

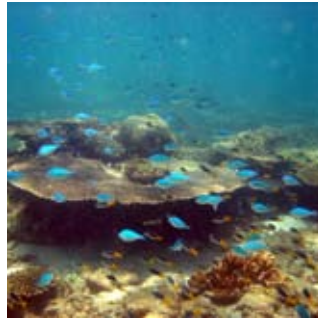
Department of Environment and Conservation

Preliminary assessment of coral communities at selected sites in the proposed Dampier Archipelago Marine Park

Marine Science Program Data Report Series

MSPDR1 November 2008

Shannon J Armstrong
Marine Science Program, Science Division



Department of
Environment and Conservation

Our environment, our future



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Cover images: (small images, left to right) Fungiid and *Acropora* corals near Conzinc Island; Overlooking the reef at Legendre Island; *Acropora* corals and damsel fish at Nelson Rocks; Reef community near Angel Island; and (large image) Luxuriant coral community at Nelson Rocks. Photos - Department of Environment and Conservation/Marine Science Program.

SUMMARY

The Dampier Archipelago coral communities are subject to a broad range of natural and anthropogenic pressures. With the upcoming gazettal of the Dampier Archipelago Marine Park it is important that the Department of Environment and Conservation (DEC) obtains information to assess changes to the condition of Dampier Archipelago coral reef communities over time. Therefore, in November 2007 the condition of coral reef communities was recorded at 12 selected sites within the Dampier Archipelago using geo-referenced underwater still and video photography. A diverse range of coral habitats was recorded during the survey. Some areas appeared to be in stages of recovery from past cyclone events but overall the coral communities appeared to be in a healthy condition. This report presents the findings of the survey.

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1 INTRODUCTION

The coral communities of the Dampier Archipelago are subject to a broad range of natural and anthropogenic pressures. Dampier has the highest per capita boat ownership in Western Australia and industry development in the region is expanding at a rapid pace including the recent commencement of a major dredging project within the Dampier Harbour by Woodside Burrup Pty Ltd. Corals in the area are also subject to extremely variable natural environmental conditions including macro-tidal fluctuations, effects from cyclones and storm events, high and/or extremely variable turbidity and warming sea water temperatures. Dampier Archipelago supports a broad range of coral habitats and is the second most diverse site in Western Australia for hard corals.

With the soon to be gazetted Dampier Archipelago Marine Park it is important that DEC obtain information to assess changes to the condition of Dampier Archipelago coral reef communities over time.

The objective of the survey was:

- To document the current status of coral communities at selected sites in the Dampier Archipelago.

2 METHODS

2.1 Site Selection

The condition of coral reef communities was recorded at 12 sites within Dampier Archipelago in November 2007. Sites were selected to target areas where coral reef communities are known to exist and to be in close proximity to sites surveyed by Simpson and Grey (1989) in 1987. Prior to the survey, Google Earth was used to identify GPS coordinates of potential sites. In the field, these GPS coordinates were used to find the general locality of the selected coral reef communities. Two divers would enter the water at each site or were manta-towed behind the vessel to locate a site where coral cover was high relative to nearby areas. If visiting an existing Simpson and Grey (1989) survey site, effort was made to stay in close proximity to the GPS coordinate for that site.

2.2 Survey methods

Still and video photography were used to record the condition of coral reef communities at each site. Divers took panoramic still and video photography of coral reef communities on an ad hoc basis (i.e. no transect line was followed) at each site. A handheld GPS was attached to a float and towed on the surface behind the diver. The time on the GPS was synchronised with the time on the cameras. The track function on the GPS was used to record its position every 10 seconds. In this way the approximate position of each photograph was recorded (i.e. the photography was geo-referenced). The Downloader Pro software program was used to link individual photographs to GPS coordinates. Photographs taken at the sites are presented herein and a copy of the video footage taken at each site is on CD attached to the back cover of this report.



Figure 1. Map showing the sites (depicted by red dots) where the condition of coral communities was recorded in November 2007.

3 DATA MANAGEMENT

3.1 Report archival

Hard copies of this report are held at the following locations:

1. Marine Science Program, Science Division, Department of Environment and Conservation, 17 Dick Perry Avenue, Western Australia, 6152. Ph: (08) 9334 0333.
2. Woodvale Library, Science Division, Department of Environment and Conservation, Ocean Reef Road, Woodvale, Western Australia, 6026. Ph: (08) 9405 5100 Fax: (08) 9306 1641.
3. Archives, Woodvale Library, Science Division, Department of Environment and Conservation, Ocean Reef Road, Woodvale, Western Australia, 6026. Ph: (08) 9405 5100 Fax: (08) 9306 1641.
4. Pilbara Region, Department of Environment and Conservation, Lot 3 Anderson Road, Karratha Industrial Estate, Karratha, Western Australia, 6530. Ph: (08) 9143 1488 Fax: (08) 91441118.

5. Serials Section, State Library of Western Australia. Alexander Library Building, Perth Cultural Centre, Perth, Western Australia, 6000.

Digital copies of this report are held at the following locations:

1. The Marine Science Program Server. Ph: (08) 93340 229 to obtain a copy.
2. CD-ROM [MSPDR1] located at the Marine Science Program. Ph: (08) 93340 229 to obtain a copy.

3.2 Digital photographs

All digital still photographs taken during the survey are archived in the image library on the Marine Science Program server.

3.3 Digital video

All mini digital video (MDV) footage collected during the survey is held at two locations:

1. MDV masters have been archived in the 'Dampier Archipelago Marine Park Long Term Monitoring Program Video Archive (Box)' file no. 2008/002194 held at the Information Management Branch, Department of Environment and Conservation, 17 Dick Perry Avenue, Kensington, Western Australia. Ph: (08) 9334 0392.
2. Digital copies on DVDs will be stored at the Marine Science Program, Science Division, Department of Environment and Conservation, 17 Dick Perry Avenue, Kensington, Western Australia. Ph: (08) 9334 0299 Fax: (08) 9334 0327.

4 RESULTS

See the CD located in the back cover of this report for the video footage taken at each site in November 2007.

4.1 Miller Rocks

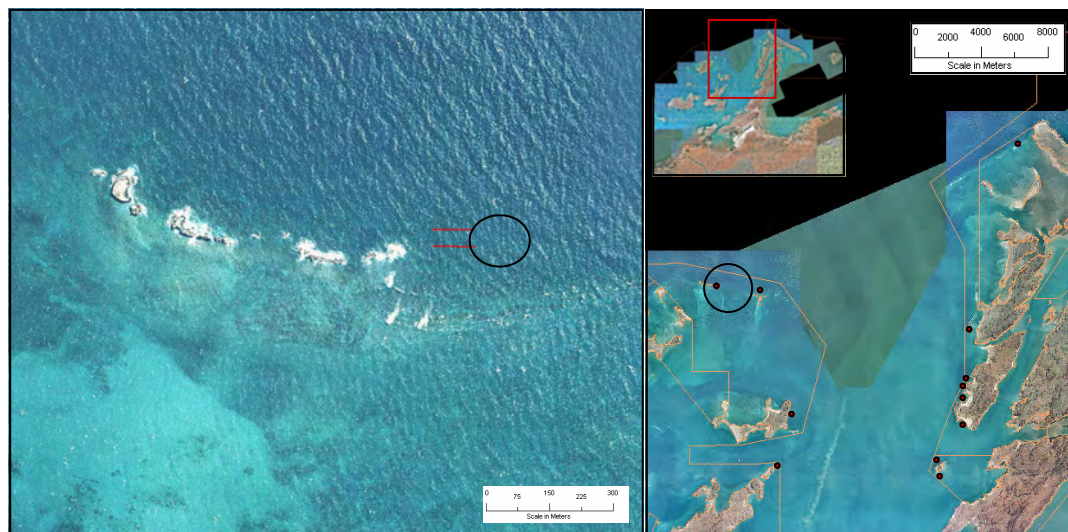


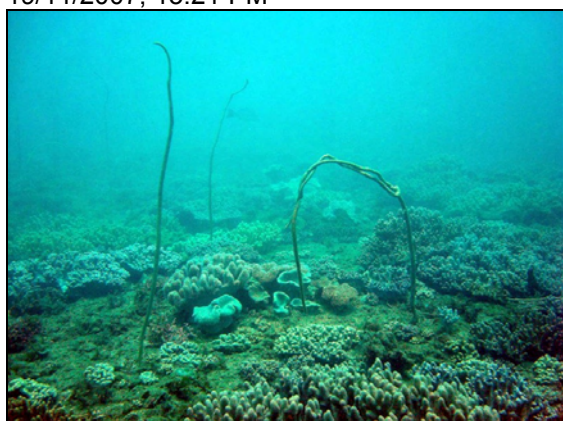
Figure 2. Map of the site at Miller Rocks (left). The survey area is circled. Positions of the transects surveyed by Simpson and Grey (1989) are shown. Position of the site (circled) in the Dampier Archipelago (right) is shown.

Table 1. Description of survey observations made at Miller Rocks.

