

Appendix F37

Sinclair Knight Merz Ltd 2009

Scott Reef Invasive Marine Species Survey



BROWSE FLNG DEVELOPMENT
Draft Environmental Impact Statement

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Scott Reef Invasive Marine Species Survey



SURVEY REPORT

- Rev 1
- 3 March 2008



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The sole purpose of this report and the associated services performed by Sinclair Knight Merz (SKM) is to identify / review / assess IMS of concern at Scott Reef in accordance with the scope of services set out in the contract between SKM and Woodside Energy Ltd. That scope of services was defined by the request of the Client.

SKM derived the data in this report primarily from the data provided by the Client. The passage of time, manifestation of latent conditions or impacts of future events may require further exploration at the site and subsequent data analysis, and re-evaluation of the findings, observations and conclusions expressed in this report.

In preparing this report, SKM has relied upon and presumed accurate certain information (or absence thereof) as provided by the Client in relation to the assessment and identification of IMS of concern at Scott Reef. Except as otherwise stated in the report, SKM has not attempted to verify the accuracy or completeness of any such information.

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Executive Summary

Woodside Energy Ltd. (Woodside) is in the initial stages of developing major gas resources identified in the Browse Basin, off the north coast of Western Australia. This has already resulted in considerable vessel activity in the region of Scott Reef which may increase further along with the future proposed activities. The current and future increase in vessels at Scott Reef potentially increases the risk of introducing invasive marine species (IMS).

To manage the risk of IMS, Woodside has contracted Sinclair Knight Merz (SKM) to determine the current status of IMS at Scott Reef and to develop a long term monitoring programme to survey for any future introductions. The baseline survey is proposed to occur over two seasons, towards the end of the dry season (September / October 2008) and immediately after the wet season (April / May 2009). This report describes the results of the first IMS baseline survey, undertaken from 26 September to 6 October 2008, with the goal of developing a baseline understanding of the presence or absence of invasive marine species on the reef. The survey methods were based on the recommended IMS survey strategy, developed by the National Introduced Marine Pests Coordination Group (NIMPCG). The specific objectives of this survey were to:

- detect any new incursions of IMS that are already established elsewhere in Australia, but are not recorded at Scott Reef
- detect IMS not previously recorded in Australia, but are known to be pests elsewhere
- establish the current status of non-indigenous marine species, including invasive species, to form the basis for a future monitoring program.

Seven study sites were established in areas already affected by human activity and those areas most likely to be affected by human activity in the future. These areas were selected on the basis that they are most susceptible to the settlement of IMS as a result of these activities; two sites on north Scott Reef and five sites on south Scott Reef. The areas investigated included both natural and artificial habitats and included the two known shipwrecks.

This survey specifically targeted IMS of concern to Scott Reef. These species were selected initially based on the NIMPCG Target Species Monitoring List with the inclusion of other species considered in previous studies to be potentially invasive in north-west Australia. These species included marine algae, molluscs, one cnidarian, polychaetes, crustaceans, and an ascidian. In addition, the survey also monitored for the presence of unlisted species that exhibited invasive characteristics.

Two main survey techniques were utilised for the surveys: low tide intertidal walking transects; and beam trawls. The intertidal walking transects were 100 m long and 2 m wide. Each transect was initially visually assessed and in addition, two 0.3 m² quadrats within each transect were



closely examined and photographed. Beam trawl transects sampled areas 375 m long and 1 m wide in shallow waters, mostly in depths less than 6 m.

Snorkel transects were used as an additional survey method and were undertaken opportunistically between tides. Snorkel transects were used to focus on sub-litoral areas within the survey sites, which were not accessible at low tide and could not be surveyed successfully with intertidal walking transects.

The survey did not identify any IMS of concern to Scott Reef. The survey did record a wide variety of species including 181 molluscs, 107 algae, 28 crustaceans and a large number of polychaete species of which six species were able to be identified. Due to the current poor state of polychaete taxonomy, most polychaetes could not be identified to the level of species.

While this survey has focused on the occurrence of IMS at Scott Reef, the existence of native species that may represent an invasive species threat elsewhere has not been overlooked. *Avrainvillea amadelpa*, a native species to Scott Reef, has been identified as an invasive algae in the Hawaiian Islands (Huisman et al. 2007) and its existence at Scott Reef may need to be considered in relation to future activities to minimise the threat of translocation.

A series of fifteen monitoring arrays were installed in six areas of Scott Reef to monitor for the presence of any invasive marine species that may settle and grow subsequent to this survey. It is suggested that these monitoring arrays are collected at least three times over a twelve month period.

In accordance with the NIMPCG criteria, a second survey is required and is planned to be undertaken following the cyclone season in April/May 2009.



1. Introduction

Woodside Energy Ltd. (Woodside) is in the initial stages of developing major gas resources off the north coast of Western Australia in the Browse Basin, located in the area under and adjacent to Scott Reef (**Figure 1-1**). While the concept for developing this gas field is in the early stages, there has already been a considerable increase in vessel activity in the region of Scott Reef. The current and potential increase in vessel activity associated with the development of the Browse gas field increases the possibility of introducing invasive marine species (IMS) to Scott Reef.

Scott Reef is biologically significant as one of the few shelf edge atolls in north-western Australia. The biota of the reef differs significantly from that of the inshore continental coastline, with a high number of species not found inshore. Due to the environmental values associated with Scott Reef it has been listed on the Register of the National Estate (DEWHA 2008). Sandy Islet, situated on the western side of south Scott Reef and some areas of south Scott Reef are also a Western Australian Class C nature reserve, managed down to the low water mark by the Department of Environment and Conservation (DEC).

The possible introduction of 'non indigenous' marine species is not unique to Scott Reef, but is in fact a worldwide issue. It is considered to be second only to habitat change as a threat to global biodiversity (Millennium Ecosystem Assessment 2005). Most introduced marine species cause no apparent harm, but a small proportion are invasive and become recognised pest species that can devastate marine ecosystems, foul industrial infrastructure and introduce diseases. Once an IMS becomes established in a new environment, it is almost impossible to eradicate. While there have been more than 200 introduced species reported to exist in Australia (CRIMP 2001), only two successful eradications have occurred: the black striped mussel *Mytilopsis sallei* in Darwin (Willan et al. 2000) and the alga *Caulerpa taxifolia* in West Lakes, near Adelaide, South Australia (M. Sierp, SARDI, pers. comm.). The environmental, economic and social costs associated with IMS introductions can be substantial (Carlton 2001; Hayes et al. 2005). For this reason, it is fortunate that only a small proportion of introduced species are invasive and become pests.

Compared to the other States and Territories, Western Australia has relatively few introduced marine species. To date, a total of 61 introduced marine species have been recorded (Huisman et al. 2008; McDonald et al., in prep.), and only four of these are considered as IMS and thus are on the national monitoring target species list (NIMPCG 2006a,b).

Disturbed and artificial habitats are known to be areas where IMS can establish. While human activities are generally responsible for the creation of artificial habitats, disturbed habitats may be created as a result of human activities or natural causes. The shallow water communities of Scott Reef have had considerable natural disturbance in recent years. In 1998, the reef was severely affected by a worldwide coral reef bleaching event (Gilmour and Smith 2006). It was estimated that 80% of the corals in waters <20m deep were killed; corals in deep areas were largely unaffected.



As the coral communities were recovering from the 1998 bleaching, they were hit by two more destructive events. There was a second bleaching in 2003, though not as severe as in 1998 and then Cyclone Fay, a Category 5 storm, passed directly over the reef, with winds at the reef exceeding 300 km/hr. This 1 in 100 year event again severely damaged the reef (Gilmour and Smith 2006). Such disturbance substantially increases access to available habitat conducive to IMS settlement (Neil et al. 2005; SKM 2007).

In recognition of the IMS issue, Woodside requested Sinclair Knight Merz Pty Ltd (SKM) to design and undertake an IMS baseline survey of Scott Reef and to develop a longer term IMS survey and monitoring programme (SKM 2008a). The survey component is proposed to be undertaken in two parts, as necessary to fulfil the NIMPCG national survey criteria that stipulate the requirement for surveys to sample for identified target species in alternate seasons. This report presents the results of the baseline IMS survey undertaken at Scott Reef in September/October 2008.

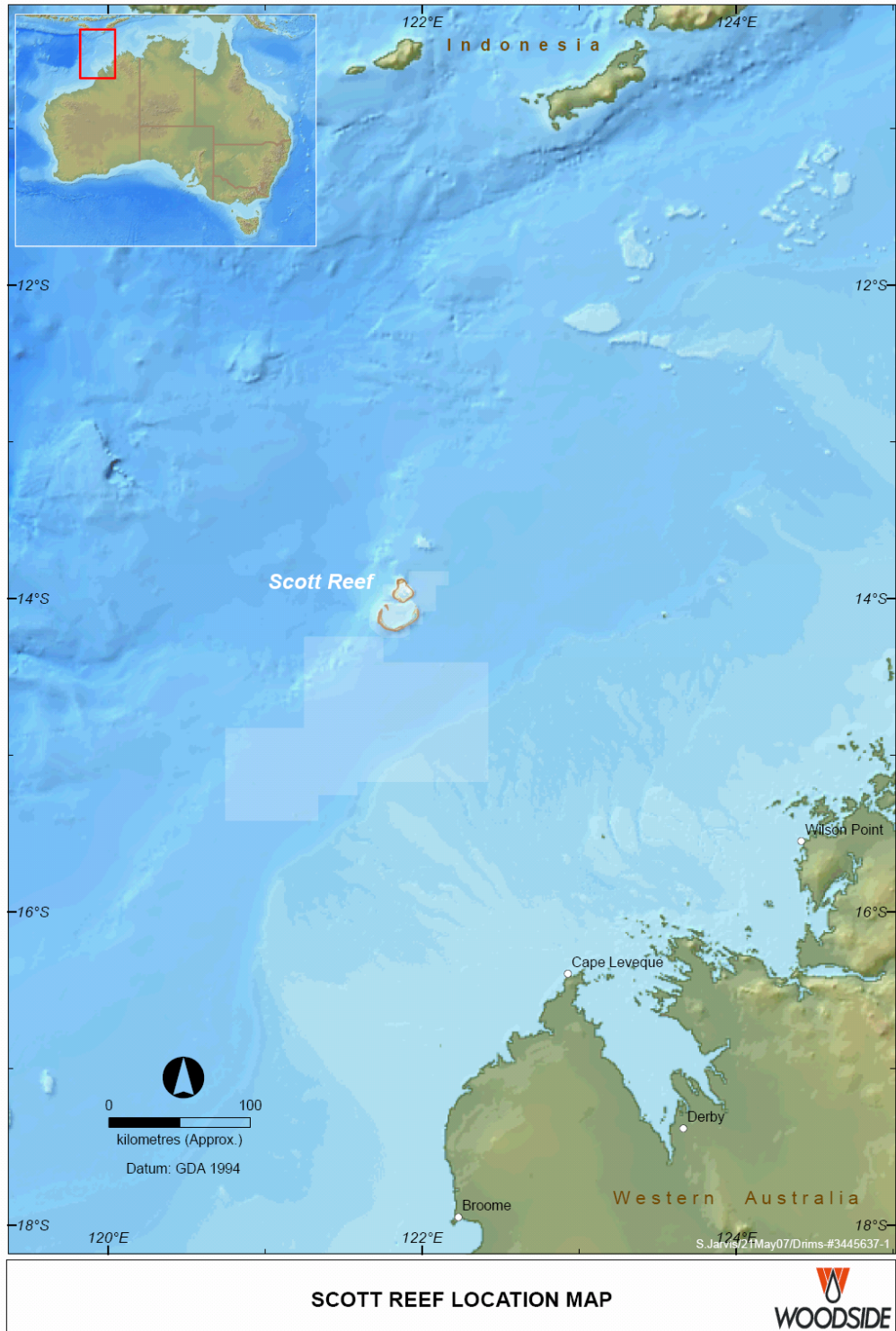


Figure 1-1: Map of north-western Australia showing the location of Scott Reef

2. Survey Strategy

2.1. Objectives of the survey and monitoring program

The primary objectives of the survey and monitoring program at Scott Reef are based on those of the NIMPCG Monitoring Strategy (2006a; 2006b). While this approach is primarily focused on marine pest species, there are provisions for the identification of unlisted species demonstrating invasive characteristics. The primary objectives of this survey are therefore:

- to detect any new incursions of IMS that are already established elsewhere in Australia but are not recorded at Scott Reef
- to detect IMS not previously recorded in Australia, but are known to be pests elsewhere
- to establish the current status of non-indigenous marine species, including invasive species at Scott Reef, to form the basis for a future monitoring program.

Full details of the sampling strategy developed for the Scott Reef survey and monitoring program are included in SKM (2008a).

2.2. The Scott Reef habitat

Scott Reef comprises of two separate reefs (north Scott and south Scott Reef) separated by a 2 km wide channel which reaches depths of 250 m (**Figure 2-1**). Eleven benthic habitat types have been described and recorded at south and north Scott Reef (AIMS 2006, **Figure 2-1**).

South Scott Reef is horseshoe-shaped with a maximum width of 28 km and is 18 km from north to south with a total area of 43,657 ha (AIMS 2006). Sandy Islet, a small sandy cay situated on the north-western most point of south Scott Reef, is the only area that remains exposed at high tide. South Scott Reef is surrounded by an extensive reef flat that varies in width from between 2 km and 3 km. The inner part of the reef flat drops off sharply to a depth of approximately 50 m. There is extensive coral coverage in this region, providing a unique assemblage of deep water corals.

North Scott Reef is smaller with a total area of 17,050 ha (AIMS 2006), and forms a complete atoll. The reef flat varies between 1 km and 2 km in width. The atoll has two entrances, the larger being near the south-western corner of the reef and the smaller on the north-eastern side. Inside the reef flat, north Scott Reef is relatively shallow with depths to about 20 m.

The reef flat is the key habitat for the survey for IMS, as it is the area most affected by disturbances, both natural (coral bleaching, Cyclone Fay) and the few human disturbances (intertidal collecting by Indonesian fishermen and the two wrecks). The reef flat area is most accessible for reef walks at low water on spring tides and has a total area of 8,522 ha on south Scott Reef and 4,703 ha on north Scott Reef (AIMS 2006).

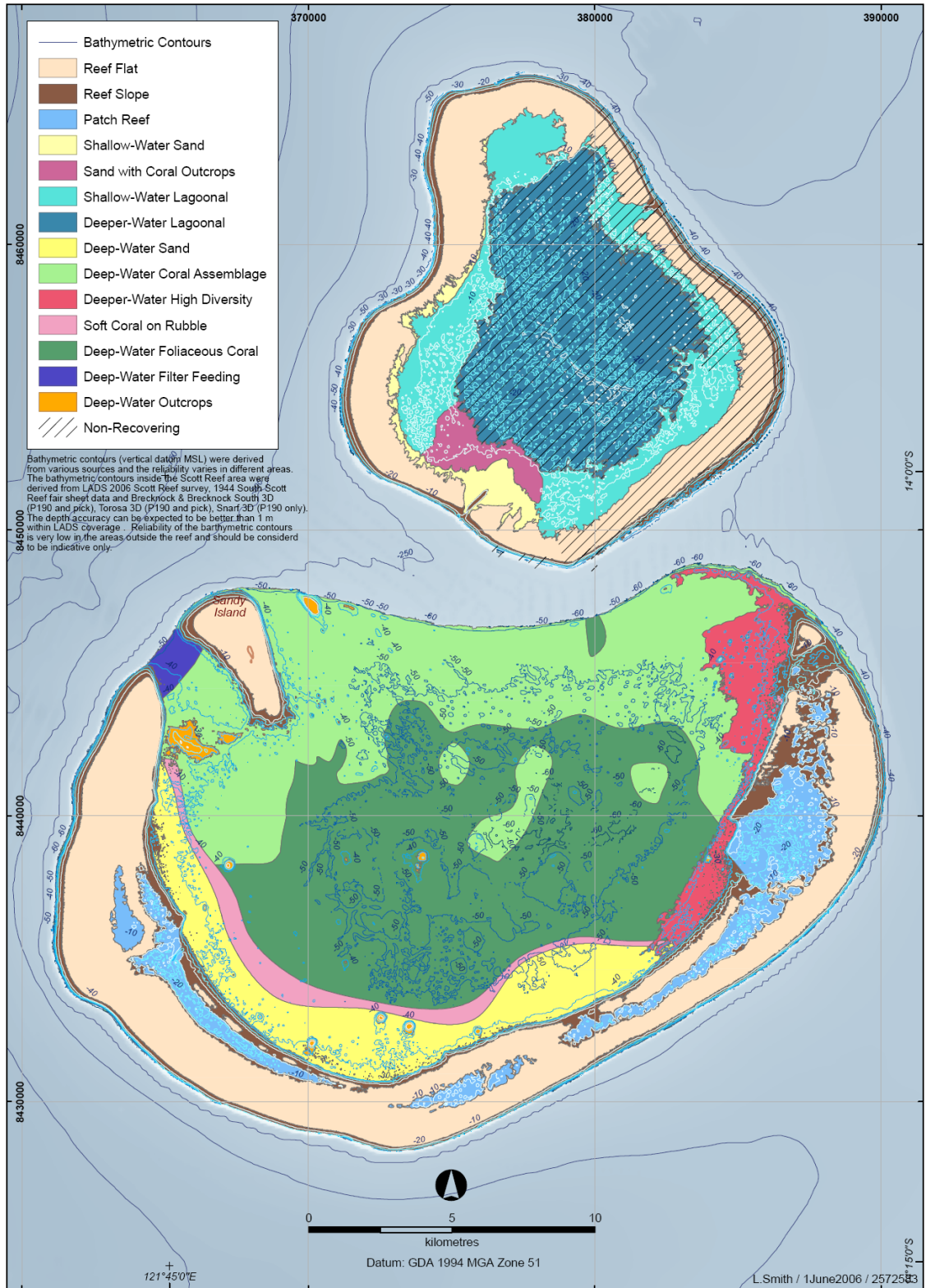


Figure 2-1: Benthic habitat type distribution at Scott Reef (AIMS 2006)



2.3. Determination of target IMS of concern to Scott Reef

Determining IMS of concern to Scott Reef was a critical aspect of the survey design. The most comprehensive work undertaken for NIMPCG by Hayes and others (Hayes et al. 2002; 2005), resulted in a national list of 55 target IMS for future port monitoring. This national monitoring list was developed from a list of 1,582 marine and estuarine species worldwide that are transported by human mediated activities and were most likely to reach Australia and cause adverse effects (Hayes et al. 2002; 2005).

The species of concern to Scott Reef was based on the NIMPCG national target species list but excluded those listed species that are not suited to the tropical environment of Scott Reef (i.e. based on known temperature and salinity tolerances). For example, the North Pacific seastar, *Asterias amurensis*, an IMS on the national list that has been introduced to Tasmania and Victoria was eliminated from consideration because the temperature range previously recorded at Scott Reef is outside the published tolerances for the species. The list of potential IMS to Scott Reef was then divided into species that are characteristically introduced through ballast water and those introduced through biofouling. As there has been no known discharge of ballast water at Scott Reef, species distributed through ballast water were eliminated. The list was further refined with the inclusion of IMS not included on the NIMPCG National list, but were identified as potential species of concern during previous IMS desktop reviews (SKM, 2007).

The final refinement to the Scott Reef target invasive marine species list was to reject species unlikely to occur at Scott Reef (because of their biology), or are otherwise known to be present in either Australia (NIMPIS 2002; Huisman et al. 2008) or Indonesia. The final Scott Reef target invasive marine species list identified 28 potential IMS of concern (**Table 2-1**).

