

# THE 1990 EXPEDITION TO CAMDEN HARBOUR, NORTH-WEST KIMBERLEY: PART 5 – MARINE INVERTEBRATES

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## INTRODUCTION

I was privileged to take part in the Camden Harbour Expedition in 1990 led by Kevin Coate. For details of the Expedition itinerary, map showing Expedition route and narrative of the Expedition see Coate (this publication). Collections of marine invertebrates, particularly corals and echinoderms, were made for the Western Australian Museum and are currently being incorporated in a Marine Fauna database for the whole of the Kimberley. Collecting was restricted to the intertidal areas and was necessarily opportunistic as marine fauna was not the major focus of the Expedition and collecting was dependent on being at a suitable locality during low tide.

I have made a number of trips to the Kimberley and each visit has surprised me with the wealth of corals in unlikely places, such as near river mouths and in enclosed bays, or in extremely turbid water where a few faviids survive and one, *Oulastrea crispata*, which has a naturally black skeleton, appears to thrive. Each trip has provided species not found previously in Western Australia.

Two early promotional publications (Stuart 1923 and Anon. c1933) drew attention to the beauty and productivity of Kimberley coral reefs, the latter calling the Kimberley the *Great North-West Coral Coast from Collier Bay to Napier Broome Bay*.

Unlike the corals, the echinoderm fauna is rather depauperate and generally found in areas of relatively clear water or where there is some current flowing.

## RESULTS

Collections of marine invertebrates were made at low tide, wherever possible, particularly of corals and echinoderms with molluscs collected opportunistically. Very few collections of corals have been made from the Kimberley coast where the coral fauna differs considerably from that of islands further from shore where corals were collected subtidally by scuba (reported by Marsh 1992a). A list of collecting stations in the vicinity of Camden Harbour and other areas visited is given in Appendix 1.

**Corals:** A total of 91 species of reef corals of 44 genera was recorded on this expedition (Appendix 2)



compared with a total of 106 species from the whole of the Kimberley (Veron 1993). 43 species recorded from the Kimberley by Veron were not found by me but 29 species appear to be new records for the Kimberley. One species, *Caulastrea curvata*, had not previously been found in Western Australia. In all about 180 species of 62 genera are now known from the Kimberley coast and nearshore islands and if the offshore atolls are included these figures jump to 350 species in 71 genera (WAM database).

Of particular interest was the finding of a coral community at the north end of Storr Island (stn 9) at the entrance to George Water which receives the outflow from the Glenelg River. The coral community here occupies a muddy rubble bank, coral cover is high but diversity is low, 22 species were recorded here including abundant *Caulastrea curvata*, other species common on the platform were a faviid, *Barabattoia amicum* and low growing branching *Porites* and *Montipora* species. From Rogers Strait (stn 2) and the south-eastern side of Augustus Island (stn 3) a combined total of 56 species was found. Montgomery Reef (stn 8) probably has the highest coral diversity of any nearshore site but limited sampling yielded 51 species.

In addition to the scleractinian corals two skeleton building octocorals, the red organ pipe coral (*Tubipora musica*) and blue

coral (*Heliopora coerulea*) were found at several sites as well as the hydrozoan stinging coral (*Millepora platyphylla*).

**Echinoderms:** Unlike the corals, the echinoderm fauna is rather depauperate and generally found in areas of relatively clear water or where there is some current flowing. Echinoderms were collected intertidally wherever possible but this collection yielded only ca33 species (Appendix 3) of the 85+ known from the Kimberley coast and nearshore islands (Marsh 1992b). Both figures are very low in comparison with the echinoderm fauna of the Dampier Archipelago where intensive sampling has revealed 286 species from 170 stations sampled by dredging, scuba diving and intertidal collecting (Marsh and Morrison 2004). Although the inshore waters of the Dampier Archipelago are moderately turbid the outer islands have fairly clear water preferred by most echinoderms.