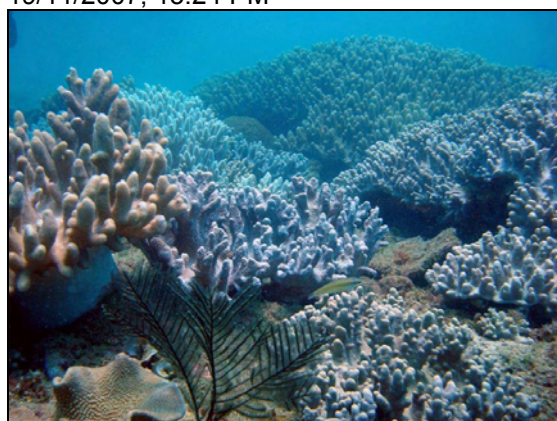
Site description	In the deeper areas, the substrate was relatively flat and the benthic community comprised of soft corals and the occasional massive coral colony. The substrate became more rugose in the shallower area closer to the rocks (~4.5 m below chart datum).
Dominate coral type	Soft corals and filter feeders.
Coral predator information	<i>Acanthaster planci</i> present, no <i>Drupella</i> observed.
Depth (below chart datum)	9.5 m and progressively shallower closer to Miller Rocks.
Fish observations	No significant fish observations.
Historical/ other existing monitoring site information	Simpson and Grey (1989) survey site (see map above).
Other information	Visibility at the site was approximately 8 m.

4.1.1 Photographs of Miller Rocks coral communities

S 20° 26' 23.05", E 116° 38' 52.99"
19/11/2007, 13:21 PM



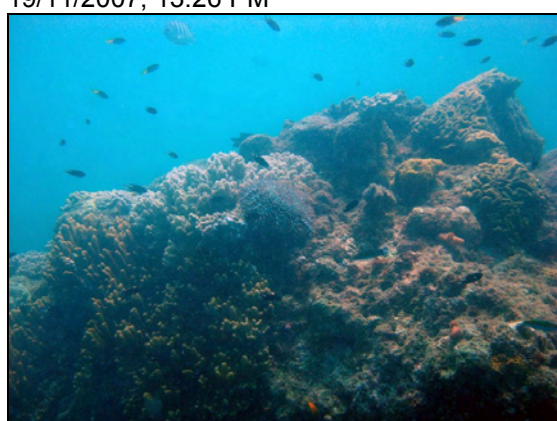
S 20° 26' 23.82", E 116° 38' 52.12"
19/11/2007, 13:24 PM



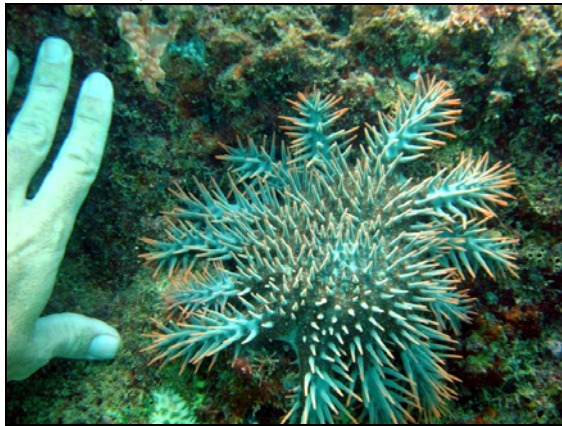
S 20° 26' 23.48", E 116° 38' 52.49"
19/11/2007, 13:22 PM



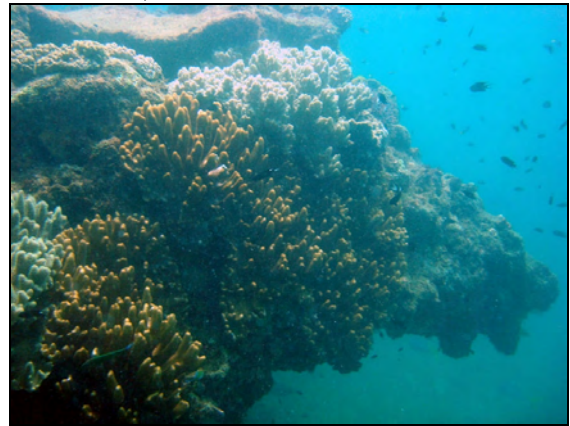
S 20° 26' 24.15", E 116° 38' 52.22"
19/11/2007, 13:26 PM



S 20° 26' 24.43", E 116° 38' 52.04"
19/11/2007, 13:28 PM



S 20° 26' 24.20", E 116° 38' 52.17"
19/11/2007, 13:26 PM



4.2 Nelson Rocks

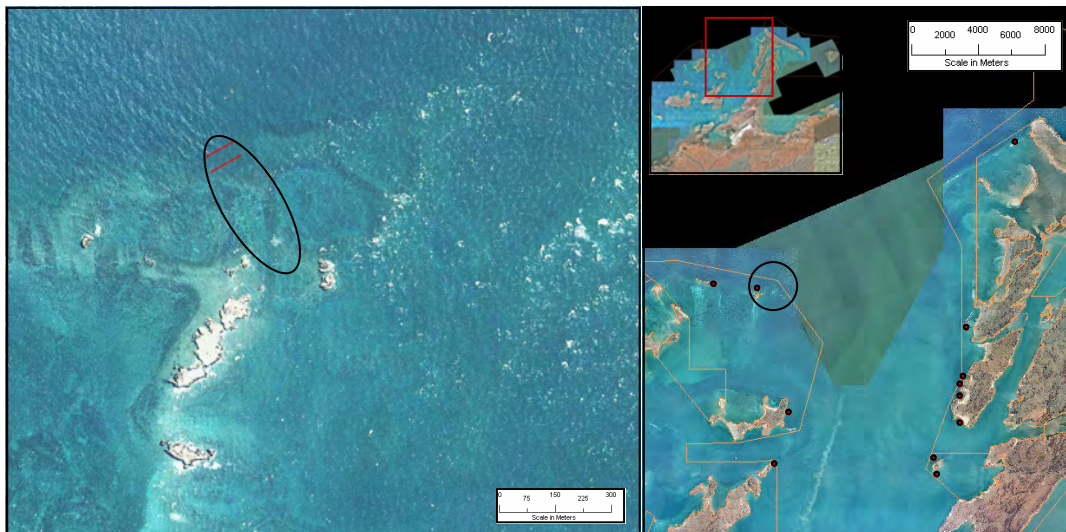


Figure 3. Map of the site at Nelson Rocks (left). The survey area is circled. Positions of transects surveyed by Simpson and Grey (1989) are shown. Position of the site (circled) in the Dampier Archipelago (right) is shown.

Table 2. Description of survey observations made at Nelson Rocks.

Site description	High diversity of corals and the highest coral cover relative to other sites visited. In the deeper areas close to the rocks, coral cover was very high. Shallower areas had less live coral cover than the deeper areas, possibly due to strong currents and swell affecting the shallower areas. Branching coral rubble, dead plate corals, pavement and the occasional small live coral colony dominated benthic cover in the shallower areas.
Dominate coral type	Plate and corymbose <i>Acropora</i> sp.
Coral predator information	No <i>Acanthaster planci</i> or <i>Drupella</i> sp. observed.
Depth (below chart datum)	0.5 to 2 m
Fish observations	Many reef fish present at the site. One <i>Nebrius ferrugineus</i> (Tawny nurse shark) was observed at the site.
Other monitoring site information	Simpson and Grey (1989) survey site (see map above).
Other information	Visibility at the site was approximately 10 to 15 m. There appeared to be a high abundance of small reef fish present at the site.

4.2.1 Photographs of Nelson Rocks coral communities

S 20°26'41.49" E 116°40'26.64"
19/11/2007, 12:27 PM



S 20°26'45.08" E 116°40.30.32"
19/11/2007, 12:43 PM



S 20°26'42.21" E 116°40'27.45"
19/11/2007, 12:31PM



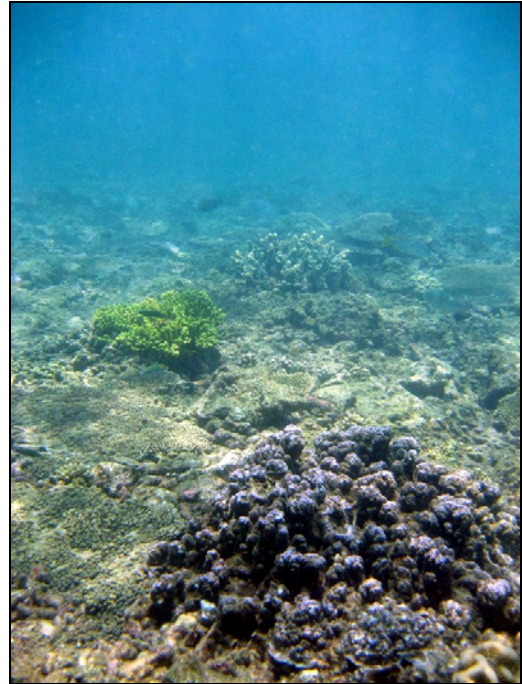
S 20°26' 46.57" E 116°40'30.65"
19/11/2007, 12:51 PM