It should be emphasised that the list is indicative only. It is based on the best information available on species that are considered to be most likely to be introduced and have the capacity to establish in the Scott Reef marine environment. However, there is always a chance that a species not on the Scott Reef target invasive marine species list or any other list will become invasive, if it is introduced to the reef. For this reason, survey teams were always vigilant in searching for species with invasive characteristics, even if they had not been previously listed.

**Table 2-1: Scott Reef target invasive marine species list**

Group	Species	Source of species for list
Algae	<i>Bonnemaisonia hamifera</i>	NIMPCG (2006a)
	<i>Caulerpa racemosa</i>	NIMPCG (2006a)
	<i>Caulerpa taxifolia</i>	NIMPCG (2006a)
	<i>Grateloupia turuturu</i>	NIMPCG (2006a)
	<i>Womersleyella setacea</i>	NIMPCG (2006a)
Bivalves	<i>Brachidontes striatularis</i>	SKM (2007)
	<i>Musculista senhousia</i>	NIMPCG (2006a)
	<i>Mytilopsis sallei</i>	NIMPCG (2006a)
	<i>Perna perna</i>	NIMPCG (2006a)
	<i>Perna viridis</i>	NIMPCG (2006a)
Gastropods	<i>Siphonaria pectinata</i>	SKM (2007)
	<i>Stramonita haemostoma floridana</i>	SKM (2007)
	<i>Thais rustica</i>	SKM (2007)
Cnidarians	<i>Carijoa riisei</i>	SKM (2007)
Polychaetes	<i>Hydroides dianthus</i>	NIMPCG (2006a)
	<i>Hydroides elegans</i>	SKM (2007)
	<i>Hydroides sanctaecrucis</i>	SKM (2007)
Barnacles	<i>Amphibalanus reticulata</i>	SKM (2007)
	<i>Australomegabalanus krakatauensis</i>	SKM (2007)
	<i>Balanus amphitrite</i>	SKM (2007)
	<i>Chthamalus proteus</i>	SKM (2007)
	<i>Megabalanus rosa</i>	SKM (2007)
	<i>Megabalanus tintinnabulum</i>	SKM (2007)
	<i>Megabalanus coccopoma</i>	SKM (2007)
Crabs	<i>Hemigrapsus sanguineus</i>	NIMPCG (2006a)
	<i>Hemigrapsus takanoi (H. penicillatus)</i>	NIMPCG (2006a)
	<i>Rhithropanopeus harrisii</i>	NIMPCG (2006a)
Ascidians	<i>Didemnum spp.</i>	NIMPCG (2006a)



2.4. Determination of sampling strategy

The sampling strategy for this survey was developed following the protocols established by NIMPCG (2006a) and is detailed in the Scott Reef IMS Survey and Monitoring Programme (SKM 2008a). In summary, these protocols require the identification of species of concern, habitat types (**Figure 2-1**) and their extent as a means of establishing sampling methods and minimum survey area criteria.

The NIMPCG Monitoring Design Excel Template (MDET) was used to determine the number of samples required in each of the sites identified (Hayes 2008). This analysis determined that 135 intertidal visual searches of 150 m long with a search width of 1 m each side of the transect line would provide the required 80% probability of finding all of the IMS species listed other than the three species of crab. Due to onsite limitations, shorter transects of 100 m in length proved to be more practical and an additional 68 transects were included (total of 203 transects) to ensure a sufficient survey area to meet the NIMPCG minimum requirements. In addition to the NIMPCG minimum requirements, two quadrats (30cm x 30cm) were photographed and sampled at predetermined points along each transect. Fifty five beam trawls, each 750 m long by 1.0 m wide, giving a total area of 750 m² per trawl was completed.

Artificial structures at Scott Reef were also targeted for detailed examination. Prior to the survey, the artificial structures proposed for the survey included any mooring buoys and chains located at Scott Reef and the two extant wrecks that are situated on Scott Reef; a guano boat located at 14°04.738'S 121°44.869'E and a tuna boat at 14°07.892'S; 121°44.865'E. However, while both wrecks were examined, no fixed mooring chains or structures were encountered during the survey.

Snorkel transects were not required as part of the minimum survey requirements and were therefore undertaken opportunistically to add value to the overall survey outcomes. It is for this reason that the MDET was not used to establish minimum snorkel transect survey area requirements.

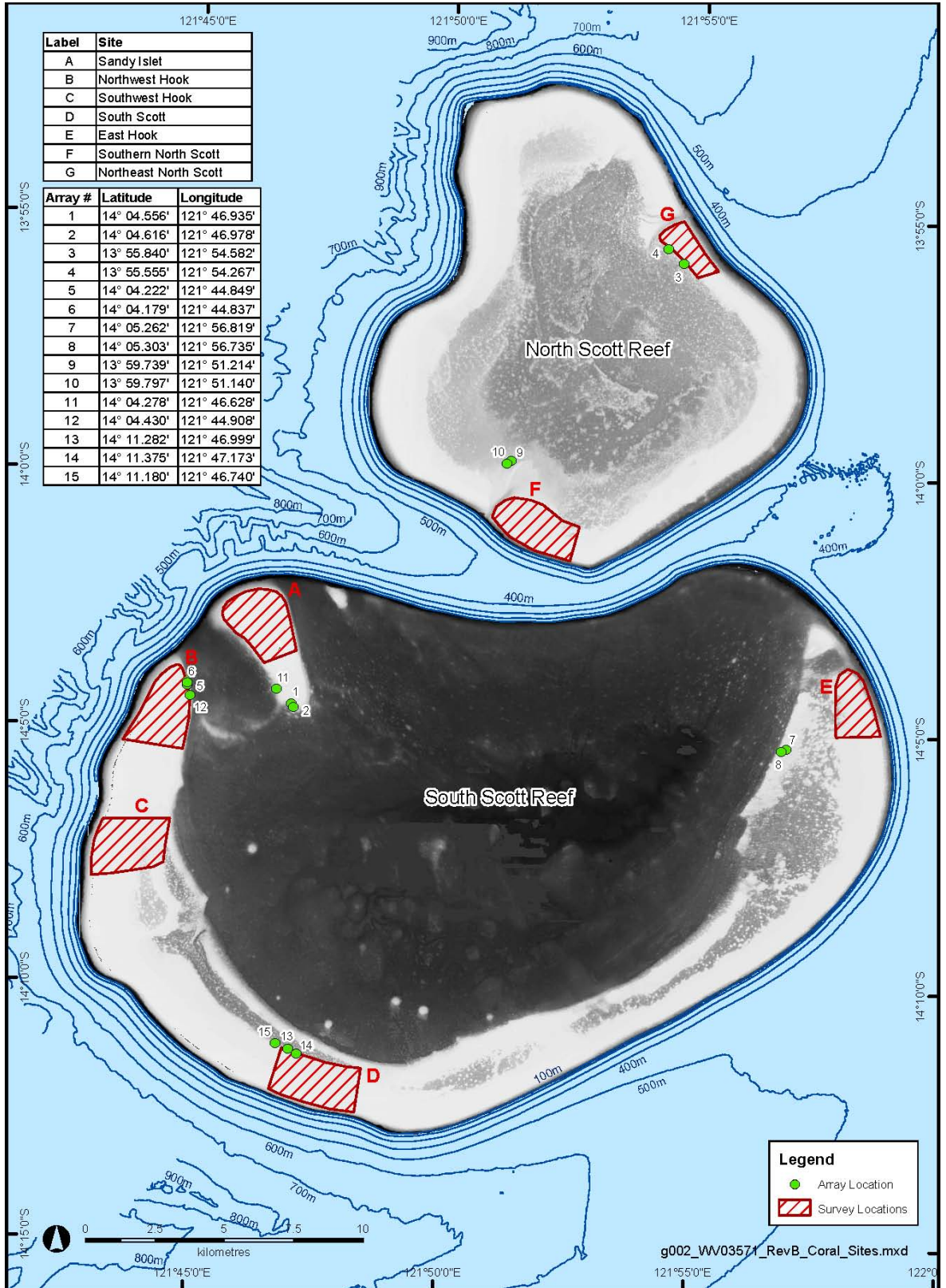


Figure 2-2: Distribution and location of survey areas and monitoring arrays at Scott Reef

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2.5. Field personnel

Personnel selected for the survey were chosen specifically to expedite efficient identification across a wide taxonomic range, and included four scientists skilled in the identification of the major groups of target species of concern. The following personnel participated in the trip:

- Craig Astbury, SKM. Project leader and field lead
- Peter Michael, SKM, Field assistant, project planning and HSE
- Dr Fred Wells, SKM (molluscs)
- Dr John Huisman, Murdoch University (algae)
- Dr Simon De Lestang, SKM Perth (crustaceans) (barnacles were sent to Diana Jones Western Australian Museum for formal identification)
- Charlotte Watson, SKM (polychaetes).

2.6. Schedule of the field program

The field survey was timed to coincide with the spring tide that occurred on 1 October 2008. The schedule was:

- **Friday, 26 September 2008**
 - 1100 - Woodside HSE briefing for all survey staff and crew of the *Kimberley Quest 1* (KQ 1)
 - 1600 - Boarded KQ1
- **Saturday, 27 September 2008**
 - 0500 - Transit to Scott Reef
- **Sunday, 28 September 2008**
 - 0630 - Arrived Scott Reef, beam trawl sampling and intertidal surveys of the reef commenced
- **Monday, 29 September-Friday, 3 October 2008**
 - Details of field survey activities are provided in **Appendix A**



- **Saturday, 4 October 2008**

1100 - Departed Scott Reef

- **Sunday, 5 October 2008**

1300- Arrived Broome.

3. Evaluation of Program Methods

As per the NIMPCG (2006a) survey criteria, the following three survey methods were applied throughout the survey period:

- intertidal transects
- beam trawls
- snorkel transects.

In addition, sub-surface settlement plate and rope mop arrays were deployed at both north and south Scott Reef (**Figure 2-2**). These were not required to fulfil the NIMPCG (2006) protocols, but provide a method to monitor for IMS introductions. The settlement array design is based on that successfully used by the Northern Territory Department of Primary Industry, Fisheries and Mines for monitoring programmes in Darwin Harbour and in Gove (Labowitch et al. 2005).

These methods have not been undertaken by SKM at Scott Reef previously and an evaluation of their suitability is presented below. Please note the descriptions and justifications of the survey methods are presented in the previous Scott Reef IMS Survey and Monitoring Programme (SKM 2008a).

3.1. Intertidal transect

Overall, intertidal transects proved to be a successful survey method suitable for the conditions experienced at Scott Reef. It was noted that in relation to crustacean observations, it was important to cover the required area prior to the returning tide. As soon as the reef platforms were inundated with water, very few if any crabs were recorded. Intertidal transect locations are provided in **Appendix B**.

3.1.1. Health and safety – intertidal transect

Safe working procedures established by SKM in the Scott Reef Health Safety and Environment (HSE) Minor Plan (SKM 2008b) were effectively implemented throughout the survey and greatly assisted in completing the necessary survey requirements without incident.

While there were not incidents to report as a result of intertidal survey activities, access to and from the reef was challenging, despite the calm and low swell conditions experienced throughout the survey period.

3.2. Beam trawl

Beam trawls were required to target the three crab species listed as species of concern in the Scott Reef target invasive marine species list. While there was a level of concern prior to the survey



relating to the lack of suitable beam trawl habitat, beam trawls were successfully undertaken and proved a useful survey method in sand and coral rubble shallow water environments. Trawls were successfully undertaken to depths of 13 m, however, the majority of trawls were undertaken in depths of around 6 m (**Figure 3-1**). The successful use of the beam trawls was dependent on good visibility to support site selection and to assist with avoidance of coral bobbies during tows. Beam trawl transect locations are provided in **Appendix C**.

3.2.1. Health and safety – beam trawl

No health and safety incidents were experienced in relation to beam trawl activities undertaken throughout the survey period. The safe working procedures established by SKM in the Scott Reef HSE Minor Plan (SKM 2008b) were effectively implemented throughout the survey and greatly assisted in completing the necessary survey requirements without incident.

The weak link and a friction loading device methods developed by SKM (**Figure 3-2** and **Figure 3-3**) were successful in minimising crew fall incidents and damage to the beam trawl during snagging events. Cable ties were used as a weak link, connecting the tow rope float and the spreader float. A second cable tie was used to ensure any broken cable ties could be recovered without littering the Scott Reef marine environment. The friction loading device was used in conjunction with the weak link or as an alternative means of quick release in areas where frequent snagging was experienced.

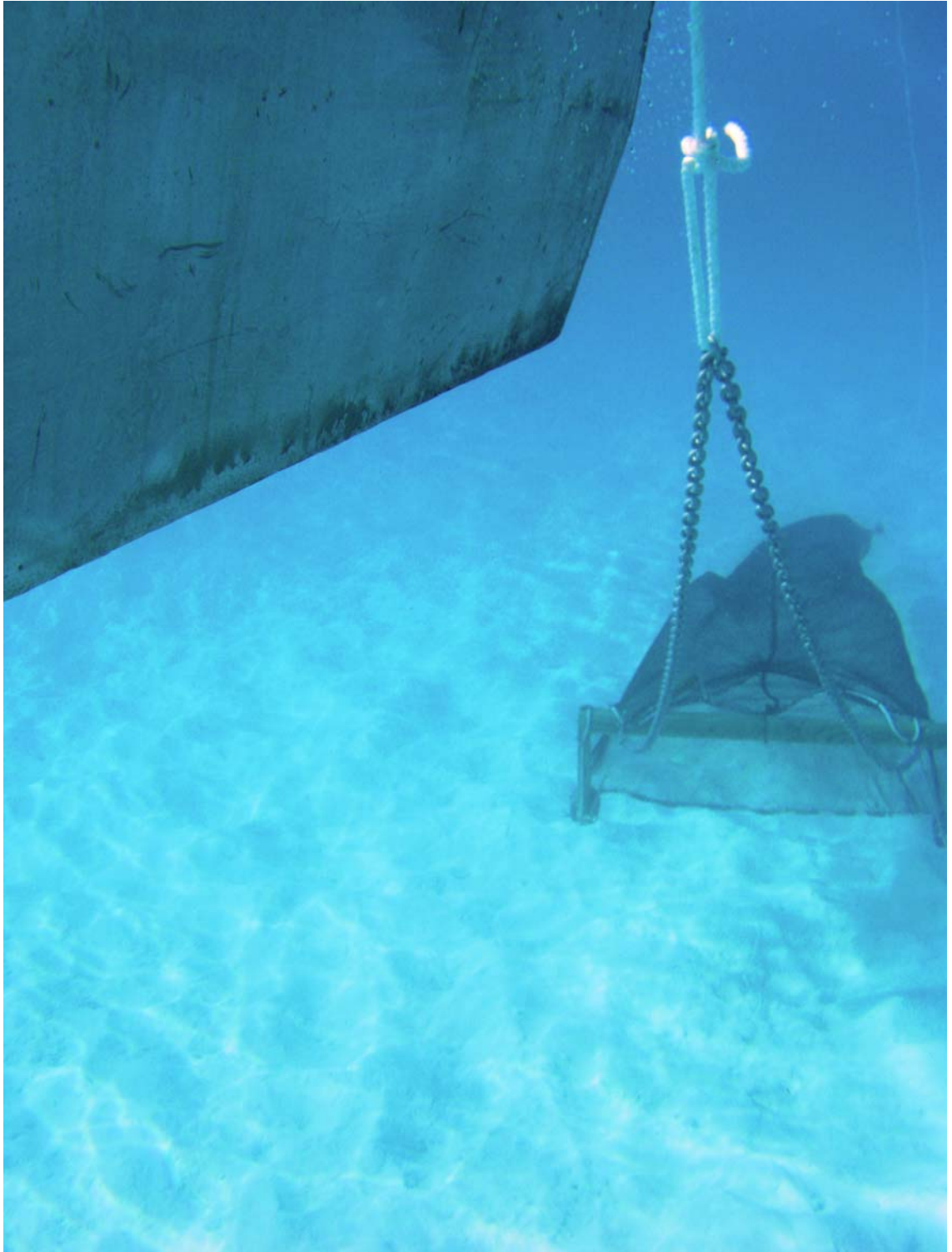


Figure 3-1: Photo of the Beam trawl while trawling at West Hook South Scott Reef

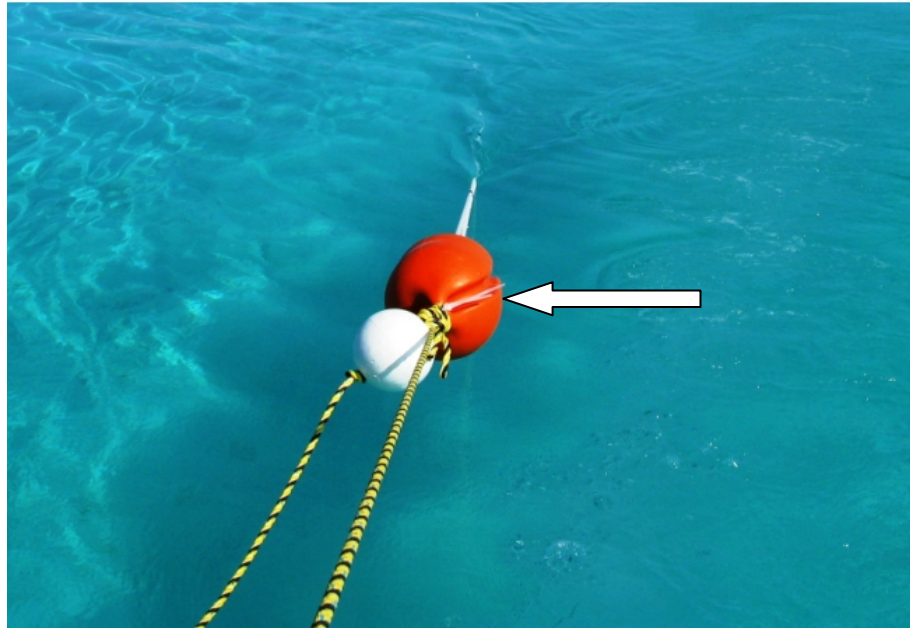


Figure 3-2: Beam trawl weak link

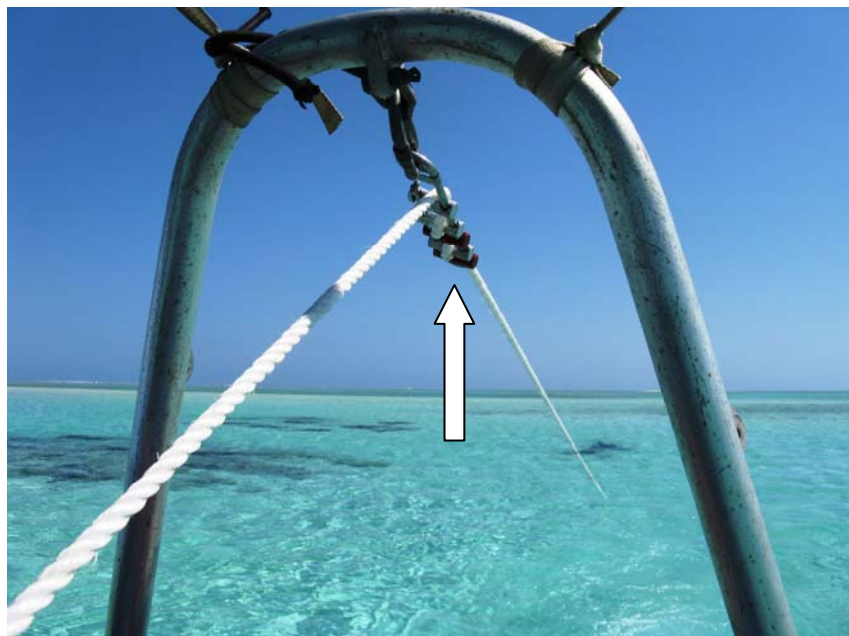


Figure 3-3: Beam trawl friction loading device

3.3. Snorkel transect

While snorkel transects are supported by the NIMPCG (2006a) criteria, they were not required to meet the minimum survey requirements and thus were undertaken opportunistically (when the water levels were too high for intertidal transects and when there was available time) to add further value to the overall survey outcomes. As anticipated, snorkelling transects were not found to be as effective as the intertidal transects.