In the Camden area, the most echinoderm species were found in one area (stns 2 and 3) in and near Rogers Strait, where there is a strong tidal current favouring crinoids (feather stars), 19 echinoderm species were recorded from this area. A brief collecting period at North Slate Island (stn 6) yielded a rare brittle star, *Ophiodyscrita acosmeta*, previously known only from the holotype, dredged off Broome in 1932 and from the Dampier Archipelago.



Undoubtedly many more echinoderms remain to be discovered in Kimberley waters but the high turbidity and prevalence of crocodiles make collecting hazardous.

## DISCUSSION AND CONCLUSIONS

It is difficult, perhaps pointless, to compare one area with another along the Kimberley coast as hydrological and topographic conditions vary from bay to bay and island to island. All are subjected to a high tidal range, up to 10 metres at extreme spring tides which generate strong currents and turbidity among the islands. In addition there is substantial river outflow in many places causing extreme seasonal changes in salinity. Nevertheless the coral fauna is extremely diverse and species rich while the echinoderm fauna is low in diversity and can be regarded as depauperate. It is postulated that the corals have a high level of resilience to variations in salinity and covering of silt which is periodically sloughed off with mucus. Some Faviids and in particular *Oulastrea crispata* can withstand periodic burying in mud, in fact the latter can only be found in muddy habitats. The Brecknock/ Camden Harbour area is not subjected to any river inflow as it lies between the catchments of the Glenelg and Prince Regent Rivers. Rogers Strait is subjected to strong currents funnelling between

Augustus Island and the mainland. This water movement provides a favourable environment for both corals and echinoderms and this proved to be the inshore area with the highest species richness with seventy-one percent of the coral species and 89% of the total genera collected on the expedition. For echinoderms 85% of the species and 88% of the genera are found in the Rogers Strait area. In general, the Kimberley coast and nearshore areas, although rich in corals has a rather depauperate echinoderm fauna compared with offshore areas such as Ashmore Reef.

Of special interest was the finding of a coral, *Caulastrea curvata* for the first time in Western Australia and a range extension for a rare brittle star *Ophiodyscrita acosmeta* from its type locality of Broome to the Slate Islands in Camden Sound.

## REFERENCES

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## **Appendix 1.** List of collecting stations for cnidarians and echinoderms.

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**Adele Island** (not numbered): (15°29'S,123°09'E) sand flats and reef platform between the island and Fraser Inlet anchorage.

**Stn 1:** (15°29'24"S,124°37'30"E) Shore below Government Camp and c100m east and west of landing place. Boulders at base of hill giving way to muddy sand flats, scattered corals and turnable boulders.

**Stn 2:** (15°24'44"S,124°38'24"E) Rogers Strait. Sampled reef and sand connecting a small island to Augustus Island. Diverse coral fauna on reef and boulders as well as *Sargassum* and other brown algae. Crinoids among rocks and coral.

**Stn 3:** (15°24'51"S,124°34'04"E) Reef on south east side of Augustus Island opposite Point Augustus, west of stn 2. Extensive sand and coral flat, echinoderms under boulders, dense population of fungiid corals.

**Stn 4:** (15°30'00"S,124°36'00"E) *Calliance* wreck site, a few corals.

**Stn 5:** (15°29'29"S,124°37'12"E) Dredged on shallow muddy sand between Sheep Island and the Government Camp site. Very unproductive.

**Stn 6:** (15°32'03"S,124°24'05"E) South end of North Slate Island. Bouldery beach, echinoderms under boulders, few corals.

**Stn 7:** (15°43'11"S,124°23'9"E) Prior Point, beach collecting, a few echinoid tests.

**Stn 8:** (15°57'S,124°13'E) Montgomery Reef, narrow inlet in reef with steep sides, scattered corals, echinoids, holothurians and ophiuroids.

**Stn 9:** (15°54'S,124°35'E) North end of Storr Island at entrance to George Water, off Doubtful Bay. Sand/rubble/coral bank off north end of Storr Island with good coral cover and a few echinoderms.