S 20°26' 44.77" E 116°40'30.15"
19/11/2007, 12:42 PM



S 20°26'46.63" E 116°40'30.93"
19/11/2007, 12:52 PM



4.3 Hamersley Shoals

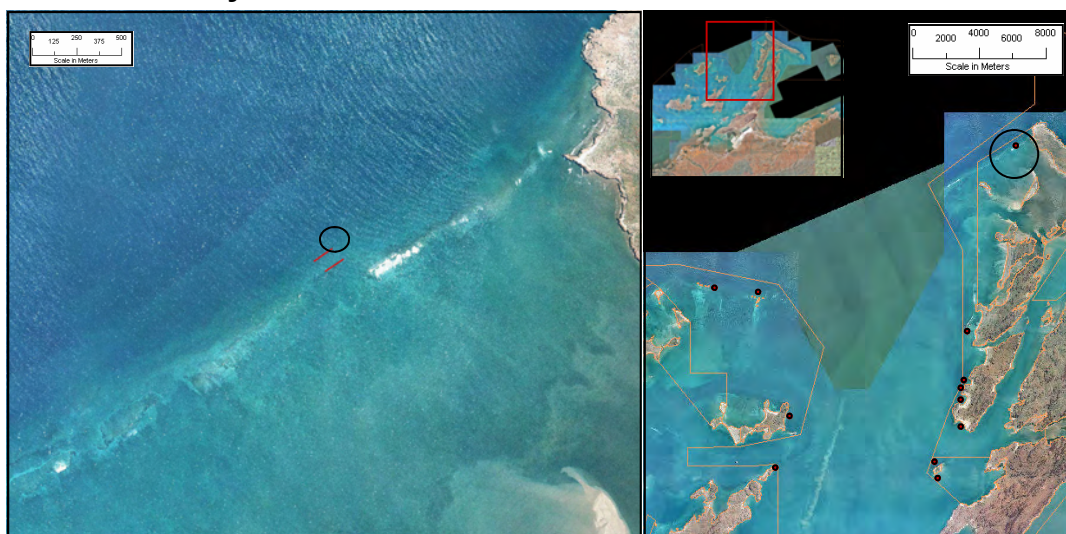


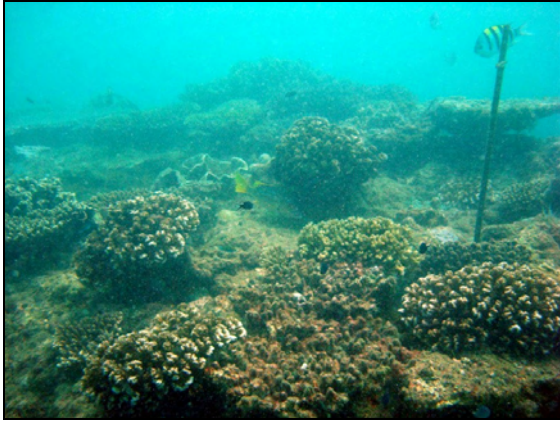
Figure 4. Map of the site at Hamersley Shoals (left). The survey area is circled. Positions of transects surveyed by Simpson and Grey (1989) are shown. Position of the site (circled) in the Dampier Archipelago (right) is shown.

Table 3. Description of survey observations made at Hamersley Shoals.

Site description	Reef slope community.
Dominant coral type	Soft corals and corymbose <i>Acropora</i> sp. although several other coral types were present.
Coral predator information	No <i>Acanthaster planci</i> or <i>Drupella</i> sp. were observed.
Depth (below chart datum)	6 m.
Fish observations	Several large <i>Plectropomus leopardus</i> (coral trout) were observed at the site.
Other monitoring site information	Simpson and Grey (1989) survey site (see map above). MScience environmental consultancy has established a coral monitoring site at this location under Woodside contract to monitor the effect of dredging and spoil disposal activities associated with the PLUTO LNG development on coral communities and water quality (Stoddart and Stoddart, 2005). Their stakes and turbidity meter were visible at the time of sampling.
Other information	Very open to swell. Visibility at the site was poor (<6 m).

4.3.1 Photographs of Hamersley Shoals coral communities

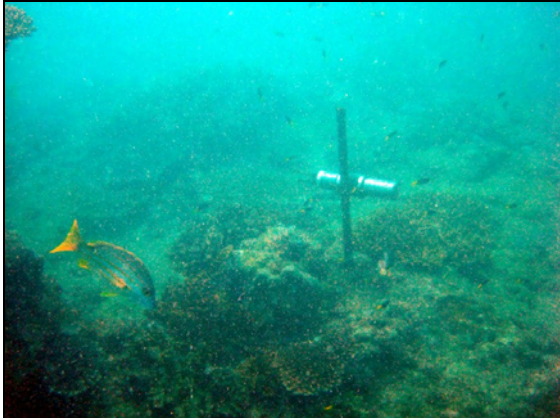
S 20°21'57.71" E 116°48'53.98"
19/11/2007, 10:55 AM



S 20°21'57.45" E 116°48'54.30"
19/11/2007, 10:01 AM



S 20°21'57.50" E 116°48'53.98"
19/11/2007, 10:55 AM



S 20°21'57.65" E 116°48'53.94"
19/11/2007, 10:54 AM



4.4 South Gidley Island

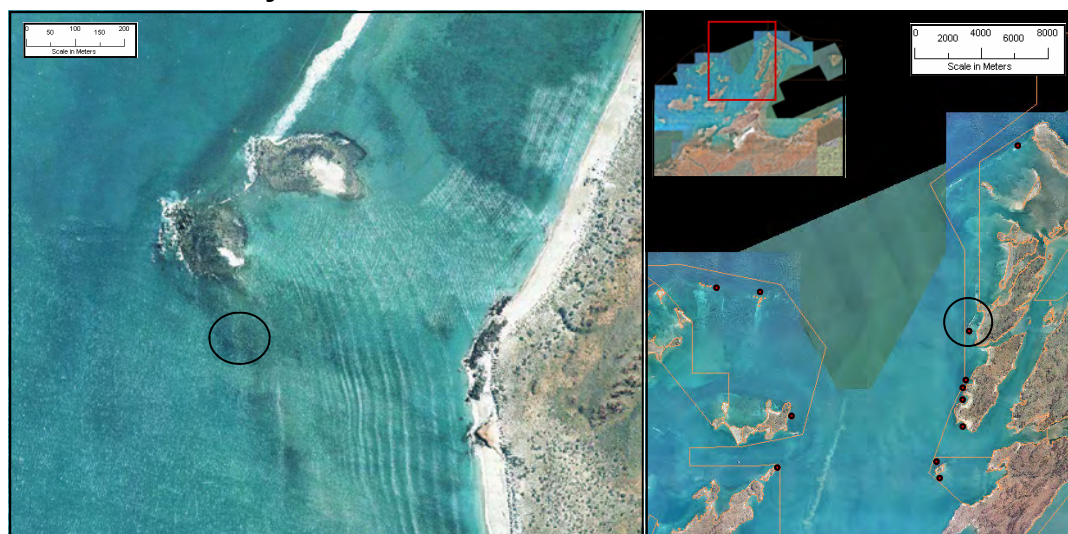


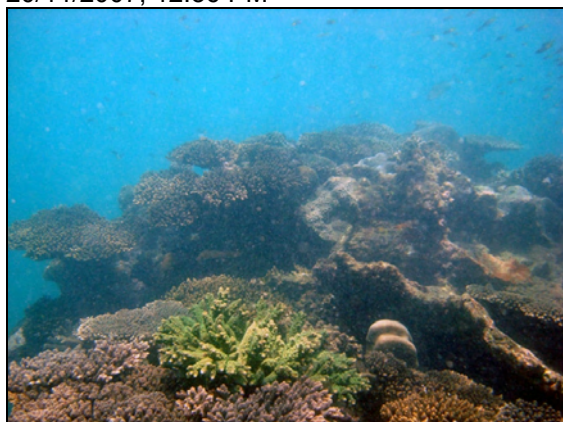
Figure 5. Map of the site at South Gidley Island (left). The survey area is circled. Position of the site (circled) in the Dampier Archipelago (right) is shown.

Table 4. Description of survey observations made at South Gidley Island.

Site description	Reef community located close to shore and adjacent to small rocky island. Patchy coral distribution.
Dominate coral type	Plate and corymbose <i>Acropora</i> sp. Faviids and branching <i>Acropora</i> sp. also present.
Coral predator information	<i>Drupella cornus</i> present. No <i>Acanthaster planci</i> observed.
Depth (below chart datum)	1.5 m.
Fish observations	No significant fish observations. Typical reef fish assemblage present.
Other monitoring site information	MScience environmental consultancy has established a coral monitoring site at this location under Woodside contract to monitor the effect of dredging and spoil disposal activities associated with the PLUTO LNG development on coral communities and water quality (Stoddart and Stoddart, 2005).
Other information	Open to swell.

4.4.1 Photographs of South Gidley Island coral communities

S 20°27'50.25" E 116°47'39.58"
20/11/2007, 12:36 PM



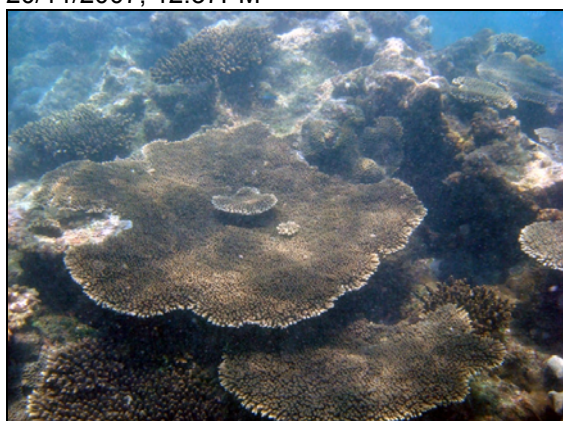
S 20°27'49.13" E 116°47'41.55"
20/11/2007, 12:40 PM



