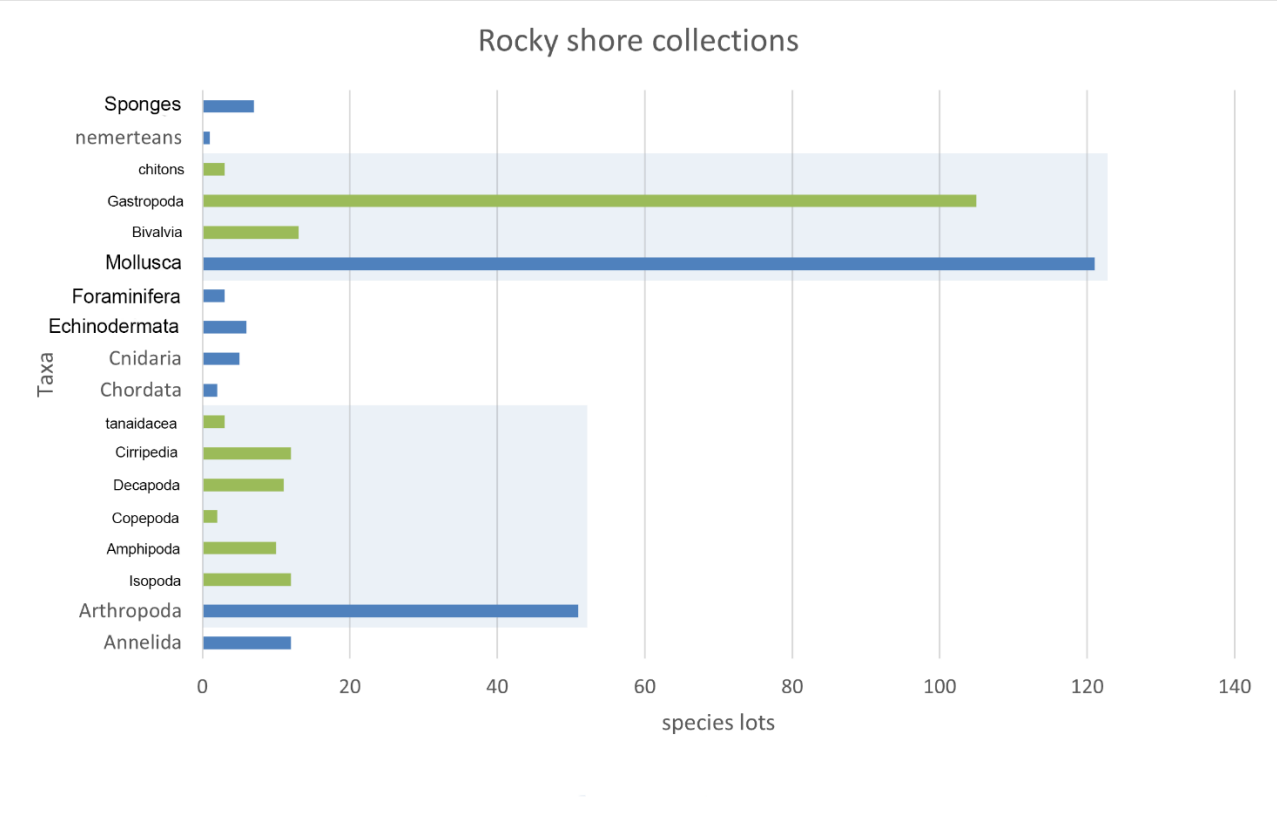

Figure 8. Diversity of marine invertebrate collected on rocky shore sites during the Yalata/Fowlers Bay bush blitz.

3.1 Un-named or not formalised taxa

The term “marine invertebrates” covers taxa across more than 20 individual phyla. Specialised taxonomists are needed to formally identify taxa past the Order or Family level and so identifications to species level are not always achievable. Almost 40% of the total marine invertebrate individuals (~250 OTUs) collected during the Bush Blitz trip were able to be identified to species level and a further 170 OTUs identified to genus or family level. Appendix 2 lists the marine invertebrate taxa identified to species. Additional data for all taxa identified to genera and above (e.g. family, order) is in the Point data file attached to this report.

