

Groote Eylandt Bush Blitz

Annelida, Nemertea, Platyhelminthes

15 – 17 June

Submitted: October 2021



Cover (left to right): *Pseudoceros* sp. BBG1 (Platyhelminthes), photo: Adam Bourke; Purple-spotted Fireworm, *Chloeia flava* (Annelida), photo: Kate and Dave Oxenham; *Nemertea* sp. BBG1 (Nemertea), photo: Chris Glasby. Groote Eylandt, 15-17 June 2021. Copyright: photographers.

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>), with the exception that the former phylum Sipuncula are included in the Annelida based on recent literature (see Introduction).

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List of contributors (all Museum & Art Gallery Northern Territory (MAGNT))

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<i>Dr Richard Willan</i>	<i>Curator Mollusca</i>	<i>Survey participant, identified the chilopods and some Platyhelminthes</i>
<i>Ms Charlotte Watson</i>	<i>Research Associate</i>	<i>Identified one of the chrysopetalids</i>

Abstract

Annelida (including polychaetes and sipunculans), Nemertea and Platyhelminthes are poorly known from Groote Eylandt, Gulf of Carpentaria. A four-day survey of these three phyla was conducted from June 14-17, 2021, in marine coastal habitats on the western shores of the island. Seven coastal sites were sampled, including coarse sand beaches, 'marl' shores, sand bars, and rocky shores. We found 34 new records of species for Groote Eylandt. No introduced species were found. Two animal phyla - Platyhelminthes and Nemertea – were reported for the first time, and a third – Annelida – was only known previously from four offshore records. Among the Annelida the most interesting find was the new record of the eunicid *Palola* sp. 'BBG1' in a sample of beach rock at South Point. This species is rare in the NT because it's preferred habitat (limestone/beachrock) is limited; it highlights the potential uniqueness of the intertidal fauna of the interstices of limestone outcrops at South Point and North East Island (not sampled) for harbouring endemics. The incidental finding of two chilopod (centipedes) in the marine zone was one of few records of that class for Groote Eylandt. The study yielded important vouchered specimens and tissue samples that will facilitate ongoing systematic studies.

1. Introduction

Marine invertebrates are the foundation of marine ecosystems, and have a range of values including very high biodiversity, crucial intermediate components of the food web, cultural significance and use as food (e.g., molluscs), and tourism (e.g., corals). Worm-like invertebrates are very diverse covering a broad range of taxonomic groups including segmented worms (Annelida – the focus group – here comprising polychaetes and sipunculans), ribbon worms (Nemertea) and flat worms (Platyhelminthes). The former phylum Sipuncula are included in the Annelida based on morphological and molecular evidence (see Purschke et al. 2014).

With about 20,000 species worldwide, the class Polychaeta (phylum Annelida) are one of the dominant invertebrate groups in marine benthic habitats. They typically make up to 30-40% of all species and individuals in marine benthic samples and include many environmentally and economically significant invasive species. Yet, they are poorly known taxonomically, with genetic studies indicating the real number of polychaete species likely to be 2-5 times greater than the 11,500 reported (Pamungkas et al. 2019). As a result of this lack of taxonomic knowledge, particularly in northern Australia, it is difficult to assess species commonness, range or whether it is endemic, and as a result determining the status of a species (e.g., threatened, exotic) is not possible. The same taxonomic issues applies to Nemertea and Platyhelminthes.

Like many islands in the Gulf of Carpentaria, Groote Eylandt, is poorly sampled and its polychaete fauna is poorly documented. Prior to the survey there where only four polychaete specimens from the area in the MAGNT collection of over 30,000 lots; these four specimen lots are included in the inventory of this report, as historical data. An Atlas of Living Australia search (11 October 2021) verified these four Annelid records as the only ones present for the region, and also indicated that Nemertea, Platyhelminthes and sipunculans have not been reported from the Groote Eylandt region previously.

Nevertheless, the long, convoluted coastline of Groote Eylandt and varied geomorphologies on the island point to high diversity of habitats and thus high diversity of intertidal polychaetes. Further, the presence of commercial wharves having international shipping traffic points to the likelihood of the presence of introduced species and potential marine pests. Note specific sampling from the GEMCO wharf was beyond the scope of this fieldwork.