S 20°27'50.26" E 116°47'40.43"
20/11/2007, 12:37 PM



S 20°27'49.68" E 116°47'42.18"
20/11/2007, 12:37PM



4.5 South Angel Island

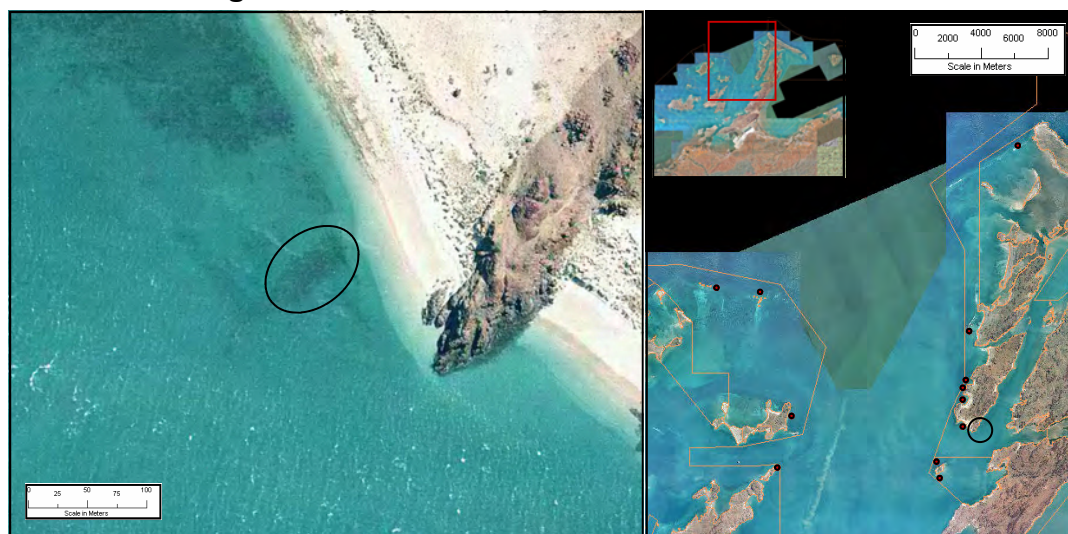


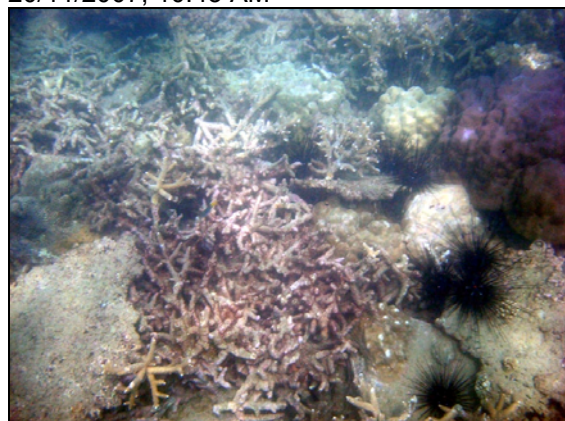
Figure 6. Map of the site at South Angel Island (left). The survey area is circled. Position of the site (circled) in the Dampier Archipelago (right) is shown.

Table 5. Description of survey observations made at South Angel Island.

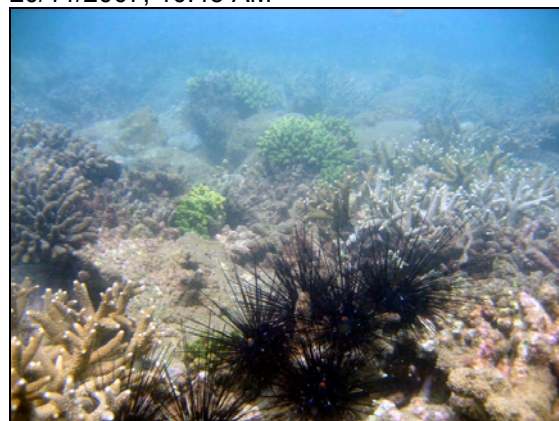
Site description	This site was a small patch of reef (50 x 20 m) adjacent to a beach located at the southern end of Angel Island. It is protected from the open ocean. Benthic cover was dominated by dead branching coral rubble and dead plate coral.
Dominate coral type	Plate and corymbose <i>Acropora</i> sp. There appeared to be a diverse assemblage of corals present at the site.
Coral predator information	No <i>Acanthaster planci</i> or <i>Drupella</i> sp. observed.
Depth (below chart datum)	0.8 m.
Fish observations	No significant fish observations.
Other monitoring site information	None.
Other information	Many <i>Diadema</i> sp. urchins possible <i>D. savignyi</i> were present at the site. Visibility was poor at the time of sampling (>5 m).

4.5.1 Photographs of South Angel Island coral communities

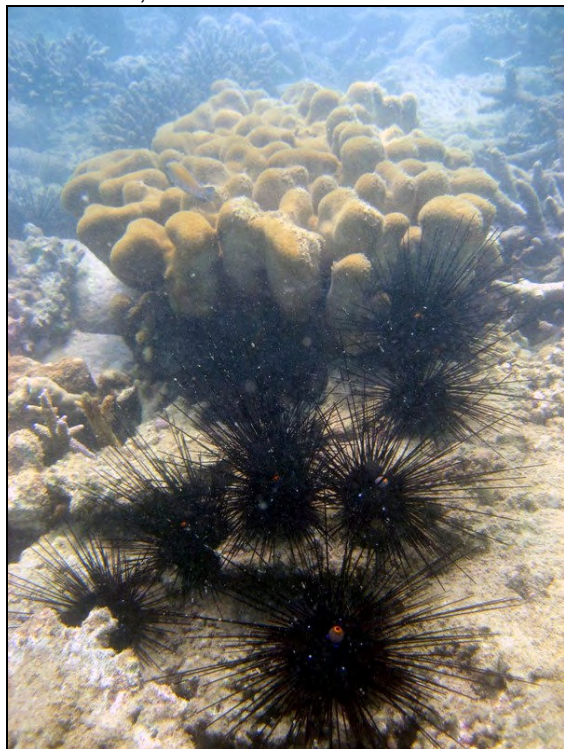
S 20°31'04.56" E 116°47'35.42"
20/11/2007, 10:43 AM



S 20°31'04.77" E 116°47'34.62"
20/11/2007, 10:45 AM



S 20°31'04.65" E 116°47'35.07"
20/11/2007, 10:44 AM



S 20°31'04.10" E 116°47'35.29"
20/11/2007, 10:48 AM



S 20°31'04.86" E 116°47'34.68"
20/11/2007, 10:48 AM



S 20°31'04.77" E 116°47'34.62"
20/11/2007, 10:45 AM



4.6 Angel Island Bay 2



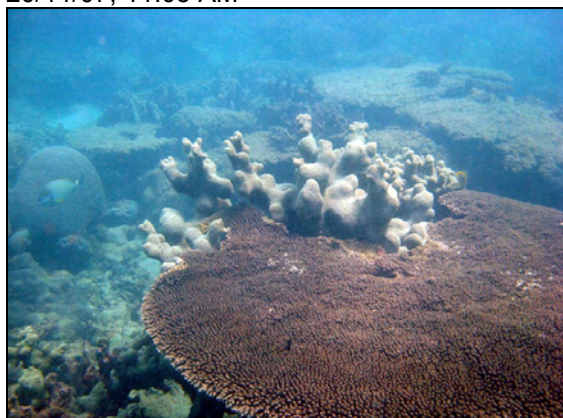
Figure 7. Map of the site at Angel Island Bay 2 (left). The survey area is circled. Position of the site (arrow) in the Dampier Archipelago (right) is shown.

Table 6. Description of survey observations made at Angel Island Bay 2.

Site description	Reef community close to shore within a small bay.
Dominate coral type	<i>Porites</i> appeared to dominate live coral cover and other corals such as Faviids and <i>Acropora</i> sp. were common. Many large live coral colonies were present.
Coral predator information	No <i>Acanthaster planci</i> or <i>Drupella</i> sp. observed.
Depth (below chart datum)	2 to 3 m.
Fish observations	High abundance of reef fish observed at the site.
Other monitoring site information	None.
Other information	Visibility was high (~10 m) at this site relative to the other sites surveyed. Evidence of prior a bleaching event or other coral mortality event present at the site (e.g. large dead plate corals).

4.6.1 Photographs of Angel Island Bay 2 coral communities

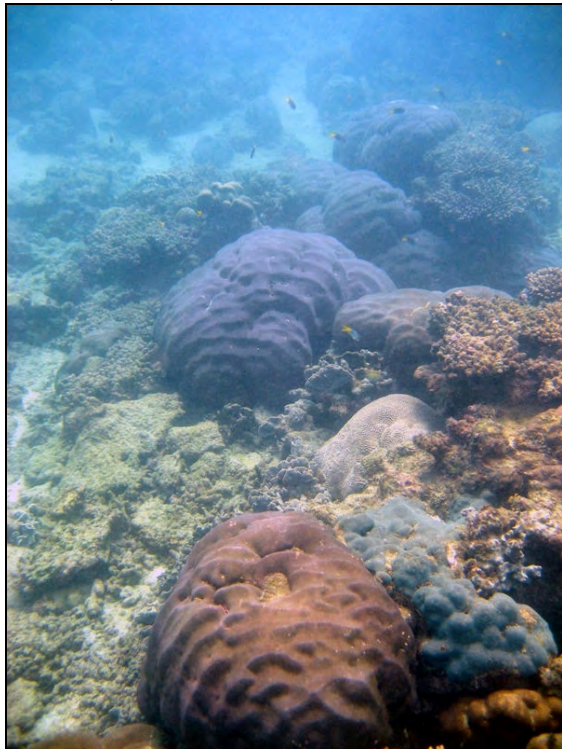
S 20°30'03.84" E 116°47'30.79"
20/11/07, 11:03 AM