Table 4. Putatively un-named or not formalised taxa

Taxon	Comment
Amphipoda	41 lots of amphipod crustaceans were collected across many sites and were not able to be sorted to species level in time for reporting. It is possible that 50+ species exist over 10+ families
Bryozoa	7 lots of bryozoans were collected with possible 3–4 species
Isopoda	30 lots of isopod crustaceans were collected across many sites and were not able to be identified to species level in time for reporting. It is possible that there are 25+ species over <10 families
Nemerteans	11 lots of nemertean worms were not able to be further identified

Oligochaetes	5 lots of oligochaete worms were not able to be further identified
Ophiuroids	9 lots of ophiuroid brittle stars were not able to be further identified in time for reporting. It is possible that there are <5 species present in the material
Polychaetes	Numerous lots of polychaete worms were not able to be identified further than family level. It is possible that there are 40+ species over 20+ families
Tanaidacea	13 lots of tanaidacean crustaceans were collected. It is possible that there are 10+ species over 5+ families
Sponges	More than 20 lots of marine sponges were collected and were not able to be further identified to species in time for reporting. It is possible that there are 15+ species over <10 families

3.2 Putative new species (new to science)

No putative new species were discovered from the material sorted to species level for reporting. For marine invertebrates, several groups such as polychaetes, nemerteans, and crustaceans (particularly Isopoda, Tanaidacea and Amphipoda) could not be identified to lower taxonomic units in time for reporting. It is possible that there are putative undescribed species within that material, which will remain within the collections of the South Australian Museum until experts can access the material for further identifications.

3.3 Exotic and pest species

There were no records of exotic or pest species recorded for fish or marine invertebrates surveyed and collected on this trip.

3.4 Threatened species

The *EPBC Act* List of Threatened Fauna is dominated by vertebrates, largely because these groups are relatively well-researched and well-known taxonomically. In contrast, invertebrate groups contain an incredibly large amount of undescribed biodiversity yet are not often listed as endangered or vulnerable species and this is likely due to the taxonomic impediment that encompasses a general lack of data, knowledge, and experienced taxonomists, and is most apparent within invertebrate research. When invertebrates are listed, the lists are dominated by molluscs and terrestrial insects from larger groups (beetles, butterflies etc.) that are traditionally more well-studied. Marine invertebrates are rarely included on Threatened Fauna lists and as such, there are no records of marine invertebrate threatened fauna species from this trip. Table 5 shows threatened species (2 mammals and 2 fish) seen in the BRUVS.

Table 5. Threatened species

Species	Listing status and level (EBPC, State/Territory)	Location sighted/observed	Indication of abundance
Neophoca cinerea	Threatened (EPBC & State)	Site 04 Point Fowler	N/A

Tursiops sp.	Threatened (State)	Site 02: Scott Bay	N/A
Achoerodus gouldii	Threatened (State)	Site 02 Scott Bay Site 03 Wandilla Bay	N/A
Galeorhinus galeus	Conservation Dependent (EPBC)	Site 01: Fowlers Bay	N/A

3.5 Range extensions

There are very few records of hard corals along the Far West Coast of South Australia in the Atlas of Living Australia (ALA). Our collections on this trip have confirmed *Turbinaria* cf. *mesenterina* (previously only known from an unconfirmed old SA Museum record in the GAB) and is the only record of the species in South Australia. *Plesiastrea versipora* and *Coscinaraea mcneilli* have also been confirmed for the first time in the western GAB. Finally, *Culicia hoffmeisteri* were identified in near shore reef habitats and are the first near shore records of this group in the western GAB based on ALA records.