While there was additional value in undertaking snorkel transects, the strong tidal currents experienced in most areas at Scott Reef did not allow for a thorough investigation of the survey area. Due to these limitations, snorkel transects would not be suitable as a primary technique for IMS surveys at Scott Reef.

3.3.1. Health and safety – snorkel transect

No health and safety incidents were experienced in relation to snorkelling activities undertaken throughout the survey period. The safe working procedures established by SKM in the Scott Reef HSE Minor Plan (SKM 2008b) were effectively implemented throughout the survey and greatly assisted in completing the necessary survey requirements without incident.

3.4. Monitoring arrays

Standard monitoring array designs have been extensively tried and tested throughout Australia. In most cases, their deployment has been assisted by attachment to artificial structures already present in the marine environment. The absence of artificial structures and the requirement for subsurface deployment (to reduce interaction with Indonesian fishermen), resulted in the final design developed by SKM (**Figure 3-4**). All fifteen monitoring arrays were successfully deployed in shallow water locations selected to assist with the recovery and future deployment of settlement plates and mops as described in the Scott Reef Survey and Monitoring Program (SKM 2008a). Deployment locations are provided in **Figure 2-2** and **Appendix D**.

3.4.1. Health and safety – monitoring array

No health and safety incidents were experienced in relation to monitoring array deployment. The safe working procedures established by SKM in the Scott Reef HSE Minor Plan (SKM 2008b) were effectively implemented during array deployment and greatly assisted with incident avoidance during these activities.

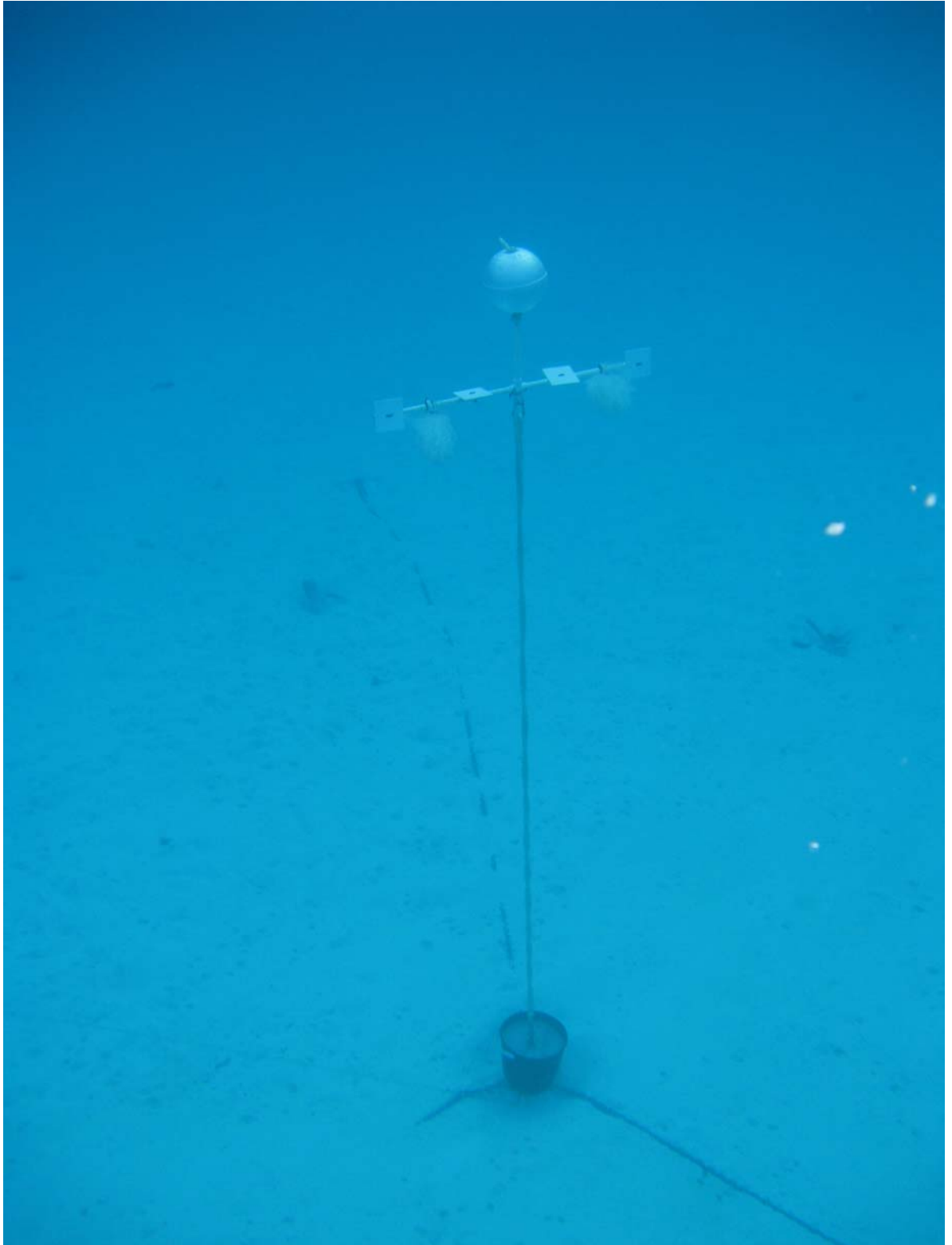


Figure 3-4: Monitoring array in-situ south of Sandy Islet

4. Results and Discussion

A total of 107 algae, 181 mollusc, 1 cnidarian, 6 polychaete, 28 crustacean and 1 ascidian species were recorded in this survey. None of these species identified are on the Scott Reef target invasive marine species list and none are considered IMS of concern to Scott Reef. The species identified are described below by taxonomic group and information on sampling methods and site location for each species is presented in **Appendix D**.

4.1. Algae

A total of 107 species of algae from 39 families were recorded during this survey. The majority of these species have been recorded in previous surveys (Huisman et al. (in press)) and none of the algal species on the Scott Reef target invasive marine species list were recorded.

This survey did record seven species that have not previously been recorded at Scott Reef, including: the green algae *Ulva flexuosa* subsp. *paradoxa*, *Valoniopsis pachynema*, *Chaetomorpha* sp., and the rare *Rhipidiphylon reticulatum*; the red algae *Endosiphonia spinuligera* and *Laurencia* sp. and the chrysophyte *Chrysonephos lewisii*. None of these species are invasive, although *Chrysonephos lewisii* is often reported as newly recorded and is now known to be widespread in the Indo-Pacific and Mediterranean. While this species has not demonstrated invasive characteristics as Scott Reef, it is impossible to tell if this species is native or introduced to this area.

While this survey has focused on the occurrence of IMS at Scott Reef, the existence of native species that may represent an invasive species threat elsewhere has not been overlooked. *Avrainvillea amadelpha*, a native species to Scott Reef, has been identified as an invasive algae in the Hawaiian Islands (Huisman et al. 2007) and its existence at Scott Reef may need to be considered in relation to future activities to minimise the threat of translocation.

4.2. Molluscs

None of the seven molluscs on the Scott Reef target invasive marine species list or any other molluscs of concern was recorded during the Scott Reef survey. In total, 181 species of molluscs were identified and all were considered typical of offshore coral reefs (F. Wells pers. comm.) (**Appendix A**). The bivalve species included: *Acrosterigma* sp., *Anadara* sp., *Asaphis* sp., *Barbatia* sp., *Glycymeris* sp., *Hippopus* sp., *Lima* sp., *Lioconcha* sp., *Lioconcha* sp., *Lithophaga* sp., *Saccostrea* sp., *Septifer* sp., *Spondylus* sp., *Tellina* sp., *Trachycardium* sp., *Tridacna* sp. and *Venus* sp. Neither of the two thaid snail species listed on the Scott Reef target invasive marine species list were observed. Those recorded included: *Thais aculeata*, *T. armigera*, *Drupa morum*, *D. rubrusidaeus*, *Drupa ricinus*, *Drupella cornus*, *D. rugosa* and *Morula granulata*. The remaining gastropod species on the Scott Reef target list was a false limpet, *Siphonaria pectinata*. This is a pulmonate (or air breathing) false limpet and is typically found in rocky intertidal environments



(such as the upper rocky shore of Sandy Islet. A thorough search of likely habitats failed to locate any siphonariids of this family.

4.3. Cnidarians

Only one species of cnidarian, *Carijoa riisei*, is listed on the Scott Reef target list and was not recorded during this survey. *Carijoa riisei* is part of a diverse group of organisms that includes corals, hydroids and jellyfish. One common characteristic of this group is their predatory nature, demonstrated by the presence of nematocysts (stinging cells) used to capture prey. *Carijoa riisei* is an Atlantic species of octocoral that was introduced to Hawaii in the late 1960s or 1970s (Colin and Arneson 1995). The species is most common on pier pilings or wrecks not exposed to direct sunlight (DeFelice et al. 2001) and could also attach to other artificial floating structures. While there are a number of native *Carijoa* species within Australia and particular attention was paid to likely habitats (wreck sites) no *Carijoa* species were observed during the IMS survey.

4.4. Polychaetes

None of the three serpulid polychaete species on the Scott Reef target list were collected during the Scott Reef survey. Polychaetes sampled during this survey were comprised of endemic fauna with no evidence of potential invasive polychaete species.

Of the seventeen families of polychaetes collected, six have been identified to genus and species. These identified species are among those most commonly found and presently known from other northern Australian coral reefs. The remaining samples were unable to be identified to species, however, Charlotte Watson has proposed to undertake further taxonomic classification of the polychaete samples as part of her current position in the Northern Territory Museum. Details of all polychaete sample classifications will be sent to Woodside as they become available.

The most common polychaete encountered at Scott Reef was *Hydroides exaltata* (Marenzeller 1885) and was observed forming individual tubes on the undersides of dead coral and giant clam shells. *Hydroides exaltata* was described from Sagami Bay, Japan and was recorded from Western Australia by Augener (1914) and has since been confirmed in Broome (WA) and Esperance (WA) by the Northern Territory Museum (C. Watson, pers. comm.).

While none of the three target polychaete species were recorded, had they been present, species confirmation would have been easily achieved. Two of the three serpulid polychaetes on the target list, *Hydroides elegans* and *H. sanctaerucis* form observable mass aggregations of tubes and could be easily identified in the field. Identification of the third serpulid, *H. dianthus*, is dependent on opercula analysis, which would have been achievable on board the survey vessel.



4.5. Crustaceans

A total of 28 crab species (25 brachyuran species and three grasped species) were recorded during the Scott Reef survey and none of the species recorded were considered to be introduced or observed to have invasive characteristics. None of the crab species listed in the Scott Reef target invasive marine species list were recorded during the survey.

Of the three target brachyuran species, two of these species belong to the family Grapsidae (*Hemigrapsus sanguineus* and *H. takanoi* (*H. penicillatus*)) and are common on rocky substrates throughout the Indo-West Pacific region. The other target species is a member of the family Panopeidae (*Rhithropanopeus harrisi*), and is commonly associated with mud and silt substrates. While both of these habitat types were surveyed as part of the survey program none of the three target species were observed.

4.6. Ascidians

Didemnum sp. was the only ascidian on the Scott Reef target invasive marine species list (**Table 2-1**). This is a complex genus with several species that occur naturally in Western Australia. While NIMPCG (2006a; 2006b) has not specified a particular species, the reference is to invasive forms. No such populations exhibiting invasive characteristics were observed at Scott Reef.

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Appendix A Scott Reef Survey Site Notes

Site	Initial Location	Comments
Site - B West Hook, south Scott Reef Day 1 28 Sept p.m.	14°04.494'S; 121°44.181'E	<p>Two teams: FW, SD and JH, CW. Depart boat 14:30, return 18:00. Tide 0.6 m at 1556. Reef flat exposed on arrival. Walked over to wreck of the guano boat. Bare, rusted steel with very little life. Crabs, <i>Percnon plannissimum</i>, <i>Grapis albolineatua</i>, some barnacles, all one species, <i>Tetraclita squamosa</i>. One oyster, <i>Saccostrea</i> sp., some nerites, <i>Nerita plicata</i>, and some littorinids. Then transects (5 x 100 m) eastward back to inside edge. Reef flat, mainly low relief, partly consolidated dead and live coral outcrops and intervening sand. Some slabs were of sizes that could be overturned, 30-60cm diameter.</p> <p>Molluscs: Lots of species of cone shells, <i>Conus marmoreus</i>, and cowries <i>Cypraea tigris</i>, <i>C. moneta</i>. One <i>Octopus</i> sp. <i>Vasum turbinellum</i>, <i>Lambis chiragra</i>, <i>L. lambis</i>, sacoglossan, <i>Tambja</i>, <i>Phyllidia</i> (3 species), <i>Rhinoclavis sinensis</i>, <i>Turbo chrysostoma</i>, <i>Hippopus hippopus</i>, <i>Tridacna crocea</i>, <i>T. maxima</i>, <i>Serpulorbis</i> sp., <i>Peristernia nassatula</i>, <i>Octopus</i> sp., <i>Nassarius papillosus</i>, <i>Mitra stictica</i>, <i>Cerithium nodulosus</i>.</p> <p>Echinoderms: <i>Bodhaschia argus</i>, <i>Coriaster granulatus</i>, <i>Linckia laevigata</i>, <i>Holothuria leucospilota</i>, crinoids, numerous brittlestars.</p> <p>Crustaceans: Stomatopod, <i>Percnon plannissimum</i>, <i>Grapis albolineatua</i>, <i>Atergatis floridus</i>, <i>Eriphia scabricula</i>, <i>Pioldius areolatus</i>.</p> <p>Polychaetes: Dorvilleidae, Terebellidae, Glyceridae, Syllidae, Capitellidae, Sabellidae, Lumbrinereidae, Phyllococidae, Maldanidae, Spionidae, Amphinomidae, Chrysopetalidae <i>Chrysopetalum</i> sp. 4, Polynoidae <i>Gastrolepis clavigera</i>, 2 pale spotted brown on <i>Bodhaschia argus</i>, Nereididae <i>Nereis</i> spp., <i>Platynereis</i> sp., <i>Ceratonereis perkinsini</i>, Eunicidae <i>Eunice torresiensis</i>, Opheliidae <i>Polyopthalmus</i> sp. 1.</p> <p>Marine plants: Algal growth on most hard surfaces, in patches dense stands of <i>Lyngbya majuscula</i> (Cyanobacteria), <i>Jania adhaerens</i> (Rhodophyta), <i>Boergesenia forbesii</i> (Chlorophyta), <i>Boodlea composita</i> (Chlorophyta), and <i>Cladophora</i> sp. (Chlorophyta). Also <i>Lobophora variegata</i> (Phaeophyceae), <i>Gelidiella acerosa</i> (Rhodophyta), <i>Halimeda opuntia</i> (Chlorophyta) and encrusting corallines [mostly <i>Hydrolithon</i> sp. (Rhodophyta)]. In quadrats, the above plus <i>Ceramium vagans</i> (Rhodophyta), <i>Centroceras clavulatum</i> (Rhodophyta), <i>Chaetomorpha</i> sp. (Chlorophyta), <i>Ulva flexuosa</i> subsp. <i>paradoxa</i> (Chlorophyta), <i>Hypnea</i> sp. (Rhodophyta), <i>Champia parvula</i> (Rhodophyta) and <i>Boodlea vanbosseae</i> (Chlorophyta).</p>
Site - F NE channel, north Scott Reef	13°55.742'S; 121°54.847'E	<p>Start 1430, finish 1800. Tide 0.4 m at 1623.</p> <p>Water knee deep to start. Upper area of low relief, some broken rocks, lower area clear by the time we got there. Pavement limestone with little relief, some small holes, occasional small bombie thrown up from below during storm. Very little living coral.</p> <p>Molluscs: <i>Vasum turbinellum</i>, <i>Ovula ovum</i>, <i>Rhinoclavis sinensis</i>, <i>Turbo chrysostoma</i>, <i>Tridacna maxima</i>, <i>T. crocea</i>, <i>Serpulorbis</i>, <i>Rhinoclavis sinensis</i>, <i>Vasum turbinellum</i>, <i>Drupa ricinus</i>, <i>Peristernia nassatula</i>, <i>Bursa granularis</i>, <i>Conus</i></p>