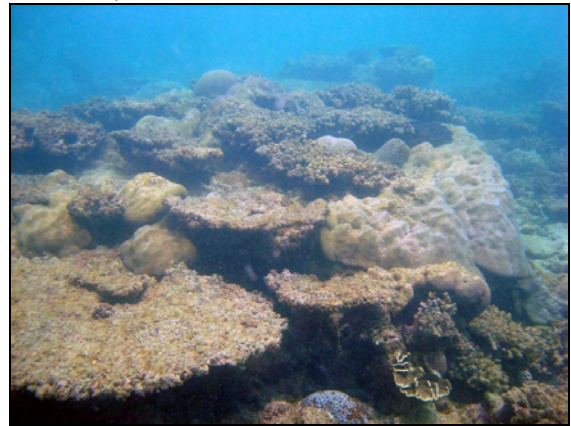
S 20°30'02.99" E 116°47'30.76"
20/11/07, 11:18 AM



S 20°30'02.92" E116°47'31.14"
20/11/07, 11:17 AM



S 20°30'03.74" E116°47'30.78"
20/11/07, 11:12 AM



S 20°30'03.21" E116°47'30.97"
20/11/07, 11:15 AM



S 20°30'02.86" E116°47'31.16"
20/11/07, 11:11 AM



S 20°30'02.86" E116°47'31.16"
20/11/07, 11:05 AM



4.7 Angel Island cliff base reef

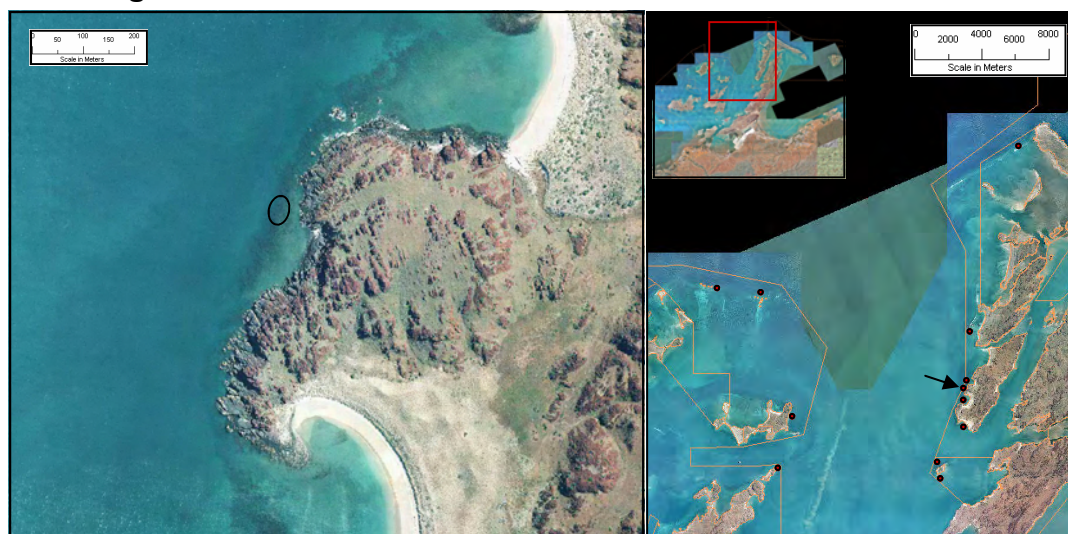


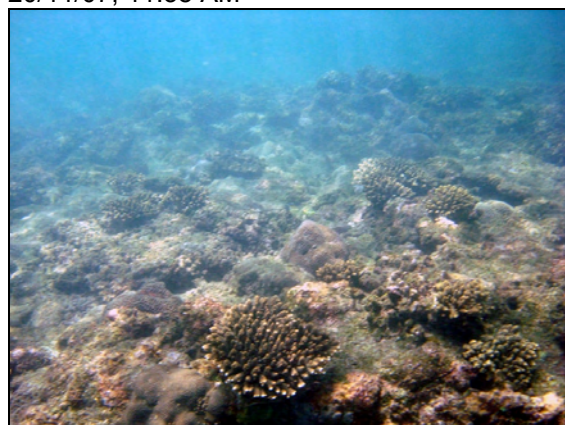
Figure 8. Map of the site at the Angel Island cliff base reef (left). The survey area is circled. Position of the site (arrow) in the Dampier Archipelago (right) is shown.

Table 7. Description of survey observations made Angel Island cliff base reef.

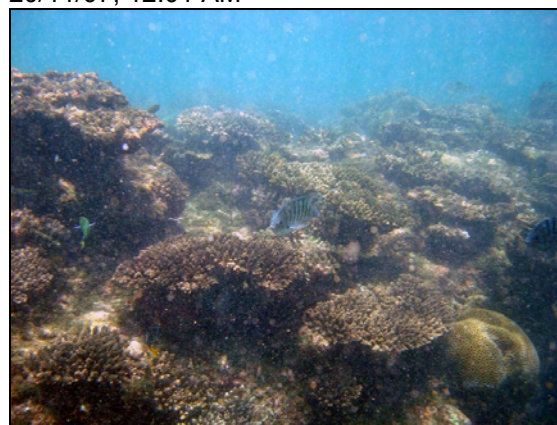
Site description	At this site, the reef was in a spur and groove formation and was located along the base of a rocky cliff. The reef sloped off into deeper waters approximately 50 m from the shore line.
Dominate coral type	Corymbose and plate <i>Acropora</i> corals (approximately 10 to 40 cm diameter). Many small faviids and <i>Porites</i> corals were also present.
Coral predator information	No <i>Acanthaster planci</i> or <i>Drupella</i> sp. observed.
Depth (below chart datum)	0.5 to 1 m.
Fish observations	Numerous schools of Scarids were observed at the site.
Other monitoring site information	None.
Other information	Visibility was poor (~ 5 m).

4.7.1 Photographs of Angel Island cliff base reef coral communities

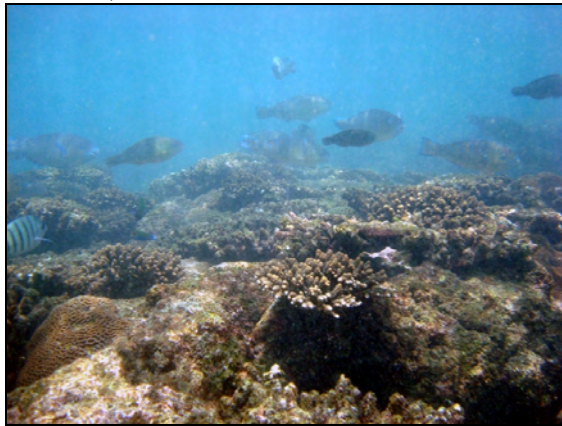
S 20°29'42.63" E 116°47'31.20"
20/11/07, 11:58 AM



S 20°29'43.40" E 116°47'31.08"
20/11/07, 12:01 AM



S 20°29'42.63" E 116°47'31.20"
20/11/07, 11:59 AM



S 20°29'42.94" E 116°47'30.82"
20/11/07, 12:08 AM



S 20°29'43.23" E 116°47'30.72"
20/11/07, 12:07 AM



4.8 Angel Island Bay 3

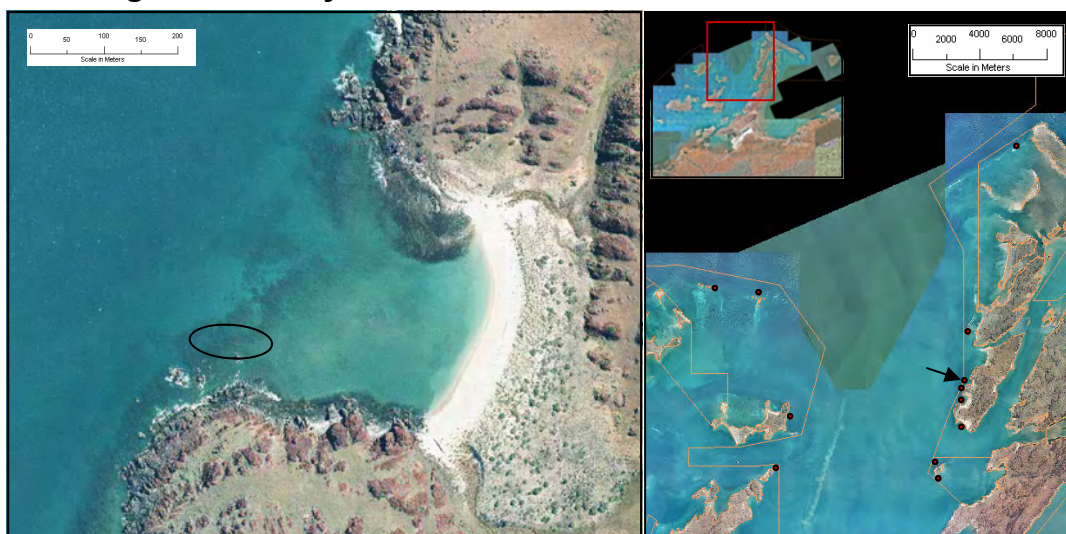


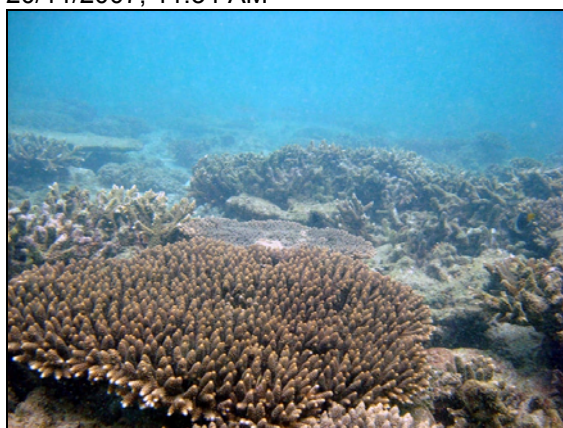
Figure 9. Map of the site at Angel Island Bay 3 (left). The survey area is circled. Position of the site (arrow) in the Dampier Archipelago (right) is shown.

