MARINE MANAGMENT SUPPORT
PILBARA

ESTABLISHMENT OF BASELINE BENTHIC MONITORING SITES IN NINGALOO MARINE PARK 1998

Data Report: MMS/PI/NMP-14/1998

A collaborative project between CALM Marine Conservation Branch,
Australian Institute of Marine Science, CALM Karratha Regional Office
and CALM Exmouth District Office

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Coast and Clean Seas Coastal Monitoring Program

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APPENDICES

SUMMARY

This data report presents the results of the first field survey of the *Ningaloo Marine Park Monitoring Program* (NMPMP) during May 1998. Twenty one sites were visited during this survey. Seven of these sites were located in sanctuary zones and the remaining 14 in general use zones. At each site a set of relocatable permanent monitoring transects were established. The selection of sites was influenced by historical information on backreef benthic communities from past surveys (Ayling *et al*. 1987; Forde 1994; Osborne in prep.). Reconnaissance of the Ningaloo Marine Park and proposed southern section was also carried out to identify human impacted sites and sites that are biologically unique. This reconnaissance will assist in the selection of future permanent monitoring sites.

The NMPMP was coordinated by the Marine Conservation Branch (MCB) of the Department of Conservation and Land Management (CALM) and conducted in collaboration with the Australian Institute of Marine Science (AIMS) and CALM's Pilbara Region and Exmouth District. This project was partially funded by the National Heritage Trust's Coast and Clean Seas, Coastal Monitoring Program.

The main objective of this survey was to establish a long-term monitoring program and provide baseline quantitative benthic habitat data along re-locatable transects to enable changes to the key conservation attributes of the Marine Park to be detected before unacceptable or irreversible impacts occur. Position-fixing of each transect was achieved by differential GPS to better than 3 m accuracy. High quality video footage was taken along three 50 m transects per site.

ACKNOWLEDGEMENTS

Direction

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Manager, Marine Conservation Branch (MCB), Nature Conservation Division, CALM - Dr. Chris Simpson
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CALM Regional/District collaboration

Pilbara Region - Fran Stanley, Reserves Management Officer.
Exmouth District - Doug Myers, District Manager & Carolyn Williams, Conservation Officer Marine.
Project Leader and Field Team Leader - Jennie Cary, MCB & Tim Daly (20-29) MCB.

AIMS collaboration

WA Branch - Dr Andrew Heyward, Officer in Charge

Funding / Resources

This project was partially funded by $23 000 provided by the National Heritage Trust's Coast and Clean Seas Coastal Monitoring Program. Significant resources including scientific, technical and logistic support were provided by CALM.

Human Resources
CALM staff - 182 person days (142 - MCB, 40 - Regional)
CALM volunteers - 300 person days
AIMS staff - 40 person days

Equipment
CALM - Vehicle, vessel, photographic equipment, dive gear, trailers and other assorted field equipment.
AIMS - Vehicle, vessel, photographic equipment, satphone.

1 INTRODUCTION

1.1 General

This data report presents details of the first field survey of the *Ningaloo Marine Park Monitoring Program* (NMPMP). The main aim of the NMPMP is to determine the health of the key benthic habitats of the Ningaloo Marine Park and the proposed southern extension of the marine park. The locality and boundaries of Ningaloo Marine Park and surrounds are shown in Figure 1. The first survey was conducted in May 1998 and involved the establishment of 21 long-term monitoring sites in coral communities. Areas identified as having a high level of human usage and being biologically unique were also visited to assist in selecting permanent monitoring sites for the next survey.

The field survey was coordinated by CALM in collaboration with the Australian Institute of Marine Science (AIMS). The Marine Conservation Branch (MCB) of CALM co-ordinated the program (Principle contact: Dr. Chris Simpson) which was conducted in collaboration with the Pilbara Regional Office (Contact: Fran Stanley) and the Exmouth District Office (Contact: Doug Myers).

Jennie Cary of the Marine Conservation Branch was the Field Team Leader and coordinated all activities in the field.

Other CALM field staff included Tim Daly, Mike Lapwood, Ian Gales, Jeff Myers, Tim Grubba and Justin Parker from the MCB; Tim Hamester from Exmouth District Office; and Peter Moore and Alan Shields from the Pilbara Regional Office. AIMS field staff include Andrew Heyward and Stuart Fields with Kim Brooks as a CALM/AIMS volunteer.

1.2 Background

The successful management of the marine environment is contingent upon comprehensive long-term monitoring programs that provide information on natural variability and long-term trends in key biological communities. Also to determine the status of important natural attributes at regular intervals and identify undesirable trends resulting from human activities in time for remedial management action to be implemented effectively. Monitoring programs generally comprise one or more of the following complementary objectives: (i) local scale impact and/or *compliance monitoring* that examines the effects of human activities in a localised area(s); (ii) temporally-constrained, broadscale *surveillance monitoring* to assess the impact of episodic regional physical and biological processes (eg the effect of cyclones and predators) and (iii) spatially-constrained, long-term monitoring of key biological parameters to determine the extent and cause of *natural variation* (eg seasonal and inter-annual variability) of key ecosystem attributes.

This report describes the first of a number of field surveys which will be conducted as part of the NMPMP. The spatial and temporal scale of on-going monitoring will determine the type of monitoring; i.e. surveillance, compliance or natural variability. As the coral communities are the most dominant benthic habitat, the major focus of the field program was to monitor the coral communities. As the majority of human activities in the marine park occur within the easily accessible lagoon and back-reef reef (on the sea-ward edge of lagoon) the majority of monitoring sites were established in these areas. In this survey long-term monitoring sites were established on back-reef coral communities. Quantitative biological information to assess the 'health' of the coral communities was obtained using video footage from re-locatable permanent transects. Long term monitoring sites were established to provide baseline ecological data from which the impacts from human activities can be monitored and managed to ensure that all activities are ecologically sustainable.

The NMPMP is linked to the recommendations of the *Ningaloo Marine Park Management Plan 1989-1999;*

- Monitoring of marine flora and fauna be carried out to gain an understanding of factors which influence the stability of marine communities in the Park.
- Monitoring and periodic surveys of recreational and commercial use in and adjacent to the park be carried out to determine the effect of human usage on marine communities in the Park.

1.3 Aims

The main aim of the NMPMP is to determine the 'health' of the major benthic habitats within the Ningaloo Marine Park and the southern extension. Primary objectives of the May 1998 field survey include:

- The establishment of re-locatable long-term monitoring sites on back-reef coral communities that are *representative* of the Ningaloo Marine Park and the proposed southern extension.

- Familiarization of areas identified as having a *high human usage* (generally in the lagoon) to assist in site selection for the next field survey.

- Familiarization of areas identified as *biologically unique* to assist in site selection for the next survey.

- The opportunistic collection of still photographs and video footage of major habitat types and visually dominant flora and fauna.

2 SITE SELECTION

2.1 Representative sites (including control sites)

Sites were selected to represent the ecological attributes of *back-reef* coral communities along approximately 300km of coastline from Bundegi reef in the north (Exmouth Gulf) to Gnarraloo in the south. A total of 21 representative sites were selected approximately every 15-20 km of coastline. These sites can be used for *surveillance monitoring* and a sub-set to monitor *natural variability*.

Site selection was further influenced if historical information of the 'health' of the coral communities from previous surveys was available. Historical data will assist in determining temporal changes. Studies reviewed to assist in site section included:

- Ayling AM and AL (1987). Ningaloo Marine Park: Preliminary fish density assessment and habitat survey; with information of coral damage due to *Drupella cornus* grazing. A report of CALM.
- Forde MJ (1994). Ecology of the Muricid gastropod *Drupella cornus* and its significance as a corallivore on Ningaloo Reef, Western Australia. Master of Science degree from University of Western Australia.
- Osborne S and Williams (in preparation). Status of *Drupella cornus* outbreak at Ningaloo Reef. CALM report.
- Simpson *et al* (1993). Destruction of corals and other reef animals by coral spawn slicks on Ningaloo Reef, Western Australia. *Coral Reefs* **12**:185-191.
- Australian Institute of Marine Science - studies undertaken in Coral Bay.

Representative sites were located in Sanctuary Zones where possible. In general, sites located in Sanctuary Zones will be used as control sites as no extractive activities are permitted in these zones. The results of long-term monitoring at sites subjected to recreational and/or commercial pressures will be assessed in the context of natural variation at the control sites. This is a fundamental requirement for effective management.

It was initially proposed that approximately 18 long-term monitoring sites representative of the backreef coral communities would be established during this survey, with the possibility of additional 7 sites. Due to adverse weather and sea conditions only 15 of the original 18 sites and 6 of the 7 additional sites were established. (Table 1; Figure 2). Historical site information and data from Osborne and Williams (in preparation) was helpful in site selection (Appendices 1 and 2). Appendix 1 summarises historical site information. Appendix 2 summarises historical data on percentage cover of live coral, substrate type and *Drupella* density.

3 METHODS

At each long-term monitoring site in this survey, the coral community was surveyed and three permanent 50 m transects were established to monitor spatial and temporal changes in benthic composition. The transects were set along the back reef at a depth contour of approximately 2m. The transects were set in a line along the depth contour one after the other, however transect start and end points were separated by a 10 m space. The distance between the start of the first transect and the end of the last transect was 50+10+50+10+50=170m. The transects were permanently set using star pickets at the start and end points, with a 50 m scaled (every 10cm) and weighted transect line following the contour of the seabed. The position of the start of each transect was recorded using differential GPS (datum WGS 84) which provides an accuracy of better than 3 metres. The sessile benthic composition along each transect was then recorded at a set height and speed, using a high quality video camera in an underwater housing, resulting in a strip

transect 50 m long and 1 m in width being sampled. Appendix 3 summarises the sampling methodology for the collection of benthic habitat video imagery.

The video sampling method was developed by the Australian Institute of Marine Science (AIMS) to monitor the status of coral dominated benthic communities by detecting and quantifying major spatial and temporal changes in the percentage cover of sessile benthos (Christie *et al.* 1996). This survey technique provides a permanent record of benthic habitats which can be later analysed in a variety of different ways. A visual record is a very compelling method for identifying change and for highlighting impacts that may result from recreational and commercial usage.

At all sites recordings of benthic composition using the video transect technique were complemented with general information on the major benthic community types (coral and seagrass meadows etc.). The visually dominant species and the nature and extent of impacts (if present) were recorded either by direct observation from the boat (i.e. by viewfinder), or by divers taking general video footage and still photographs.

All habitat data and related observations were recorded electronically onto standard data files which had been pre-formatted and stored on a laptop computer. Data sheets for written data recordings were also made available. All written data were transferred to the computer files during the field survey, on the day of collection. These data sheets included:

1. *Transect data sheet* - with differential GPS latitude and longitudes for each of the 3 transects at each site.
2. *Long-term monitoring site data sheet* - a site map which includes vessel location, transect locations and other features of interest.
3. *Habitat data sheet* - describes the habitat at the site including dominant species and notes any impact or activity at the site.
4. *Video data sheet* - gives the video time codes for each transect at each site.

3.1 Establishment of permanent transects

Each site consists of three permanent 50 meter transect lines placed end to end in a straight line with a 10m space between ends. A star picket was driven into the substrate at the start and end points of each transect. These were marked by a weighted marker float to enable DGPS coordinates to be obtained from the surface. Previous field trips have proven that transect deployment can be best achieved by using either procedures 1 or 2 or a combination of both depending on conditions, available vessels and personnel (Appendix 4). Appendix 4 summarises the general procedures followed.

4 RESULTS

Each ‘transect’ site has data recorded on four data sheets; the Transect data sheet, Long-term monitoring site data sheet, Habitat data sheet and Video data sheet. The sites appear in the order shown in Table 1.

The original Hi-8 video tapes, will be archived by CALM’s Information Management Branch and the VHS duplicates with the permanent transect data are stored at the Marine Conservation Branch in Fremantle. The Australian Institute of Marine Science (AIMS) has copies of the video tapes used to carry out analysis using AIMS Video Transect Analysis System (AVTAS).

Table 1. Summary of monitoring sites established in May 1998: historical information, site description and transect location (lat/long of transect 1).