This current survey in the Groote Eylandt Indigenous Protected Area therefore held considerable potential to discover new species, and new records of Annelids and other worm phyla, in collaboration with Indigenous Rangers, traditional owners and educators.

2. Methods

2.1 Site selection

Site selection followed Bush Blitz guidelines, being mainly at or near the identified Bush Blitz coastal sites liaised with traditional owners. Collecting was restricted to a 4-day period (June 14-17) corresponding the period that C. Glasby was present on Groote. MAGNT field numbers (CG-21-02 to CG 21-09) were given to each collecting site, and collection data recorded, to facilitate distinction of the different habitats sampled at each site (see Point Data spreadsheet).

2.2 Survey techniques

At each site, we used standard, non-quantitative, procedures for collecting, marine invertebrates. The worm team (CG, OB) worked together with the mollusc and fish team at all sites in the period June 14-17. Survey technique depended on habitat, as follows:

Coastal sediments: digging to about 20-30 cm with a shovel or trowel, and hand picking worms (and tubes) that could be seen; to capture smaller forms we sieved sediments through a 1 of 2 mm sieve and collected the animals retained, which were sorted back in the lab.

Mangroves: mangrove leaf/branch litter were checked for worms by eye in the field and worms removed; the mangrove mud was root-bound and not able to be sampled using conventional techniques.

Coastal rocky (and marl) shore: Rocks up to 30 cm in diameter were collected, broken into small pieces using a geology pick, and placed in a 20-litre bucket. Seawater was added to the bucket and the water/rock mixture agitated for several minutes before the supernatant was poured through a 0.5 mm sieve. This was repeated three times. Worms retained in the sieve were washed into a collecting container, and sorted back in the lab.

Sampling was conducted under NT Fisheries Permit S17/3418. The taxa sampled do not require ethic committee approval, but were handled in a respectful and careful manner.

2.2.1 Methods used at standard survey sites

Standard survey sites were in terrestrial habitat so not applicable for the near-shore marine sampling undertaken for annelids.

2.3 Identifying the collections

All annelids were sorted and identified by C. Glasby, initially (to family/genus) in the lab of the Rangers Station, then more finely in the lab at MAGNT, Darwin. Charlotte Watson (MAGNT, Research Associate) provided the species name for *Chrysopetalum* sp. 7. Images of live specimens were captured for about half of the species. Specimens were either fixed in 10% seawater formalin or 100% DNA grade ethanol. All material was registered with MAGNT.

Chilopoda and Platyhelminthes were identified, in part, by Richard Willan.

Literature consultation was un-necessary (no relevant local guides for northern Australia).



Figure 1. (left to right). Olga Biriukova collecting in 'marl' habitat south of Emerald River, CG21-05 (photo, Chris Glasby). Richard Willan and Olga Biriukova collecting at South Point, CG21-07 (photo Chris Glasby). Mangroves at upper reaches of Second Creek, CG21-08 (photo, Chris Glasby). *Groote Eylandt*, 15-17 June 2021. Copyright: *photographer*.

3. Results and Discussion

Appendix 1 lists all Annelida, Nemertea, Platyhelminthes recorded during the Groote Eylandt Bush Blitz, in addition to four historical/literature records of Annelida from Groote Eylandt, and a single sight record of an amphinomid fireworm (Polychaeta) by Katie Oxenham on 31 July 2021 at Milyangkudakba Point (highlighted). In addition, we collected incidentally two specimens of a marine Chilopoda, which were identified as *Scolopendromorpha* sp. "BBG 1".

Annelids, particularly polychaetes, dominated the intertidal worm fauna of all habitats sampled Groote Eylandt, with 29 species representing 15 families, including the Phascolosomatidae (formerly Sipuncula). The Nemertea and polyclad Platyhelminthes were found only on rocky shores. The two chilipod (centipede) specimens were found in about 20 cm of water behind the mangrove zone. It indicates the remarkable ability of the normally terrestrial chilopods to withstand salt water for short periods.