Table 8. Description of survey observations made at Angel Island Bay 3.

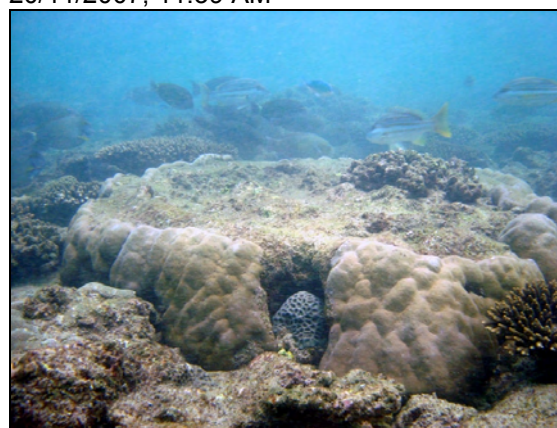
Site description	Patchy coral community located at the outer proximity of a small bay.
Dominate coral type	Corymbose and plate <i>Acropora</i> sp. and Faviid corals.
Coral predator information	No <i>Acanthaster planci</i> or <i>Drupella</i> sp. observed.
Depth (below chart datum)	0.1 to 2.5 m
Fish observations	No significant fish observations.
Other monitoring site information	None.
Other information	Visibility at the site was about 7 m. It is likely that some of the corals in the shallower areas of this site are intertidal.

4.8.1 Photographs of Angel Island Bay 3 coral communities

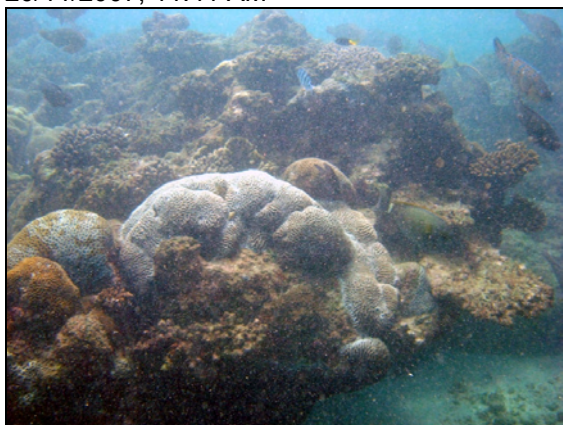
S 20°29'37.14" E 116°47'41.76"
20/11/2007, 11:34 AM



S 20°29'37.14" E 116°47'41.76"
20/11/2007, 11:39 AM



S 20°29'37.14" E 116°47'41.76"
20/11/2007, 11:41 AM



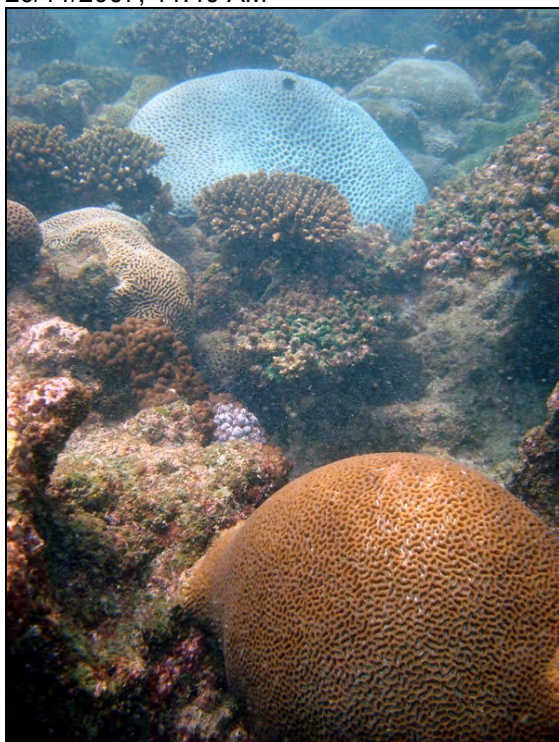
S 20°29'37.14" E 116°47'41.76"
20/11/2007, 11:40 AM



S 20°29'37.14" E 116°47'41.76"
20/11/2007, 11:35 AM



S 20°29'37.14" E 116°47'41.76"
20/11/2007, 11:40 AM



4.9 South-east Conzinc Island

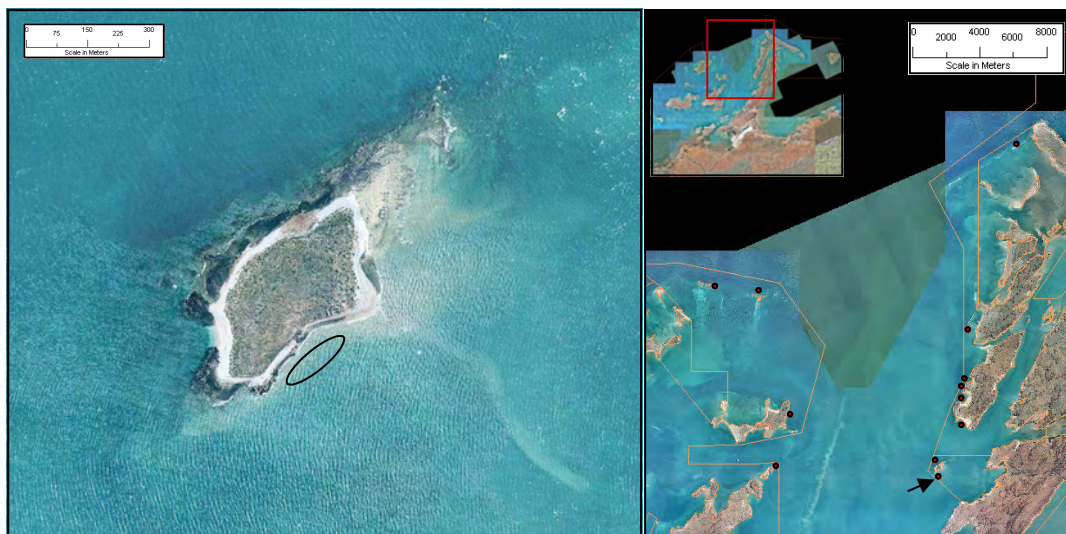


Figure 10. Map of the site at south-east Conzinc Island (left). The survey area is circled. Position of the site (arrow) in the Dampier Archipelago (right) is shown.

Table 9. Description of survey observations made at south-east Conzinc Island.

Site description	A reef community located along the south-eastern side of Conzinc Island. The water was very turbid during the time of sampling (visibility <4 m). The site is protected from the open ocean and is in close proximity to industrial development at Dampier Port.
Dominate coral type	Plate, branching and corymbose <i>Acropora</i> , and <i>Fungia</i> spp. Many other coral types were present including small <i>Porites</i> spp., <i>Pavona</i> spp. and Mussidae corals. The coral assemblage appeared to be diverse at this site.
Coral predator information	No <i>Acanthaster planci</i> or <i>Drupella</i> sp. observed.
Depth (below chart datum)	1.8 m.
Fish observations	No significant fish observations.
Other monitoring site information	MScience environmental consultancy has established a coral monitoring site in close proximity to this location under Woodside contract to monitor the effect of dredging and spoil disposal activities associated with the PLUTO LNG development on coral communities and water quality (Stoddart and Stoddart, 2005).
Other information	-

4.9.1 Photographs of South-east Conzinc Island coral communities

S 20°32'28.76" E 116°46'40.18"
20/11/07, 9:47 AM



S 20°32'28.76" E 116°46'40.18"
20/11/07, 9:44 AM



S 20°32'28.76" E 116°46'40.18"
20/11/07, 9:51 AM



S 20°32'28.76" E 116°46'40.18"
20/11/07, 9:48 AM



S 20°32'28.76" E 116°46'40.18"
20/11/07, 9:53 AM



4.10 North-east Conzinc Island

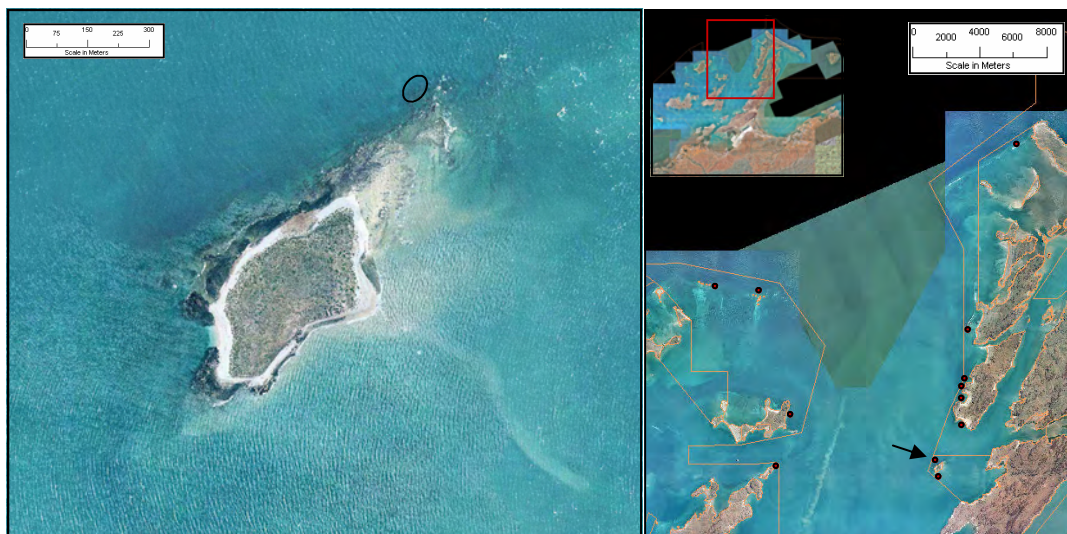


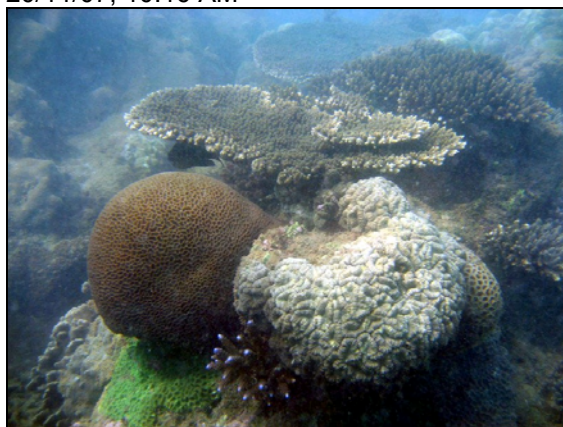
Figure 11. Map of the site at north-east Conzinc Island (left). The survey area is circled. Position of the site (arrow) in the Dampier Archipelago (right) is shown.