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Site	Initial Location	Comments
Day 2 29 Sept p.m.		<p><i>miles</i>, <i>C. sponsalis</i>, <i>C. chaldeus</i>, <i>C. distans</i>, <i>Berthellina citrina</i>, <i>Halgerda tessellate</i>, <i>Trachycardium</i> sp., <i>Drupella cornus</i>.</p> <p>Echinoderms: <i>Coriaster granulatus</i>, <i>Linckia laevigata</i>, <i>Holothuria leucospilota</i> black starfish, several species of holothurians, crinoids, sea urchins.</p> <p>Crustaceans: Stomatopod, <i>Huenia heraldica</i>, <i>Eriphia scabricula</i>, <i>Schizophrys aspera</i>.</p> <p>Polychaetes: Spionidae, Chrysopetalidae <i>Chrysopetalum</i> sp.5 (juveniles), Amphinomidae <i>Eurythoe complanata</i>, large, ranging round reef LWS, Nereididae <i>Nereis</i> spp., <i>Platynereis</i> sp., <i>Ceratonereis perkinsini</i>, Opheliidae <i>Polyopthalmus</i> sp. 1,</p> <p>Marine plants: Consolidated dead and live coral outcrops with sand patches. Mostly low relief but occasional higher rock. Algal growth on most hard surfaces, commonly the green turf <i>Boodlea vanbosseae</i> (Chlorophyta). <i>Turbinaria ornata</i> (Phaeophyceae), <i>Lobophora variegata</i> (Phaeophyceae), <i>Ganonema pinnatum</i> (Rhodophyta), <i>Galaxaura rugosa</i> (Rhodophyta) and <i>Liagora divaricata?</i> (Rhodophyta) also common. <i>Halimeda</i> sp. also sporadically on rock. Sparse patches of seagrass <i>Thalassia hemprichii</i> in sand. Near eastern edge <i>Laurencia</i> sp.(Rhodophyta) common., plus <i>Tolypocladia glomerulata</i> (Rhodophyta). Other species noted (either visually but in low numbers or in quadrats): <i>Neomeris bilimbata</i> (Chlorophyta), <i>Anadyomene plicata</i> (Chlorophyta), <i>Halimeda minima</i> (Chlorophyta), <i>Jania adhaerens</i> (Rhodophyta), <i>Champia parvula</i> (Rhodophyta), <i>Gelidiella acerosa</i> (Rhodophyta), <i>Endosiphonia spinuligera</i> (Rhodophyta), <i>Caulerpa cupressoides</i> (Chlorophyta) and <i>Valoniopsis pachynema</i> (Chlorophyta).</p> <p>Beam trawl: Polychaetes: Serpulidae <i>Hydroides exaltatus</i>, solitary tubes on dead coral.</p> <p>Beam trawl Crustaceans: <i>Calappa calappa</i>, <i>Thalamita</i> sp.1, <i>Portunus</i> sp. 1.</p>
Site - A Sandy Island, South Scott Reef Day 3 30 Sept a.m.	14°03.555'S; 121°46.341'E	<p>Reef flat to west of island. Start 0530, finish 0730. Tide 0.3 m at 0447. Very flat, dead coral, some pavement, some areas of sand. Few live corals.</p> <p>Molluscs: <i>Mitra papalis</i>, <i>Lambis chiragra</i>, <i>Lambis lambis</i>, <i>Cerithium nodulosus</i>, <i>Cypraea staphylaea</i>, <i>C. erosa</i>, <i>C. moneta</i>, <i>C. isabella</i>, <i>C. eglantina</i>, <i>Hippopus hippopus</i>, <i>Pinctada margaritifera</i>, <i>Tectus pyramis</i>, <i>Chelidonura hirundinina</i>, <i>Turbo chrysostomus</i>, <i>Chama</i> sp., <i>Trochus maculatus</i>, <i>Turbo chrysostomus</i>, <i>Elysia</i> sp., <i>Strombus luhuanus</i>, <i>S. lentiginosa</i>, <i>Tridacna crocea</i>, <i>Coralliophila neritoides</i>, <i>Conus chaldeus</i>, <i>C. marmoreus</i>, <i>C. Flavidus</i>, <i>Gymnodoris</i> sp. , <i>Polinices tumidus</i>, <i>Strombus mutabilis</i>, <i>Terebra crenulata</i>.</p> <p>Echinoderms: <i>Holothuria atra</i>, <i>Coriaster granulatus</i>, <i>Linckia laevigata</i>, several species each of holothurians, ophiuroids and sea urchins.</p> <p>Crustaceans: <i>Calappa calappa</i>, <i>Zosymus aenus</i>, <i>Eriphia scabricula</i>, <i>Pioldius areolatus</i>, <i>Cyclax suborbicularis</i>, <i>Portunus</i> sp.</p> <p>Polychaetes: Amphinomidae, Dorvilleidae, Terebellidae, Glyceridae, Syllidae, Capitellidae, Lumbrinereidae, Spionidae, Phyllodocidae, Sabellidae, Polynoidae, Chrysopetalidae, <i>Chrysopetalum</i> sp.4, <i>Chrysopetalum</i> sp.14, Nereididae <i>Nereis</i> spp, <i>Platynereis</i> sp, <i>Ceratonereis perkinsini</i>, <i>Neanthes</i> sp., Opheliidae <i>Polyopthalmus</i> sp. 1,</p>

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Site	Initial Location	Comments
		<p>Serpulidae <i>Hydroides exaltatus</i>.</p> <p>Marine plants: Consolidated dead and live coral outcrops with sand patches. Mostly low relief. Algal growth relatively sparse, but patches of seagrass <i>Thalassia hemprichii</i> common in sand. Also noted: <i>Boodlea vanbosseae</i> (Chlorophyta), <i>Galaxaura rugosa</i> (Rhodophyta), <i>Caulerpa cupressoides</i> (Chlorophyta), <i>Ganonema pinnatum</i> (Rhodophyta), <i>Liagora divaricata?</i> (Rhodophyta), <i>Neomeris bilimbata</i> (Chlorophyta), <i>Anadyomene plicata</i> (Chlorophyta), <i>Dasya</i> sp. (Rhodophyta) and <i>Boergesenia forbesii</i> (Chlorophyta).</p>
<p>Site - B</p> <p>West Hook, south Scott Reef</p> <p>Day 3</p> <p>30 Sept p.m.</p>	<p>14°04.284'S; 121°44.731'E</p>	<p>Depart boat at 1500, return at 1800. Tide 0.4 m at 1623. Walk mostly northward from eastern edge.</p> <p>Molluscs: <i>Cerithium nodulosus</i>, <i>Turbo chrysostratus</i>, <i>Polinices tumidus</i>, <i>Rhinoclavis sinensis</i>, <i>Lambis chiragra</i>, <i>L. lambis</i>, <i>Tectus pyramis</i>, <i>sacoglossan</i>, <i>Hippopus hippopus</i>, <i>Latirolagena smaragdula</i>, <i>Cypraea moneta</i>, <i>C. erosa</i>, <i>C. tigris</i>, <i>C. eglantina</i>, <i>C. isabella</i>, <i>Coralliophila neritoides</i>, <i>Vasum turbinellum</i>, <i>Strombus lentiginosus</i>, <i>S. mutabilis</i>, <i>Phyllidia varicosa</i>, <i>Drupa ricinus</i>, <i>D. rubusidaeus</i>, <i>Trochus maculatus</i>, <i>Spondylus</i> sp., <i>Onchidium</i> sp., <i>Peristernia nassatula</i>, <i>Morula granulata</i>, <i>Nembrotha</i> sp. (black), <i>Cymatium nesioticum</i>, <i>Tellina scobinata</i>, <i>Conus planorbis</i>, <i>C. capitaneus</i>, <i>C. Sanguinolenus</i>, <i>C. Coronatus</i>, <i>Periglypta</i> sp</p> <p>Echinoderms: <i>Linckia laevigata</i>, <i>Diadema</i> sp.</p> <p>Crustaceans: Stomatopods, <i>Percnon plannissimum</i>, <i>Zosymus aenus</i>, <i>Pioldius areolatus</i>, <i>Eriphia scabricula</i>, <i>Thalamita</i> sp., <i>Thalamita picta</i>, <i>Thalamita admete</i>.</p> <p>Polychaetes: Polynoidae <i>Gastrolepis clavigera</i>, on <i>Holothuria atra</i>. Amphinomidae <i>Eurythoe complanata</i>, commonly seen, feeding while stretched out from holes in reef.</p> <p>Marine plants: Consolidated dead and live coral outcrops with sand patches, initially similar to Day 1 site with cover of low cyanobacteria on most surfaces, but this eventually reducing. Towards northern areas the reef has larger boulders and rock pools, with a generally higher relief. Cyanobacteria common initially, also <i>Halimeda opuntia</i>, <i>Boergesenia forbesii</i>, <i>Boodlea composita</i> and <i>Neomeris bilimbata</i> (all Chlorophyta). Towards northern areas (the later transects), <i>Galaxaura rugosa</i> (Rhodophyta), <i>Ganonema pinnatum</i> (Rhodophyta), <i>Cladophora</i> sp. (Chlorophyta) and <i>Boodlea vanbosseae</i> (Chlorophyta) all present.</p> <p>Beam trawl Polychaetes: Serpulidae <i>Hydroides exaltatus</i>, solitary tubes on dead coral. Eunicidae <i>Eunice torresiensis</i>, <i>E. complanata</i>, inside dead coral.</p> <p>Beam trawl Crustaceans: <i>Thalamita admete</i>, <i>Portunus</i> sp..</p>
<p>Site - D</p> <p>East Hook, south Scott</p>	<p>14°03.916'S; 121°57.936'E</p>	<p>Depart boat at 0620, return at 0730. Low tide of 0.2 m at 0518. Return at 0830 for snorkel transects, complete at 1000. Reef with more relief, low dead coral slabs interspersed with small sand patched. Small bombies interspersed with some live coral. Under water entire time, 30 cm at start, 45 cm at end. Gave up on intertidal walk and undertook snorkel transects in 1.5 m of water.</p>

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Site	Initial Location	Comments
Reef Day 4 1 Oct a.m.		<p>Molluscs: <i>Rhinoclavis sinensis</i>, <i>Tridacna crocea</i>, <i>T. derasa</i>, <i>T. maxima</i>, <i>Hippopus hippopus</i>, <i>Turbo chrysostomus</i>, <i>Drupa morum</i>, <i>Cerithium nodulosus</i>, <i>Spondylus</i> sp., <i>Cypraea erosa</i>, <i>C. moneta</i>, <i>C. isabella</i>, <i>Tellina scobinata</i>, <i>Nassarius papillosus</i>, <i>Strombus mutabilis</i>, <i>Cerithium columna</i>, <i>Vasum turbinellum</i>, <i>Ovula ovum</i>, <i>Tectus pyramis</i>, <i>Lambis chiragra</i>, <i>Hipponyx conicus</i>, <i>Conus erinaceus</i>, <i>C. distans</i>, <i>C. miliaris</i>, <i>C. vexillum</i>, <i>C. rattus</i>, <i>Peristernia nassatula</i>.</p> <p>Crustaceans: Too much water on the reef – no crabs visible</p> <p>Marine plants: <i>Halimeda</i> sp., <i>Caulerpa cupressoides</i>, <i>Ganonema pinnatum</i>, <i>Liagora divaricata</i>, <i>Boodlea vanbosseae</i>, <i>Galaxaura rugosa</i>, <i>Ganonema farinosum</i>, <i>Turbinaria ornata</i>, <i>Neomeris bilimbata</i>.</p> <p>Beam trawl Crustaceans: <i>Thalamita admete</i>, <i>Thalamita</i> sp.</p>
Site - A Sandy Island, south Scott Reef Day 4 1 Oct p.m.	14°02.429'S; 121°46.190'E	<p>Reef flat to west of island. Depart boat at 1630, return at 1800. Low tide of 0.4 m at 1719. Walk to wreck of tuna boat. Very low relief, small dead coral, some pavement, interspersed with sand. Continuation of earlier transects, heading further north towards wreck. Wreck well broken up, with ballast rock, ribs showing. Very little life.</p> <p>Molluscs: <i>Nerita albicilla</i> most common species on wreck, also <i>Saccostrea</i> sp. and <i>Thais aculeata</i>. <i>Turbo chrysostomus</i>, <i>Lambis lambis</i>, <i>L. chiragra</i>, <i>Tridacna crocea</i>, <i>Polinices melanostomus</i>, <i>Cerithium nodulosus</i>, <i>Rhinoclavis sinensis</i>, <i>Trochus niloticus</i>, <i>Cantharus undosus</i>, <i>Vasum turbinellum</i>, <i>Cypraea moneta</i>, <i>C. annulus</i>, <i>Polinices tumidus</i>, <i>Strombus lentiginosus</i>, <i>Conus ebraeus</i>, <i>Latirolagena smaragdula</i>, <i>Trochus maculatus</i>, <i>Casmaria erinaceus</i>, <i>Terebra feline</i>, <i>Conus vexillum</i>, <i>C. planorbis</i>, <i>Pleuroploca</i> ? sp .</p> <p>Echinoderms: <i>Linckia laevigata</i>, black starfish.</p> <p>Crustaceans: barnacles on wreck same as before. <i>Atergatopsis germanini</i>, <i>Etisus dentatus</i>, <i>Zosymus aenus</i>, <i>Percnon plannissimum</i>, <i>Pioldius areolatus</i>, Porcellanidae sp.</p> <p>Polychaetes: Dorvilleidae, Terebellidae, Glyceridae, Syllidae, Capitellidae, Nereididae <i>Nereis</i> spp., <i>Platynereis</i> sp., <i>Ceratonereis perkinsini</i>, <i>Nereis</i> cf <i>denhamensis</i>, Opheliidae <i>Polyopthalmus</i> sp. 1.</p> <p>Marine plants: Similar species observed except for <i>Liagora ceranoides</i> moderately abundant towards centre of reef.</p>
Site - E Southern side, southwest channel, north Scott Reef.	14°00.716'S; 121°51.000'E	<p>Started 0545, returned 0800. Low tide of 0.2 m at 0547. Intertidal walk, starting at channel bank and heading eastward for 8 transects (approx. 800m) close to crest edge, then heading approximately westward for additional 3 transects. Low, flat basement pavement with scattered low dead coral slabs. Some tidepools and very limited rocks that could be turned over.</p> <p>Molluscs: <i>Coriocella nigra</i>, <i>Drupa rubusidaeus</i>, <i>D. ricinus</i>, <i>Latirolagena smaragdula</i>, <i>Turbo chrysostomus</i>, <i>Cassia erinaceus</i>, <i>Lima lima</i>, <i>Venus toreuma</i>, <i>Pleuroploca</i>?, <i>Pyrene scripta</i>, ? <i>Mitra acuminata</i>, <i>Harpa</i> sp., <i>Conus</i> sp (1 cm bright yellow), <i>Limpet</i>, <i>Septa gemmata</i>, <i>Conus miles</i>, <i>C. sponsalis</i>, <i>C. imperialis</i>, <i>C. vexillum</i>, <i>C. distans</i>, <i>C. planorbis</i>, <i>C. miliaris</i>, <i>C. coronatus</i>, <i>C. scabriusculus</i>, <i>C. capitaneus</i>, <i>C. rattus</i>, <i>C. Aff ebraeus</i>, <i>Serpulorbis</i> sp.,</p>

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Site	Initial Location	Comments
<p>Day 5 2 Oct a.m.</p>		<p><i>Rhinoclavis sinensis</i>, <i>Spondylus</i> sp. (under rock), <i>Spondylus</i> sp., <i>Hipponix conicus</i>, <i>Onchidium</i> sp., <i>Lambis chiragra</i>, <i>Peristernia nassatula</i>, <i>Vasum turbinellum</i>, <i>Periglyppta</i> sp., <i>Tridacna crocea</i>, <i>Polinices tumidus</i>, <i>Tectus pyramis</i>, <i>Charonia tritonis</i>, <i>Drupa ricinus</i>, <i>Hippopus hippopus</i>, <i>Bursa granularis</i>, <i>Bursa</i> sp., <i>Burse with black stripes</i>, <i>Polinices melanosomus</i>, <i>Terebra felina</i>, <i>Cypraea tigris</i>, <i>C. moneta</i>, <i>C. lynx</i>, <i>C. erosa</i>, <i>C. isabella</i>, <i>C. cylindrica</i>, <i>C. staphylaea</i>, <i>C. kieneri</i>.</p> <p>Echinoderms: <i>Linckia laevigata</i>, <i>Tripneustes</i> sp., <i>Holothuria</i> sp.</p> <p>Crustaceans: <i>Eriphia sebana</i>, <i>Eriphia scabricula</i>, <i>Zosymus aenus</i>, <i>Percnon plannissimum</i>, <i>Pioldius areolatus</i>, <i>Petrolishes tomentosus</i>, <i>Actaea polyacantha</i>?</p> <p>Polychaetes: Glyceridae, Syllidae, Spionidae, Amphinomidae, Polynoidae <i>Gastrolepis clavigera</i> on <i>Bodhaschia argus</i>, Chrysopetalidae <i>Chrysopetalum</i> sp.5, Eunicidae <i>Eunice torresiensis</i>, Nereididae <i>Nereis</i> spp., <i>Platynereis</i> sp., <i>Ceratonereis perkinsini</i>, <i>Nereis</i> cf <i>denhamensis</i>, Opheliidae <i>Polyopthalmus</i> sp. 1, Serpulidae <i>Pomatoceros stellatus</i>.</p> <p>Marine plants: Consolidated dead and live coral outcrops with sand patches, generally low relief with a few larger outcrops. <i>Boodlea vanbosseae</i> common again, often on higher surfaces, forming a turf. Also present: <i>Liagora ceranoides</i>, <i>Galaxaura rugosa</i>, <i>Zellera tawallina</i>, <i>Gelidiella acerosa</i>, <i>Galaxaura filamentosa</i>, <i>Ganonema pinnatum</i>, <i>Liagora divaricata</i>, <i>Jania adhaerens</i>, and <i>Hydrolithon onkodes</i> (all Rhodophyta), <i>Turbinaria ornata</i> (Phaeophyceae), <i>Caulerpa cupressoides</i>, <i>Halimeda opuntia</i>, <i>Halimeda lacunalis</i>?, <i>Anadyomene plicata</i>, <i>Boodlea composita</i>, <i>Neomeris bilimbata</i> (all Chlorophyta).</p> <p>Beam trawling: <i>Casmaria erinaceus</i>, <i>Codakia tigerina</i>, <i>Rhinoclavia asper</i>, <i>Cypraea moneta</i>, <i>Polinices tumidus</i>, <i>Tellina</i> sp., <i>Arca</i> sp., <i>Conus tessellatus</i>, <i>Chelia equestris</i>, <i>Fragum fragum</i>, <i>Lioconcha ornata</i>, <i>Fulvia aperta</i>, ? <i>Fimbria</i>, <i>Terebra nebulosa</i>, <i>T. crenulata</i>, <i>Vexillum plicarium</i>, <i>Conus eburneus</i>, <i>Oliva</i> sp. 2.</p> <p>Beam trawl Crustaceans: <i>Portunus</i> sp.</p>
<p>Site - A</p> <p>Sandy Island, south Scott Reef</p> <p>Day 5 2 Oct p.m</p>	<p>14°03.405'S; 121°46.676'E</p>	<p>Started 1600, returned 1800. Low tide of 0.6 m at 1745. Walked along side of island. Island sandy, gives was in mid to lower intertidal to thick beachrock, broken in some areas. Walked full extent of beachrock, but did not do transects. Also inspected remnants of former weather station. Started at 14°03.405'S; 121°46.676'E, finished at 14°03.271'S; 121°46.653'E.</p> <p>Molluscs: <i>Nerita polita</i>, <i>Malea pomum</i>, <i>Casmaria erinaceus</i>, <i>Rhinoclavia asper</i>, <i>Trochus maculatus</i>, <i>Bursa granularis</i>, <i>Barbatia amygdaluntotsum</i>, <i>Cerithium tenuifilum</i>, <i>C. columna</i>, <i>Strombus lentiginosus</i>, <i>Tridacna crocea</i>, <i>Hippopus hippopus</i>, <i>Polinices melanostomus</i>, <i>P. tumidus</i>, <i>Spondylus</i> sp., <i>Nerita albicilla</i>, <i>Tellina scobinata</i>, <i>Cheilea equestris</i>, <i>Lambis lambis</i>, <i>Lioconcha ornata</i>, <i>Fragum fragum</i>, <i>Glycymeris</i> sp., <i>Codakia tigerina</i>, vermetid sp., <i>Morula granulata</i>, <i>Asaphis violaceans</i>, <i>Thais</i> sp., <i>Anadara</i> sp., <i>Patella</i> sp., <i>Mitra paupercula</i>, <i>Strombu gibberulus</i>, <i>Oliva</i> sp., <i>Terebra crenulata</i>, <i>T. felina</i>, <i>Clypeomorus</i> sp., <i>Ranularia muricinum</i>, <i>Conus ebraeus</i>, <i>C. sponsalis</i>, <i>C. marmoreus</i>, <i>C. pulicarius</i>, <i>Cypraea moneta</i>.</p> <p>Echinoderms: Heart urchin, <i>Linckia laevigata</i>.</p>