No.	Site name	Zone	PREVIOUS STUDIES	SITE DESCRIPTION #1	Longitude and Latitude (DGPS) *
N1	**Bundegi**	Non Sanctuary	1) Osborne 1991/1994.	Reef structure not typical. Note: scattered offshore reef.	21° 49.699' 114° 10.718'
N2	**Mildura Wreck**	Non Sanctuary	No previous studies	Reef structure not typical. Note: scattered reef extending offshore to shelves.	21° 47.098' 114° 10.011'
N3	**Vlamingh Head**	Non Sanctuary	No previous studies	Reef structure not typical. Note: scattered reef out to surf zone approximately 750m offshore.	21° 48.279' 114° 06.763'
N5	**Tantabiddi**	Non Sanctuary	1) Osborne 1991/1994.	Reef structure typical. Note: numerous channels through barrier reef to the north.	21° 53.646' 113° 57.146'
N6	**Ned's Camp/Mesa**	Sanctuary	1) Osborne 1991/1994. 2) Ayling 1987.	Reef structure typical. Note: major channel through barrier reef south of Low Pt	21° 58.466' 113° 55.291'
N7	**Turquoise Bay**	Sanctuary	1) Osborne 91/94.	Reef structure typical. Note: broad barrier reef.	22° 06.570' 113° 52.655'
N8	**Osprey**	Sanctuary	1) Osborne 1991/1994. 2) Forde 1988.	Reef structure typical. Note: major channel through barrier reef adjacent to launch site.	22° 14.708' 113° 49.744'
N9	**Bunderra**	Non Sanctuary	1) Osborne 1991/1994.	Reef structure typical. Note: broad barrier reef and lagoon.	22° 23.491' 113° 44.804'
N10	**Lefroy Bay**	Non Sanctuary	1) Osborne 1991/1994.	Reef structure typical	22° 30.290' 113° 41.913'
N11	**Pt. Cloates**	Sanctuary	1) Osborne 1991/1994.	Reef structure typical. Note: broad lagoon.	22° 41.358' 113° 38.634'
N12	**Dugong Sanctuary**	Sanctuary	No previous studies	Reef structure typical. Note: broad lagoon.	22° 51.839' 113° 45.521'
N13	**Bruboodijo Pt.**	Non Sanctuary	1) Osborne 1991/1994.	Reef structure typical. Note: broad lagoon.	22° 56.728' 113° 46.645'
N14	**Coral Bay/Billš Bay**	Sanctuary	1) Osborne 1991/1994 2) Forde 1988.	Reef structure typical. Note: broad lagoon with extensive coverage of coral.	23° 08.881' 113° 44.965'
N17	**Cape Farquhar**	Non Sanctuary	No previous studies	Reef structure not typical. Note: small barrier reef extending north and south of the cape.	23° 37.410' 113° 36.887'
N18	**Gnarraloo Bay**	Non Sanctuary	No previous studies	Reef structure not typical. Note: reef extending north and south of the southern point of Gnarraloo Bay..	23° 45.758' 113° 32.500'
N19	**Bundegi**	Sanctuary	1) Osborne 1991/1994.	Reef structure not typical. Note: scattered offshore reef.	21° 51.409' 114° 09.982'
N20	**Jurabi Pt.**	Non Sanctuary	No previous studies	Reef structure typical. Note: barrier reed to south and scattered reef to the north.	21° 51.412' 113° 59.951'

Table 1. continued

No.	Site name	Zone	PREVIOUS STUDIES	SITE DESCRIPTION #1	Longitude and Latitude (DGPS) *
N21	**Yardie Creek**	Non Sanctuary	No previous studies	Reef structure typical. Note: major channels to immediate north of Yardie Creek, and major break in barrier reef to south	22° 18.909' 113° 47.783'
N22	**North Coral Bay**	Non Sanctuary	No previous studies	Reef structure typical. Note: northern tip of barrier reef extending north from Bills Bay.	23° 05.942' 113° 44.397'
N24	**Pelican Pt.**	Non Sanctuary	1) Osborne 1991/1994.	Reef structure typical. Note: broad lagoon. Channel to north	23° 20.023' 113° 46.671'
N25	**Pt. Billy**	Non Sanctuary	No previous studies	Reef structure typical	22° 33.105' 113° 39.407'

* DGPS coordinates were obtained using the WGS 84 datum.

Table 2. Summary of proposed monitoring sites not established in May 1998: historical information, and site description.

No.	Site name	Zone	PREVIOUS STUDIES	SITE DESCRIPTION
N4	Torpedo Bay	Non Sanctuary	No previous studies	Reef structure not typical. Note: scattered offshore reef.
N15	Pelican Sanctuary	Sanctuary	No previous studies	Reef structure typical.
N16	Alison Pt.	Non Sanctuary	No previous studies	Reef structure not typical. Note: scattered exposed reef.
N22 (b)	Outer Reef Bill's Bay	Sanctuary	1) Forde 1988.	Reef structure typical.
N23	South Coral Bay	Non Sanctuary	No previous studies	Reef structure typical.

SITE DATA SHEETS

TRANSECT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N	**Site Name**	Bundegi	**Date**	5/5/98	**Recorder**	Lapwood
Time	12.10	**Video tape no.**	NMPMP/bvt/05.05.98 /#1		**Video operator**		Cary

T1	**Length (m)**	**50**	**Compass bearing (°)**	60	**Distance to T2 (m)**	10
Transect	**DGPS Lat**		**DGPS Long**	**Depth (m)**	**Picket type**	**Picket ht (m)**
Start	21° 49.699' S		114° 10.718' E	3.0	60 cm Star/ Steel	0.15
Finish	° ' S		° ' E			

Notes: (eg. description of habitat and dominant species along transect)
Live hard coral: 35%
Dead coral: 50%
Algae: 4%
Abiotic: 11%

T2	**Length (m)**	**50**	**Compass bearing (°)**	60	**Distance to T2 (m)**	10
Transect	**DGPS Lat**		**DGPS Long**	**Depth (m)**	**Picket type**	**Picket ht (m)**
Start	21° 49.725' S		114° 10.698' E	3.0	60cm Star/ Steel	0.15
Finish	° ' S		° ' E			

Notes:
Live hard coral: 11%
Dead coral: 62%
Algae: 11%
Abiotic: 17%

T3	**Length (m)**	**50**	**Compass bearing (°)**	60		
Transect	**DGPS Lat**		**DGPS Long**	**Depth (m)**	**Picket type**	**Picket ht (m)**
Start	21° 49.750' S		114° 10.682' E	3.0	60cm Star/ Steel	0.15
Finish	21° 49.776' S		114° 10.678' E	3	60cm Star/ Steel	0.15

Notes:
Live coral: 15%
Dead coral: 51%
Algae: 3%
Abiotic: 32%

LONG-TERM MONITORING SITE DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N1	**Site Name**	Bundegi	**Date**	5/5/98	**Recorder**	Lapwood

GPS Latitude	**GPS Longitude**	**Differential**			
21° 49.699' S	114° 10.718' E	**Yes**	☒	**No**	☐

Habitat type	Coral backreef. High Silt Load					
Location of nearest transect from GPS position	**Transect No.**	T1	**Compass bearing (°)**	190	**Distance (m)**	10.0

Site Map (include north indicator, scale, vessel location, water depth, transect locations & other features of interest):

Notes:

HABITAT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N1	**Site Name**	Bundegi	**Date**	5/5/98	**Recorder**	Cary
Vessel	AIMS 4.3M NAIAD CALM 3.8M ZODIAC	**Time**	1140	**Weather**	25 Knots SE		
Sea	20cm Waves	**Water depth (m)**	3.0	**Water visibility (m)**	7.0		

GPS Latitude	GPS Longitude	Differential			
21° 49.699' S	114° 10.718' E	**Yes**	☒	**No**	☐

Site location	Just north of the Bundegi Public Jetty.

Habitat Description

Depth: 2.8-3.0m
Immediately inshore of reef platform; Dense (30-40%) live coral cover. High level of sedimentation.
Live coral: 20% (mean)
Dead coral: 54% (mean)
Algae: 6% (mean)
Abiotic: 20% (mean)

Dominant Species

Seagrass	
Macro-algae	Dictyota sp. (wide-branch)
Coral	Montipora & Acropora sp. (dominant). A hyacynathus plates and comrymbose forms
Fish	few fish species observed; medium-sized Scarids; Damsels, Chromis sp.; 4 Coral trout
Invertebrates	

Other Features

Impact or Activity

Storm damage evident—few years ago; upturned plates. High level of sedimentation.

Video reference	NMPMP/bvt/05.05.98 /#1	**Aerial reference**	1985/WA 2286C /RUN /5157
Slide reference		**Print reference**	

VIDEO DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N1	**Site Name**	Bundegi	**Date**	5/5/98	**Recorder**	Cary
Start time	12.10	**Finish time**	12.31	**Depth (m)**	2.8-3.0	**Visibility (m)**	7.0

Underwater Video System	Blaupunkt CC894 camcorder in StingRay SR-700 housing											
Focus mode				**Exposure mode**				**Program mode**				**White balance mode**			
Auto	☐	Manual	☒	Auto	☒	Manual	☐	Sports	☐	High-speed	☒	Auto	☒	Outdoor	☐
Lens system				**Filters**								**Lights**			
Wide-angle	☒	Zoom-macro	☐	None	☒	Red	☐	Yellow	☐	Orange	☐	On	☐	Off	☒

Video operator	Cary	**Tape no.**	NMPMP/bvt/05.05.98 /#1	**Height above substrate (cm)**	30
Time coding for all video footage at site:		**From:**	00:00:12:51	**To:**	00:00:33:08

Transect time coding	**Start**	**Finish**	**Total time (mins/secs)**
T1	00:00:13:39	00:00:19:26	6.25
T2	00:00:20:11	00:00:25:28	5.17
T3	00:00:26:59	00:00:32:07	5.48

Notes:

360 degree scan Beginning of each transect
General footage at end of T3

TRANSECT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				Field Survey		MAY 1998
Site No.	N	Site Name		Date	6/5/98	Recorder	Lapwood
Time	11.20	Video tape no.	NMPMP/bvt/06.05.98 /#2			Video operator	Cary

T1	Length (m)	50	Compass bearing (°)	300	Distance to T2 (m)	10.0
Transect	DGPS Lat		DGPS Long	Depth (m)	Picket type	Picket ht (m)
Start	21° 47.098' S		114° 10.011' E	3.0	60cm Star/Steel	0.2
Finish	° ' S		° ' E			

Notes: (eg. Description of habitat and dominant species along transect)
Live coral: 3%
Dead coral: 0%
Algae: 10%
Abiotic: 80%

T2	Length (m)	50	Compass bearing (°)	300	Distance to T2 (m)	10.0
Transect	DGPS Lat		DGPS Long	Depth (m)	Picket type	Picket ht (m)
Start	21° 47.089' S		114° 09.984' E	4.0	60cm Star/Steel	0.2
Finish	° ' S		° ' E			

Notes:
Live coral: 1%
Dead coral: 0%
Algae: 22%
Abiotic: 76%

T3	Length (m)	50	Compass bearing (°)	300		
Transect	DGPS Lat		DGPS Long	Depth (m)	Picket type	Picket ht (m)
Start	21° 47.063' S		114° 09.960' E	3.0	60cm Star/Steel	0.2
Finish	21° 47.045' S		114° 09.936' E	3.0	60cm Star/Steel	

Notes:
DGPS inoperable - returned to fix sites the following day.
T2 - depth - 4.0m (ledge)
Live coral: 2% Dead coral: 0%
Algae: 72% Abiotic: 25%

LONG-TERM MONITORING SITE DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				Field Survey		MAY 1998
Site No.	N2	Site Name	Mildura Wreck	Date	6/5/98	Recorder	Fields

GPS Latitude	GPS Longitude	Differential			
21 ° 47.098 ' S	114 ° 10.011 ' E	Yes	☒	No	☐

Habitat type	Limestone pavement covered in algae and small coral colonies					
Location of nearest transect from GPS position	Transect No.	T1	Compass bearing (°)	300	Distance (m)	10.0

Site Map (include north indicator, scale, vessel location, water depth, transect locations & other features of interest):

Notes:

All colonies very small in size. High energy zone, future access may be affected by sea conditions.
Site closer in aspect to reef falt or slope as there is no backreef.

HABITAT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N2	**Site Name**	Mildura Wreck	**Date**	6/5/98	**Recorder**	Grubba
Vessel	AIMS 4.3M NAIAD CALM 3.8M ZODIAC	**Time**	11.20	**Weather**	8 knots NE		
Sea	Slight swell	**Water depth (m)**	2.0-4.0	**Water visibility (m)**	12.0		

GPS Latitude	GPS Longitude	Differential			
21 ° 47.098 ' S	114 ° 10.011 ' E	**Yes**	☒	**No**	☐

Site location	SW of Mildura wreck

Habitat Description

Limestone pavement. High energy area (swell). Flat bottom, some depressions and ridges.
Live coral: 2% (mean)
Dead coral: 0% (mean)
Algae: 35% (mean)
Abiotic: 60% (mean)

Dominant Species

Seagrass	Halophila ovalis
Macro-algae	Fliamentous blue/green, Dictyota sp., Amphiroa foliacea
Coral	Acroporta sp.—very small colonies; Pocillopora sp (2); Soft coral—Sarcophyton & Sinularia sps.; some Platygyra &Gonipora sps.
Fish	Dominant—Pomacentridae, Pomacanthidae, Labridae (juveniles); Scaridae (juveniles), Acanthridae, Balistidae, Rhinecanthus verrucosus
Invertebrates	Dominant—spirastrella vagabunda (sponge), Echinometra sp., Octopus cyanea; some Tripneustes gratilla, Linckia laevigata, Actinopga mauritiana, Echinometridae aciculatus, Oxycomantus bennetti

Other Features

Cowries: Cypracea tigris, Lambia chiragra (spider conch)

Impact or Activity

High energy site.