Table 10. Description of survey observations made at north-east Conzinc Island.

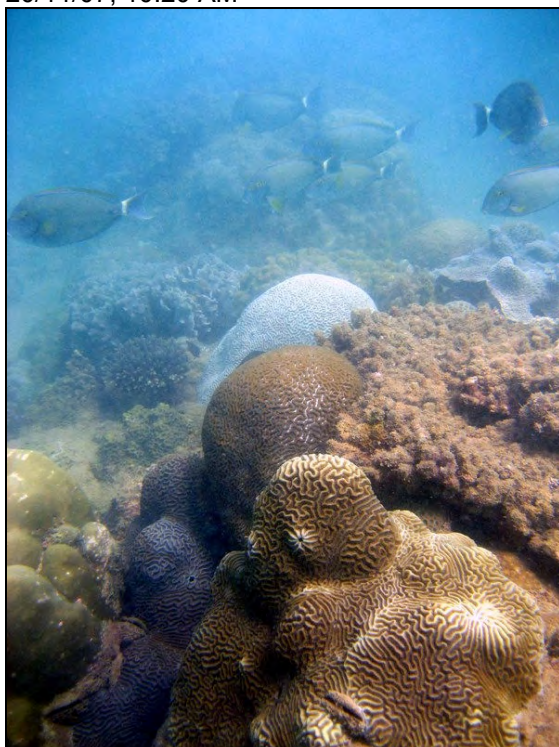
Site description	Coral reef community located at the north-east side of Conzinc Island. Corals were generally growing in clustered or ‘bommie’ formations separated by rocky pavement or sand.
Dominate coral type	Faviids appeared to dominate live coral cover although there was a high number of different corals present at the site including <i>Porites</i> sp., plate and corymbose <i>Acropora</i> sp., and Mussidae corals.
Coral predator information	No <i>Acanthaster planci</i> or <i>Drupella</i> sp. observed.
Depth (below chart datum)	0.5 to 4 m.
Fish observations	Typical reef fish present.
Other monitoring site information	MScience environmental consultancy has established a coral monitoring site at this location under Woodside contract to monitor the effect of dredging and spoil disposal activities associated with the PLUTO LNG development on coral communities and water quality (Stoddart and Stoddart, 2005).
Other information	Visibility was approximately 4 m.

4.10.1 Photographs of North-east Conzinc Island coral communities

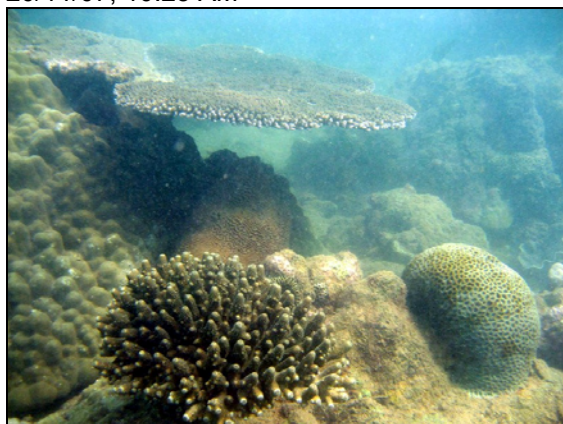
S 20°32'09.26" E 116°46'46.86"
20/11/07, 10:16 AM



S 20°32'09.20" E 116°46'46.79"
20/11/07, 10:20 AM



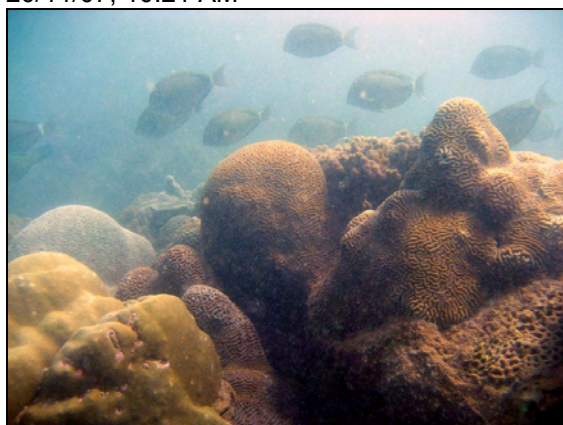
S 20°32'09.24" E 116°46'46.88"
20/11/07, 10:23 AM



S 20°32'09.27" E 116°46'46.81"
20/11/07, 10:18 AM



S 20°32'09.23" E 116°46'46.82"
20/11/07, 10:21 AM



4.11 High Point

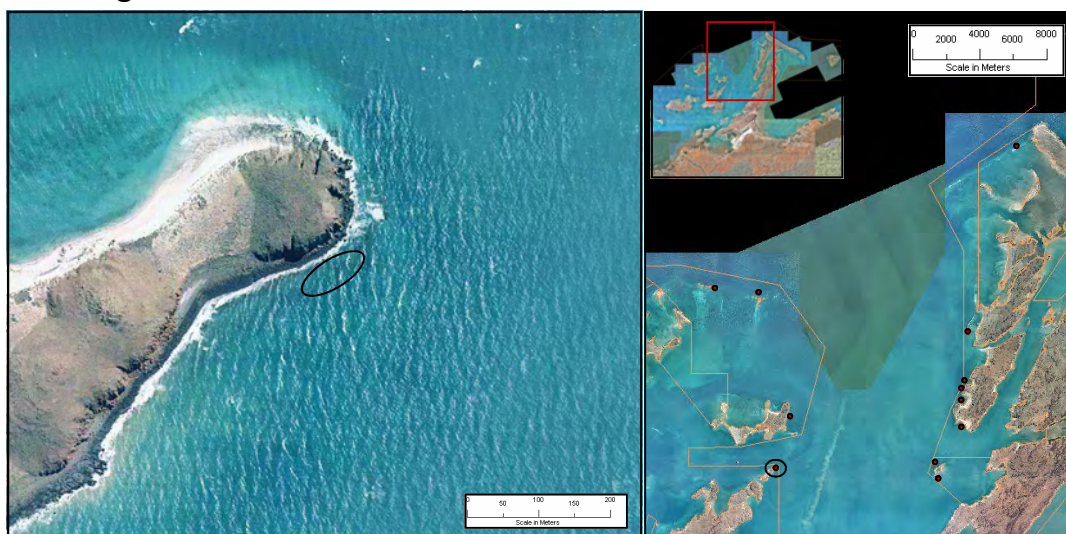


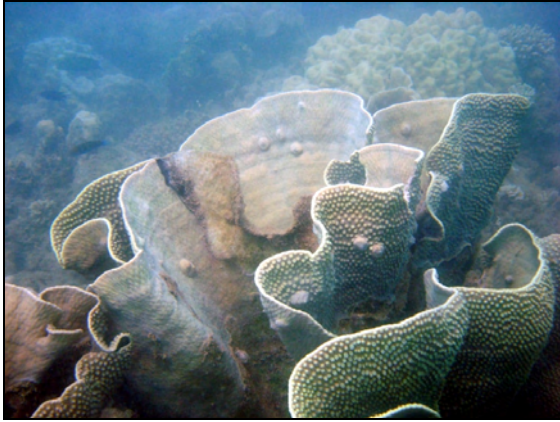
Figure 12. Map of the site at High Point on the north-east tip of Lewis Island (left). The survey area is circled. Position of the site (circled) in the Dampier Archipelago (right) is shown.

Table 11. Description of survey observations made at High Point.

Site description	Coral reef community located at the north-east end of Lewis Island. Corals generally appeared to be growing on large boulders and rock surfaces. The reef was shallow close to the shore with some corals possibly being intertidal. The reef progressed into deeper waters within approximately 20 m of the shoreline. The site is protected from the open ocean.
Dominate coral type	<i>Pavona decussate</i> dominated coral cover. <i>Porites</i> spp., <i>Millepora</i> spp., and Faviids also comprised a high percentage of live coral cover. Less resilient corals such as <i>Acropora</i> spp. were present but comprised a much lower percent of coral cover compared to the more resilient massive corals.
Coral predator information	No <i>Acanthaster planci</i> or <i>Drupella</i> sp. observed.
Depth (below chart datum)	1.5 m to 12.5 m.
Fish observations	No significant fish observations.
Other monitoring site information	MScience environmental consultancy has established a coral monitoring site at this location under Woodside contract to monitor the effect of dredging and spoil disposal activities associated with the PLUTO LNG development on coral communities and water quality (Stoddart and Stoddart, 2005).
Other information	Visibility at the site was very poor (<4 m) during the time of sampling.