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Site	Initial Location	Comments
		<p>Crustaceans: <i>Eriphia sebana</i>, <i>Percnon plannissimum</i>, <i>Eriphia scabricula</i>, <i>Petrolishes tomentosus</i>, <i>Pioldius areolatus</i>, <i>Thalmita</i> sp.</p> <p>Marine plants: In crevices dense cover of <i>Boodlea vanbosseae</i> and <i>Cladophora</i> sp. (both Chlorophyta). Otherwise no algae, but noted numerous specimens of <i>Leptolyngbya crosbyana</i> (Cyanobacteria) during the walk across the reef flat.</p>
<p>Site - C</p> <p>Southwestern corner, south Scott Reef</p> <p>Day 6</p> <p>3 Oct a.m.</p>	<p>14°11.630'S; 121°47.487'E</p>	<p>Started 0550, returned 0830. Low tide of 0.4 m at 0615. Transect across entire reef from inner margin to outer shore. Inner was largely sand with some coral. Increasing amount of coral, until at front margin it was essentially a basement pavement with some scattered coral slabs. Virtually all of the coral was dead, very low lying. Some dead slabs to turn over.</p> <p>Molluscs: <i>Malea pomum</i>, <i>Casmaria erinaceus</i>, <i>Rhinoclavis asper</i>, <i>Strombus lentiginosus</i>, <i>S. mutabilis</i>, <i>S. luhuanus</i>, <i>Rhinoclavis sinensis</i>, <i>Tellina scobinata</i>, <i>Hippopus hippopus</i>, <i>Tridacna crocea</i>, <i>Fragum fragum</i>, <i>Lioconcha ornata</i>, <i>Cerithium echinatum</i>, <i>C. nodulosus</i>, <i>Lambis chiragra</i>, <i>L. lambis</i>, <i>Oliva</i> sp. (small), <i>Drupa rubusidaeus</i>, <i>Ovula ovum</i>, <i>Chelidoneura amoena</i>, <i>Spondylus</i> sp., <i>Barbatia amygdalumtotsum</i>, <i>Nembrotha</i> sp., <i>Lithophaga</i> sp., <i>Onchidium</i> sp., <i>Serpulorbis</i> sp., <i>Peristernia nassatula</i>, <i>Hipponix conicus</i>, Black pleurobranch, <i>Drupa ricinus</i>, white <i>Bursa</i> w black spots, <i>Octopus</i> sp., <i>Spondylus</i> under rock, <i>Pinctada margaritifera</i>, <i>Tectus pyramis</i>, <i>Lithophaga</i> sp., <i>Coralliophila neritoides</i>, <i>Thais armigera</i>, <i>Mitra acuminata</i>, <i>M. stictica</i>, <i>Septifer bilocularis</i>, <i>Venus toreuma</i>, <i>Natica gualteriana</i>, <i>Terebra maculata</i>, <i>T. felina</i>, <i>Cypraea tigris</i>, <i>C. moneta</i>, <i>C. lynx</i>, <i>C. erosa</i>, <i>C. carneola</i>, <i>C. caputserpentis</i>, <i>C. isabella</i>, <i>C. vitellus</i>, <i>C. arabica</i>, <i>C. labrolineata</i>, <i>Conus capitaneus</i>, <i>C. chaldeus</i>, <i>C. imperialis</i>, <i>C. eburneus</i>, <i>C. pulicarius</i>, <i>C. vexillum</i>, <i>C. lividus</i>, <i>C. vitulinus</i>, <i>C. capitaneus</i>.</p> <p>Echinoderms: pincushion star, black spotted cucumber</p> <p>Crustaceans: <i>Huenia brevifrons</i>, <i>Lybia tesselata</i>, <i>Neopetrolisthes</i> sp., <i>Percnon guinotae</i>, <i>Percnon plannissimum</i>, <i>Petrolishes tomentosus</i>, <i>Eriphia scabricula</i>, <i>Cyclax suborbicularis</i>, <i>Tiarina cornigera</i>, <i>Thalamita</i> sp., <i>Pioldius areolatus</i>, <i>Zosymus aenus</i>, <i>Thalamita spinifera</i>.</p> <p>Polychaetes: Hesionidae, Amphinomidae, Lumbrinereidae, Polynoidae <i>Gastrolepis clavigera</i>, on <i>Holothuria atra</i>, Chrysopetalidae <i>Treptopale</i> sp.1, <i>Chrysopetalum</i> sp.4, Nereididae, <i>Nereis</i> spp., <i>Platynereis</i> sp., Eunicidae <i>Eunice torresiensi.s</i></p> <p>Marine plants: Started at lagoon edge in sandy area, then headed towards outer edge. Initially very sandy with occasional outcrops. <i>Spyridia filamentosa</i> (Rhodophyta) very common, with much of the substratum also covered with the wispy green <i>Ulva flexuosa</i> subsp. <i>paradoxa</i> (Chlorophyta). <i>Padina</i> sp (Phaeophyceae) also common and <i>Caulerpa cupressoides</i> (Chlorophyta) in the sand. Further towards the middle and outer edge the reef becomes more consolidated and supports more typical species: <i>Halimeda opuntia</i>, <i>Halimeda minima</i>, <i>Halimeda lacunalis</i>?, <i>Galaxaura rugosa</i>, <i>Ganonema pinnatum</i>, <i>Liagora divaricata</i>, <i>Liagora ceranoides</i>, <i>Gelidiella acerosa</i>, <i>Coelothrix irregularis</i>, <i>Dictyosphaeria cavernosa</i>, Close to edge two species of <i>Wrangelia</i> (Rhodophyta) are common.</p> <p>Beam trawl. Molluscs: <i>Cheilea equestris</i>, <i>Terebra maculata</i>, <i>T. subulata</i>, <i>Conus eburneus</i>, <i>Vexillum pacificum</i>,</p>

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Site	Initial Location	Comments
		<i>Oliva</i> sp. (small), <i>Pyrene turturina</i> . Beam trawl Crustaceans: <i>Portunus</i> sp.
Site - F Northeastern channel, north Scott Reef. Day 6 3 Oct p.m	13°55.637'S; 121°54.616'E	Started 1500, returned 1630. Low tide of 0.8 m at 1807. Snorkel transects across reef flat, then visual searches along reef flat and on isolated bombies in deeper water, not measured transects. Beam trawl. Molluscs: <i>Strombus gibberulus</i> , <i>Terebra maculata</i> , <i>Oliva</i> (small). Polychaetes: Serpulidae <i>Hydroides exaltatus</i> , solitary tubes on dead coral. Beam trawl Crustaceans: <i>Portunus</i> sp. Majid sp.
Site - G west side, south Scott Reef Day 7 4 Oct a.m.	14°08.183'S; 121°44.371'E	Reef flat inside lagoon, Started 0545, returned 0830. Low tide of 0.6 m at 0639. Sand bank with small, isolated dead coral slabs in the sand, became thicker further down transect. Few to turn over. Molluscs: <i>Lambis lambis</i> , <i>L. chiragra</i> , <i>Strombus gibberulus</i> , <i>S. microunceus</i> , <i>S. luhuanus</i> , <i>S. lentiginosus</i> , <i>Tridacna crocea</i> , <i>T. derasa</i> , <i>Hippopus hippopus</i> , <i>Barbatia amygdalumtotum</i> , <i>Polinices melanostomus</i> , <i>P. tumidus</i> , <i>Casmaria erinaceus</i> , <i>Pleuroploca nodulose</i> , <i>Vasum turbinellum</i> , <i>Cantharus undosus</i> , <i>Pinctada margaritifera</i> , <i>Septifer bilocularis</i> , <i>Lima lima</i> , <i>Elysia</i> sp., <i>Chicoreus</i> sp., <i>Conus pulicarius</i> , <i>C. marmoreus</i> , <i>C. eburneus</i> , <i>C. capitaneus</i> , <i>C. tessulatus</i> , <i>C. sponsalis</i> , <i>C. striatus</i> , <i>C. miliaris</i> , <i>C. sanguinolentus</i> , <i>C. rattus</i> , <i>Vexillum pacificum</i> , <i>R. sinensis</i> , <i>Bulla</i> sp., <i>Spondylus</i> sp., <i>Spondylus</i> sp. under rock, <i>Octopus</i> sp., <i>Turbo chrysostomus</i> , <i>Tectus pyramis</i> , <i>C. crenatus</i> , <i>Tellina scobinata</i> , <i>Drupella cornus</i> , <i>Drupa rubusidaeus</i> , <i>D. ricinus</i> , <i>Cypraea moneta</i> , <i>C. erosa</i> , <i>C. isabella</i> , <i>C. histrio</i> , <i>C. caurica</i> , <i>Terebra maculata</i> , <i>T. affinis</i> , <i>C. tongana</i> , <i>Onchidium</i> sp., <i>Trachycardium</i> sp., <i>Phyllidia</i> sp., <i>Chama</i> sp., <i>Tellina</i> sp., <i>Acrosterigma</i> sp. Echinoderms: <i>Bodhaschia argus</i> , <i>Holothuria atra</i> , <i>H. edulis</i> , <i>Linckia laevigata</i> , pincushion star Crustaceans: <i>Eriphia scabricula</i> , <i>Pioldius areolatus</i> , <i>Zosymus aenus</i> , <i>Leptodius</i> or <i>Macromedaeus</i> sp., <i>Domecia hispida</i> . Polychaetes: Syllidae, Nereididae undet., Chrysopetalidae <i>Treptopale</i> sp.1, Polynoidae <i>Gastrolepis clavigera</i> . Marine plants: Similar suite of species (<i>Halimeda opuntia</i> , <i>Halimeda lacunalis</i> ?, <i>Halimeda minima</i> , <i>Valonia ventricosa</i> , <i>Caulerpa cupressoides</i> , <i>Caulerpa serrulata</i> , <i>Dictyosphaeria cavernosa</i> , <i>Boodlea vanbosseae</i> , <i>Turbinaria ornata</i> , <i>Lobophora variegata</i> , <i>Galaxaura rugosa</i> , <i>Ganonema farinosum</i> , <i>Ganonema pinnatum</i> , <i>Liagora ceranoides</i> , <i>Liagora divaricata</i> , <i>Gelidiella acerosa</i> , <i>Coelothrix irregularis</i> , <i>Tolypocladia glomerulata</i>). Unique to this site compared to the others visited during the survey is the presence of the filamentous chrysophyte <i>Chrysonephos lewisii</i> .



Appendix B Scott Reef Transect Locations

Date	Transect	Latitude	Longitude	Quadrat	Comments
Site B. West Hook, South Scott Reef					
28 Sept	Wreck	14°04.494'S	121°44.181'E		
Day 1	FW 1, SD1	14°04.490'S	121°44.182'E	Start	
		14°04.489'S	121°44.193'E	20 m	
		14°04.485'S	121°44.127'E	80 m	
		14°04.484'S	121°44.238'E	Finish	
	FW 2, SD2	14°04.484'S	121°44.238'E	Start	
		14°04.478'S	121°44.251'E	20 m	
		14°04.472'S	121°44.288'E	80 m	
		14°04.469'S	121°44.301'E	Finish	
	FW 3, SD 3	14°04.470'S	121°44.303'E	Start	
		14°04.469'S	121°44.315'E	20 m	
		14°04.466'S	121°44.349'E	80 m	
		14°04.465'S	121°44.361'E	Finish	
	FW 4, SD 4	14°04.464'S	121°44.361'E	Start	
		14°04.463'S	121°44.372'E	20 m	
		14°04.458'S	121°44.405'E	80 m	
		14°04.457'S	121°44.416'E	Finish	
Site F. Northeast channel, North Scott Reef					
29 Sept	FW 1, SD 1	13°55.742'S	121°54.847 'E	Start	
Day 2		13°55.732'S	121°54.868 'E	75 m	
		13°55.708'S	121°54.874 'E	Finish	
	FW 2, SD 2	13°55.717'S	121°54.879 'E	Start	
		13°55.736'S	121°54.856 'E	50 m	
		13°55.754'S	121°54.836 'E	Finish	
	FW 3, SD 3	13°55.754'S	121°54.836 'E	Start	
		13°55.788'S	121°54.800'E	25 m	
		13°55.799'S	121°54.790'E	Finish	100m quadrat
	FW 4, SD 4	13°55.799'S	121°54.790'E	Start	
		13°55.762'S	121°54.782'E	75 m	
		13°55.745'S	121°54.782'E	Finish	
	FW 5, SD 5	13°55.745'S	121°54.782'E	Start	
		13°55.718'S	121°54.785'E	50 m	
		13°55.691'S	121°54.788'E	Finish	
	FW 6, SD 6	13°55.691'S	121°54.788'E	Start	
		13°55.677'S	121°54.790'E	25 m	
		13°55.627'S	121°54.791'E	Finish	100m quadrat



Date	Transect	Latitude	Longitude	Quadrat	Comments
	FW 7, SD 7	13°55.627'S	121°54.791'E	Start	
		13°55.588'S	121°54.807'E	75 m	
		13°55.575'S	121°54.812'E	Finish	
	FW 8, SD 8	13°55.575'S	121°54.812'E	Start	
		13°55.552'S	121°54.795'E	50 m	
		13°55.522'S	121°54.788'E	Finish	
	FW9, SD 9	13°55.522'S	121°54.788'E	Start	
		13°55.534'S	121°54.799'E	25 m	
		13°55.560'S	121°54.833'E	Finish	100m quadrat
	FW 10, SD 10	13°55.560'S	121°54.833'E	Start	
		13°55.597'S	121°54.844'E	75 m	
		13°55.612'S	121°54.851'E	Finish	
	FW 11, SD 11	13°55.612'S	121°54.851'E	Start	
		13°55.639'S	121°54.861'E	50 m	
		13°55.666'S	121°54.871'E	Finish	
Site A. Sandy Island, South Scott Reef					
30 Sep	FW 1, SD 1	14°03.555'S	121°46.341'E	Start	
Day 3 a.m.		14°03.506'S	121°46.313'E	75 m	
		14°03.494'S	121°46.303'E	Finish	
	FW 2, SD 2	14°03.494'S	121°46.303'E	Start	
		14°03.466'S	121°46.307'E	50 m	
		14°03.439'S	121°46.311'E	Finish	
	FW 3, SD 3	14°03.424'S	121°46.311'E	Start	
		14°03.424'S	121°46.311'E	25 m	
		14°03.385'S	121°46.320'E	Finish	100m quadrat
	FW 4, SD 4	14°03.385'S	121°46.320'E	Start	
		14°03.404'S	121°46.359'E	75 m	
		14°03.406'S	121°46.374'E	Finish	
	FW 5, SD 5	14°03.406'S	121°46.374'E	Start	
		14°03.387'S	121°46.394'E	50 m	
		14°03.368'S	121°46.416'E	Finish	
	FW 6, SD 6	14°03.368'S	121°46.416'E	Start	
		14°03.359'S	121°46.427'E	25 m	
		14°03.333'S	121°46.459'E	Finish	100m quadrat
Site B. West Hook, South Scott Reef					
30 Sep	FW 1, SD 1	14°04.284'S	121°44.731'E	Start	
Day 3 p.m.		14°04.283'S	121°44.688'E	75 m	
		14°04.285'S	121°44.674'E	Finish	
	FW 2, SD 2	14°04.285'S	121°44.674'E	Start	



Date	Transect	Latitude	Longitude	Quadrat	Comments
		14°04.281'S	121°44.645'E	50 m	
		14°04.279'S	121°44.615'E	Finish	
	FW 3, SD 3	14°04.279'S	121°44.615'E	Start	
		14°04.278'S	121°44.597'E	25 m	
		14°04.277'S	121°44.545'E	Finish	100m quadrat
	FW 4, SD 4	14°04.277'S	121°44.545'E	Start	
		14°04.227'S	121°44.503'E	75 m	
		14°04.214'S	121°44.496'E	Finish	
	FW 5, SD 5	14°04.214'S	121°44.496'E	Start	
		14°04.188'S	121°44.482'E	50 m	
		14°04.172'S	121°44.460'E	Finish	
	FW 6, SD 6	14°04.172'S	121°44.460'E	Start	
		14°04.155'S	121°44.445'E	25 m	
		14°04.129'S	121°44.417'E	Finish	100m quadrat
Site D. East Hook, South Scott Reef					
1 Oct	FW 1, SD 1	14°03.916'S	121°57.936'E	Start	
Day 4 a.m.		14°03.921'S	121°57.980'E	75 m	
		14°03.920'S	121°57.992'E	Finish	
	FW 2, SD 2	14°03.920'S	121°57.992'E	Start	
		14°03.932'S	121°57.017'E	50 m	
		14°03.944'S	121°57.040'E	Finish	
	FW 3, SD 3	14°03.944'S	121°57.040'E	Start	
		14°03.953'S	121°57.055'E	25 m	
		14°03.966'S	121°57.091'E	Finish	100m quadrat
	FW 4, SD 4	14°03.966'S	121°57.091'E	Start	
		14°03.000'S	121°57.117'E	75 m	
		14°03.009'S	121°57.125'E	Finish	
	FW 5, SD 5	14°04.394'S	121°58.163'E	Start	Snorkel
		14°04.404'S	121°58.189'E	75 m	
		14°04.406'S	121°58.197'E	Finish	
	FW 6, SD 6	14°04.406'S	121°58.197'E	14°04.406'S	Snorkel
		14°04.412'S	121°58.205'E	50 m	
		14°04.418'S	121°58.214'E	Finish	
	FW 7, SD 7	14°04.418'S	121°58.214'E	Start	Snorkel
		14°04.426'S	121°58.223'E	25 m	
		14°04.438'S	121°58.239'E	Finish	100m quadrat
	FW 8, SD 8	14°04.438'S	121°58.239'E	Start	Snorkel
		14°04.440'S	121°58.261'E	75 m	
		14°04.436'S	121°58.270'E	Finish	



Date	Transect	Latitude	Longitude	Quadrat	Comments
Site A. Sandy Island, South Scott Reef					
1 Oct	FW 1, SD 1	14°02.429'S	121°46.190'E	Start	Wreck site
Day 4 p.m.	FW 1, SD 1	14°02.440'S	121°46.191'E	Start	Wreck site
		14°02.480'S	121°46.185'E	75 m	
		14°02.494'S	121°46.183'E	Finish	
	FW 2, SD 2	14°02.494'S	121°46.183'E	Start	
		14°02.523'S	121°46.178'E	50 m	
		14°02.555'S	121°46.170'E	Finish	
	FW 3, SD 3	14°02.555'S	121°46.170'E	Start	
		14°02.573'S	121°46.164'E	25 m	
		14°02.611'S	121°46.150'E	Finish	100m quadrat
Site E. Southwest channel, north Scott Reef					
2 Oct	FW 1, SD 1	14°00.716'S	121°51.000'E	Start	
Day 5 a.m.		14°00.750'S	121°51.029'E	75 m	
		14°00.756'S	121°51.038'E	Finish	
	FW 2, SD 2	14°00.756'S	121°51.038'E	Start	
		14°00.748'S	121°51.048'E	50 m	
		14°00.810'S	121°51.045'E	Finish	
	FW 3, SD 3	14°00.810'S	121°51.045'E	Start	
		14°00.828'S	121°51.045'E	25 m	
		14°00.864'S	121°51.047'E	Finish	100m quadrat
	FW 4, SD 4	14°00.864'S	121°51.047'E	Start	
		14°00.909'S	121°51.848'E	75 m	
		14°00.920'S	121°51.848'E	Finish	
	FW 5, SD 5	14°00.951'S	121°51.096'E	Start	
		14°00.951'S	121°51.'E	50 m	
		14°00.951'S	121°51.096'E	Finish	
	FW 6, SD 6	14°00.948'S	121°51.124'E	Start	
		14°00.947'S	121°51.138'E	25 m	
		14°00.914'S	121°51.136'E	Finish	100m quadrat
	FW 7, SD 7	14°00.914'S	121°51.136'E	Start	
		14°00.883'S	121°51.109'E	75 m	
		14°00.872'S	121°51.102'E	Finish	
	FW 8, SD 8	14°00.872'S	121°51.102'E	Start	
		14°00.849'S	121°51.086'E	50 m	
		14°00.824'S	121°51.076'E	Finish	
	FW 9, SD 9	14°00.808'S	121°51.067'E	Start	
		14°00.775'S	121°51.046'E	25 m	
		14°00.736'S	121°51.029'E	Finish	100m quadrat