Video reference	NMPMP/bvt/06.05.98 /#2	**Aerial reference**	1994 /WA 3405C /RUN1/ 5068
Slide reference		**Print reference**	

VIDEO DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				Field Survey		MAY 1998
Site No.	N2	Site Name	Mildura wreck	Date	6/5/98	Recorder	Myers
Start time	11.20	Finish time	13.30	Depth (m)	2.0-4.0	Visibility (m)	12.0

Underwater Video System	Blaupunkt CC894 camcorder in StingRay SR-700 housing

Focus mode				Exposure mode				Program mode				White balance mode			
Auto	☐	Manual	☒	Auto	☒	Manual	☐	Sports	☐	High-speed	☒	Auto	☒	Outdoor	☐

Lens system				Filters								Lights			
Wide-angle	☒	Zoom-macro	☐	None	☒	Red	☐	Yellow	☐	Orange	☐	On	☐	Off	☒

Video operator	Cary	Tape no.	NMPMP/bvt/06.05.98 /#2	Height above substrate (cm)	30
Time coding for all video footage at site:		From:	00:00:00:00	To:	00:00:22:14

Transect time coding	Start	Finish	Total time (mins/secs)
T1	00:00:06:05	00:00:10:43	4.38
T2	00:00:10:45	00:00:16:00	5.15
T3	00:00:17:05	00:00:21:24	4.19

Notes:

Program mode: 250 Speed

TRANSECT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				Field Survey		MAY 1998
Site No.	N	Site Name		Date	6/5/98	Recorder	Lapwood
Time	14.38	Video tape no.	NMPMP/bvt/06.05.98 /#2			Video operator	Cary

T1	Length (m)	50	Compass bearing (°)	330	Distance to T2 (m)	10.0
Transect	DGPS Lat		DGPS Long	Depth (m)	Picket type	Picket ht (m)
Start	21° 48.279' S		114° 06.763' E	3.0	60cm Star/Steel	0.2
Finish	° ' S		° ' E			

Notes: (eg. Description of habitat and dominant species along transect)
Live coral: 1%
Dead coral: 1%
Algae: 0%
Abiotic: 98%

T2	Length (m)	50	Compass bearing (°)	330	Distance to T2 (m)	10.0
Transect	DGPS Lat		DGPS Long	Depth (m)	Picket type	Picket ht (m)
Start	21° 48.251' S		114° 06.738' E	4.0	60cm Star/Steel	0.2
Finish	° ' S		° ' E			

Notes:
Live coral: 2%
Dead coral: 0%
Algae: 0%
Abiotic: 98%

T3	Length (m)	50	Compass bearing (°)	330		
Transect	DGPS Lat		DGPS Long	Depth (m)	Picket type	Picket ht (m)
Start	21° 48.234' S		114° 06.715' E	5.0	60cm Star/Steel	0.2
Finish	21° 48.218' S		114° 06.695' E	5.0	60cm Star/Steel	0.2

Notes:
DGPS inoperable. Returned to fix the sites the following day.
Visability under water 8.0-10.0m.
Live coral: 2% Dead coral: 0%
Algae: 0% Abiotic: 97%

LONG-TERM MONITORING SITE DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				Field Survey		MAY 1998
Site No.	N3	Site Name	Vlamingh Head	Date	6/5/98	Recorder	Fields

GPS Latitude	GPS Longitude	Differential			
21 ° 48.279 ' S	114 ° 06.763 ' E	Yes	☒	No	☐

Habitat type	Grooved limstone susbstrate (echinoderm scars)					
Location of nearest transect from GPS position	Transect No.	T	Compass bearing (°)		Distance (m)	

Site Map (include north indicator, scale, vessel location, water depth, transect locations & other features of interest):

Notes:
Very small coral colonies on limestone

HABITAT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N3	**Site Name**	Vlamingh Head	**Date**	6/5/98	**Recorder**	Cary
Vessel	AIMS 4.3M NAIAD CALM 3.8 ZODIAC	**Time**	14.38	**Weather**	8 knots ENE		
Sea	Slight swell	**Water depth (m)**	3.0-5.0	**Water visibility (m)**	8.0-10.0		

GPS Latitude	GPS Longitude	Differential			
21 ° 48.279 ' S	114 ° 06.763 ' E	**Yes**	☒	**No**	☐

Site location	Vlamingh Head - slightly to the north

Habitat Description

Limestone pavement- gulleys/grooves small coral colonies.
Live coral: 2% (mean)
Dead coral: 0% (mean)
Algae: 0% (mean)
Abiotic: 98% (mean)

Dominant Species

Seagrass	Halophila ovalis
Macro-algae	Halimeda sp., Filamentous blue-green, Dictyota sp.; Valonia ventricosa, Amphiroa foliacea
Coral	Dominant—Acropora sp., Pocillopora (2 spp.), Sinularia (3spp.); Soft coral—Sarcophyton; Platygyra sp., Gonipora sp., Blue Acropora cryombose
Fish	Damsels, wrasse, parrot, tusk fish, school of spangled emperor; juveile angelfish, mackerel
Invertebrates	Tridacna maxima; Linckia sp. (sea star); some Echinometra, Tripneustes gratilla (dominant)

Other Features

Impact or Activity

Surfing break—north west of site

Video reference	NMPMP/bvt/06.05.98 /#2	**Aerial reference**	1994 /WA 3405C /RUN1/ 5064
Slide reference		**Print reference**	

VIDEO DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N3	**Site Name**	Vlamingh Head	**Date**	6/5/98	**Recorder**	Myers
Start time	14.38	**Finish time**	16.30	**Depth (m)**	2.9	**Visibility (m)**	8.0-10.0

Underwater Video System	Blaupunkt CC894 camcorder in StingRay SR-700 housing											
Focus mode				**Exposure mode**				**Program mode**				**White balance mode**			
Auto	☐	Manual	☒	Auto	☒	Manual	☐	Sports	☐	High-speed	☒	Auto	☒	Outdoor	☐
Lens system				**Filters**								**Lights**			
Wide-angle	☒	Zoom-macro	☐	None	☒	Red	☐	Yellow	☐	Orange	☐	On	☐	Off	☒

Video operator	Cary	**Tape no.**	NMPMP/bvt/06.05.98 /#2	**Height above substrate (cm)**	30
Time coding for all video footage at site:		**From:**	00:00:22:14	**To:**	00:00:40:24

Transect time coding	**Start**	**Finish**	**Total time (mins/secs)**
T1	00:00:22:50	00:00:27:00	4.10
T2	00:00:28:00	00:00:32:42	4.42
T3	00:00:33:52	00:00:38:29	4.37

Notes:

TRANSECT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				Field Survey		MAY 1998
Site No.	N	Site Name		Date	4/5/98	Recorder	Lapwood
Time	13.30	Video tape no.	NMPMP/bvt/04.05.98 /#1			Video operator	Fields

T1	Length (m)	50	Compass bearing (°)		Distance to T2 (m)	10.0
Transect	DGPS Lat	DGPS Long	Depth (m)	Picket type	Picket ht (cm)	
Start	21° 53.646' S	113° 57.146' E	2.9	60cm Star/Steel	0.15	

Notes: (eg. Description of habitat and dominant species along transect)
Live coral: 13%
Dead coral: 19%
Algae: 0%
Abiotic: 67%

T2	Length (m)	50	Compass bearing (°)		Distance to T2 (m)	10.0
Transect	DGPS Lat	DGPS Long	Depth (m)	Picket type	Picket ht (cm)	
Start	21° 53.671' S	113° 57.121' E	2.9	60cm Star/Steel	0.15	

Notes:
Live coral: 8%
Dead coral: 15%
Algae: 0%
Abiotic: 77%

T3	Length (m)	50	Compass bearing (°)			
Transect	DGPS Lat	DGPS Long	Depth (m)	Picket type	Picket ht (cm)	
Start	21° 53.691' S	113° 57.100' E	2.9	60cm Star/Steel	0.15	
Finish	21° 53.710' S	113° 57.079' E	2.9	60cm Star/Steel	0.15	

Notes:
Live coral: 7%
Dead coral: 14%
Algae: 0%
Abiotic: 79%

LONG-TERM MONITORING SITE DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N5	**Site Name**	Tantabiddi	**Date**	4/5/98	**Recorder**	Lapwood

GPS Latitude	**GPS Longitude**	**Differential**			
21° 53.646' S	113° 57.146' E	**Yes**	☒	**No**	☐

Habitat type	Back reef, approx 10% coral cover, coral rubble and some sand.						
Location of nearest transect from GPS position		**Transect No.**	T3	**Compass bearing (°)**	180	**Distance (m)**	

Site Map (include north indicator, scale, vessel location, water depth, transect locations & other features of interest):

Notes:

HABITAT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N5	**Site Name**	Tantabiddi	**Date**	4/5/98	**Recorder**	Grubba
Vessel	AIMS 4.3M NAIAD CALM 3.8M ZODIAC	**Time**	13.30	**Weather**	SW 5-8 knots		
Sea	slight swellL	**Water depth (m)**	2.5	**Water visibility (m)**	20.0		

GPS Latitude	GPS Longitude	Differential			
21° 53.646' S	113° 57.146' E	**Yes**	☒	**No**	☐

Site location	West of Tantabiddi boat ramp, immediately inside reef crest.

Habitat Description

High energy site. Large areas of rubble, scattered bombies and small-medium colonies. High energy evident by dislodged colonies, considerable fresh scarring (reccently dead).
Live coral: 9% (mean)
Dead coral: 16% (mean)
Algae: 0% (mean)
Abiotic: 75% (mean)

Dominant Species

Seagrass	
Macro-algae	Filamentous blue/green algae
Coral	Acropora plates (A. digitifera, some A. robusta); Porites bomies(P.domicornis); Millepora sp.; Favites sp. Platygrya sp.; Galaxea sp.; Gonipora sp.; Sarcophyton sp.
Fish	Large Scarids, Pomacentrus;
Invertebrates	Holothuriians (2 sp.); Echinometra

Other Features

In lagoon limestone pavement with macroalgae and seagrass (Cynodocea)

Impact or Activity

Video reference	NMPMP/bvt/04.05.98 /#1	**Aerial reference**	1994/WA 3405C /RUN4/5033
Slide reference		**Print reference**	

VIDEO DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N5	**Site Name**	Tantabiddi	**Date**	4/5/98	**Recorder**	Cary
Start time	13.00	**Finish time**	14.00	**Depth (m)**	2.9	**Visibility (m)**	20.0

Underwater Video System	Blaupunkt CC894 camcorder in StingRay SR-700 housing											
Focus mode				**Exposure mode**				**Program mode**				**White balance mode**			
Auto	☐	Manual	☒	Auto	☒	Manual	☐	Sports	☐	High-speed	☒	Auto	☒	Outdoor	☐
Lens system				**Filters**								**Lights**			
Wide-angle	☒	Zoom-macro	☐	None	☒	Red	☐	Yellow	☐	Orange	☐	On	☐	Off	☒

Video operator	Fields	**Tape no.**	NMPMP/bvt/04.05.98 /#1	**Height above substrate (cm)**	30
Time coding for all video footage at site:		**From:**	00:00:00:00	**To:**	00:00:12:50

Transect time coding	**Start**	**Finish**	**Total time (mins/secs)**
T1	00:00:00:40	00:00:03:47	3.07
T2	00:00:04:15	00:00:07:59	3.44
T3	00:00:08:31	00:00:12:50	5.29

Notes:

Program mode: 1/250

TRANSECT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N	**Site Name**		**Date**	7/5/98	**Recorder**	Lapwood
Time	15.30	**Video tape no.**	NMPMP/bvt/07.05.98 /#2		**Video operator**		Cary

T1	**Length (m)**	**50**	**Compass bearing (°)**	180	**Distance to T2 (m)**	10.0
Transect	**DGPS Lat**		**DGPS Long**	**Depth (m)**	**Picket type**	**Picket ht (m)**
Start	21° 58.466' S		113° 55.291' E	1.0	60cm Star/Steel	0.2
Finish	° ' S		° ' E			

Notes: (eg. Description of habitat and dominant species along transect)
Live coral: 9%
Dead coral: 17%
Algae: 2%
Abiotic: 66%

T2	**Length (m)**	**50**	**Compass bearing (°)**	180	**Distance to T2 (m)**	10.0
Transect	**DGPS Lat**		**DGPS Long**	**Depth (m)**	**Picket type**	**Picket ht (m)**
Start	21° 58.494' S		113° 55.281' E	1.0	60cm Star/Steel	0.2
Finish	° ' S		° ' E			

Notes:
Live coral: 3%
Dead coral: 44%
Algae: 11%
Abiotic: 41%

T3	**Length (m)**	**50**	**Compass bearing (°)**	180		
Transect	**DGPS Lat**		**DGPS Long**	**Depth (m)**	**Picket type**	**Picket ht (m)**
Start	21° 58.527' S		113° 55.273' E	1.0	60cm Star/Steel	0.2
Finish	21° 58.553' S		113° 55.265' E	1.0	60cm Star/Steel	0.2

Notes:
Shallow - only camera operator on scuba, rest of team snorkled.
Laid transect line by boat - (drifted).
Live coral: 2% Dead coral: 35%
Algae: 9% Abiotic: 54%

LONG-TERM MONITORING SITE DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N6	**Site Name**	Neds Camp/Mesa	**Date**	7/5/98	**Recorder**	Lapwood

GPS Latitude	**GPS Longitude**	**Differential**			
21° 58.466' S	113° 55.291' E	**Yes**	☒	**No**	☐

Habitat type	Coral backreef. High cover of dead reef (Acropora plate and branching forms)f					
Location of nearest transect from GPS position	**Transect No.**	T2	**Compass bearing (°)**	180	**Distance (m)**	10.0

Site Map (include north indicator, scale, vessel location, water depth, transect locations & other features of interest):

Notes:

Drupella or storm damage? High abundance of juvenile coral colonies on dead coral plate and branching forms.