3.1 Un-named or not formalised taxa

The majority of species found in the survey currently lack a formal name. They have been given alphanumeric species names, BBG1, BBG2, etc, where BBG = BushBlitz Groote. Most of the species listed in Table 1 are probably new species; however, further taxonomic studies are required to ascertain this. Aside from the species listed below, there are another six or so putative species in the diverse family Syllidae, which were not identified to morphospecies, although the record appears in the Appendix.



Figure 2. *Left: Ceratonereis* sp. 'BBG1' (photo, C. Glasby), *Right: polyclad* sp. 'BBG1' (photo: A. Bourke). Groote Eylandt 15-17 June 2021. Copyright: photographer.

Table 1. Putatively un-named or not formalised taxa	
Taxon	Comment
<i>Spiochaetopterus</i> sp. 'BBG1' (Chaetopteridae)	Probably the same as that from Nhulunbuy harbour (vouchers in MAGNT collection)
<i>Lysidice</i> sp. 'BBG1' (Eunicidae)	
<i>Palola</i> sp. 'BBG1' (Eunicidae)	Probably <i>Palola viridis</i> species group
<i>Ceratonereis</i> sp. 'BBG1' (Nereididae)	
<i>Neanthes</i> sp. 'BBG1' (Nereididae)	
<i>Pseudonereis</i> sp. 'BBG1' (Nereididae)	
oenonid sp.'BBG1' (Oeononidae)	
<i>Diopatra</i> sp. 'BBG1' (Eunicidae)	
<i>Leitoscoloplos</i> sp. 'BBG1' (Orbiniidae)	
<i>Phascolosoma</i> sp. 'BBG1' (sipunculan)	
<i>Lepidonotus</i> sp. 'BBG1' (Polynoidae)	
sepulid sp. 'BBG1' (Serpulidae)	
<i>Polydora</i> sp. 'BBG1' (Spionidae)	
<i>Rhynchospio</i> sp. 'BBG1' (Spionidae)	
<i>Scolecopsis</i> sp. 'BBG1' (Spionidae)	
<i>Amphitrides</i> sp. 'BBG1' (Terebellidae)	
sipunculan sp. 'BBG2'	
Scolopendromorpha sp. 'BBG1' (Chilopoda)	
nemertean sp. 'BBG1' (Nemertea)	
nemertean sp. 'BBG2' (Nemertea)	
<i>Pseudoceros</i> sp. 'BBG1' (Platyhelminthes)	See photograph on BushBlitz Twitter (A. Bourke)
polyclad sp. 'BBG1' (Platyhelminthes)	See photograph on BushBlitz Twitter (A. Bourke; identified as <i>Pseudoceros</i> sp., but possibly incorrect).
polyclad sp. 'BBG2' (Platyhelminthes)	

3.2 Putative new species (new to science)

Three putative new species were identified, although only one (*Namalycastis* sp. 'BBG1') was as a direct result of the Groote Eylandt Bush Blitz survey. The other two were known from other collections and are currently being studied at MAGNT by Glasby (*Perinereis nuntia* sp. gp; Nereididae) and Watson (*Chrysopetalum* sp. 7 complex; Chrysopetalidae) (Table 2).

Species	Comment
<i>Chrysopetalum</i> sp. 7 complex	Currently being described by C. Watson
<i>Namalycastis</i> sp. 'BBG1'	Will be described by C. Glasby
<i>Perinereis nuntia</i> sp. gp	Currently being described by C. Glasby

3.3 Exotic and pest species

No exotic/pest species (listed or not under Commonwealth or State/Territory legislation) were identified in the survey. However, as noted we did not sample at the most likely site for pests (Gemco wharf). Existing unsorted samples held at MAGNT collected in 2006 by Fisheries Introduced Species officers could hold potential introduced species.

3.4 Threatened species

We found no species listed as critically endangered, endangered, vulnerable or conservation dependent under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 and/or equivalent categories in State/Territory legislation.

3.5 Range extensions

All formally named species reported from Groote Eylandt itself (not including historical offshore records) are range extensions because, as explained in the Introduction, there are no published records of the target taxa from Groote Eylandt. The offshore records of *Nicon rotunda* and *Synelmis sergi* have been published previously (Hutchings & Reid 1988; Glasby & Marks 2013). In Table 3, the approximate straight-line distance from the nearest known record is provided in the case where distances were 'small', otherwise the nearest location is provided.