Date	Transect	Latitude	Longitude	Quadrat	Comments
	FW 10, SD 10	14°00.736'S	121°51.029'E	Start	
		14°00.747'S	121°51.021'E	75 m	
		14°00.748'S	121°51.017'E	Finish	
	FW 11, SD 11	14°00.748'S	121°51.017'E	Start	
		14°00.768'S	121°50.993'E	50 m	
		14°00.783'S	121°50.975'E	Finish	
	FW 12, SD 12	14°00.783'S	121°50.975'E	Start	
		14°00.789'S	121°50.990'E	25 m	
		14°00.799'S	121°51.030'E	Finish	100m quadrat
	FW 13, SD 13	14°00.799'S	121°51.030'E	Start	
		14°00.763'S	121°51.009'E	75 m	
		14°00.752'S	121°51.003'E	Finish	
Site C. Southwest corner, south Scott Reef					
3 Oct	FW 1, SD 1	14°11.630'S	121°47.487'E	Start	
Day 6 a.m.		14°11.677'S	121°47.478'E	75 m	
		14°11.686'S	121°47.477'E	Finish	
	FW 2, SD 2	14°11.686'S	121°47.477'E	Start	
		14°11.712'S	121°47.469'E	50 m	
		14°11.740'S	121°47.468'E	Finish	
	FW 3, SD 3	14°11.740'S	121°47.468'E	Start	
		14°11.760'S	121°47.469'E	25 m	
		14°11.797'S	121°47.472'E	Finish	100m quadrat
	FW 4, SD 4	14°11.797'S	121°47.472'E	Start	
		14°11.854'S	121°47.486'E	75 m	
		14°11.875'S	121°47.491'E	Finish	
	FW 5, SD 5	14°11.875'S	121°47.491'E	Start	
		14°11.903'S	121°47.498'E	50 m	
		14°11.931'S	121°47.571'E	Finish	
	FW 6, SD 6	14°11.931'S	121°47.571'E	Start	
		14°11.944'S	121°47.519'E	25 m	
		14°11.977'S	121°47.546'E	Finish	100m quadrat
	FW 7, SD 7	14°11.977'S	121°47.546'E	Start	
		14°11.018'S	121°47.561'E	75 m	
		14°11.034'S	121°47.557'E	Finish	
	FW 8, SD 8	14°11.034'S	121°47.557'E	Start	
		14°11.066'S	121°47.547'E	50 m	
		14°11.091'S	121°47.549'E	Finish	
	FW 9, SD 9	14°11.091'S	121°47.549'E	Start	
		14°11.108'S	121°47.550'E	25 m	



Date	Transect	Latitude	Longitude	Quadrat	Comments
		14°11.146'S	121°47.550'E	Finish	100m quadrat
	FW 10, SD 10	14°11.146'S	121°47.550'E	Start	
		14°11.186'S	121°47.547'E	75 m	
		14°11.201'S	121°47.547'E	Finish	
	FW 11, SD 11	14°11.201'S	121°47.547'E	Start	
		14°11.231'S	121°47.545'E	50 m	
		14°11.258'S	121°47.545'E	Finish	
	FW 12, SD 12	14°11.258'S	121°47.545'E	Start	
		14°11.273'S	121°47.543'E	25 m	
		14°11.314'S	121°47.543'E	Finish	100m quadrat
	FW 13, SD 13	14°11.277'S	121°47.550'E	Start	
		14°11.238'S	121°47.564'E	75 m	
		14°11.226'S	121°47.564'E	Finish	
	FW 14, SD 14	14°11.226'S	121°47.564'E	Start	
		14°11.199'S	121°47.573'E	50 m	
		14°11.172'S	121°47.579'E	Finish	
	FW 15, SD 15	14°11.172'S	121°47.579'E	Start	
		14°11.158'S	121°47.583'E	25 m	
		14°11.119'S	121°47.592'E	Finish	100m quadrat
	FW 16, SD 16	14°11.119'S	121°47.592'E	Start	
		14°11.075'S	121°47.591'E	75 m	
		14°11.063'S	121°47.594'E	Finish	
	FW 17, SD 17	14°11.063'S	121°47.594'E	Start	
		14°11.033'S	121°47.589'E	50 m	
		14°11.006'S	121°47.588'E	Finish	
Site F. Northeast channel, North Scott Reef					
3 Oct	FW 1, SD 1	13°55.637'S	121°54.616'E	Start	
Day 6		13°55.613'S	121°54.618'E	75 m	
		13°55.611'S	121°54.624'E	Finish	
	FW 2, SD 2	13°55.611'S	121°54.624'E	Start	
		13°55.595'S	121°54.618'E	50 m	
		13°55.591'S	121°54.624'E	Finish	
	FW 3, SD 3	13°55.591'S	121°54.624'E	Start	
		13°55.582'S	121°54.630'E	25 m	
		13°55.562'S	121°54.639'E	Finish	100m quadrat
	FW 4, SD 4	13°55.562'S	121°54.639'E	Start	
		13°55.542'S	121°54.651'E	75 m	
		13°55.535'S	121°54.651'E	Finish	
	FW 5, SD 5	13°55.535'S	121°54.651'E	Start	



Date	Transect	Latitude	Longitude	Quadrat	Comments
		13°55.522'S	121°54.661'E	50 m	
		13°55.508'S	121°54.637'E	Finish	
	FW 6, SD 6	13°55.508'S	121°54.637'E	Start	
		13°55.504'S	121°54.662'E	25 m	
		13°55.'S	121°54.'E	Finish	100m quadrat
Site G. Middle of western reef, South Scott Reef					
4 Oct	FW 1, SD 1	14°08.183'S	121°44.371'E	Start	
Day 7 a.m.		14°08.209'S	121°44.340'E	75 m	
		14°08.219'S	121°44.329'E	Finish	
	FW 2, SD 2	14°08.219'S	121°44.329'E	Start	
		14°08.245'S	121°44.343'E	50 m	
		14°08.267'S	121°44.355'E	Finish	
	FW 3, SD 3	14°08.267'S	121°44.355'E	Start	
		14°08.289'S	121°44.361'E	25 m	
		14°08.324'S	121°44.380'E	Finish	100m quadrat
	FW 4, SD 4	14°08.324'S	121°44.380'E	Start	
		14°08.366'S	121°44.396'E	75 m	
		14°08.372'S	121°44.406'E	Finish	
	FW 5, SD 5	14°08.372'S	121°44.406'E	Start	
		14°08.387'S	121°44.431'E	50 m	
		14°08.404'S	121°44.450'E	Finish	
	FW 6, SD 6	14°08.404'S	121°44.450'E	Start	
		14°08.415'S	121°44.460'E	25 m	
		14°08.446'S	121°44.485'E	Finish	100m quadrat
	FW 7, SD 7	14°08.446'S	121°44.485'E	Start	
		14°08.477'S	121°44.512'E	75 m	
		14°08.487'S	121°44.523'E	Finish	
	FW 8, SD 8	14°08.487'S	121°44.523'E	Start	
		14°08.524'S	121°44.539'E	50 m	
		14°08.533'S	121°44.566'E	Finish	
	FW 9, SD 9	14°08.533'S	121°44.566'E	Start	
		14°08.549'S	121°44.566'E	25 m	
		14°08.591'S	121°44.574'E	Finish	100m quadrat
	FW 10, SD 10	14°08.591'S	121°44.574'E	Start	
		14°08.635'S	121°44.581'E	75 m	
		14°08.639'S	121°44.583'E	Finish	
	FW 11, SD 11	14°08.639'S	121°44.583'E	Start	
		14°08.675'S	121°44.575'E	50 m	
		14°08.694'S	121°44.573'E	Finish	



Date	Transect	Latitude	Longitude	Quadrat	Comments
	FW 12, SD 12	14°08.694'S	121°44.573'E	Start	
		14°08.705'S	121°44.568'E	25 m	
		14°08.742'S	121°44.558'E	Finish	100m quadrat
Site B. West Hook, South Scott Reef					
28 Sep	JH 1, CW 1	14°04.503'S	121°44.186'E	Start	
Day 1		14°04.503'S	121°44.198'E	80m	
		14°04.507'S	121°44.229'E	20 m	
		14°04.508'S	121°44.241'E	Finish	
	JH 2, CW 2	14°04.520'S	121°44.239'E	Start	
		14°04.516'S	121°44.195'E	80 m	
		14°04.521'S	121°44.220'E	20m	
		14°04.516'S	121°44.185'E	Finish	
	JH 3, CW 3	14°04.507'S	121°44.240'E	Start	
		14°04.509'S	121°44.252'E	20m	
		14°04.496'S	121°44.282'E	80 m	
		14°04.484'S	121°44.291'E	Finish	
	JH 4, CW 4	14°04.484'S	121°44.291'E	Start	
		14°04.484'S	121°44.299'E	20m	
		14°04.471'S	121°44.331'E	80 m	
		14°04.470'S	121°44.342'E	Finish	
	JH 5, CW 5	14°04.467'S	121°44.346'E	Start	
		14°04.469'S	121°44.357'E	20m	
		14°04.465'S	121°44.389'E	80 m	
		14°04.463'S	121°44.401'E	Finish	
Site F. Northeast channel, North Scott Reef					
29 Sep	JH 1, CA 1	13°55.710'S	121°54.863'E	Start	
Day 2		13°55.718'S	121°54.849'E	75 m	
		13°55.721'S	121°54.809'E	Finish	
	JH 2, CA 2	13°55.721'S	121°54.809'E	Start	
		13°55.728'S	121°54.794'E	50 m	
		13°55.735'S	121°54.776'E	Finish	
	JH 3, CA 3	13°55.735'S	121°54.776'E	Start	
		13°55.760S	121°54.801'E	25 m	
		13°55.768'S	121°54.810'E	Finish	100 m quadrat
	JH 4, CA 4	13°55.768'S	121°54.810'E	Start	
		13°55.771'S	121°54.896'E	75 m	
		13°55.772'S	121°54.857'E	Finish	
	JH 5, CA 5	13°55.772'S	121°54.857'E	Start	
		13°55.777'S	121°54.877'E	50 m	



Date	Transect	Latitude	Longitude	Quadrat	Comments
		13°55.782'S	121°54.896'E	Finish	
	JH 6, CA 6	13°55.782'S	121°54.896'E	Start	
		13°55.810'S	121°54.880'E	25 m	
		13°55.818'S	121°54.874'E	Finish	100m quadrat
	JH 7, CA 7	13°55.818'S	121°54.874'E	Start	
		13°55.844'S	121°54.857'E	75 m	
		13°55.852'S	121°54.851'E	Finish	
	JH 8, CA 8	13°55.852'S	121°54.851'E	Start	
		13°55.837'S	121°54.841'E	50 m	
		13°55.822'S	121°54.831'E	Finish	
	JH 9, CA 9	13°55.822'S	121°54.831'E	Start	
		13°55.'S	121°54.8827'E	25 m	
		13°55.784'S	121°54.814'E	Finish	100 m quadrat
	JH 10, CA 10	13°55.784'S	121°54.814'E	Start	
		13°55.'S	121°54.802'E	75 m	
		13°55.751'S	121°54.798'E	Finish	
	JH 11, CA 11	13°55.751'S	121°54.798'E	Start	
		13°55.'S	121°54.801'E	50 m	
		13°55.727'S	121°54.804'E	Finish	
Site A. Sandy Island, South Scott Reef					
30 Sep	JH 1, CW 1	14°03.555'S	121°46.344'E	Start	
Day 3 a.m.		14°03.575'S	121°46.379'E	75 m	
		14°03.582'S	121°46.388'E	Finish	
	JH 2, CW 2	14°03.576'S	121°46.401'E	Start	
		14°03.551'S	121°46.411'E	50 m	
		14°03.537'S	121°46.425'E	Finish	
	JH 3, CW 3	14°03.537'S	121°46.425'E	Start	
		14°03.522'S	121°46.422'E	25 m	
		14°03.488'S	121°46.414'E	Finish	100m quadrat
	JH 4, CW 4	14°03.488'S	121°46.414'E	Start	
		14°03.450'S	121°46.412'E	75 m	
		14°03.442'S	121°46.410'E	Finish	
	JH 5, CW 5	14°03.433'S	121°46.415'E	Start	
		14°03.413'S	121°46.433'E	50 m	
		14°03.396'S	121°46.445'E	Finish	
	JH 6, CW 6	14°03.396'S	121°46.445'E	Start	
		14°03.387'S	121°46.454'E	25 m	
		14°03.365'S	121°46.475'E	Finish	100m quadrat
	JH 7, CW 7	14°03.365'S	121°46.475'E	Start	



Date	Transect	Latitude	Longitude	Quadrat	Comments
		14°03.339'S	121°46.509'E	75 m	
		14°03.336'S	121°46.514'E	Finish	
Site B. West Hook, South Scott Reef					
30 Sep	JH 1, CW 1	14°04.276'S	121°44.732'E	Start	
Day 3 p.m.		14°04.265'S	121°44.694'E	75 m	
		14°04.265'S	121°44.686'E	Finish	
	JH 2, CW 2	14°04.265'S	121°44.686'E	Start	
		14°04.261'S	121°44.662'E	50 m	
		14°04.259'S	121°44.639'E	Finish	
	JH 3, CW 3	14°04.259'S	121°44.639'E	Start	
		14°04.247'S	121°44.634'E	25 m	
		14°04.223'S	121°44.616'E	Finish	100m quadrat
	JH 4, CW 4	14°04.223'S	121°44.616'E	Start	
		14°04.185'S	121°44.605'E	75 m	
		14°04.183'S	121°44.604'E	Finish	
	JH 5, CW 5	14°04.183'S	121°44.604'E	Start	
		14°04.165'S	121°44.590'E	50 m	
		14°04.148'S	121°44.577'E	Finish	
	JH 6, CW 6	14°04.148'S	121°44.577'E	Start	
		14°04.140'S	121°44.569'E	25 m	
		14°04.115'S	121°44.546'E	Finish	100m quadrat
	JH 7, CW 7	14°04.115'S	121°44.546'E	Start	
		14°04.089'S	121°44.523'E	75 m	
		14°04.083'S	121°44.520'E	Finish	
	JH 8, CW 8	14°04.083'S	121°44.520'E	Start	
		14°04.064'S	121°44.503'E	50 m	
		14°04.053'S	121°44.488'E	Finish	
	JH 9, CW 9	14°04.053'S	121°44.488'E	Start	
		14°04.044'S	121°44.479'E	25 m	
		14°04.019'S	121°44.460'E	Finish	100m quadrat
Site D. East Hook, South Scott Reef					
1 Oct	JH 1, CW 1	14°03.919'S	121°57.933'E	Start	
Day 4 a.m.		14°03.935'S	121°57.970'E	75 m	
		14°03.939'S	121°57.979'E	Finish	
	JH 2, CW 2	14°03.939'S	121°57.979'E	Start	
		14°03.954'S	121°58.001'E	50 m	
		14°03.968'S	121°58.017'E	Finish	
	JH 3, CW 3	14°03.968'S	121°58.017'E	Start	
		14°03.976'S	121°58.027'E	25 m	



Date	Transect	Latitude	Longitude	Quadrat	Comments
		14°04.991'S	121°44.051'E	Finish	100m quadrat
	JH 4, CW 4	14°04.991'S	121°44.051'E	Start	
		14°04.024'S	121°44.081'E	75 m	
		14°04.029'S	121°44.089'E	Finish	
	JH 5, CW 5	14°04.029'S	121°44.089'E	Start	
		14°04.048'S	121°44.109'E	50 m	
		14°04.062'S	121°44.129'E	Finish	
	JH 6, CW 6	14°04.218'S	121°58.084'E	Start	Snorkel
		14°04.250'S	121°58.112'E	75 m	
		14°04.257'S	121°58.114'E	Finish	
	JH 7, CW 7	14°04.257'S	121°58.114'E	Start	Snorkel
		14°04.284'S	121°58.139'E	50 m	
		14°04.309'S	121°58.147'E	Finish	
	JH 8, CW 8	14°04.309'S	121°58.147'E	Start	Snorkel
		14°04.323'S	121°58.144'E	25 m	
		14°04.355'S	121°58.182'E	Finish	100m quadrat
	JH 9, CW 9	14°04.355'S	121°58.182'E	Start	Snorkel
		14°04.395'S	121°58.187'E	75 m	
		14°04.407'S	121°58.187'E	Finish	
Site A. Sandy Island, South Scott Reef					
1 Oct	JH 1, CW 1	14°03.145'S	121°45.968'E	Start	
Day 4 p.m.		14°03.105'S	121°45.976'E	75 m	
		14°03.090'S	121°45.980'E	Finish	
	JH 2, CW 2	14°03.090'S	121°45.980'E	Start	
		14°03.066'S	121°45.992'E	50 m	
		14°03.043'S	121°46.001'E	Finish	
	JH 3, CW 3	14°03.043'S	121°46.001'E	Start	
		14°03.031'S	121°46.002'E	25 m	
		14°02.996'S	121°46.013'E	Finish	100m quadrat
	JH 4, CW 4	14°02.763'S	121°46.079'E	Start	
		14°02.800'S	121°46.074'E	75 m	
		14°02.810'S	121°46.071'E	Finish	
Site E. Southwest channel, north Scott Reef					
2 Oct	JH 1, CW 1	14°00.709'S	121°50.997'E	Start	
Day 5 a.m.		14°00.742'S	121°50.982'E	75 m	
		14°00.755'S	121°50.978'E	Finish	
	JH 2, CW 2	14°00.755'S	121°50.978'E	Start	
		14°00.777'S	121°50.970'E	50 m	
		14°00.799'S	121°50.965'E	Finish	



Date	Transect	Latitude	Longitude	Quadrat	Comments
	JH 3, CW 3	14°00.799'S	121°50.965'E	Start	
		14°00.813'S	121°50.966'E	25 m	
		14°00.845'S	121°50.977'E	Finish	100m quadrat
	JH 4, CW 4	14°00.845'S	121°50.977'E	Start	
		14°00.877'S	121°50.994'E	75 m	
		14°00.887'S	121°52.003'E	Finish	
	JH 5, CW 5	14°00.887'S	121°52.003'E	Start	
		14°00.888'S	121°51.021'E	50 m	
		14°00.901'S	121°51.040'E	Finish	
	JH 6, CW 6	14°00.901'S	121°51.040'E	Start	
		14°00.912'S	121°51.056'E	25 m	
		14°00.939'S	121°51.087'E	Finish	100m quadrat
	JH 7, CW 7	14°00.939'S	121°51.087'E	Start	
		14°00.910'S	121°51.102'E	75 m	
		14°00.897'S	121°51.106'E	Finish	
	JH 8, CW 8	14°00.897'S	121°51.106'E	Start	
		14°00.875'S	121°51.089'E	50 m	
		14°00.858'S	121°51.070'E	Finish	
	JH 9, CW 9	14°00.858'S	121°51.070'E	Start	
		14°00.849'S	121°51.066'E	25 m	
		14°00.822'S	121°51.039'E	Finish	100m quadrat
	JH 10, CW 10	14°00.820'S	121°51.042'E	Start	
		14°00.782'S	121°51.036'E	75 m	
		14°00.773'S	121°51.028'E	Finish	
	JH 11, CW 11	14°00.768'S	121°51.029'E	Start	
		14°00.767'S	121°51.003'E	50 m	
		14°00.759'S	121°51.978'E	Finish	
Site C. Southwest corner, south Scott Reef					
3 Oct	JH 1, CW 1	14°11.652'S	121°47.590'E	Start	
Day 6 a.m.		14°11.687'S	121°47.517'E	75 m	
		14°11.703'S	121°47.519'E	Finish	
	JH 2, CW 2	14°11.703'S	121°47.519'E	Start	
		14°11.727'S	121°47.530'E	50 m	
		14°11.749'S	121°47.539'E	Finish	
	JH 3, CW 3	14°11.749'S	121°47.539'E	Start	
		14°11.761'S	121°47.545'E	25 m	
		14°11.793'S	121°47.555'E	Finish	100m quadrat
	JH 4, CW 4	14°11.793'S	121°47.555'E	Start	
		14°11.831'S	121°47.555'E	75 m	