HABITAT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N6	**Site Name**	Neds Camp/Mesa	**Date**	7/5/98	**Recorder**	Grubba
Vessel	CALM Zodiac	**Time**	15.30	**Weather**	5 knots + N.		
Sea		**Water depth (m)**	1.0	**Water visibility (m)**	8.0		

GPS Latitude	**GPS Longitude**	**Differential**			
21° 53.646' S	113° 57.146' E	**Yes**	☒	**No**	☐

Site location	NW of Neds Camp, W of Mangrove sanctuary

Habitat Description

Back reef - possibly exposed during low tide. Sparsely scattered live Acropora plate. Branching forms more abundant. Substrate dominated by dead (whole / broken up) Acropora plates all dettached , overturned and Acropora coryonbose species.
Live coral: 5% (mean)
Dead coral: 32% (mean)
Algae: 8% (mean)
Abiotic: 53% (mean)

Dominant Species

Seagrass	Halophila ovalis
Macro-algae	Galaxaura sp? Rhodymenia sp growing over dead corals.
Coral	Echinopora sp., Acropora sp., Astrepora sp., Favites sp., Favia sp., Seriatopora caliendrum, Hyd ?
Fish	Dominant - Pomacanthidae & Acanthuridae. Others - Chaetodontidae & Scaridae
Invertebrates	Panulirus versicolor, Tridacne sp (40 cm)

Other Features

Reef white tip shark - Triaenodon obesus

Impact or Activity

Majority of reef 'old' dead coral, of Acrpora species (plates & coryonbose). New coral growth on old.

Video reference	NMPMP/bvt/ 07.05.98 /# 2	**Aerial reference**	1994 /WA 3405C /RUN5/ 5045
Slide reference		**Print reference**	

VIDEO DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N6	**Site Name**	Neds Camp/Mesa	**Date**	7/5/98	**Recorder**	Cary
Start time	15.30	**Finish time**	17.30	**Depth (m)**	1.0	**Visibility (m)**	8.0

Underwater Video System	Blaupunkt CC894 camcorder in StingRay SR-700 housing											
Focus mode				**Exposure mode**				**Program mode**				**White balance mode**			
Auto	☐	Manual	☒	Auto	☒	Manual	☐	Sports	☒	High-speed	☐	Auto	☒	Outdoor	☐
Lens system				**Filters**								**Lights**			
Wide-angle	☒	Zoom-macro	☐	None	☒	Red	☐	Yellow	☐	Orange	☐	On	☐	Off	☒

Video operator	Cary	**Tape no.**	NMPMP/bvt/07.05.98 /#2	**Height above substrate (cm)**	30
Time coding for all video footage at site:		**From:**	: :40:30	**To:**	:1:18:23

Transect time coding	**Start**	**Finish**	**Total time (mins/secs)**
T1	: : :	: : :	.
T2	: :54:15	: :59:07	4.52
T3	:1:00:00	:1:04:39	4.39

Notes:

T1 was done 3 times!!! Individual coral species were video taped to assist in ID.

	Start	Finish Time	Total Time	
1)	41.29	?.35	?	
2)	48.40	53.10	4.30	
3)	1.14.09	1.18.23	4.14	Speed 250

TRANSECT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N	**Site Name**		**Date**	8/5/98	**Recorder**	Cary
Time	10.00	**Video tape no.**	NMPMP/bvt/08.05.98 /#3		**Video operator**		Cary / Grubba

T1	**Length (m)**	**50**	**Compass bearing (°)**	170	**Distance to T2 (m)**	10.0
Transect	**DGPS Lat**		**DGPS Long**	**Depth (m)**	**Picket type**	**Picket ht (m)**
Start	22° 06.570' S		113° 52.655' E	1.0	60cm Star/Steel	0.2
Finish	° ' S		° ' E			

Notes: (eg. Description of habitat and dominant species along transect)
Acropora plates - many Drupella scars - recent & old with occassional massives
Live coral: 19% Dead coral: 62%
Algae: 2% Abiotic: 17%

T2	**Length (m)**	**50**	**Compass bearing (°)**	170	**Distance to T2 (m)**	10.0
Transect	**DGPS Lat**		**DGPS Long**	**Depth (m)**	**Picket type**	**Picket ht (m)**
Start	22° 06.602' S		113° 52.650' E	1.0	60cm Star/Steel	0.2
Finish	° ' S		° ' E			

Notes:
Acropora plates - many Drupella scars - recent & old with occassional massives
Live coral: 20% Dead coral: 71%
Algae: 2% Abiotic: 6%

T3	**Length (m)**	**50**	**Compass bearing (°)**	170		
Transect	**DGPS Lat**		**DGPS Long**	**Depth (m)**	**Picket type**	**Picket ht (m)**
Start	22° 06.633' S		113° 52.638' E	1.0	60cm Star/Steel	0.2
Finish	22° 06.657' S		113° 52.631' E	1.0	60cm Star/Steel	0.2

Notes:
Beginning & end of transect as per 1 & 2. However in middle less coral - effect of swash zone.
Live coral: 9% Dead coral: 46%
Algae: 2% Abiotic: 43%

LONG-TERM MONITORING SITE DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N7	**Site Name**	Turquoise Bay	**Date**	8/5/98	**Recorder**	Cary

GPS Latitude	**GPS Longitude**	**Differential**			
22° 06.570' S	113° 52.655' E	**Yes**	☒	**No**	☐

Habitat type	Coral backreef - Acropora plates - many Drupella scars						
Location of nearest transect from GPS position		**Transect No.**	T	**Compass bearing (°)**		**Distance (m)**	

Site Map (include north indicator, scale, vessel location, water depth, transect locations & other features of interest):

Notes:

HABITAT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PRORGRAM				**Field Survey**		MAY 1998
Site No.	N7	**Site Name**	Turquoise Bay	**Date**	8/5/98	**Recorder**	Grubba
Vessel	CALM Zodiac	**Time**	10.00	**Weather**	5 -8 knots N.		
Sea	Calm	**Water depth (m)**	1.0	**Water visibility (m)**	20.0		

GPS Latitude	**GPS Longitude**	**Differential**			
22° 06.570' S	113° 52.655' E	**Yes**	☒	**No**	☐

Site location	Backreef slightly south of launch site

Habitat Description

Back reef broken by distinct wash zones. Dominated by Acropora sp. Plate & coryonbose. Large colonies of Sinularia sp. Drupella common feeding scars abundant on colonies.
Live coral: 16% (mean)
Dead coral: 60% (mean)
Algae: 2% (mean)
Abiotic: 22% (mean)

Dominant Species

Seagrass	
Macro-algae	Dictoya sp. Turbinaria sp. Titanophora weberae ?
Coral	Sarrophyton sp. Acropora (plates & coryonbose) Porities sp. Faviidae, Sinularia sp. Fungiidae, Montipora sp.
Fish	Acanthuridae & Scaridae dominantLutjanidae Pomacentridae Labridae Chaetodontidae Pomacanthidae
Invertebrates	Drupella abundant. Holothuria sp. Diadema

Other Features

Reef White Tip Shark - Triaenodon obesus Blue-spotted ray - Taeniura lymma

Impact or Activity

Drupella and feed scars abundant (recent & old)

Video reference	NMPMP/bvt/08.05.98 /#3	**Aerial reference**	1994 /WA 3405C /RUN5/ 5028
Slide reference		**Print reference**	

VIDEO DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N7	**Site Name**	Turquoise Bay	**Date**	8/5/98	**Recorder**	Moore
Start time	10.00	**Finish time**	12.00	**Depth (m)**	0.8	**Visibility (m)**	20.0

Underwater Video System	Blaupunkt CC894 camcorder in StingRay SR-700 housing

Focus mode				**Exposure mode**				**Program mode**				**White balance mode**			
Auto	☐	Manual	☒	Auto	☒	Manual	☐	Sports	☒	High-speed	☐	Auto	☒	Outdoor	☐

Lens system				**Filters**								**Lights**			
Wide-angle	☒	Zoom-macro	☐	None	☒	Red	☐	Yellow	☐	Orange	☐	On	☐	Off	☒

Video operator	Cary/ Grubba	**Tape no.**	NMPMP/bvt/08.05.98 /#3	**Height above substrate (cm)**	30
Time coding for all video footage at site:		**From:**	: :00:00	**To:**	: :25:39

Transect time coding	**Start**	**Finish**	**Total time (mins/secs)**
T1	: :05:27	: :10:40	5.13
T2	: :11: 55	: :16:54	4.59
T3	: :18:00	: :24:14	6.14

Notes:

Abundant Drupella, many scars - recent & old. Speed 250

00:00 to 05:27 Dead reef and recruitment with Drupella feeding scars
24:14 to 25:00 Blue spotted ray

TRANSECT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N	**Site Name**		**Date**	9/5/98	**Recorder**	Grubba
Time	10.30	**Video tape no.**	NMPMP/bvt/08.05.98 /#3		**Video operator**		Cary

T1	**Length (m)**	**50**	**Compass bearing (°)**	160	**Distance to T2 (m)**	10.0
Transect	**DGPS Lat**		**DGPS Long**	**Depth (m)**	**Picket type**	**Picket ht (m)**
Start	22° 14.708' S		113° 49.744' E	1.5	60cm Star/Steel	0.2
Finish	° ' S		° ' E			

Notes: (eg. description of habitat and dominant species along transect)
Dead coral - primarily Acropora plate (Same along all three transects)
Live coral: 4% Dead coral: 77%
Algae: 3% Abiotic: 15%

T2	**Length (m)**	**50**	**Compass bearing (°)**	160	**Distance to T2 (m)**	10.0
Transect	**DGPS Lat**		**DGPS Long**	**Depth (m)**	**Picket type**	**Picket ht (m)**
Start	22° 14.735' S		113° 49.729' E	1.5	60cm Star/Steel	0.2
Finish	° ' S		° ' E			

Notes:
Wash channels - scattered along the back reef. Drupella observed eating remaining last large plate. Acropora plates up to 1.0m diameter dead.
Live coral: 2% Dead coral: 80%
Algae: 1% Abiotic: 12%

T3	**Length (m)**	**50**	**Compass bearing (°)**	160		
Transect	**DGPS Lat**		**DGPS Long**	**Depth (m)**	**Picket type**	**Picket ht (m)**
Start	22° 14.764' S		113° 49.711' E	1.5	60cm Star/Steel	0.2
Finish	22° 14.786' S		113° 49.701' E	1.5	star	0.2

Notes:
5m wash zone 19.0m - 24.0m on transect. 24.0m along transect a large Acropora plate 1.5m in diameter. Big sarcophyton each 30cm nearby.
Live coral: 1% Dead coral: 51%
Algae: 0% Abiotic: 48%

LONG-TERM MONITORING SITE DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N8	**Site Name**	Osprey Bay	**Date**	9/5/98	**Recorder**	Grubba

GPS Latitude	**GPS Longitude**	**Differential**			
22° 14.708' S	113° 49.744' E	**Yes**	☒	**No**	☐

Habitat type	Backreef - dominated by dead Acropora plates						
Location of nearest transect from GPS position		**Transect No.**	T	**Compass bearing (°)**		**Distance (m)**	

Site Map (include north indicator, scale, vessel location, water depth, transect locations & other features of interest):

Notes:

HABITAT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N8	**Site Name**	Osprey Bay	**Date**	9/5/98	**Recorder**	Cary
Vessel	MCB zodiac	**Time**	10.30	**Weather**	north 12-15 knots		
Sea	Calm	**Water depth (m)**	1.5	**Water visibility (m)**	17.0		

GPS Latitude	**GPS Longitude**	**Differential**			
22° 14.708' S	113° 49.744' E	**Yes**	☒	**No**	☐

Site location	Backreef coral cmmunity

Habitat Description

Backreef - high mortality of plate corals (A. hyacynthus) resulting from Drupella cornis infestation. ~ 30% cover. Drupella aggregated under numerous coral colonies which showed obious feeding scars. Also present were favites; favia; sinularia; sarcophyton; (30cm) pocillopora;porites ~ 5%
Live coral: 2% (mean)
Dead coral: 69% (mean)
Algae: 1% (mean)
Abiotic: 25% (mean)

Dominant Species

Seagrass	
Macro-algae	Titanophora weberae, Dictyota sp, Galaxaura marginata, Turbinaria sp
Coral	Acropora hyacynthus(90% dead); Drupella cornis aggregations on remaining live cover; occasional massives(favites, favia, porites)
Fish	Acathuridae, Chaetodontida, Pomacanthidae, Labridae, Scaridae, Lutjanidae - abundant, Pomacentridae - abundant.
Invertebrates	Drupella cornis very abundant in aggregations on living corals

Other Features

Pocillopora,soft corals (sinularia and sarcophyton)

Impact or Activity

Significant impact from Drupella cornisvisible on the A. hyacynthus plates.