**Stn 10:** Bird Island. No collections.

**Stn 11:** (16°05'31"S,124°05'47"E) Kingfisher Island. Beach collecting.

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## Appendix 2. List of corals and collecting stations.

	Stations
Phylum CNIDARIA	
Class HYDROZOA	
Family Milleporidae (fire corals)	
<i>Millepora platyphylla</i> Hemprich & Ehrenberg, 1834	Adele Island
Class ANTHOZOA	
Subclass Octocorallia	
Order Coenothecalia	
Family Helioporidae (blue coral)	
<i>Heliopora coerulea</i> (Pallas, 1766)	2
Order Stolonifera	
Family Tubiporidae (organ pipe coral)	
<i>Tubipora musica</i> Linnaeus, 1758	Adele Island, 6,8
Subclass Hexacoralla	
Order Scleractinia (hard corals)	
Family Astrocoeniidae	
<i>Stylocoeniella guentheri</i> (Bassett-Smith, 1890)	3
Family Pocilloporidae	
<i>Pocillopora damicornis</i> (Linnaeus, 1758)	3
<i>Seriatopora caliendrum</i> Ehrenberg, 1834	8
<i>Seriatopora hystrix</i> Dana, 1846	8
<i>Stylophora pistillata</i> (Esper, 1797)	Adele Island
Family Acroporidae	
<i>Acropora aspera</i> (Dana, 1846)	8
<i>A. cf. austera</i> (Dana, 1846)	2,3,8
<i>A. cf. cerealis</i> (Dana, 1846)	8
<i>A. digitifera</i> (Dana, 1846)	8
<i>A. cf. horrida</i> (Dana, 1846)	2
<i>A. humilis</i> (Dana, 1846)	8
<i>A. hyacinthus</i> (Dana, 1846)	3,8
<i>A. millepora</i> (Ehrenberg, 1834)	Adele Island
<i>A. cf. nobilis</i> (Dana, 1846)	2,3
<i>A. cf. tenuis</i> (Dana, 1846)	8
<i>A. valida</i> (Dana, 1846)	8
<i>A. sp.1</i>	3,8
<i>A. sp.2</i>	8,9
<i>Astreopora myriophthalma</i> (Lamarck, 1816)	3,8
<i>Montipora digitata</i> (Dana, 1846)	Adele Island, 8,9
<i>M. monasteriata</i> (Forskål, 1775)	3
<i>M. cf. nodosa</i> (Dana, 1846)	8
<i>M. cf. peltiformis</i> Bernard, 1897	8

## Appendix 2 (cont.)

	Stations
<b>Family Poritidae</b>	
<i>Alveopora allingi</i> Hoffmeister, 1925	3
<i>Goniopora</i> cf. <i>djiboutiensis</i> Vaughan, 1907	Adele Island, 1,3
<i>G.</i> cf. <i>minor</i> Crossland, 1952	8,9
<i>G. tenuidens</i> Quelch, 1886	3
<i>Goniopora</i> sp.1	8
<i>G.</i> sp.2	8,9
<i>G.</i> sp.3	1
<i>Porites cylindrica</i> Dana, 1846	2,3,9
<i>P.</i> cf. <i>lutea</i> Edwards & Haime, 1860	2, 3, 8
<i>P. nigrescens</i> Dana, 1846	2,3,8,9
<b>Family Siderastreidae</b>	
<i>Psammocora contigua</i> (Esper, 1797)	3
<i>Pseudosiderastrea tayami</i> Yabe & Sugiyama, 1935	Adele Island, 3,9
<b>Family Agariciidae</b>	
<i>Coeloseris mayeri</i> Vaughan, 1918	3
<i>Pavona decussata</i> (Dana, 1846)	3
<b>Family Fungiidae</b>	
<i>Fungia fungites</i> (Linnaeus, 1758)	Adele Island, 2,3,8
<i>F. horrida</i> Dana, 1846	2
<i>F. concinna</i> Verrill, 1864	Adele Island, 3,8
<i>F. repanda</i> Dana, 1846	8
<i>Heliofungia actiniformis</i> (Quoy & Gaimard, 1833)	1,2,3
<i>Herpolitha limax</i> (Houttuyn, 1772)	2,3
<i>Polyphyllia talpina</i> (Lamarck, 1801)	3,8
<i>Ctenactis echinata</i> (Pallas, 1766)	3
<i>Sandalolitha robusta</i> (Quelch, 1884)	2
<i>Lithophyllon undulatum</i> Rehberg, 1892	3
<b>Family Oculinidae</b>	
<i>Galaxea astreata</i> (Lamarck, 1816)	3,8
<i>G. fascicularis</i> (Linnaeus, 1767)	2,3,8
<b>Family Pectiniidae</b>	
<i>Echinophyllia aspera</i> (Ellis & Solander, 1786)	3,8
<b>Family Mussidae</b>	
<i>Acanthastrea echinata</i> (Dana, 1846)	3,8
<i>A. hillae</i> Wells, 1955	3
<i>Lobophyllia hemprichii</i> (Ehrenberg, 1834)	2,3,8
<i>Symphyllia recta</i> (Dana, 1846)	1,2,8