4.11.1 Photographs of High Point coral communities

S 20°32'23.16" E 116°41'01.89"
20/11/07, 2:55 PM



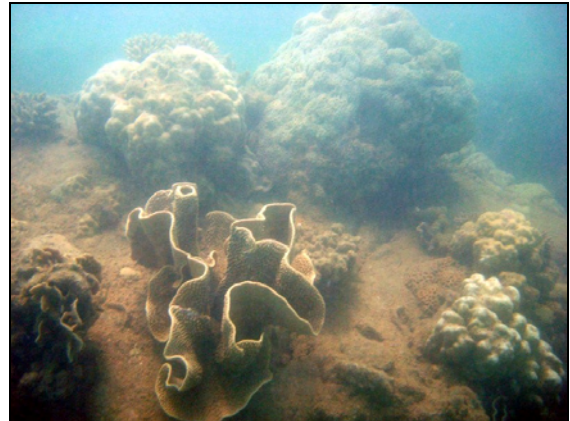
S 20°32'23.14" E 116°41'02.01"
20/11/07, 2:53 PM



S 20°32'23.14" E 116°41'01.87"
20/11/07, 2:55PM



S 20°32'23.13" E 116°41'01.91"
20/11/07, 2:57 PM



S 20°32'23.15" E 116°41'01.88"
20/11/07, 2:53 PM



4.12 Eastern side of Malus Island

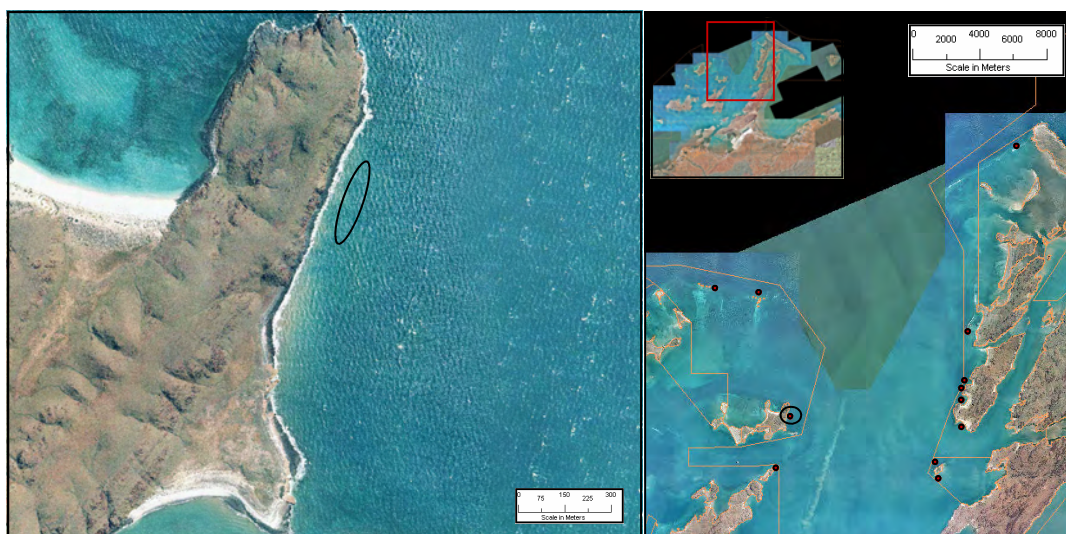


Figure 13. Map of the site at the eastern side of Malus Island (left). The survey area is circled. Position of the site (circled) in the Dampier Archipelago (right) is shown.

Table 12. Description of survey observations made at eastern side of Malus Island.

Site description	Reef dominated by large <i>Porites</i> spp. colonies located along the eastern side of Malus Island.
Dominate coral type	Large <i>Porites</i> spp. coral colonies (up to approximately 5 m in diameter) dominated coral cover. Other corals such as <i>Pavona</i> spp., <i>Millepora</i> spp., and Faviid corals were also present. Less resilient corals such as <i>Acropora</i> spp. were present but comprised a much lower percent of coral cover compared to the more resilient massive corals.
Coral predator information	No <i>Acanthaster planci</i> or <i>Drupella</i> sp. observed.
Depth (below chart datum)	2 to 5 m.
Fish observations	Several large <i>Platax Batavians</i> (hump-headed bat fish) were observed at the site.
Other monitoring site information	None.
Other information	The visibility was poor at this site during the time of sampling (< 7 m).

4.12.1 Photographs of the eastern side of Malus Island coral communities

S 20°30'31.84" E 116°41'27.28"
20/11/07, 1:34 PM



S 20°30'32.44" E 116°41'27.17"
20/11/07, 1:35 PM



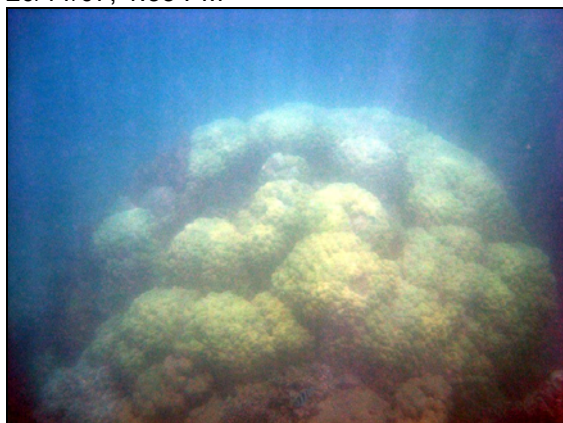
S 20°30'30.89" E 116°41'27.54"
20/11/07, 1:33 PM



S 20°30'31.84" E 116°41'27.28"
20/11/07, 1:34 PM



S 20°30'32.44" E 116°41'27.17"
20/11/07, 1:35 PM



S 20°30'34.06" E 116°41'26.29"
20/11/07, 1:47 PM



5 ACKNOWLEDGMENTS

This project was funded by DEC's Marine Science Program. In-kind logistical support was provided by the Department of Fisheries (DoF) - Karratha Office, including the use of its vessel. Mike Dunne, Terry Molloy and Keith Saunders from DoF Karratha assisted in the survey and their time and effort was greatly appreciated. The photographs contained in this report were taken by both DEC and DoF staff.

6 REFERENCES

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Stoddart JA, Stoddart SE (2005) Corals of the Dampier Harbour: Their survival and reproduction during the dredging programs of 2004. MScience Pty Ltd, Dampier Port Authority, Western Australia. 74p.

LIST OF EXISTING MARINE SCIENCE PROGRAM REPORTS

Other Marine Science Program Reports:

MSP 2006/01	Long-term monitoring program in the Montebello/Barrow Islands marine protected areas. Scoping field trip: 8-11 August 2006. Field Program Report. Bancroft KP, Simpson CJ, Long S (2006).	MSP 2007/03	Ningaloo Marine Park <i>Drupella</i> Long-term Monitoring Program: Results of the 2006 survey. Technical Report. Armstrong SJ (2007).
MSP 2006/02	Establishment of additional long-term monitoring sites for <i>Drupella cornus</i> populations in the southern section of the Ningaloo Marine Park and the Muiron and Sunday Islands Marine Management Areas. Field Program Report. Armstrong SJ (2006).	MSP 2007/04	Summary of the winter coral bleaching event at Ningaloo Marine Park, July 2006. Data Report. Armstrong SJ, Webster F, Kendrick A, Mau R, & Onton K (2007).
MSP 2006/03	Long-term monitoring program in the Montebello/Barrow Islands marine protected areas. Scoping field trip: 8-11 August 2006. Data Report. Bancroft KP (2006).	MSP 2007/05	Disturbance and recovery of coral communities in Bill's Bay, Ningaloo Marine Park: Field survey 16-23 October 2006. Technical and Data Report. Long S (2007).
MSP 2006/04	Disturbance and recovery of coral communities in Bill's Bay, Ningaloo Marine Park: 2006 survey. Field Program Report. Long S (2006).	MSP 2007/06	Bibliography of marine scientific research relevant to Perth's metropolitan marine protected areas and adjacent waters. Data Report. Lierich D, Bancroft KP (2007).
MSP 2006/05	Establishing baseline benthic community monitoring sites in the Montebello/Barrow Islands marine protected areas: 7-22 December 2006. Field Program Report. Bancroft KP, Armstrong SJ (2006).	MSP 2007/07	Current and proposed marine research projects relevant to Perth's metropolitan marine protected areas and adjacent waters. Data Report. Lierich D, Bancroft KP (2007).
MSP 2007/01	Bibliography of marine scientific research relevant to the Rowley Shoals Marine Park and the Mermaid Reef Marine National Nature Reserve. Data Report. Edwards A, Bancroft KP (2007).	MSP2007/08	Disturbance history of coral communities in Bill's Bay, Ningaloo Marine Park, 1975-2007. Data Report. van Schoubroeck P, Long S (2007).
MSP 2007/02	Current and proposed marine research projects relevant to the Rowley Shoals Marine Park and the Mermaid Reef Marine National Nature Reserve. Data Report. Edwards A, Bancroft KP (2007).	MSP 2008/01	Comparative marine biodiversity survey of the Rowley Shoals 1-17 December 2007. Metadata Report. Long S., Armstrong SJ, Fabricius K, Field I, Cook K, Colquhoun J, & Huisman J (2008).