Video reference	NMPMP/bvt/09.05.98 /#3	**Aerial reference**	1994 /WA 3405C /RUN6/ 5020
Slide reference		**Print reference**	

VIDEO DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N8	**Site Name**	Osprey Bay	**Date**	8/5/98	**Recorder**	Cary
Start time	10.30	**Finish time**	11.30	**Depth (m)**	1.5	**Visibility (m)**	17.0

Underwater Video System	Blaupunkt CC894 camcorder in StingRay SR-700 housing

Focus mode				**Exposure mode**				**Program mode**				**White balance mode**			
Auto	☐	Manual	☒	Auto	☒	Manual	☐	Sports	☒	High-speed	☐	Auto	☒	Outdoor	☐
Lens system				**Filters**								**Lights**			
Wide-angle	☒	Zoom-macro	☐	None	☒	Red	☐	Yellow	☐	Orange	☐	On	☐	Off	☒

Video operator	Cary/ Grubba	**Tape no.**	NMPMP/bvt/08.05.98 /#3	**Height above substrate (cm)**	30
Time coding for all video footage at site:		**From:**	: :27:55	**To:**	: :53:52

Transect time coding	**Start**	**Finish**	**Total time (mins/secs)**
T1	: :30:07	: :35:42	5.35
T2	: :38:17	: :43:55	5.58
T3	: :44:38	: :50:37	6.00

Notes:

Don't go past 53:52 as the camera damaged the tape.

T3 - 45.0m massive favites? Alive although looks dead on top

Project	NINGALOO MARINE PARK MONITORING PROGRAM				Field Survey		MAY 1998
Site No.	N	Site Name		Date	14/5/98	Recorder	Grubba
Time	15.00	Video tape no.	NMPMP/bvt/14.05.98 /#5			Video operator	Grubba

T1	Length (m)	50	Compass bearing (°)	180	Distance to T2 (m)	10.0
Transect	DGPS Lat		DGPS Long	Depth (m)	Picket type	Picket ht (m)
Start	22° 23.491' S		113° 44.804' E	1.5-2.0	60cm Star/Steel	0.2
Finish	° ' S		° ' E			

Notes: (eg. description of habitat and dominant species along transect)
Live coral: 27%
Dead coral: 43%
Algae: 3%
Abiotic: 26%

T2	Length (m)	50	Compass bearing (°)	180	Distance to T2 (m)	10.0
Transect	DGPS Lat		DGPS Long	Depth (m)	Picket type	Picket ht (m)
Start	22° 23.521' S		113° 44.801' E	1.5-2.0	60cm Star/Steel	0.2
Finish	° ' S		° ' E			

Notes:
Live coral: 17%
Dead coral: 61%
Algae: 6%
Abiotic: 14%

T3	Length (m)	50	Compass bearing (°)	180		
Transect	DGPS Lat		DGPS Long	Depth (m)	Picket type	Picket ht (m)
Start	22° 23.550' S		113° 44.800' E	1.5-2.0	60cm Star/Steel	0.2
Finish	22° 23.576' S		113° 44.799' E	1.5-2.0	60cm Star/Steel	0.2

Notes:
Live coral: 20%
Dead coral: 39%
Algae: 0%
Abiotic: 41%

LONG-TERM MONITORING SITE DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				Field Survey		MAY 1998
Site No.	N9	Site Name	Bunderra	Date	14/5/98	Recorder	Lapwood

GPS Latitude	GPS Longitude	Differential			
22° 23.491' S	113° 44.804' E	Yes	☒	No	☐

Habitat type	Backreef habitat					
Location of nearest transect from GPS position	Transect No.	T	Compass bearing (°)		Distance (m)	

Site Map (include north indicator, scale, vessel location, water depth, transect locations & other features of interest):

Notes:

HABITAT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N9	**Site Name**	Bunderra	**Date**	14/5/98	**Recorder**	Grubba
Vessel	CALM Zodiac	**Time**	15.00	**Weather**			
Sea	Slight swell	**Water depth (m)**	1.0-2.0	**Water visibility (m)**	10.0		

GPS Latitude	**GPS Longitude**	**Differential**			
22° 23.491' S	113° 44.804' E	**Yes**	☒	**No**	☐

Site location	Boat Launched aprroximately 10.4 km south of Yardie Creek

Habitat Description

Backreef habitat. Sandy rubble substrate with high coral diversity of plate corymbose and arborescent Acropora sp. Many species of massives; though few fish.
Live coral: 22% (mean)
Dead coral: 48% (mean)
Algae: 3% (mean)
Abiotic: 27% (mean)

Dominant Species

Seagrass	
Macro-algae	Galaxaura marginata, Turbinaria sp., Filamentous blue-green algae, Dictyota sp.
Coral	Dominant—Acropora sp. (digitifera, floridae); few Montipora sp., Fungidae sp., Favites sp.; Soft corals—Sinularia sp., and other sps.
Fish	Pomacentrids and Pomacanthids
Invertebrates	Holothurians

Other Features

Few large mobile fish. The site was interspersed with large sandy patches; one patch of soft coral dominated apprx 3.0m of substrate on the transect

Impact or Activity

Some Drupella

Video reference	NMPMP/bvt/14.05.98 /#5	**Aerial reference**	1994 /WA 3405C /RUN7/ 5009
Slide reference		**Print reference**	

VIDEO DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N9	**Site Name**	Bunderra	**Date**	14/5/98	**Recorder**	Cary
Start time	15.00	**Finish time**	16.30	**Depth (m)**	2.0	**Visibility (m)**	10.0

Underwater Video System	Blaupunkt CC894 camcorder in StingRay SR-700 housing											
Focus mode				**Exposure mode**				**Program mode**				**White balance mode**			
Auto	☒	Manual	☐	Auto	☒	Manual	☐	Sports	☒	High-speed	☐	Auto	☒	Outdoor	☐
Lens system				**Filters**								**Lights**			
Wide-angle	☒	Zoom-macro	☐	None	☒	Red	☐	Yellow	☐	Orange	☐	On	☐	Off	☒

Video operator	Grubba	**Tape no.**	NMPMP/bvt/14.05.98 /#5	**Height above substrate (cm)**	30
Time coding for all video footage at site:		**From:**	00:00:40:31	**To:**	00:01:11:19

Transect time coding	**Start**	**Finish**	**Total time (mins/secs)**
T1	00:00:42:29	00:00:48:55	6.26
T2	00:00:49:52	00:00:56:49	6.57
T3	00:00:57:46	00:01:04:59	7.13

Notes:

T3 repeated by Myers: Trial 1:06:16 – 1:11:19

TRANSECT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				Field Survey		MAY 1998
Site No.	N	Site Name		Date	14/5/98	Recorder	Grubba
Time	10.20	Video tape no.	NMPMP/bvt/14.05.98 /#5			Video operator	Grubba

T1	Length (m)	50	Compass bearing (°)	20	Distance to T2 (m)	10.0
Transect	DGPS Lat		DGPS Long	Depth (m)	Picket type	Picket ht (m)
Start	22° 30.290' S		113° 41.913' E	1.5-2.0	60cm Star/Steel	0.2
Finish	° ' S		° ' E			

Notes: (eg. description of habitat and dominant species along transect)
Live coral: 15%
Dead coral: 60%
Algae: 4%
Abiotic: 23%

T2	Length (m)	50	Compass bearing (°)	20	Distance to T2 (m)	10.0
Transect	DGPS Lat		DGPS Long	Depth (m)	Picket type	Picket ht (m)
Start	22° 30.322' S		113° 41.909' E	1.5-2.0	60cm Star/Steel	0.2
Finish	° ' S		° ' E			

Notes:
Live coral: 25%
Dead coral: 50%
Algae: 8%
Abiotic: 18%

T3	Length (m)	50	Compass bearing (°)	20		
Transect	DGPS Lat		DGPS Long	Depth (m)	Picket type	Picket ht (m)
Start	22° 30.346' S		113° 41.894' E	1.5-2.0	60cm Star/Steel	0.2
Finish	22° 30.377' S		113° 41.899' E	1.5-2.0	60cm Star/Steel	0.2

Notes:
Live coral: 8%
Dead coral: 81%
Algae: 5%
Abiotic: 24%

LONG-TERM MONITORING SITE DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				Field Survey		MAY 1998
Site No.	N10	Site Name	Lefroy Bay	Date	14/5/98	Recorder	Lapwood

GPS Latitude	GPS Longitude	Differential			
22° 30.290' S	113° 41.913' E	Yes	☒	No	☐

Habitat type	Backreef					
Location of nearest transect from GPS position	Transect No.	T	Compass bearing (°)	180	Distance (m)	

Site Map (include north indicator, scale, vessel location, water depth, transect locations & other features of interest):

Notes:

HABITAT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N10	**Site Name**	Lefroy Bay	**Date**	14/5/98	**Recorder**	Grubba
Vessel	CALM Zodiac	**Time**	10.05	**Weather**			
Sea		**Water depth (m)**	1.0-2.0	**Water visibility (m)**	8.0-10.0		

GPS Latitude	GPS Longitude	Differential			
22° 30.290' S	113° 41.913' E	**Yes**	☒	**No**	☐

Site location	Lefroy Bay backreef—launch boat 24km south of yardie creek or 2 km south of main Winderabandi

Habitat Description

Shallow backreef habitat—sandy rubble substrate; relatively high diversity. Majority of colonies were young, except favids
Live coral: 16% (mean)
Dead coral: 64% (mean)
Algae: 6% (mean)
Abiotic: 22% (mean)

Dominant Species

Seagrass	
Macro-algae	Galaxaura marginata, Dictyota sp., Fliamentous blue-green algae
Coral	Dominant—Acropora sp. (mainly corymbose and large massive corals, few plates); Favites sp., Astreopora; Soft
Fish	Pomacentridae, few juvenile Labridae
Invertebrates	Holothurians (several sp.), large Tridacna

Other Features

27-30m of transect 1 is covered by Sinularia sp.

Impact or Activity

High proportion of old dead Acropora plates;
some Drupella in transect 2.