**Family Merulinidae**

<i>Hydnophora pilosa</i> Veron, 1985	3
<i>Merulina ampliata</i> (Ellis & Solander, 1786)	2,8

**Family Faviidae**

<i>Barabattoia amicornum</i> (Edwards & Haime, 1850)	8,9
<i>Caulastrea curvata</i> Wijsman-Best, 1972	9
<i>C. tumida</i> Matthai, 1928	3,6,8
<i>Favia</i> cf. <i>favus</i> (Forskål, 1775)	1,2,8,9
<i>F. matthai</i> Vaughan, 1918	8
<i>F. pallida</i> (Dana, 1846)	1,9
<i>F. speciosa</i> (Dana, 1846)	1
<i>Favites abdita</i> (Ellis & Solander, 1786)	1,3,8,9
<i>F. chinensis</i> (Verrill, 1866)	2
<i>F. flexuosa</i> (Dana, 1846)	1,10
<i>F. pentagona</i> (Esper, 1794)	1,3,9
<i>Goniastrea aspera</i> Verrill, 1865	1,10
<i>G. pectinata</i> (Ehrenberg, 1834)	2,3,8
<i>G. retiformis</i> (Lamarck, 1816)	1,2,3,8
<i>G. palauensis</i> (Yabe, Sugiyama & Eguchi, 1936)	8,9
<i>Platygyra daedalea</i> (Ellis & Solander, 1786)	1,2,8,9
<i>P. lamellina</i> (Ehrenberg, 1834)	8
<i>P. pini</i> Chevalier, 1975	2
<i>P. sinensis</i> (Edwards & Haime, 1849)	3,8,9
<i>P. verweyi</i> Wijsman-Best, 1976	1,9
<i>Leptoria phrygia</i> (Ellis & Solander, 1786)	8
<i>Leptastrea pruinosa</i> Crossland, 1952	3,8,9
<i>Montastrea magnistellata</i> Chevalier, 1971	8
<i>M. valenciennesi</i> (Edwards & Haime, 1848)	3,8
<i>Moseleya latistellata</i> Quelch, 1884	2
<i>Oulastrea crispata</i> (Lamarck, 1816)	6
<i>Cyphastrea chalcidicum</i> (Forskål, 1775)	9
<i>C. microphthalma</i> (Lamarck, 1816)	3,9
<i>C. serailia</i> (Forskål, 1775)	Adele Island, 1,3

**Family Trachyphyllidae**

<i>Trachyphyllia geoffroyi</i> (Audouin, 1826)	1,4,8,9
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**Family Caryophyllidae**

<i>Catalaphyllia jardinei</i> (Saville-Kent, 1893)	3,8
<i>Euphyllia glabrescens</i> (Chamisso & Eysenhardt, 1821)	1,4,8,9

**Family Dendrophyllidae**

<i>Turbinaria bifrons</i> Brüggemann, 1877	2
<i>T. frondens</i> (Dana, 1846)	3
<i>T. stellulata</i> (Lamarck, 1816)	3,8

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### Appendix 3. List of echinoderms and collecting stations.