Table 6. Range extensions or significant infill in distribution records for species

Species	**Location sighted/observed**	**Distance from nearest known record (km)**	**Comments**
Coscinaraea mcneilli	Point Fowler	~120km	First record of this species from shore collections (not offshore) in the western GAB, west of Smoky Bay
Plesiastrea versipora	Point Fowler	~270km	First records of this species in the western GAB, west of Venus Bay
Turbinaria cf. *mesenterina*	Point Fowler	~1600km	Confirms an old SA Museum record for this species in the GAB and is the only record of the species along the coastline of South Australia
Culicia hoffmeisteri	Point Fowler	~130km	These will be the first records in ALA from GAB intertidal (not offshore)

3.6 Genetic information

Hard corals were subsampled to confirm species identification through genetic analysis and to look for any genetic variation. Samples were kept in 95% EtOH and provided to Dr Zoe Richards (WA Museum/Curtin University). Results from the genetic analysis are not yet available, so hard coral species identification was based on morphology and external characteristics.

Subsampling of other marine invertebrates was undertaken for potential future analysis and were deposited at the SA Museum's Australian Biological Tissue Collection. These are directly linked in the database to the voucher collection and are accessible to external researchers.

4. Information on species lists

N/A

5. Information for land managers

Dog Fence Beach had a large amount of plastic on the beach, we filled and removed several rubbish bags.

6. Other significant findings

N/A

7. Conclusions

The identification and collection of the hard corals *Turbinaria* cf. *mesenterina, Plesiastrea versipora*, and *Coscinaraea mcneilli* from the Far West coast of South Australia are significant new records for the region. Molecular analyses of these specimens are ongoing and will become part of a larger molecular dataset that will help determine the evolutionary relationships of Australian hard corals. BRUVS fish surveys identified 57 fish species, including several new records for the region within the Atlas of Living Australia (ALA). Collections of marine invertebrates from soft sediment surveys, diving, and rocky reef collections resulted in the identification of 136 species and added a significant number of specimens (~650) from this poorly documented region to the SA Museum collections.

In summary, the Bush Blitz survey of the Far West coast region provided a comprehensive assessment and facilitated the collection of new material from the coastal and marine fauna and flora of an under-studied and remote region of southern Australia. As global warming will change current patterns around Australia, the tropicalisation of temperate seas is likely to intensify, increasing connectivity between the east and west coast of Australia. The data and specimens obtained during this survey form an important benchmark in our knowledge of distribution ranges of marine macroinvertebrates and fishes, and the specimens collected will be available as reference material for future use in molecular analyses to examine evolutionary relationships, as well as for examining climate change and species distributions.

Acknowledgements

We would like to thank the entire Bush Blitz team for managing the trip and providing our team with an opportunity to survey and collect data and specimens from the Far West Coast region. We would also like to acknowledge the Yalata Rangers (Sandro and team) as well as the Fowlers Bay Rangers for their willingness to share their knowledge of Country as it related to our sampling activities and for giving us permission to access collection sites. A big thank you to the community of Fowlers Bay for their welcome and interest in our work, especially to caterer Jess Viersma and her team.