Video reference	NMPMP/bvt/14.05.98 /#5	**Aerial reference**	1994 /WA 3434C /RUN11/ 5120
Slide reference		**Print reference**	

VIDEO DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N10	**Site Name**	Lefroy Bay	**Date**	14/5/98	**Recorder**	Cary
Start time	10.30	**Finish time**	12.30	**Depth (m)**	1.5	**Visibility (m)**	10.0

Underwater Video System	Blaupunkt CC894 camcorder in StingRay SR-700 housing

Focus mode				**Exposure mode**				**Program mode**				**White balance mode**			
Auto	☒	Manual	☐	Auto	☒	Manual	☐	Sports	☒	High-speed	☐	Auto	☒	Outdoor	☐
Lens system				**Filters**								**Lights**			
Wide-angle	☒	Zoom-macro	☐	None	☒	Red	☐	Yellow	☐	Orange	☐	On	☐	Off	☒

Video operator	Grubba	**Tape no.**	NMPMP/bvt/14.05.98 /#5	**Height above substrate (cm)**	30
Time coding for all video footage at site:		**From:**	00:00:20:00	**To:**	00:0:40:31

Transect time coding	**Start**	**Finish**	**Total time (mins/secs)**
T1	00:00:20:53	00:00:26:34	6.21
T2	00:00:27:11	00:00:33:07	6.36
T3	00:00:33:54	00:00:40:55	7.01

Notes:

TRANSECT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N	**Site Name**		**Date**	15/5/98	**Recorder**	Lapwood
Time	11.00	**Video tape no.**	NMPMP/bvt/15.05.98 /#6		**Video operator**		Grubba/Myers

T1	**Length (m)**	**50**	**Compass bearing (°)**	356	**Distance to T2 (m)**	10.0
Transect	**DGPS Lat**		**DGPS Long**	**Depth (m)**	**Picket type**	**Picket ht (m)**
Start	22° 41.358' S		113° 38.634' E	1.8	90cm Star/Steel	0.15
Finish	° ' S		° ' E			

Notes: (eg. description of habitat and dominant species along transect)
Live coral: 23%
Dead coral: 44%
Algae: 11%
Abiotic: 23%

T2	**Length (m)**	**50**	**Compass bearing (°)**	356	**Distance to T2 (m)**	10.0
Transect	**DGPS Lat**		**DGPS Long**	**Depth (m)**	**Picket type**	**Picket ht (m)**
Start	22° 41.389' S		113° 38.632' E	1.8	90cm Star/Steel	0.15
Finish	° ' S		° ' E			

Notes:
Live coral: 16%
Dead coral: 56%
Algae: 2%
Abiotic: 26%

T3	**Length (m)**	**50**	**Compass bearing (°)**	356		
Transect	**DGPS Lat**		**DGPS Long**	**Depth (m)**	**Picket type**	**Picket ht (m)**
Start	22° 41.418' S		113° 38.629' E	1.8	90cm Star/Steel	0.15
Finish	22° 41.448' S		113° 38.629' E	1.8	90cm Star/Steel	0.15

Notes:
Live coral: 16%
Dead coral: 62%
Algae: 3%
Abiotic: 18%

LONG-TERM MONITORING SITE DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N11	**Site Name**	Pt. Cloates	**Date**	15/5/98	**Recorder**	Lapwood

GPS Latitude	**GPS Longitude**	**Differential**			
22° 41.358 ' S	113° 38.634 ' E	**Yes**	☐	**No**	☐

Habitat type	Backreef					
Location of nearest transect from GPS position	**Transect No.**	T	**Compass bearing (°)**		**Distance (m)**	

Site Map (include north indicator, scale, vessel location, water depth, transect locations & other features of interest):

Notes:

HABITAT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N11	**Site Name**	Pt. Cloates	**Date**	15/5/98	**Recorder**	Cary
Vessel	CALM Zodiac	**Time**	11.00	**Weather**	NE 12 knots		
Sea		**Water depth (m)**	1.8	**Water visibility (m)**	10.0		

GPS Latitude	GPS Longitude	Differential			
22° 41.358 ' S	113° 38.634 ' E	**Yes**	☐	**No**	☐

Site location	Pt. Cloates - immediately outside snactuary; boat launched at Ningaloo Homestead.

Habitat Description

Backreef coral habitat—Dominated by Acropora plates. Some Drupella.
Live coral: 19% (mean)
Dead coral: 54% (mean)
Algae: 5% (mean)
Abiotic: 23% (mean)

Dominant Species

Seagrass	
Macro-algae	Dictyota sp., Turbinaria sp., Filamentous blue-green algae
Coral	Dominant—Acropora sp. plates (hyacnthus, digitate corals), Some Pocillopora, Favites sp., Lobophyllia, Gonipora, Favia sp.; some branching Acropora, Platygyra
Fish	Pomacentride, Labridae, Scaridae, Acanthuridae
Invertebrates	Holothurians

Other Features

Access to Osbourne's Drupella sites was not possible due to adverse sea conditions (swell). Site placed outside of sanctuary due to low abundance of coral within sanctuary. Backreef/lagoon was dominated by limestone pavement covered with macro algae (if not sand).

Impact or Activity

T1—Some Drupella—1.5 m, 19.0m, 36.0 m
T3—Some Drupella—26.0m

Video reference	NMPMP/bvt/15.05.98 /#6	**Aerial reference**	1994 /WA 3434C /RUN12/ 5132
Slide reference		**Print reference**	

VIDEO DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N11	**Site Name**	Pt. Cloates	**Date**	15/5/98	**Recorder**	Cary
Start time	11.00	**Finish time**	12.00	**Depth (m)**	1.8	**Visibility (m)**	10.0

Underwater Video System	Blaupunkt CC894 camcorder in StingRay SR-700 housing

Focus mode				**Exposure mode**				**Program mode**				**White balance mode**			
Auto	☒	Manual	☐	Auto	☒	Manual	☐	Sports	☒	High-speed	☐	Auto	☒	Outdoor	☐

Lens system				**Filters**								**Lights**			
Wide-angle	☒	Zoom-macro	☐	None	☒	Red	☐	Yellow	☐	Orange	☐	On	☒	Off	☐

Video operator	Grubba/myers	**Tape no.**	NMPMP/bvt/15.05.98 /#6	**Height above substrate (cm)**	30
Time coding for all video footage at site:		**From:**	00:00:00:08	**To:**	00:00:24:59

Transect time coding	**Start**	**Finish**	**Total time (mins/secs)**
T1	00:00:00:29	00:00:05:16	5.07
T2	00:00:06:04	00:00:10:38	4.34
T3	00:00:14:15	00:00:19:39	5.24

Notes:

T3 WAS DONE 3 TIME: FIRST TIME WAS ABORTED AT 14.0m, 2ND AND 3RD Times were good;
*2 14:15 – 19:39
*3 20:13 –24:59

TRANSECT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				Field Survey		MAY 1998
Site No.	N	Site Name		Date	17/5/98	Recorder	Lapwood
Time	12.00	Video tape no.	NMPMP/bvt/17.05.98 /#6			Video operator	Myers

T1	Length (m)	50	Compass bearing (°)	180	Distance to T2 (m)	10.0
Transect	DGPS Lat		DGPS Long	Depth (m)	Picket type	Picket ht (m)
Start	22° 51.839' S		113° 45.521' E	2.5	90cm Star/Steel	0.15
Finish	° ' S		° ' E			

Notes: (eg. description of habitat and dominant species along transect)
Live coral: 17%
Dead coral: 71%
Algae: 2%
Abiotic: 9%

T2	Length (m)	50	Compass bearing (°)	180	Distance to T2 (m)	10.0
Transect	DGPS Lat		DGPS Long	Depth (m)	Picket type	Picket ht (m)
Start	22° 51.870' S		113° 45.518' E	2.5	90cm Star/Steel	0.15
Finish	° ' S		° ' E			

Notes:
Live coral: 23%
Dead coral: 66%
Algae: 1%
Abiotic: 10%

T3	Length (m)	50	Compass bearing (°)	180		
Transect	DGPS Lat		DGPS Long	Depth (m)	Picket type	Picket ht (m)
Start	22° 51.901' S		113° 45.515' E	2.5	90cm Star/Steel	0.15
Finish	22° 51.924' S		113° 45.511' E	2.5	90cm Star/Steel	0.15

Notes:
Live coral: 31%
Dead coral: 63%
Algae: 1%
Abiotic: 5%

LONG-TERM MONITORING SITE DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				Field Survey		MAY 1998
Site No.	N12	Site Name	Dugong Snactuary	Date	17/5/98	Recorder	Lapwood

GPS Latitude	GPS Longitude	Differential			
22° 51.839' S	113° 45.521' E	Yes	☒	No	☐

Habitat type	Backreed - Coral					
Location of nearest transect from GPS position	Transect No.	T1	Compass bearing (°)	180	Distance (m)	10.0

Site Map (include north indicator, scale, vessel location, water depth, transect locations & other features of interest):

Notes:
Launch site 12km north of Dugong Samctuary southern boundary
(Dugong Sanctuary approximately 18km of coastline).

HABITAT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N12	**Site Name**	Dugong Sanctuary	**Date**	17/5/98	**Recorder**	Cary
Vessel	CALM Zodiac	**Time**	12.00	**Weather**	5 Knots		
Sea		**Water depth (m)**	2.5	**Water visibility (m)**	15.0		

GPS Latitude	GPS Longitude	Differential			
22° 51.839 ' S	113 ° 45.521 ' E	**Yes**	☐	**No**	☐

Site location	12Km north of Dugong Sanctuary southern boundary.

Habitat Description

Backreef—coral. NOT TYPICAL. More gaps in backreef than normal. Acropora plates and digitate forms dominated, but also many massives. Backreef 5km from shoreline.
Live coral: 24% (mean)
Dead coral: 67% (mean)
Algae: 1% (mean)
Abiotic: 8% (mean)

Dominant Species

Seagrass	
Macro-algae	
Coral	Dominant—Acropora sp. Plates (A. hyacinthus & digitate); some Favites sp., Lobophyllia, Astreopora, Platygyra, Goniastrea, Leptora, Seriatopora
Fish	Chaetodontidae, Pomacanthidae; few large fish sp.
Invertebrates	Holuturians, clams; few nudibranchs and sea stars (Linckia laevigata, Formia indica), urchins, Drupella

Other Features

Coral reef occurs up to 800m east of reef crest. Limestone pavement covered in macro algae (mainly sargassum) occurs from shoreline to 4km offshore.

Impact or Activity

Drupella relatively common on Acropora—more than other backreefs south of Yardie (up to this point in survey); but, not as much as north of Yardie Creek.

Video reference	NMPMP/bvt/ 17.05.98 /# 6	**Aerial reference**	1994 /WA 3434C /RUN12/ 5191
Slide reference		**Print reference**	

VIDEO DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N12	**Site Name**	Dugong Sanctuary	**Date**	17/5/98	**Recorder**	Myers
Start time	12.00	**Finish time**	12.30	**Depth (m)**	2.5	**Visibility (m)**	15.0

Underwater Video System	Blaupunkt CC894 camcorder in StingRay SR-700 housing

Focus mode				**Exposure mode**				**Program mode**				**White balance mode**			
Auto	☒	Manual	☐	Auto	☒	Manual	☐	Sports	☒	High-speed	☐	Auto	☒	Outdoor	☐

Lens system				**Filters**								**Lights**			
Wide-angle	☒	Zoom-macro	☐	None	☒	Red	☐	Yellow	☐	Orange	☐	On	☐	Off	☒

Video operator	Myers	**Tape no.**	NMPMP/bvt/17.05.98 /#6	**Height above substrate (cm)**	30
Time coding for all video footage at site:		**From:**	00:00:24:59	**To:**	00:00:40:51

Transect time coding	**Start**	**Finish**	**Total time (mins/secs)**
T1	00:00:25:51	00:00:30:11	4.20
T2	00:00:30:55	00:00:35:17	5.62
T3	00:00:36:14	00:00:40:51	4.37

Notes:

This site was filmed twice—also on tape #7 starting at 36:59—57:47

TRANSECT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N	**Site Name**		**Date**	20/5/98	**Recorder**	Daly
Time	12.30	**Video tape no.**	NMPMP/bvt/ 20.05.98 /# 9		**Video operator**		Myers

T1	**Length (m)**	**50**	**Compass bearing (°)**		**Distance to T2 (m)**	10.0
Transect	**DGPS Lat**		**DGPS Long**	**Depth (m)**	**Picket type**	**Picket ht (m)**
Start	22° 56.728' S		113° 46.645' E	1.0	90cm Star/Steel	0.15
Finish	° ' S		° ' E			

Notes: (eg. description of habitat and dominant species along transect)
Live coral: 7%
Dead coral: 79%
Algae: 1%
Abiotic: 0%

T2	**Length (m)**	**50**	**Compass bearing (°)**		**Distance to T2 (m)**	10
Transect	**DGPS Lat**		**DGPS Long**	**Depth (m)**	**Picket type**	**Picket ht (m)**
Start	22° 56.763' S		113° 46.645' E	1.0	90cm Star/Steel	0.15
Finish	° ' S		° ' E			

Notes:
Live coral: 8%
Dead coral: 76%
Algae: 12%
Abiotic: 4%

T3	**Length (m)**	**50**	**Compass bearing (°)**			
Transect	**DGPS Lat**		**DGPS Long**	**Depth (m)**	**Picket type**	**Picket ht (m)**
Start	22° 56.796' S		113° 46.643' E	1.0	90cm Star/Steel	0.15
Finish	22° 56.821' S		113° 46.640' E	1.0	90cm Star/Steel	0.15

Notes:
Live coral: 17%
Dead coral: 69%
Algae: 7%
Abiotic: 7%

LONG-TERM MONITORING SITE DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N13	**Site Name**	Bruboodijoo Pt.	**Date**	20/5/98	**Recorder**	Daly

GPS Latitude	**GPS Longitude**	**Differential**			
22° 56.728 ' S	113° 46.645 ' E	**Yes**	☐	**No**	☐