Species	Location sighted/observed	Distance from nearest known record (km)	Comments
<i>Chloeia flava</i>	Milyangkwudakba Point	~5 km	Many records offshore from Groote Eylandt
<i>Bhawania amboinensis</i> sp. gp	South Point	Nhulunbuy	Widely distributed throughout the Indo-west Pacific

<i>Perinereis helleri</i>	W coast Groote E.	Cape York	Widespread in northern Australia
<i>Perinereis nigropunctata</i>	South Point	Cape York	Widespread in northern Australia
<i>Perinereis nuntia</i> sp. gp	W coast Groote E.	Lizard Is, northern GBR	Widespread in Indo-west Pacific and northern Australia, but only sand habitats
<i>Perinereis vancaurica</i>	Emerald Creek	Nhulunbuy	Widely distributed throughout the Indo-west Pacific
<i>Leitoscoloplos latibranchus</i>	Emerald Creek	Darwin	Widespread in Australia
<i>Myrianida pachycera</i>	South Point	Nhulunbuy	Widely distributed throughout the Indo-west Pacific and northern Australia



Figure 3. Left. *Myrianida pachycera*, showing epitokous reproduction with the adult (left) budding off a chain of reproductive individuals, each successively older (and bigger) than the former one (photo, C. Glasby). Right: oeonid sp. 'BBG1' (photo, C. Glasby), Groote Eylandt 15-17 June 2021. Copyright: photographer.

3.6 Genetic information

Tissue samples for genetics *per se* were not taken, but samples indicated in column V in the Point Data spreadsheet, registered at MAGNT and preserved in 100% ethanol and are available for molecular analysis.

4. Information on species lists

As well as containing a complete list of species collected during the fieldwork, Appendix 1 also contains a few historical records from the Groote Eylandt area and one post-field trip record. Nevertheless, the list underestimates greatly the actual diversity of Annelida, Platyhelminthes and Nemertea of Groote Eylandt, which is likely to be in excess of 500 species, given its size and the diversity of habitats. In order to better document this fauna of the area, we recommend studying samples from a greater range of habitats around the island, and including offshore substrates. To this end, MAGNT holds a small collection of unsorted marine invertebrates associated with NT fisheries standard/routine rope mop collections, circa 2006, collected on the GEMCO wharf, Groote Eylandt. Identification of the polychaetes in this collection would yield further new species records, and possibly new species (native or exotic). In addition, MAGNT anticipates receiving a large collection of benthic marine worms from Bardalumba Bay as part of an ecological survey to be conducted November 2021. This material from shallow offshore water will contain a completely different suite of annelids (and other worms) as reported here. Identification of Annelida from both locations will substantially add to the list of species reported here.

New species will be described as time and resources allow.

5. Information for land managers

The habitats sampled during the fieldwork were limited acting as a pilot study, so it was not possible to get a full appreciation of 'uniqueness' or 'quality', or to estimate species rarity. We note the presence of several potential indicator species, belonging to the families Capitellidae (not reported, as they were not identified beyond family) and Spionidae, including *Polydora* sp. 'BBG1' and *Scolelepis* sp. 'BBG1', but we did not find them in large numbers suggesting that there was no substantial nutrient enrichment.

Of interest was the presence of *Palola* sp. 'BBG1' (Eunicidae) in a sample from beach rock at South Point. This species is rare in the NT because of limited preferred habitat (limestone or beachrock). Members of the genus are known to spawn annually in February-March in Indonesia and Timor Leste, and in November on the Great Barrier Reef. In Australia, spawning is often associated with well-known coral spawning events, but in the Indonesian Archipelago, the palolo spawning is an event in itself, underpinning cultural ceremonies on several islands (Lombok, Sumba, Timor Leste). With this in mind, the limestone outcrops at South Point and NE Island are quite unique for the region and worthy of conservation efforts. While no rare or endemic species were found, further surveying should be undertaken to more fully explore this aspect with the potential for discovery noted as high.