Date	Transect	Latitude	Longitude	Quadrat	Comments
		14°11.842'S	121°47.562'E	Finish	
	JH 5, CW 5	14°11.842'S	121°47.562'E	Start	
		14°11.862'S	121°47.571'E	50 m	
		14°11.885'S	121°47.579'E	Finish	
	JH 6, CW 6	14°11.885'S	121°47.579'E	Start	
		14°11.895'S	121°47.579'E	25 m	
		14°11.929'S	121°47.588'E	Finish	100m quadrat
	JH 7, CW 7	14°11.929'S	121°47.588'E	Start	
		14°11.967'S	121°47.595'E	75 m	
		14°11.979'S	121°47.596'E	Finish	
	JH 8, CW 8	14°11.979'S	121°47.596'E	Start	
		14°11.005'S	121°47.596'E	50 m	
		14°11.028'S	121°47.593'E	Finish	
	JH 9, CW 9	14°11.028'S	121°47.593'E	Start	
		14°11.041'S	121°47.591'E	25 m	
		14°11.078'S	121°47.585'E	Finish	100m quadrat
	JH 10, CW 10	14°11.078'S	121°47.585'E	Start	
		14°11.116'S	121°47.581'E	75 m	
		14°11.129'S	121°47.577'E	Finish	
	JH 11, CW 11	14°11.129'S	121°47.577'E	Start	
		14°11.155'S	121°47.570'E	50 m	
		14°12.182'S	121°47.565'E	Finish	
	JH 12, CW 12	14°12.182'S	121°47.565'E	Start	
		14°12.195'S	121°47.562'E	25 m	
		14°12.231'S	121°47.562'E	Finish	100m quadrat
	JH 13, CW 13	14°12.231'S	121°47.562'E	Start	
		14°12.267'S	121°47.563'E	75 m	
		14°12.279'S	121°47.560'E	Finish	
Site G. Middle of western reef, South Scott Reef					
4 Oct	JH 1, CW 1	14°08.184'S	121°44.378'E	Start	
Day 7 a.m.		14°08.220'S	121°44.371'E	75 m	
		14°08.228'S	121°44.375'E	Finish	
	JH 2, CW 2	14°08.228'S	121°44.375'E	Start	
		14°08.250'S	121°44.372'E	50 m	
		14°08.273'S	121°44.378'E	Finish	
	JH 3, CW 3	14°08.273'S	121°44.378'E	Start	
		14°08.283'S	121°44.378'E	25 m	
		14°08.314'S	121°44.382'E	Finish	100m quadrat
	JH 4, CW 4	14°08.314'S	121°44.382'E	Start	



Date	Transect	Latitude	Longitude	Quadrat	Comments
		14°08.342'S	121°44.392'E	75 m	
		14°08.346'S	121°44.396'E	Finish	
	JH 5, CW 5	14°08.346'S	121°44.396'E	Start	
		14°08.344'S	121°44.422'E	50 m	
		14°08.360'S	121°44.434'E	Finish	
	JH 6, CW 6	14°08.360'S	121°44.434'E	Start	
		14°08.370'S	121°44.441'E	25 m	
		14°08.395'S	121°44.461'E	Finish	100m quadrat
	JH 7, CW 7	14°08.395'S	121°44.461'E	Start	
		14°08.424'S	121°44.490'E	75 m	
		14°08.433'S	121°44.496'E	Finish	
	JH 8, CW 8	14°08.433'S	121°44.496'E	Start	
		14°08.453'S	121°44.512'E	50 m	
		14°08.471'S	121°44.526'E	Finish	
	JH 9, CW 9	14°08.471'S	121°44.526'E	Start	
		14°08.480'S	121°44.534'E	25 m	
		14°08.503'S	121°44.555'E	Finish	100m quadrat
	JH 10, CW 10	14°08.503'S	121°44.555'E	Start	
		14°08.538'S	121°44.573'E	75 m	
		14°08.548'S	121°44.577'E	Finish	
	JH 11, CW 11	14°08.548'S	121°44.577'E	Start	
		14°08.571'S	121°44.571'E	50 m	
		14°08.591'S	121°44.571'E	Finish	
	JH 12, CW 12	14°08.591'S	121°44.571'E	Start	
		14°08.602'S	121°44.564'E	25 m	
		14°08.634'S	121°44.561'E	Finish	100m quadrat
	JH 13, CW 13	14°08.639'S	121°44.564'E	Start	
		14°08.673'S	121°44.572'E	75 m	
		14°08.685'S	121°44.569'E	Finish	
	JH 14, CW 14	14°08.685'S	121°44.569'E	Start	
		14°08.706'S	121°44.558'E	75 m	
		14°08.721'S	121°44.554'E	Finish	



Appendix C Scott Reef Bean Trawl Locations

Note: In many instances, several adjacent trawls were conducted between similar 'start' and 'stop' locations in order to maximise the area covered of suitable and available habitat. Trawls were undertaken to ensure that the same area of seabed was not sampled twice.

Site	Date	Operators	Trawl #	Distance trawled (m)	Habitat description	Approx depth (m)	Start		Finish	
							Lat.	Long.	Lat.	Long.
Sandy Islet, south Scott Reef	28/09/2008	Peter Michael (PM), Craig Astbury (CA)	1	1580	Sand with coral rubble	2-3m	14°03.810'	121°46.674'	14°03.888'	121°46.720'
			2	6000	Bare sand with few small coral bommies	6m	14°04.621'	121°46.972'	14°04.535'	121°46.843'
			subtotal	7580						
Northeast, north Scott reef	29/09/2008	PM	1	1310	Sand stretch next to reef flat - south of entrance	3-5m	13°55.673'	121°54.471'	13°55.673'	121°54.417'
			2	3690	Sand stretch next to reef flat , numerous large bommies - south of entrance	4-7m	13°56.005'	121°54.771'	13°55.876'	121°54.657'
	3/10/2008	PM, CA	3	2300	Sand and rubble area with long runs weaving between large bommies - north of entrance	6m	13°54.646'	121°53.764'	13°54.737'	121°53.839'
			4	420	Small rubbly patch amongst bommies - north of entrance	5-7m	13°55.779'	121°54.651'	13°55.846'	121°54.611'
			subtotal	7720						



C.1 Location of Beam Trawls at Scott Reef Cont.

Site	Date	Operators	Trawl #	Distance trawled (m)	Habitat description	Approx depth (m)	Start		Finish	
							Lat.	Long.	Lat.	Long.
West Hook south Scott Reef	30/09/2008	PM, CA	1	4220	Sand strip adjacent to reef flat dropping steeply towards the lagoon	4-8m	14°05.590'	121°44.765'	14°05.783'	121°44.730'
			2	1100	As above	8m	14°06.703'	121°44.565'	14°06.902'	121°44.567'
			3	2200	As above	4-7m	14°05.590'	121°44.765'	14°05.783'	121°44.730'
			subtotal	7520						
East Hook south Scott Reef	1/10/2008	PM, CA	1	2500	Small sand patch with rubble edges	6-8m	14°04.413'	121°57.870'	14°04.301'	121°57.895'
			2	5000	Sand hole with large bommies to weave	6-13m	14°04.993'	121°57.835'	14°04.831'	121°57.842'
			subtotal	7500						
Southwest entrance north Scott Reef	2/10/2008	PM, CA	1	2600	Sand, deeper gully on the lagoon side of the reef and adjacent sand flat	5-8m	13°59.947'	121°51.302'	13°59.780'	121°51.666'
			2	700	Shallow sand flat adjacent to reef, few rubble patches and small bommies	1-3m	13°59.879'	121°51.295'	13°59.911'	121°51.534'
			3	300	As above	1-3m	13°59.911'	121°51.534'	13°59.764'	121°51.448'
			4	380	As above	1-3m	13°59.764'	121°51.448'	13°59.823'	121°51.621'
			5	230	As above	1-3m	13°59.823'	121°51.621'	13°59.729'	121°51.525'
			6	270	As above	1-3m	13°59.729'	121°51.525'	13°59.784'	121°51.626'
			7	190	As above	1-3m	13°59.784'	121°51.626'	13°59.739'	121°51.500'



C.2 Location of Beam Trawls at Scott Reef Cont.

Site	Date	Operators	Trawl #	Distance trawled (m)	Habitat description	Approx depth (m)	Start		Finish	
							Lat.	Long.	Lat.	Long.
Southwest entrance north Scott Reef	2/10/2008	PM, CA	8	750	As above	1-3m	13°59.739'	121°51.500'	14°00.024'	121°51.215'
			9	300	As above	1-3m	14°00.024'	121°51.215'	13°59.919'	121°51.312'
			10	375	As above	1-3m	13°59.919'	121°51.312'	13°59.962'	121°51.432'
			11	350	As above	1-3m	13°59.962'	121°51.432'	13°59.838'	121°51.365'
			12	320	As above	1-3m	13°59.838'	121°51.365'	13°59.887'	121°51.525'
			13	440	As above	1-3m	13°59.887'	121°51.525'	13°59.783'	121°51.422'
			14	300	As above	1-3m	13°59.783'	121°51.422'	13°59.740'	121°51.580'
			subtotal	7505						
South Scott Reef a	3/10/2008	PM, CA	1	6000	Sand next to reef flat	4-7m	14°11.414'	121°47.343'	14°11.469'	121°47.557'
			2	2500	Sand next to reef flat	4m	14°11.659'	121°48.350'	14°11.629'	121°48.208'
			subtotal	8500						
South Scott Reef b	4/10/2008	PM, CA	1	1000	Shallow sand flat with coral rubble	1-2m	14° 07.302'	121°44.368'	14°07.300'	121°44.462'
			2	5500	Sandy bottom, ranging from shallow flat to deep gullies between bommies.	2-8m	14°07.487'	121°44.400'	14°07.375'	121°44.393'
			3	1000	Shallow sand flat with coral rubble	1-3m	14° 07.336'	121°43.991'	14°07.272'	121°43.986'
			subtotal	7500						
			Total area trawled	53825 m ²						



Appendix D Monitoring Array Locations

Array Number	Latitude	Longitude
1	14° 04.556'	121° 46.935'
2	14° 04.616'	121° 46.978'
3	13° 55.840'	121° 54.582'
4	13° 55.555'	121° 54.267'
5	14° 04.222'	121° 44.849'
6	14° 04.179'	121° 44.837'
7	14° 05.262'	121° 56.819'
8	14° 05.303'	121° 56.735'
9	13° 59.739'	121° 51.214'
10	13° 59.797'	121° 51.140'
11	14° 04.278'	121° 46.628'
12	14° 04.430'	121° 44.908'
13	14° 11.282'	121° 46.999'
14	14° 11.375'	121° 47.173'
15	14° 11.180'	121° 46.740'



Appendix E Location / method and species list

Location	Method/Species
<p>Site - A Sandy Island, South Scott Reef</p>	<p>Intertidal Transects:</p> <p>Molluscs: <i>Mitra papalis</i>, <i>Lambis chiragra</i>, <i>Lambis lambis</i>, <i>Cerithium nodulosus</i>, <i>Cypraea staphylaea</i>, <i>Cypraea. erosa</i>, <i>Cypraea moneta</i>, <i>Cypraea isabella</i>, <i>Cypraea eglantina</i>, <i>Hippopus hippopus</i>, <i>Pinctada margaritifera</i>, <i>Tectus pyramis</i>, <i>Chelidonura hirundinina</i>, <i>Turbo chrysostomus</i>, <i>Chama</i> sp., <i>Trochus maculatus</i>, <i>Turbo chrysostomus</i>, <i>Elysia</i> sp., <i>Strombus luhuanus</i>, <i>Strombus lentiginosa</i>, <i>Tridacna crocea</i>, <i>Coralliophila neritoides</i>, <i>Conus chaldeus</i>, <i>Conus marmoreus</i>, <i>Conus flavidus</i>, <i>Gymnodoris</i> sp., <i>Polinices tumidus</i>, <i>Strombus mutabilis</i>, <i>Terebra crenulata</i>, <i>Nerita albicilla</i>, <i>Saccostrea</i> sp., <i>Thais aculeata</i>, <i>Polinices melanostomus</i>, <i>Rhinoclavis sinensis</i>, <i>Trochus niloticus</i>, <i>Cantharus undosus</i>, <i>Vasum turbinellum</i>, <i>Cypraea annulus</i>, <i>Conus ebraeus</i>, <i>Latirolagena smaragdula</i>, <i>Casmaria erinaceus</i>, <i>Terebra feline</i>, <i>Conus vexillum</i>, <i>Conus planorbis</i>, <i>Pleuroploca</i> sp?, <i>Nerita polita</i>, <i>Malea pomum</i>, <i>Rhinoclavis asper</i>, <i>Trochus maculatus</i>, <i>Bursa granularis</i>, <i>Barbatia amygdaluntotsum</i>, <i>Cerithium tenuifilum</i>, <i>Cerithium columna</i>, <i>Strombus lentiginosus</i>, <i>Spondylus</i> sp., <i>Tellina scobinata</i>, <i>Cheilea equestris</i>, <i>Lioconcha ornata</i>, <i>Fragum fragum</i>, <i>Glycymeris</i> sp., <i>Codakia tigerina</i>, vermetid sp., <i>Morula granulata</i>, <i>Asaphis violaceans</i>, <i>Thais</i> sp., <i>Anadara</i> sp., <i>Patella</i> sp., <i>Mitra paupercula</i>, <i>Strombu gibberulus</i>, <i>Oliva</i> sp., <i>Clypeomorus</i> sp., <i>Ranularia muricinum</i>, <i>Conus sponsalis</i>, <i>Conus pulicarius</i>, and <i>Cypraea moneta</i>.</p> <p>Echinoderms: <i>Holothuria atra</i>, <i>Coriaster granulatus</i>, <i>Linckia laevigata</i>, holothurians, ophiuroids</p> <p>Crustaceans: <i>Calappa calappa</i>, <i>Zosymus aenus</i>, <i>Eriphia scabricula</i>, <i>Pioldius areolatus</i>, <i>Cyclax suborbicularis</i>, <i>Portunus</i> sp., <i>Atergatopsis germanini</i>, <i>Etisia dentatus</i>, <i>Zosymus aenus</i>, <i>Percnon plannissimum</i>, Porcellanidae sp., <i>Eriphia sebana</i>, <i>Petrolishes tomentosus</i>, <i>Thalmita</i> sp.</p> <p>Polychaetes: Amphinomidae, Dorvilleidae, Terebellidae, Glyceridae, Syllidae, Capitellidae, Lumbrinereidae, Spionidae, Phyllodocidae, Sabellidae, Polynoidae, Chrysopetalidae, <i>Chrysopetalum</i>, Nereididae <i>Nereis</i> spp, <i>Platynereis</i> sp, <i>Ceratonereis perkinsi</i>, <i>Neanthes</i> sp., Opheliidae <i>Polyopthalmus</i> sp. 1, Serpulidae <i>Hydroides exaltatus</i>, <i>Nereis</i> cf <i>denhamensis</i>.</p> <p>Marine plants: <i>Thalassia hemprichii</i>, <i>Boodlea vanbosseae</i> (Chlorophyta), <i>Galaxaura rugosa</i> (Rhodophyta), <i>Caulerpa cupressoides</i> (Chlorophyta), <i>Ganonema pinnatum</i> (Rhodophyta), <i>Liagora divaricata?</i> (Rhodophyta), <i>Neomeris bilimbata</i> (Chlorophyta), <i>Anadyomene plicata</i> (Chlorophyta), <i>Dasya</i> sp. (Rhodophyta) and <i>Boergesenia forbesii</i> (Chlorophyta), <i>Cladophora</i> sp. (Chlorophyta), <i>Leptolyngbya crosbyana</i> (Cyanobacteria), <i>Liagora ceranoides</i>.</p>
<p>Site - B West Hook, south Scott Reef</p>	<p>Intertidal Transects:</p> <p>Molluscs: <i>Conus marmoreus</i>, <i>Cypraea tigris</i>, <i>Cypraea moneta</i>, <i>Vasum turbinellum</i>, <i>Lambis chiragra</i>, <i>Lambis lambis</i>, <i>sacoglossan</i>, <i>Tambja</i>, <i>Phyllidia</i> (3 species), <i>Rhinoclavis sinensis</i>, <i>Turbo chrysostoma</i>, <i>Hippopus hippopus</i>, <i>Tridacna crocea</i>, <i>Tridacna maxima</i>, <i>Serpulorbis</i> sp., <i>Peristernia nassatula</i>, <i>Nassaricus papillosus</i>, <i>Mitra stictica</i>, <i>Nerita plicata</i>, <i>Cerithium nodulosus</i>, <i>Polinices tumidus</i> <i>Hippopus hippopus</i>, <i>Latirolagena smaragdula</i>, <i>Cypraea erosa</i>, <i>Cypraea eglantina</i>, <i>Cypraea isabella</i>, <i>Coralliophila neritoides</i>, <i>Strombus</i></p>