Habitat type	Backreef - coral					
Location of nearest transect from GPS position	**Transect No.**	T1	**Compass bearing (°)**		**Distance (m)**	

Site Map (include north indicator, scale, vessel location, water depth, transect locations & other features of interest):

Notes:

HABITAT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N13	**Site Name**	Bruboodijoo Pt.	**Date**	20/5/98	**Recorder**	Grubba
Vessel	CALM Zodiac	**Time**	12.30	**Weather**	10-15 knots SE		
Sea	Calm with strong current	**Water depth (m)**	1.0	**Water visibility (m)**	18.0		

GPS Latitude	**GPS Longitude**	**Differential**			
22° 56.728' S	113° 46.645' E	**Yes**	☒	**No**	☐

Site location	North of Bruboodijoo Pt; 9 mile camp launching site (9miles north of Coral Bay)

Habitat Description

Backreef dominated by Acropora sp. Plates. Over 90% of plates are dead, of these few are detached. Patches in between plates are sand /rubble and branching Acropora sp. Area subject to strong water movement from reef crest. Acropora mortality is probably due to high densities of Drupella (past and Present)
Live coral: 11% (mean)
Dead coral: 75% (mean)
Algae: 7% (mean)
Abiotic: 4% (mean)

Dominant Species

Seagrass	
Macro-algae	Filamentous blue-green, Dctyota sp., Turbinaria sp., Zellura tawallina
Coral	Dominant: Acropora sp. Plates; few branching & digitate Acropora, Monitpora sp., Fungia, Favids, Hydnophora and Sinularia sp., Lobophyllia
Fish	juvenile Labridae; Pomacentridae; some Pomacanthidae and Chaetodentidae; large schools of Acanthurids, med sized Scarids
Invertebrates	Giant clams, Very high abundence of Drupella, hermit crabs using Drupella shells

Other Features

Site similar to Yardie Creek (N21) except Acropora plates (dead) more extensive

Impact or Activity

Impact due to Drupella severe (worst since N1-N14). 90% of Acropora plates dead (past) (some 1.5m diameter). 10% of Live Acropora showing feeding scars. Drupella also feeding on branching Acropora.

Video reference	NMPMP/bvt/ 20.05.98 /# 9	**Aerial reference**	1994 /WA 3434C /RUN14/ 5186
Slide reference		**Print reference**	

VIDEO DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N13	**Site Name**	Bruboodijoo Pt.	**Date**	20/5/98	**Recorder**	Myers
Start time	12.30	**Finish time**	14.30	**Depth (m)**	2.0	**Visibility (m)**	15.0

Underwater Video System	Blaupunkt CC894 camcorder in StingRay SR-700 housing

Focus mode				**Exposure mode**				**Program mode**				**White balance mode**			
Auto	☒	Manual	☐	Auto	☒	Manual	☐	Sports	☒	High-speed	☐	Auto	☒	Outdoor	☐
Lens system				**Filters**								**Lights**			
Wide-angle	☒	Zoom-macro	☐	None	☒	Red	☐	Yellow	☐	Orange	☐	On	☐	Off	☒

Video operator	Myers	**Tape no.**	NMPMP/bvt/20.05.98 /#9	**Height above substrate (cm)**	30
Time coding for all video footage at site:		**From:**	00:00:21:06	**To:**	00:00:47:01

Transect time coding	**Start**	**Finish**	**Total time (mins/secs)**
T1	00:00:21:56	00:00:28:28	5.32
T2	00:00:29:02	00:00:34:59	5.57
T3	00:00:35:41	00:00:42:13	6.32

Notes:

**General footage at beginning and end—coral and Drupella damage
**Camera not positioned in housing correctly, thus the housing is seen in the film
**Strong current made it difficult to film; hand of camera person is seen occasionally, but transect line is always in view

TRANSECT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N	**Site Name**		**Date**	19/5/98	**Recorder**	Grubba
Time	10.20	**Video tape no.**	NMPMP/bvt/19.05.98 /#8		**Video operator**		Myers

T1	**Length (m)**	**50**	**Compass bearing (°)**	180	**Distance to T2 (m)**	10.0
Transect	**DGPS Lat**		**DGPS Long**	**Depth (m)**	**Picket type**	**Picket ht (m)**
Start	23° 08.881' S		113° 44.965' E	1.5-2.0	90cm Star/Steel	0.15
Finish	° ' S		° ' E			

Notes: (eg. description of habitat and dominant species along transect)
Started transect in sand on north edge of bommie. Glass bottom boat mooring 150m to the north.
Live coral: 13% Dead coral: 7%
Algae: 0% Abiotic: 26%

T2	**Length (m)**	**50**	**Compass bearing (°)**	180	**Distance to T2 (m)**	10.0
Transect	**DGPS Lat**		**DGPS Long**	**Depth (m)**	**Picket type**	**Picket ht (m)**
Start	23° 08.911' S		113° 44.971' E	1.5-2.0	90cm Star/Steel	0.15
Finish	° ' S		° ' E			

Notes:
Live coral: 11%
Dead coral: 56%
Algae: 1%
Abiotic: 31%

T3	**Length (m)**	**50**	**Compass bearing (°)**	180		
Transect	**DGPS Lat**		**DGPS Long**	**Depth (m)**	**Picket type**	**Picket ht (m)**
Start	23° 08.945' S		113° 44.982' E	1.5-2.0	90cm Star/Steel	0.15
Finish	23° 08.960' S		113° 44.980' E	1.5-2.0	90cm Star/Steel	0.15

Notes:
Re-positioned T3 to avoid sand; old end of transect 23 08.959' S 113 44.989' E

LONG-TERM MONITORING SITE DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				Field Survey		MAY 1998
Site No.	N14	Site Name	Coral Bay/Billis Bay	Date	19/5/98	Recorder	Daly

GPS Latitude	GPS Longitude	Differential			
23° 08.881 ' S	113° 44.965 ' E	Yes	☐	No	☐

Habitat type	Backreef-coral					
Location of nearest transect from GPS position	Transect No.	T1	Compass bearing (°)		Distance (m)	10

Site Map (include north indicator, scale, vessel location, water depth, transect locations & other features of interest):

Notes:

HABITAT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N14	**Site Name**	Coral bay/Bill's Bay	**Date**	19/5/98	**Recorder**	Grubba
Vessel	CALM Zodiac	**Time**	10.30	**Weather**	5 knots SE		
Sea	Calm	**Water depth (m)**	2.0	**Water visibility (m)**	18.0		

GPS Latitude	GPS Longitude	Differential			
23° 08.881' S	113° 44.965' E	**Yes**	☒	**No**	☐

Site location	Directly out from Coral Bay township. 150m south of glass bottom boat mooring.

Habitat Description

Backreef—dominated by massives/submassives/digitate Acropora sp. Dead Acropora plates, digitate and dead Branching Acropora. Transect passes through some sandy patches. Some large colonies of masssive corals. T2 passed through a rubble zone.
Live coral: 13% (mean)
Dead coral: 42% (mean)
Algae: 1%
Abiotic: 26% (mean)

Dominant Species

Seagrass	
Macro-algae	Dictyota sp., Galazaura marginata, Filamentous blue-green algae
Coral	Acropora sp. (digitate, grandis), Monitpora sp., Favites, Platygyra, Echinoporal few fungia, Merulina sp.; Soft coral—Sinularia sp.
Fish	Pomacentridae, med sized Scaridae, Acanthuridae
Invertebrates	Several clams; few sea stars & Holothurians

Other Features

No visible Drupella scars or animals. Acropora has not and has not been a dominant coral in this area.

Impact or Activity

Med to high energy site—seems to be some sand scouring (begginig T1). Some storm dammage. Glass bottom boat/ snorkelling/boat mooring 150m to the north. No Drupella observed.

Video reference	NMPMP/bvt/19.05.98 /#8	**Aerial reference**	1994 /WA 3434C /RUN16/ 5169
Slide reference		**Print reference**	

VIDEO DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N14	**Site Name**	Coral Bay/Bill's Bay	**Date**	19/5/98	**Recorder**	Myers
Start time	12.00	**Finish time**	14.00	**Depth (m)**	2.0	**Visibility (m)**	18.0

Underwater Video System	Blaupunkt CC894 camcorder in StingRay SR-700 housing

Focus mode				**Exposure mode**				**Program mode**				**White balance mode**			
Auto	☒	Manual	☐	Auto	☒	Manual	☐	Sports	☒	High-speed	☐	Auto	☒	Outdoor	☐
Lens system				**Filters**								**Lights**			
Wide-angle	☒	Zoom-macro	☐	None	☒	Red	☐	Yellow	☐	Orange	☐	On	☐	Off	☒

Video operator	Myers	**Tape no.**	NMPMP/bvt/19.05.98 /#8	**Height above substrate (cm)**	30
Time coding for all video footage at site:		**From:**	00:00:00:00	**To:**	00:00:22:04

Transect time coding	**Start**	**Finish**	**Total time (mins/secs)**
T1	00:00:00:42	00:00:05:16	4.44
T2	00:00:06:12	00:00:10:41	4.29
T3	00:00:16:53	00:00:22:05	4.58

Notes:

T3 filmed twice—ignore first filming (11:27—16:23)
Transect moved to a new bearing and refilmed due to high cover of sand at first location.

TRANSECT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				Field Survey		MAY 1998
Site No.	N	Site Name		Date	23/5/98	Recorder	Parker
Time	13.00	Video tape no.	NMPMP/bvt/23.05.98 /#10		Video operator		Myers

T1	Length (m)	50	Compass bearing (°)		Distance to T2 (m)	10.0
Transect	DGPS Lat	DGPS Long	Depth (m)	Picket type	Picket ht (m)	
Start	23° 37.410' S	113° 36.887' E	0.5-1.0	90cm Star/Steel	0.15	
Finish	° ' S	° ' E				

Notes: (eg. description of habitat and dominant species along transect)
Live coral: 70%
Dead coral: 21%
Algae: 0%
Abiotic: 9%

T2	Length (m)	50	Compass bearing (°)		Distance to T2 (m)	10.0
Transect	DGPS Lat	DGPS Long	Depth (m)	Picket type	Picket ht (m)	
Start	23° 37.434' S	113° 36.867' E	0.5-1.0	90cm Star/Steel	0.15	
Finish	° ' S	° ' E				

Notes:
Live coral: 71%
Dead coral: 26%
Algae: 0%
Abiotic: 3%

T3	Length (m)	50	Compass bearing (°)			
Transect	DGPS Lat	DGPS Long	Depth (m)	Picket type	Picket ht (m)	
Start	23° 37.458' S	113° 36.859' E	0.5-1.0	90cm Star/Steel	0.15	
Finish	23° 37.481' S	113° 36.830' E	0.5-1.0	90cm Star/Steel	0.15	

Notes:
Live coral: 58%
Dead coral: 35%
Algae: 0%
Abiotic: 7%

LONG-TERM MONITORING SITE DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				Field Survey		MAY 1998
Site No.	N17	Site Name	Cape Farquhar	Date	23/5/98	Recorder	Daly

GPS Latitude	GPS Longitude	Differential			
23° 37.410 ' S	113° 36.887 ' E	Yes	☐	No	☐

Habitat type	Backreef - coral					
Location of nearest transect from GPS position	Transect No.	T	Compass bearing (°)		Distance (m)	

Site Map (include north indicator, scale, vessel location, water depth, transect locations & other features of interest):

Notes:

HABITAT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N17	**Site Name**	Cape Farquhar	**Date**	23/5/98	**Recorder**	Myers
Vessel	CALM Zodiac	**Time**	13.00	**Weather**			
Sea	Calm, very strong current	**Water depth (m)**	1.0	**Water visibility (m)**	10.0-15.0		

GPS Latitude	**GPS Longitude**	**Differential**			
23° 37.410 ' S	113° 36.887 ' E	**Yes**	☐	**No**	☐

Site location	north of the cape, directly out from the launch site

Habitat Description

Backreef/ partial lagoonal type coral. Dominated by Acropora sp. –both plate (1m diam.) and branching corals. Very diverse site with several species of Acropora, Favites, Fungi, Montipora and soft corals. 40-50% lve coral with some sany patches. No Drupella seen, nor any feeding scars evident.
Live coral: 66% (mean)
Dead coral: 27% (mean)
Algae: 0% (mean)
Abiotic: 6% (mean)

Dominant Species

Seagrass	
Macro-algae	Dictyota sp., Filamentous blue-green algae, Coralline algae, Turbinaria sp.
Coral	Dominant—Acropora sp. (digitate plates and branching); Favites sp., Playgyra sp., encrusting Montipora sp.; soft
Fish	Pomacanthidae, Pomacentridae, Chaetodontidae
Invertebrates	Sea stars (Formia indica, Linckia laevigata), Holothurians, Echinometra sp., few clams

Other Features

Impact or Activity

Low impact site due to sites isolation. Moderate energy site. Majority of dead coral is old but attached.