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Appendix 1. List of vertebrates recorded during the Yalata 2021 Bush Blitz						
Family	**Species**	**Common name**	**Putative new species**	**Threatened (EPBC Act)**	**Threatened (State/ Territory**	**Exotic/ pest**
Arripidae	*Arripis georgianus*	Australian herring	No	No	No	No
Arripidae	*Arripis truttaceus*	Western Australian salmon	No	No	No	No
Berycidae	*Centroberyx gerrardi*	Bight redfish	No	No	No	No
Carangidae	*Pseudocaranx sp.*	Trevally sp.	No	No	No	No
Carangidae	*Seriola lalandi*	Yellowtail kingfish	No	No	No	No
Carangidae	*Trachurus novaezelandiae*	Yellowtail scad	No	No	No	No
Chaetodontidae	*Chelmonops curiosus*	Western talma	No	No	No	No
Cheilodactylidae	*Cheilodactylus nigripes*	Magpie perch	No	No	No	No
Cheilodactylidae	*Dactylophora nigricans*	Dusky morwong	No	No	No	No
Dasyatidae	*Bathytoshia brevicaudata*	Smooth stingray	No	No	No	No
Delphinidae	*Tursiops sp.*	Bottlenose dolphin	No	No	Yes	No
Dinolestidae	*Dinolestes lewini*	Longfin pike	No	No	No	No
Enoplosidae	*Enoplosus armatus*	Old wife	No	No	No	No
Gerreidae	*Parequula melbournensis*	Silverbelly	No	No	No	No
Kyphosidae	*Girella zebra*	Zebrafish	No	No	No	No
Kyphosidae	*Kyphosus sydneyanus*	Silver drummer	No	No	No	No
Labridae	*Achoerodus gouldii*	Western blue groper	No	No	Yes	No
Labridae	*Austrolabrus maculatus*	Blackspotted wrasse	No	No	No	No
Labridae	*Notolabrus parilus*	Brownspotted wrasse	No	No	No	No
Labridae	*Notolabrus tetricus*	Bluethroat wrasse	No	No	No	No
Labridae	*Ophthalmolepis lineolata*	Southern maori wrasse	No	No	No	No
Labridae	*Pictilabrus laticlavius*	Senator wrasse	No	No	No	No
Loliginidae	*Sepioteuthis australis*	Southern calamari	No	No	No	No
Monacanthidae	*Acanthaluteres vittiger*	Toothbrush leatherjacket	No	No	No	No
Monacanthidae	*Meuschenia flavolineata*	Yellowstriped leatherjacket	No	No	No	No
Monacanthidae	*Meuschenia freycineti*	Sixspine leatherjacket	No	No	No	No
Monacanthidae	*Meuschenia galii*	Bluelined leatherjacket	No	No	No	No
Monacanthidae	*Meuschenia hippocrepis*	Horseshoe leatherjacket	No	No	No	No

Family	Species	Common name	Putative new species	Threatened (EPBC Act)	Threatened (State/ Territory	Exotic/ pest
Monacanthidae	*Nelusetta ayraud*	Ocean leatherjacket	No	No	No	No
Monacanthidae	*Scobinichthys granulatus*	Rough leatherjacket	No	No	No	No
Mullidae	*Upeneichthys vlamingii*	Bluespotted goatfish	No	No	No	No
Myliobatidae	*Myliobatis tenuicaudatus*	Southern eagle ray	No	No	No	No
Neosebastidae	*Neosebastes scorpaenoides*	Common gurnard perch	No	No	No	No
Odacidae	*Haletta semifasciata*	Blue weed whiting	No	No	No	No
Odacidae	*Olisthops cyanomelas*	Herring cale	No	No	No	No
Odacidae	*Siphonognathus attenuatus*	Slender weed whiting	No	No	No	No
Otariidae	*Neophoca cinerea*	Australian sea lion	No	Yes	Yes	No
Pentacerotidae	*Pentaceropsis recurvirostris*	Longsnout boarfish	No	No	No	No
Pinguipedidae	*Parapercis ramsayi*	Spotted grubfish	No	No	No	No
Platycephalidae	*Platycephalus speculator*	Southern bluespotted flathead	No	No	No	No
Platycephalidae	*Platycephalus bassensis*	Southern sand flathead	No	No	No	No
Pomacentridae	*Parma victoriae*	Scalyfin	No	No	No	No
Portunidae	*Ovalipes australiensis*	Common sand crab	No	No	No	No
Rhinobatidae	*Trygonorrhina dumerilii*	Southern fiddler ray	No	No	No	No
Scorpididae	*Scorpis aequipinnis*	Sea sweep	No	No	No	No
Scorpididae	*Scorpis georgiana*	Banded sweep	No	No	No	No
Scorpididae	*Tilodon sexfasciatus*	Moonlighter	No	No	No	No
Serranidae	*Caesioperca rasor*	Barber perch	No	No	No	No
Sillaginidae	*Sillaginodes punctatus*	King George whiting	No	No	No	No
Sillaginidae	*Sillago bassensis*	Southern school whiting	No	No	No	No
Sparidae	*Chrysophrys auratus*	Pink snapper	No	No	No	No
Sphyraenidae	*Sphyraena novaehollandiae*	Snook	No	No	No	No
Terapontidae	*Pelsartia humeralis*	Sea trumpeter	No	No	No	No
Tetraodontidae	*Tetractenos glaber*	Smooth toadfish	No	No	No	No
Tetraodontidae	*Torquigener pleurogramma*	Weeping toadfish	No	No	No	No
Triakidae	*Galeorhinus galeus*	School shark	No	No	No	No
Triakidae	*Mustelus antarcticus*	Gummy shark	No	No	No	No