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#### Class CRINOIDEA

##### Family Comasteridae

<i>Comatula purpurea</i> (Müller, 1843)	3
<i>Comatella stelligera</i> (Carpenter, 1888)	3
<i>Comaster multifidus</i> (Müller, 1841)	2
<i>Comanthus gisleni</i> Rowe et al, 1986	3
<i>Comanthus parvicirrus</i> (Müller, 1841)	2, 3

##### Family Zygometridae

<i>Zygometra microdiscus</i> (Bell, 1882)	5
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##### Family Mariametridae

<i>Lamprometra palmata</i> (Müller, 1841)	3
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##### Family Antedonidae

<i>Dorometra nana</i> (Hartlaub, 1890)	2
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#### Class ASTEROIDEA

##### Family Oreasteridae

<i>Gymnanthenea globigera</i> (Döderlein, 1915)	3
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##### Family Asterinidae

<i>Aquilonastra coronata</i> (von Martens, 1866)	9
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#### Class OPHIUROIDEA

##### Family Ophiactidae

<i>Ophiactis savignyi</i> (Müller & Troschel, 1842)	3
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##### Family Amphiuridae

Genus and species indet.	5
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##### Family Ophiotrichidae

<i>Macrophiothrix caenosa</i> Hoggett, 2006	6
<i>M. paucispina</i> Hoggett, 1991	1, 6, 8, 9
<i>M. sp. cf. callizona</i> H.L. Clark, 1938	6
<i>M. sp.</i> (juvenile)	3
<i>Ophiothrix</i> spp. (juv.)	3
<i>Ophiothrix</i> ( <i>Keystonea</i> ) <i>nereidina</i> (Lamarck, 1816)	2, 3

##### Family Ophiocomidae

<i>Ophiarthrum elegans</i> Peters, 1851	3, 6, 8
<i>Ophiomastix mixta</i> Lütken, 1869	8

##### Family Ophiodermatidae

<i>Ophiarachnella infernalis</i> (Müller & Troschel, 1842)	1, 3, 6, 8, 9
<i>O. septemspinosa</i> (Müller & Troschel, 1842)	3
<i>Ophioconis cincta</i> Brock, 1888	3
<i>Ophiodyscrita acosmeta</i> H.L. Clark, 1938	6

Family <b>Ophiuridae</b>	
<i>Ophioplocus imbricata</i> (Müller & Troschel, 1842)	1, 3, 6, 8, 9
Class <b>ECHINOIDEA</b>	
Family <b>Cidaridae</b>	
<i>Phyllacanthus longispinus</i> Mortensen, 1918	2, 3, 8
Family <b>Diadematidae</b>	
<i>Diadema setosum</i> (Leske, 1778)	2
Family <b>Temnopleuridae</b>	
<i>Mespilia globulus</i> (Linnaeus, 1758)	1, 5, 8
Family <b>Parasaleniididae</b>	
<i>Parasalenia gratiosa</i> A. Agassiz, 1863	1
Family <b>Laganidae</b>	
<i>Peronella orbicularis</i> (Leske, 1778)	1, 5, 7, 11
Family <b>Loveniidae</b>	
<i>Breynia neanika</i> McNamara, 1982	1
Class <b>HOLOTHUROIDEA</b>	
Family <b>Holothuriidae</b>	
<i>Holothuria (Thymiosycia) impatiens</i> (Forskål, 1775)	8
<i>H. (Mertensiothuria) leucospilota</i> (Brandt, 1835)	1, Adele Island, 6, 8
<i>H. (Halodeima) atra</i> Jaeger, 1833	1, Adele Island, 6
Family <b>Stichopodidae</b>	
<i>Stichopus horrens</i> Selenka, 1867	Adele Island

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