6. Other significant findings

No further findings to report at this stage.

7. Conclusions

The most significant finding of the study was the number of new records (34 species) for Groote Eylandt. Two animal phyla - Platyhelminthes and Nemertea – were reported for the first time, and a third – Annelida – was only known previously from four records, all of which were found offshore from the island. Many of the new records will be shown to represent new species, with further study. The incidental finding of two chilipod (centipede) specimens in shallow marine water indicates the remarkable ability of the normally terrestrial chilopods to withstand salt water for short periods. The potential for discovery of new records and species new to science on Groote Eylandt through additional surveying and post survey study is high.

Acknowledgements

We would like to acknowledge the Traditional Owners of the Groote Eylandt Archipelago, and recognise their ongoing cultural connection to land and sea country. We pay our respects to Elders past, present and emerging. We thank Traditional Owners and the Anindilyakwa Land Council for allowing us to conduct our survey and the Anindilyakwa Land and Sea Rangers for their help and involvement, with a special thanks to Katie Oxenham for her organising efforts. The field assistance and enthusiasm of teachers participating in TeachLive was also gratefully received. Last but not least, we wish to thank the helicopter pilots, catering staff and Bush Blitz team for their help on the survey.

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Appendices

Appendix 1. List of Annelida, Nemertea, Platyhelminthes (and incidental Chilopoda) recorded during the Groote Eylandt Bush Blitz. Those highlighted represent historical records or post-field trip records.

Phylum/Class	Family	Species
Annelida	Amphinomidae	Chloeia flava (post field trip visual record, and ALA records)
Annelida	Capitellidae	Unknown (poor condition)
Annelida	Chaetopteridae	Spiochaetopterus sp. 'BBG1'
Annelida	Chrysopetalidae	Bhawania amboinensis sp. group
Annelida	Chrysopetalidae	Chrysopetalum sp. 7 complex
Annelida	Eunicidae	Lysidice sp. 'BBG1'
Annelida	Eunicidae	Palola sp. 'BBG1'
Annelida	Nereididae	Ceratonereis sp. 'BBG1'
Annelida	Nereididae	Namalycastis sp 'BBG1'
Annelida	Nereididae	Neanthes sp. 'BBG1'
Annelida	Nereididae	Nicon rotunda (see Hutchings & Reid 1988)
Annelida	Nereididae	Perinereis helleri
Annelida	Nereididae	Perinereis nigropunctata
Annelida	Nereididae	Perinereis nuntia sp. group
Annelida	Nereididae	Perinereis vancaurica
Annelida	Nereididae	Pseudonereis sp. 'BBG1'
Annelida	Oeonidae	oeonid sp.'BBG1'
Annelida	Onuphidae	Diopatra sp. 'BBG1'
Annelida	Orbiniidae	Leitoscoloplos latibranchus
Annelida	Orbiniidae	Leitoscoloplos sp. 'BBG1'
Annelida (formerly Sipuncula, as per AFD)	Phascolosomatidae	Phascolosoma sp. 'BBG1'
Annelida	Pilargidae	Synelmis sergi (see Glasby & Marks 2013)
Annelida	Polynoidae	Lepidonotus sp. 'BBG1'
Annelida	Serpulidae	sepulid sp. 'BBG1'
Annelida	Spionidae	Polydora sp. 'BBG1'
Annelida	Spionidae	Rhynchospio sp. 'BBG1'
Annelida	Spionidae	Scolelepis sp. 'BBG1'
Annelida	Syllidae	Myrianida pachycera
Annelida	Syllidae	syllids (~6 undetermined species)
Annelida	Terebellidae	Amphitrides sp. 'BBG1'
Annelida	unknown	sipunculan sp. 'BBG2'
Chilopoda	Scolopendromorpha	Scolopendromorpha sp. 'BBG1'
Nemertea	unknown	nemertean sp. 'BBG1'
Nemertea	unknown	nemertean sp. 'BBG2'
Platyhelminthes	Pseudocerotidae	Pseudoceros sp. 'BBG1'
Platyhelminthes	unknown	polyclad sp. 'BBG1'
Platyhelminthes	unknown	polyclad sp. 'BBG2'