Appendix 2. List of marine Invertebrates recorded during the Yalata 2021 Bush Blitz						
Family	**Species**	**Common name**	**Putative new species**	**Threatened (EPBC Act)**	**Threatened (State/ Territory**	**Exotic/ pest**
ANNELIDA						
Eunicidae	*Eunice laticeps*	Bristle worm	no	no	no	no
ARTHROPODA						
Alpheidae	*Alpheus villosus*	Shrimp	no	no	no	no
Alpheidae	*Synalpheus harpagatrus*	Shrimp	no	no	no	no
Callianassidae	*Biffarius arenosus*	Shrimp	no	no	no	no
Callianassidae	*Biffarius ceramicus*	Shrimp	no	no	no	no
Callianassidae	*Biffarius limosus*	Shrimp	no	no	no	no
Callianassidae	*Calliaxina aequimanus*	Shrimp	no	no	no	no
Callianassidae	*Neocallichirus angelikae*	Shrimp	no	no	no	no
Catophragmidae	*Catomerus polymerus*	Barnacle	no	no	no	no
Chthamalidae	*Chthamalus antennatus*	Barnacle	no	no	no	no
Diogenidae	*Paguristes frontalis*	Hermit crab	no	no	no	no
Diogenidae	*Paguristes sulcatus*	Hermit crab	no	no	no	no
Eriphiidae	*Ozius truncatus*	Crab	no	no	no	no
Galatheidae	*Galathea australiensis*	Crab	no	no	no	no
Galatheidae	*Galathea magnifica*	Squat lobster	no	no	no	no
Grapsidae	*Cyclograpsus granulosus*	Crab	no	no	no	no
Grapsidae	*Leptograpsus variabilis*	Crab	no	no	no	no
Grapsidae	*Leptograpsus variegatus*	Crab	no	no	no	no
Hymenosomatidae	*Halicarcinus ovatus*	Crab	no	no	no	no
Idoteidae	*Euidotea bakeri*	Sea lice	no	no	no	no
Leucosiidae	*Bellidilia laevis*	Pebble crab	no	no	no	no
Ovalipidae	*Ovalipes australiensis*	Crab	no	no	no	no
Palaemonidae	*Palaemon dolospinus*	Shrimp	no	no	no	no
Palaemonidae	*Palaemon serenus*	Shrimp	no	no	no	no
Penaeidae	*Penaeus latisulcatus*	Prawn	no	no	no	no

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Tetraclitidae	*Tetraclitella purpuascens*	Barnacle	no	no	no	no
BRYOZOA						
Phidoloporidae	*Triphyllozoon moniliferum*	Lace coral	no	no	no	no
CHORDATA						
Pyuridae	*Pyura gibbosa*	Sea squirt	no	no	no	no
Ritterellidae	*Ritterella compacta*	Sea squirt	no	no	no	no
CNIDARIA						
Actiniidae	*Actinia tenebrosa*	Anemone	no	no	no	no
Coscinaraeidae	*Coscinaraea mcneilli*	Coral	no	no	no	no
Dendrophylliidae	*Turbinaria* cf. *mesenterina*	Coral	no	no	no	no
Mussidae	*Scolymia australis*	Coral	no	no	no	no
Nephtheidae	*Drifa gaboensis*	Soft coral	no	no	no	no
Plesiastreidae	*Plesiastrea versipora*	Coral	no	no	no	no
Porpitidae	*Velella velella*	By-the-Wind Sailor	no	no	no	no
Rhizangiidae	*Culicia hoffmeisteri*	Coral	no	no	no	no
ECHINODERMATA						
Amphiuridae	*Amphiura constricta*	Brittle star	no	no	no	no
Asterinidae	*Meridiastra calcar*	Sea star	no	no	no	no
Asterinidae	*Pseudonepanthia troughtoni*	Sea star	no	no	no	no
Asteropseidae	*Petricia vernicia*	Sea star	no	no	no	no
Comatulidae	*Cenolia trichoptera*	Feather star	no	no	no	no
Echinasteridae	*Echinaster arcystatus*	Sea star	no	no	no	no
Echinasteridae	*Plectaster decans*	Sea star	no	no	no	no
Goniasteridae	*Fromia polypora*	Sea star	no	no	no	no
Goniasteridae	*Nectria macrobranchia*	Sea star	no	no	no	no
Goniasteridae	*Nectria saori*	Sea star	no	no	no	no
Goniasteridae	*Pentagonaster dubeni*	Sea star	no	no	no	no