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Location	Method/Species
	<p><i>lentiginosus</i>, <i>Strombus mutabilis</i>, <i>Phyllidia varicosa</i>, <i>Drupa ricinus</i>, <i>Drupa rubusidaeus</i>, <i>Trochus maculatus</i>, <i>Spondylus</i> sp., <i>Onchidium</i> sp., <i>Morula granulata</i>, <i>Nembrotha</i> sp. (black), <i>Cymatium nesioticum</i>, <i>Tellina scobinata</i>, <i>Conus planorbis</i>, <i>Conus capitaneus</i>, <i>Conus Sanguinolenus</i>, <i>Conus Coronatus</i>, <i>Periglypta</i> sp, <i>Saccostrea</i> sp, <i>littorinids</i> sp.</p> <p>Echinoderms: <i>Bodhaschia argus</i>, <i>Coriaster granulatus</i>, <i>Linckia laevigata</i>, <i>Holothuria leucospilota</i>, <i>Diadema</i> sp.</p> <p>Crustaceans: Stomatopod, <i>Percnon plannissimum</i>, <i>Grapis albolineatua</i>, <i>Atergatis floridus</i>, <i>Eriphia scabricula</i>, <i>Pioldius areolatus</i>. Stomatopods, <i>Zosymus aenus</i>, <i>Pioldius areolatus</i>, <i>Eriphia scabricula</i>, <i>Thalamita</i> sp., <i>Thalamita picta</i>, <i>Thalamita admete</i>, <i>Tetraclita squamosa</i>.</p> <p>Polychaetes: Dorvilleidae, Terebellidae, Glyceridae, Syllidae, Capitellidae, Sabellidae, Lumbrinereidae, Phyllodocidae, Maldanidae, Spionidae, Amphinomidae, Chrysopetalidae <i>Chrysopetalum</i>, Polynoidae, <i>Gastrolepis clavigera</i>, <i>Bodhaschia argus</i>, Nereididae <i>Nereis</i> spp., <i>Platynereis</i> sp., <i>Ceratonereis perkinsini</i>, Eunicidae <i>Eunice torresiensis</i>, Opheliidae <i>Polyopthalmus</i>. <i>Holothuria atra</i>. Amphinomidae <i>Eurythoe complanata</i>.</p> <p>Marine plants: <i>Lyngbya majuscula</i> <i>Halimeda opuntia</i> (Cyanobacteria), <i>Jania adhaerens</i> (Rhodophyta), <i>Boergesenia forbesii</i> (Chlorophyta), <i>Ulva flexuosa</i> subsp. <i>paradoxa</i> (Chlorophyta), <i>Boodlea vanbosseae</i>, <i>Boodlea composita</i> and <i>Neomeris bilimbata</i> (Chlorophyta), <i>Cladophora</i> sp. (Chlorophyta), <i>Chaetomorpha</i> sp. (Chlorophyta), <i>Lobophora variegata</i> (Phaeophyceae), <i>Gelidiella acerosa</i> (Rhodophyta), <i>Hydrolithon</i> sp. (Rhodophyta), <i>Ganonema pinnatum</i> (Rhodophyta), <i>Galaxaura rugosa</i> (Rhodophyta), <i>Ceramium vagans</i> (Rhodophyta), <i>Centroceras clavulatum</i> (Rhodophyta), <i>Hypnea</i> sp. (Rhodophyta), <i>Champia parvula</i> (Rhodophyta).</p> <p>Beam Trawl:</p> <p>Polychaetes: Serpulidae <i>Hydroides exaltatus</i>, Eunicidae <i>Eunice torresiensis</i>, <i>Eunice complanata</i>.</p> <p>Crustaceans: <i>Thalamita admete</i>, <i>Portunus</i> sp.</p>
<p>Site - C</p> <p>Southwestern corner, south Scott Reef</p>	<p>Intertidal Transects:</p> <p>Molluscs: <i>Malea pomum</i>, <i>Casmaria erinaceus</i>, <i>Rhinoclavis asper</i>, <i>Strombus lentiginosus</i>, <i>Strombus lmutabilis</i>, <i>Strombus lluhuanus</i>, <i>Rhinoclavis sinensis</i>, <i>Tellina scobinata</i>, <i>Hippopus hippopus</i>, <i>Tridacna crocea</i>, <i>Fragum fragum</i>, <i>Lioconcha ornata</i>, <i>Cerithium echinatum</i>, <i>Cerithium nodulosus</i>, <i>Lambis chiragra</i>, <i>Lambis lambis</i>, <i>Oliva</i> sp. (small), <i>Drupa rubusidaeus</i>, <i>Ovula ovum</i>, <i>Chelidoneura amoena</i>, <i>Spondylus</i> sp., <i>Barbatia amygdalumtotsum</i>, <i>Nembrotha</i> sp., <i>Lithophaga</i> sp., <i>Onchidium</i> sp., <i>Serpulorbis</i> sp., <i>Peristernia nassatula</i>, <i>Hipponix conicus</i>, Black pleurobranch, <i>Drupa ricinus</i>, <i>Octopus</i> sp., <i>Spondylus</i>, <i>Pinctada margaritifera</i>, <i>Tectus pyramis</i>, <i>Lithophaga</i> sp., <i>Coralliophila neritoides</i>, <i>Thais armigera</i>, <i>Mitra acuminata</i>, <i>Mitra stictica</i>, <i>Septifer bilocularis</i>, <i>Venus toreuma</i>, <i>Natica qualteriana</i>, <i>Terebra maculata</i>, <i>T. felina</i>, <i>Cypraea tigris</i>, <i>Cypraea moneta</i>, <i>Cypraea lynx</i>, <i>Cypraea erosa</i>, <i>Cypraea carneola</i>, <i>Cypraea caputserpentis</i>, <i>Cypraea isabella</i>, <i>Cypraea vitellus</i>, <i>Cypraea arabica</i>, <i>Cypraea labrolineata</i>, <i>Conus capitaneus</i>, <i>Conus chaldeus</i>, <i>Conus imperialis</i>, <i>Conus eburneus</i>, <i>Conus pulicarius</i>, <i>Conus vexillum</i>, <i>Conus lividus</i>, <i>Conus vitulinus</i>, <i>Conus capitaneus</i>.</p> <p>Crustaceans: <i>Huenia brevifrons</i>, <i>Lybia tessellata</i>, <i>Neopetrolisthes</i> sp., <i>Percnon guinotae</i>, <i>Percnon plannissimum</i>, <i>Petrolishes tomentosus</i>, <i>Eriphia scabricula</i>, <i>Cyclax</i></p>

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Location	Method/Species
	<p><i>suborbicularis</i>, <i>Tiarina cornigera</i>, <i>Thalamita</i> sp., <i>Pioldius areolatus</i>, <i>Zosymus aenus</i>, <i>Thalamita spinifera</i>.</p> <p>Polychaetes: Hesionidae, Amphinomidae, Lumbrinereidae, Polynoidae <i>Gastrolepis clavigera</i>, on <i>Holothuria atra</i>, Chrysopetalidae <i>Treptopale</i>, <i>Chrysopetalum</i>, Nereididae, <i>Nereis</i> spp., <i>Platynereis</i> sp., Eunicidae <i>Eunice torresiensi.s</i></p> <p>Marine plants: <i>Spyridia filamentosa</i> (Rhodophyta), <i>Ulva flexuosa</i> subsp. <i>paradoxa</i> (Chlorophyta). <i>Padina</i> sp (Phaeophyceae), <i>Caulerpa cupressoides</i> (Chlorophyta), <i>Halimeda opuntia</i>, <i>Halimeda minima</i>, <i>Halimeda lacunalis?</i>, <i>Galaxaura rugosa</i>, <i>Ganonema pinnatum</i>, <i>Liagora divaricata</i>, <i>Liagora ceranoides</i>, <i>Gelidiella acerosa</i>, <i>Coelothrix irregularis</i>, <i>Dictyosphaeria cavernosa</i>, and <i>Wrangelia</i> (Rhodophyta).</p> <p>Beam Trawl:</p> <p>Molluscs: <i>Cheilea equestris</i>, <i>Terebra maculata</i>, <i>T. subulata</i>, <i>Conus eburneus</i>, <i>Vexillum pacificum</i>, <i>Oliva</i> sp., <i>Pyrene turturina</i>.</p> <p>Crustaceans: <i>Portunus</i> sp.</p>
<p>Site - D</p> <p>East Hook, south Scott Reef</p>	<p>Snorkel Transects:</p> <p>Molluscs: <i>Rhinoclavis sinensis</i>, <i>Tridacna crocea</i>, <i>Tridacna derasa</i>, <i>Tridacna maxima</i>, <i>Hippopus hippopus</i>, <i>Turbo chrysostomus</i>, <i>Drupa morum</i>, <i>Cerithium nodulosus</i>, <i>Spondylus</i> sp., <i>Cypraea erosa</i>, <i>Cypraea moneta</i>, <i>Cypraea isabella</i>, <i>Tellina scobinata</i>, <i>Nassarius papillosus</i>, <i>Strombus mutabilis</i>, <i>Cerithium columna</i>, <i>Vasum turbinellum</i>, <i>Ovula ovum</i>, <i>Tectus pyramis</i>, <i>Lambis chiragra</i>, <i>Hipponyx conicus</i>, <i>Conus erinaceus</i>, <i>Conus distans</i>, <i>Conus miliaris</i>, <i>Conus vexillum</i>, <i>Conus rattus</i>, <i>Peristernia nassatula</i>.</p> <p>Marine plants: <i>Halimeda</i> sp., <i>Caulerpa cupressoides</i>, <i>Ganonema pinnatum</i>, <i>Liagora divaricata</i>, <i>Boodlea vanbosseae</i>, <i>Galaxaura rugosa</i>, <i>Ganonema farinosum</i>, <i>Turbinaria ornata</i>, <i>Neomeris bilimbata</i></p> <p>Beam Trawl:</p> <p>Crustaceans: <i>Thalamita admete</i>, <i>Thalamita</i> sp.</p>
<p>Site - E</p> <p>Southern side, southwest channel, north Scott Reef.</p>	<p>Intertidal Transects:</p> <p>Molluscs: <i>Coriocella nigra</i>, <i>Drupa rubusidaeus</i>, <i>Drupa ricinus</i>, <i>Latirolagena smaragdula</i>, <i>Turbo chrysostomus</i>, <i>Cassis erinaceus</i>, <i>Lima lima</i>, <i>Venus toreuma</i>, <i>Pleuroploca?</i>, <i>Pyrene scripta</i>, ? <i>Mitra acuminata</i>, <i>Harpa</i> sp., <i>Conus</i> sp (1 cm bright yellow), <i>Septa gemmata</i>, <i>Conus miles</i>, <i>Conus sponsalis</i>, <i>Conus imperialis</i>, <i>Conus vexillum</i>, <i>Conus distans</i>, <i>Conus planorbis</i>, <i>Conus miliaris</i>, <i>Conus coronatus</i>, <i>Conus scabriusculus</i>, <i>Conus capitaneus</i>, <i>Conus rattus</i>, <i>Conus Aff ebraeus</i>, <i>Serpulorbis</i> sp., <i>Rhinoclavis sinensis</i>, <i>Spondylus</i> sp. (under rock), <i>Spondylus</i> sp., <i>Hipponyx conicus</i>, <i>Onchidium</i> sp., <i>Lambis chiragra</i>, <i>Peristernia nassatula</i>, <i>Vasum turbinellum</i>, <i>Periglyppta</i> sp., <i>Tridacna crocea</i>, <i>Polinices tumidus</i>, <i>Tectus pyramis</i>, <i>Charonia tritonis</i>, <i>Drupa ricinus</i>, <i>Hippopus hippopus</i>, <i>Bursa granularis</i>, <i>Bursa</i> sp., <i>Burse with black stripes</i>, <i>Polinices melanosomus</i>, <i>Terebra felina</i>, <i>Cypraea tigris</i>, <i>Cypraea moneta</i>, <i>Cypraea lynx</i>, <i>Cypraea erosa</i>, <i>Cypraea isabella</i>, <i>Cypraea cylindrica</i>, <i>Cypraea staphylea</i>, <i>Cypraea kieneri</i>.</p> <p>Echinoderms: <i>Linckia laevigata</i>, <i>Tripneustes</i> sp., <i>Holothuria</i> sp.</p> <p>Crustaceans: <i>Eriphia sebana</i>, <i>Eriphia scabricula</i>, <i>Zosymus aenus</i>, <i>Percnon plannissimum</i>, <i>Pioldius areolatus</i>, <i>Petrolishes tomentosus</i>, <i>Actaea polyacantha?</i></p> <p>Polychaetes: Glyceridae, Syllidae, Spionidae, Amphinomidae, Polynoidae <i>Gastrolepis clavigera</i> on <i>Bodhaschia argus</i>, Chrysopetalidae <i>Chrysopetalum</i>, Eunicidae <i>Eunice</i></p>



Location	Method/Species
	<p><i>torresiensis</i>, Nereididae <i>Nereis</i> spp., <i>Platynereis</i> sp., <i>Ceratonereis perkinsini</i>, <i>Nereis</i> cf <i>denhamensis</i>, Opheliidae <i>Polyopthalmus</i>, Serpulidae <i>Pomatoceros stellatus</i>.</p> <p>Marine plants: <i>Boodlea vanbosseae</i>, <i>Liagora ceranoides</i>, <i>Galaxaura rugosa</i>, <i>Zellera tawallina</i>, <i>Gelidiella acerosa</i>, <i>Galaxaura filamentosa</i>, <i>Ganonema pinnatum</i>, <i>Liagora divaricata</i>, <i>Jania adhaerens</i>, and <i>Hydrolithon onkodes</i> (all Rhodophyta), <i>Turbinaria ornata</i> (Phaeophyceae), <i>Caulerpa cupressoides</i>, <i>Halimeda opuntia</i>, <i>Halimeda lacunalis?</i>, <i>Anadyomene plicata</i>, <i>Boodlea composita</i>, <i>Neomeris bilimbata</i> (all Chlorophyta).</p> <p>Beam Trawl: Molluscs: <i>Casmaria erinaceus</i>, <i>Codakia tigerina</i>, <i>Rhinoclavia asper</i>, <i>Cypraea moneta</i>, <i>Tellina</i> sp, <i>Arca</i> sp, <i>Conus tessellatus</i>, <i>Chelia equestris</i>, <i>Fragum fragum</i>, <i>Terebra nebulosa</i>, <i>Terebra. crenulata</i>, <i>Vexillum plicarium</i>, <i>Conus eburneus</i>, <i>Oliva</i> sp, <i>Polinices tumidus</i>, <i>Lioconcha ornata</i>, <i>Fulvia aperta</i>. Crustaceans: <i>Portunus</i> sp.</p>
<p>Site - F NE channel, north Scott Reef</p>	<p>Intertidal Transects: Molluscs: <i>Vasum turbinellum</i>, <i>Ovula ovum</i>, <i>Rhinoclavis sinensis</i>, <i>Turbo chrysostoma</i>, <i>Tridacna maxima</i>, <i>Tridacna crocea</i>, <i>Serpulorbis</i>, <i>Rhinoclavis sinensis</i>, <i>Vasum turbinellum</i>, <i>Drupa ricinus</i>, <i>Peristernia nassatula</i>, <i>Bursa granularis</i>, <i>Conus miles</i>, <i>Conus sponsalis</i>, <i>Conus chaldeus</i>, <i>Conus distans</i>, <i>Berthellina citrina</i>, <i>Halgerda tessellate</i>, <i>Trachycardium</i> sp., <i>Drupella cornus</i>. Echinoderms: <i>Coriaster granulatus</i>, <i>Linckia laevigata</i>, <i>Holothuria leucospilota</i>. Crustaceans: Stomatopod, <i>Huenia heraldica</i>, <i>Eriphia scabricula</i>, <i>Schizophrys aspera</i>. Polychaetes: Spionidae, Chrysopetalidae <i>Chrysopetalum</i>, Amphinomidae <i>Eurythoe complanata</i>, Nereididae <i>Nereis</i> spp., <i>Platynereis</i> sp., <i>Ceratonereis perkinsini</i>, Opheliidae <i>Polyopthalmus</i>. Marine plants: <i>Boodlea vanbosseae</i> (Chlorophyta). <i>Turbinaria ornata</i> (Phaeophyceae), <i>Lobophora variegata</i> (Phaeophyceae), <i>Ganonema pinnatum</i> (Rhodophyta), <i>Galaxaura rugosa</i> (Rhodophyta), <i>Liagora divaricata?</i> (Rhodophyta), <i>Halimeda</i> sp., <i>Thalassia hemprichii</i>, <i>Laurencia</i> sp.(Rhodophyta), <i>Tolypiocladia glomerulata</i> (Rhodophyta), <i>Neomeris bilimbata</i> (Chlorophyta), <i>Anadyomene plicata</i> (Chlorophyta), <i>Halimeda minima</i> (Chlorophyta), <i>Jania adhaerens</i> (Rhodophyta), <i>Champia parvula</i> (Rhodophyta), <i>Gelidiella acerosa</i> (Rhodophyta), <i>Endosiphonia spinuligera</i> (Rhodophyta), <i>Caulerpa cupressoides</i> (Chlorophyta) and <i>Valoniopsis pachynema</i> (Chlorophyta).</p> <p>Beam Trawl: Polychaetes: Serpulidae <i>Hydroides exaltatus</i> Crustaceans: <i>Calappa calappa</i>, <i>Thalamita</i> sp.1, <i>Portunus</i> sp. 1. <i>Majid</i> sp. Molluscs: <i>Strombus gibberulus</i>, <i>Terebra maculata</i>, <i>Oliva</i>.</p>
<p>Site - G west side, south Scott Reef</p>	<p>Intertidal Transects: Molluscs: <i>Lambis lambis</i>, <i>Lambis chiragra</i>, <i>Strombus gibberulus</i>, <i>Strombus microurceus</i>, <i>Strombus luhuanus</i>, <i>Strombus lentiginosus</i>, <i>Tridacna crocea</i>, <i>Tridacna derasa</i>, <i>Hippopus hippopus</i>, <i>Barbatia amygdalumtotsum</i>, <i>Polinices melanostomus</i>, <i>Polinices tumidus</i>, <i>Casmaria erinaceus</i>, <i>Pleuroploca nodulose</i>, <i>Vasum turbinellum</i>, <i>Cantharus undosus</i>,</p>

SINCLAIR KNIGHT MERZ



Location	Method/Species
	<p><i>Pinctada margaritifera</i>, <i>Septifer bilocularis</i>, <i>Lima lima</i>, <i>Elysia</i> sp., <i>Chicoreus</i> sp., <i>Conus pulicarius</i>, <i>Conus marmoreus</i>, <i>Conus eburneus</i>, <i>Conus capitaneus</i>, <i>Conus tessulatus</i>, <i>Conus sponsalis</i>, <i>Conus striatus</i>, <i>Conus miliaris</i>, <i>Conus sanguinolentus</i>, <i>Conus rattus</i>, <i>Vexillum pacificum</i>, <i>R. sinensis</i>, <i>Bulla</i> sp., <i>Spondylus</i> sp., <i>Octopus</i> sp., <i>Turbo chrystomus</i>, <i>Tectus pyramis</i>, <i>C. crenatus</i>, <i>Tellina scobinata</i>, <i>Drupella cornus</i>, <i>Drupa rubusidaeus</i>, <i>Drupa ricinus</i>, <i>Cypraea moneta</i>, <i>Cypraea erosa</i>, <i>Cypraea isabella</i>, <i>Cypraea histrio</i>, <i>Cypraea caurica</i>, <i>Terebra maculata</i>, <i>Terebra affinis</i>, <i>C. tongana</i>, <i>Onchidium</i> sp., <i>Trachycardium</i> sp., <i>Phyllidia</i> sp., <i>Chama</i> sp., <i>Tellina</i> sp., <i>Acrosterigma</i> sp.</p> <p>Echinoderms: <i>Bodhaschia argus</i>, <i>Holothuria atra</i>, <i>Holothuria edulis</i>, <i>Linckia laevigata</i></p> <p>Crustaceans: <i>Eriphia scabricula</i>, <i>Pioldius areolatus</i>, <i>Zosymus aenus</i>, <i>Leptodius</i> or <i>Macromedaeus</i> sp., <i>Domecia hispida</i>.</p> <p>Polychaetes: Syllidae, Nereididae undet., Chrysopetalidae <i>Treptopale</i>, Polynoidae <i>Gastrolepis clavigera</i>.</p> <p>Marine plants: <i>Halimeda opuntia</i>, <i>Halimeda lacunalis?</i>, <i>Halimeda minima</i>, <i>Valonia ventricosa</i>, <i>Caulerpa cupressoides</i>, <i>Caulerpa serrulata</i>, <i>Dictyosphaeria cavernosa</i>, <i>Boodlea vanbosseae</i>, <i>Turbinaria ornata</i>, <i>Lobophora variegata</i>, <i>Galaxaura rugosa</i>, <i>Ganonema farinosum</i>, <i>Ganonema pinnatum</i>, <i>Liagora ceranoides</i>, <i>Liagora divaricata</i>, <i>Gelidiella acerosa</i>, <i>Coelothrix irregularis</i>, <i>Tolypocladia glomerulata</i> and <i>Chrysonephos lewisii</i>.</p>