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Goniasteridae	*Tosia australis*	Sea star	no	no	no	no
Ophiotrichidae	*Ophiothrix caespitosa*	Brittle star	no	no	no	no
HEMICHORDATA						
Ptychoderidae	*Balanoglossus australiensis*	Acorn worm	no	no	no	no
MOLLUSCA						
Arcidae	*Barbatia (Barbatia) pistachia*	Clam shell	no	no	no	no
Batillariidae	*Zeacumantus diemenensis*	Snail shell	no	no	no	no
Batillariidae	*Zeacumantus plumbeus*	Snail shell	no	no	no	no
Buccinidae	*Cominella (Cominella) lineolata*	Snail shell	no	no	no	no
Bullidae	*Bulla quoyii*	Snail shell	no	no	no	no
Calyptraeidae	*Maoricrypta immersa*	Snail shell	no	no	no	no
Cerithiidae	*Cacozeliana granarium*	Snail shell	no	no	no	no
Cerithiidae	*Cacozeliana icarus*	Snail shell	no	no	no	no
Chromodoridae	*Ceratosoma brevicaudatum*	Snail shell	no	no	no	no
Chromodoridae	*Hypselodoris infucata*	Snail shell	no	no	no	no
Conidae	*Conus anemone*	Snail shell	no	no	no	no
Epitoniidae	*Cingulina magna*	Snail shell	no	no	no	no
Fasciolariidae	*Pleuroploca australasia*	Snail shell	no	no	no	no
Fissurellidae	*Clypidina rugosa*	Snail shell	no	no	no	no
Fissurellidae	*Cosmetalepas concatenata*	Snail shell	no	no	no	no
Hiatellidae	*Hiatella australis*	Clam shell	no	no	no	no
Lasaeidae	*Lasaea australis*	Clam shell	no	no	no	no
Litiopidae	*Styliferina translucida*	Snail shell	no	no	no	no
Littorinidae	*Afrolittorina praetermissa*	Snail shell	no	no	no	no
Littorinidae	*Austrolittorina unifasciata*	Snail shell	no	no	no	no
Littorinidae	*Bembicium nanum*	Snail shell	no	no	no	no
Lottiidae	*Lottia mixta*	Snail shell	no	no	no	no
Lottiidae	*Notoacmea flammea*	Snail shell	no	no	no	no

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Lottiidae	*Notoacmea mayi*	Snail shell	no	no	no	no
Lottiidae	*Patelloida alticostata*	Snail shell	no	no	no	no
Lottiidae	*Patelloida insignis*	Snail shell	no	no	no	no
Lottiidae	*Patelloida latistrigata*	Snail shell	no	no	no	no
Lucinidae	*Epicodakia tatei*	Clam shell	no	no	no	no
Lucinidae	*Notomyrtea botanica*	Clam shell	no	no	no	no
Malleidae	*Malleus meridianus*	Clam shell	no	no	no	no
Mesodesmatidae	*Anapella cycladea*	Clam shell	no	no	no	no
Mesodesmatidae	*Atactodea cuneata*	Clam shell	no	no	no	no
Mesodesmatidae	*Paphies angusta*	Clam shell	no	no	no	no
Mesodesmatidae	*Paphies cuneata*	Clam shell	no	no	no	no
Mesodesmatidae	*Paphies elongata*	Clam shell	no	no	no	no
Mopaliidae	*Plaxiphora albida*	Chiton	no	no	no	no
Muricidae	*Dicathais orbita*	Snail shell	no	no	no	no
Mytilidae	*Brachidontes erosus*	Mussel	no	no	no	no
Mytilidae	*Brachiodontes rostratus*	Mussel	no	no	no	no
Mytilidae	*Modiolus areolatus*	Mussel	no	no	no	no
Mytilidae	*Musculus nana*	Mussel	no	no	no	no
Mytilidae	*Mytilus edulis*	Mussel	no	no	no	no
Mytilidae	*Mytilus galloprovincialis*	Mussel	no	no	no	no
Mytilidae	*Trichomya hirsuta*	Mussel	no	no	no	no
Mytilidae	*Xenostrobus inconstans*	Mussel	no	no	no	no
Mytilidae	*Xenostrobus pulex*	Mussel	no	no	no	no
Nacellidae	*Cellana radiata*	Snail shell	no	no	no	no
Nacellidae	*Cellana solida*	Snail shell	no	no	no	no
Nacellidae	*Cellana tramoserica*	Snail shell	no	no	no	no
Nassariinae	*Nassarius pauperatus*	Snail shell	no	no	no	no
Nassariinae	*Nassarius pyrrhus*	Snail shell	no	no	no	no
Naticidae	*Eunaticina umbilicata*	Snail shell	no	no	no	no
Naticidae	*Natica incei*	Snail shell	no	no	no	no

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Naticidae	*Polinices conicus*	Snail shell	no	no	no	no
Neritidae	*Nerita atramentosa*	Snail shell	no	no	no	no
Olividae	*Cupidoliva nympha*	Snail shell	no	no	no	no
Patellidae	*Patella peroni*	Snail shell	no	no	no	no
Pectinidae	*Mimachlamys asperrima*	Clam shell	no	no	no	no
Pectinidae	*Semipallium aktinos*	Clam shell	no	no	no	no
Phyllidiidae	*Phyllidia nobilis*	Snail shell	no	no	no	no
Psammobiidae	*Hiatula biradiata*	Clam shell	no	no	no	no
Pupillidae	*Pupoides adelaidae*	Snail shell	no	no	no	no
Siphonariidae	*Siphonaria diemenensis*	Snail shell	no	no	no	no
Siphonariidae	*Siphonaria tasmanica*	Snail shell	no	no	no	no
Siphonariidae	*Siphonaria zelandica*	Snail shell	no	no	no	no
Solemyidae	*Solemya australis*	Clam shell	no	no	no	no
Trochidae	*Austrocochlea concumerata*	Snail shell	no	no	no	no
Trochidae	*Austrocochlea parcata*	Snail shell	no	no	no	no
Trochidae	*Austrocochlea rudis*	Snail shell	no	no	no	no
Trochidae	*Cantharidus lepidus*	Snail shell	no	no	no	no
Trochidae	*Chlorodiloma adelaidae*	Snail shell	no	no	no	no
Trochidae	*Clanculus plebejus*	Snail shell	no	no	no	no
Trochidae	*Diloma concameratum*	Snail shell	no	no	no	no
Trochidae	*Prothalotia lehmanni*	Snail shell	no	no	no	no
Trochidae	*Prothalotia pulcherrimus*	Snail shell	no	no	no	no
Trochidae	*Thalotia chlorostoma*	Snail shell	no	no	no	no
Trochidae	*Thalotia conica*	Snail shell	no	no	no	no
Turbinidae	*Turbo jourdani*	Snail shell	no	no	no	no
Turbinidae	*Turbo torquatus*	Snail shell	no	no	no	no
Turbinidae	*Turbo undulatus*	Snail shell	no	no	no	no
Veneridae	*Katelysia scalarina*	Clam shell	no	no	no	no
Volutidae	*Lyria mitraeformis*	Snail shell	no	no	no	no

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PORIFERA						
Clionaidae	*Spheciospongia papillosa*	Sponge	No	No	No	No
Microcionidae	*Holopsamma laminaefavosa*	Sponge	No	No	No	No
Spongiidae	*Coscinoderma pesleonis*	Sponge	No	No	No	No
Thorectidae	*Strepsichordaia calciformis*	Sponge	No	No	No	No