Video reference	NMPMP/bvt/23.05.98 /#10	**Aerial reference**	1994 /WA 3434C /RUN19/ 5150
Slide reference		**Print reference**	

VIDEO DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N17	**Site Name**	Cape Farquhar	**Date**	23/5/98	**Recorder**	Myers
Start time	13.30	**Finish time**	15.00	**Depth (m)**	1.0	**Visibility (m)**	10.0

Underwater Video System	Blaupunkt CC894 camcorder in StingRay SR-700 housing											
Focus mode				**Exposure mode**				**Program mode**				**White balance mode**			
Auto	☒	Manual	☐	Auto	☒	Manual	☐	Sports	☒	High-speed	☐	Auto	☒	Outdoor	☐
Lens system				**Filters**								**Lights**			
Wide-angle	☒	Zoom-macro	☐	None	☒	Red	☐	Yellow	☐	Orange	☐	On	☐	Off	☒

Video operator	Myers	**Tape no.**	NMPMP/bvt/23.05.98 /#10	**Height above substrate (cm)**	30
Time coding for all video footage at site:		**From:**	00:00:00:00	**To:**	00:00:17:44

Transect time coding	**Start**	**Finish**	**Total time (mins/secs)**
T1	00:00:00:47	00:00:05:59	5.12
T2	00:00:06:36	00:00:11:27	5.09
T3	00:00:12:00	00:00:16:57	4.57

Notes:

Site very shallow in places (possibily intertidal) ((<1.0m). There was a very strong current which hampered the filming of transects. There was a pause in the filming of T1 at 4:30, but the transect line remains visible.

**General footage of beach and area at beginning and end of site footage.

** General footage of reef diversity, and some of the area (although out of focus) is on tape #9, 47:04 to 49:56.

TRANSECT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				Field Survey		MAY 1998
Site No.	N	Site Name		Date	28/5/98	Recorder	Myers
Time	9:30	Video tape no.	NMPMP/bvt/28.05.98 /#10		Video operator		Myers

T1	Length (m)	50	Compass bearing (°)	340	Distance to T2 (m)	10.0
Transect	DGPS Lat		DGPS Long	Depth (m)	Picket type	Picket ht (m)
Start	23° 45.758' S		113° 32.500' E	2.0	90cm Star/Steel	0.15
Finish	° ' S		° ' E			

Notes: (eg. description of habitat and dominant species along transect)
Transect begins south of large branching Acropora formation. Formation meets sand on the northern face.
Live coral: 67% Dead coral: 25%
Algae: 0% Abiotic: 0%

T2	Length (m)	50	Compass bearing (°)	340	Distance to T2 (m)	10.0
Transect	DGPS Lat		DGPS Long	Depth (m)	Picket type	Picket ht (m)
Start	23° 45.776' S		113° 32.484' E	2.0	90cm Star/Steel	0.15
Finish	° ' S		° ' E			

Notes:
Live coral: 78%
Dead coral: 13%
Algae: 0%
Abiotic: 8%

T3	Length (m)	50	Compass bearing (°)	340		
Transect	DGPS Lat		DGPS Long	Depth (m)	Picket type	Picket ht (m)
Start	23° 45.806' S		113° 32.484' E	2.0	90cm Star/Steel	0.15
Finish	23° 45.831' S		113° 32.462' E	2.0	90cm Star/Steel	0.15

Notes:
Live coral: 78%
Dead coral: 16%
Algae: 0%
Abiotic: 6%

LONG-TERM MONITORING SITE DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				Field Survey		MAY 1998
Site No.	N18	Site Name	Gnarraloo Bay	Date	28/5/98	Recorder	Daly

GPS Latitude	GPS Longitude	Differential			
23° 45.758 ' S	113° 32.500 ' E	Yes	☐	No	☐

Habitat type	Backreef/Lagoonal - coral					
Location of nearest transect from GPS position	Transect No.	T	Compass bearing (°)		Distance (m)	

Site Map (include north indicator, scale, vessel location, water depth, transect locations & other features of interest):

Notes:

HABITAT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N18	**Site Name**	Gnarraloo Bay	**Date**	28/5/98	**Recorder**	Myers
Vessel	CALM Zodiac	**Time**	9.30	**Weather**			
Sea		**Water depth (m)**	2.0-4.0	**Water visibility (m)**	6.0		

GPS Latitude	GPS Longitude	Differential			
23° 45.750' S	113° 32.500' E	**Yes**	☒	**No**	☐

Site location	out from sand spit extending from the southern cornner of the bay.

Habitat Description

Backreef/partial lagoonal. Good coral cover of Acropora sp. Dominated by plates and branching forms. (Plates 1-2m diameter). Large bommies/patches of favites sp. And Lobophylia sp. Some large areas of sand and rubble.
Live coral: 75% (mean)
Dead coral: 18% (mean)
Algae: 0% (mean)
Abiotic: 5% (mean)

Dominant Species

Seagrass	Halophila ovalis
Macro-algae	Dictyota sp.; Filamentous blue-green algae; Turbinaria sp.
Coral	Dominant Acropora plate and barnching forms; Favites sp.; Lobophylla sp.; Montipora sp.; Echinopora sp.; Porites sp.; soft coral; Sarcophyton sp.; Pocillopora sp.
Fish	Pomacentridae; Pomacanthidae; few Labridae; Some Anemonefish near Anemone patches
Invertebrates	Holothurians; giant clam; patches of anemone

Other Features

Impact or Activity

High Eneregy Site with evidence of old coral and some large rubble zones, with few plates overturned. No evidence of Drupella.

Video reference	NMPMP/bvt/28.05.98 /#10	**Aerial reference**	1994 /WA 3434C /RUN21/ 5162
Slide reference		**Print reference**	

VIDEO DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N18	**Site Name**	Gnarraloo Bay	**Date**	28/5/98	**Recorder**	Myers
Start time	9.00	**Finish time**	11.30	**Depth (m)**	4.0-5.0	**Visibility (m)**	8.0

Underwater Video System	Blaupunkt CC894 camcorder in StingRay SR-700 housing											
Focus mode				**Exposure mode**				**Program mode**				**White balance mode**			
Auto	☐	Manual	☐	Auto	☐	Manual	☐	Sports	☐	High-speed	☐	Auto	☐	Outdoor	☐
Lens system				**Filters**								**Lights**			
Wide-angle	☐	Zoom-macro	☐	None	☐	Red	☐	Yellow	☐	Orange	☐	On	☐	Off	☐

Video operator	Myers	**Tape no.**	NMPMP/bvt/ 28.05.98 /# 10	**Height above substrate (cm)**	30
Time coding for all video footage at site:		**From:**	: : 17 : 45	**To:**	: : 40 : 22

Transect time coding	**Start**	**Finish**	**Total time (mins/secs)**
T1	: : 19 : 00	: : 23 : 39	4. 39
T2	: : 24 : 12	: : 28 : 52	4. 40
T3	: : 35 : 28	: : 40 : 20	5. 32

Notes:

TRANSECT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				Field Survey		MAY 1998
Site No.	N	Site Name		Date	5/5/98	Recorder	Lapwood
Time	13.00	Video tape no.	NMPMP/bvt/05.05.98 /#1			Video operator	Cary

T1	Length (m)	50	Compass bearing (°)		Distance to T2 (m)	10.0
Transect	DGPS Lat	DGPS Long	Depth (m)	Picket type	Picket ht (m)	
Start	21° 51.409' S	114° 09.982' E	1.5-2.0	60cm Star/Steel	0.15	
Finish	° ' S	° ' E				

Notes: (eg. description of habitat and dominant species along transect)
Live coral: 24%
Dead coral: 22%
Algae: 0%
Abiotic: 54%

T2	Length (m)	50	Compass bearing (°)		Distance to T2 (m)	10.0
Transect	DGPS Lat	DGPS Long	Depth (m)	Picket type	Picket ht (m)	
Start	21° 51.429' S	114° 09.959' E	1.5-2.0	60cm Star/Steel	0.15	
Finish	° ' S	° ' E				

Notes:
Live coral: 22%
Dead coral: 30%
Algae: 0%
Abiotic: 53%

T3	Length (m)	50	Compass bearing (°)			
Transect	DGPS Lat	DGPS Long	Depth (m)	Picket type	Picket ht (m)	
Start	21° 51.453' S	114° 09.942' E	1.5-2.0	60cm Star/Steel	0.15	
Finish	21° 51.472' S	114° 09.923' E	1.5-2.0	60cm Star/Steel	0.15	

Notes:
Live coral: 19%
Dead coral: 66%
Algae: 0%
Abiotic: 41%

LONG-TERM MONITORING SITE DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				Field Survey		MAY 1998
Site No.	N19	Site Name	Bundegi Sanctuary	Date	5/5/98	Recorder	Lapwood

GPS Latitude	GPS Longitude	Differential			
21° 51.409 ' S	114° 09.982 ' E	Yes	☐	No	☐

Habitat type	Backreef - coral					
Location of nearest transect from GPS position	Transect No.	T	Compass bearing (°)		Distance (m)	

Site Map (include north indicator, scale, vessel location, water depth, transect locations & other features of interest):

Notes:

HABITAT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N19	**Site Name**	Bundegi Sanctuary	**Date**	5/5/98	**Recorder**	Grubba
Vessel	AIMS 4.3M NAIAD CALM 3.8M Zodiac	**Time**	13.32	**Weather**	> 5 knots		
Sea	Calm	**Water depth (m)**	2.0	**Water visibility (m)**	15.0		

GPS Latitude	GPS Longitude	Differential			
21° 51.409' S	114° 09.982' E	**Yes**	☒	**No**	☐

Site location	Immediately inside reef crest.

Habitat Description

Backreef dominanted by high diversity of Acropora sp. and growth forms. Very narrow backreef and reef. High diversity of Pomacentridae and medium sized Scarids. Bottom is coral rubble with approximately 30% live coral cover.
Live coral: 22% (mean)
Dead coral: 39% (mean)
Algae: 0% (mean)
Abiotic: 41%

Dominant Species

Seagrass	
Macro-algae	
Coral	Acropora sp. (high diversity—plate and branching), 1 Porites
Fish	Pomacentridae, Scaridae, Lutjanidae, Chaetodontidae
Invertebrates	1 Panulirus versicolor

Other Features

1 Potato grouper (epinephelus tukula); 1 Reef Whitetip shark (Triaenodon obesus), uniquely shaped Acropora sp.

Impact or Activity

No visual human impacts; Previous cyclone damage

Video reference	NMPMP/bvt/05.05.98 /#1	**Aerial reference**	1985/WA 3434C /RUN /5154
Slide reference		**Print reference**	

VIDEO DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				Field Survey		MAY 1998
Site No.	N19	Site Name	Bundegi Sanctuary	Date	5/5/98	Recorder	Cary
Start time	13.00	Finish time	15.30	Depth (m)	1.5-2.0	Visibility (m)	15.0

Underwater Video System	Blaupunkt CC894 camcorder in StingRay SR-700 housing

Focus mode				Exposure mode				Program mode				White balance mode			
Auto	☐	Manual	☒	Auto	☒	Manual	☐	Sports	☐	High-speed	☒	Auto	☒	Outdoor	☐

Lens system				Filters								Lights			
Wide-angle	☒	Zoom-macro	☐	None	☒	Red	☐	Yellow	☐	Orange	☐	On	☐	Off	☒

Video operator	Cary	Tape no.	NMPMP/bvt/05.05.98 /#1	Height above substrate (cm)	30
Time coding for all video footage at site:		From:	00:00:33:09	To:	00:00:52:02

Transect time coding	Start	Finish	Total time (mins/secs)
T1	00:00:34:01	00:00:38:38	4.37
T2	00:00:39:22	00:00:43:58	5.20
T3	00:00:44:41	00:00:49:33	5.37

Notes:

TRANSECT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				Field Survey		MAY 1998
Site No.	N	Site Name		Date	12/5/98	Recorder	Grubba
Time	9.30	Video tape no.	NMPMP/bvt/12.05.98 /#4			Video operator	Grubba

T1	Length (m)	50	Compass bearing (°)	20	Distance to T2 (m)	10.0
Transect	DGPS Lat		DGPS Long	Depth (m)	Picket type	Picket ht (m)
Start	21° 51.412' S		113° 59.951' E	4.0	60cm Star/Steel	0.2
Finish	° ' S		° ' E			

Notes: (eg. description of habitat and dominant species along transect)
Important note: This site was established and filmed from south to north, as opposed to the north to south direction of the other sites.
Live coral: 13% Dead coral: 79%
Algae: 0% Abiotic: 9%

T2	Length (m)	50	Compass bearing (°)	20	Distance to T2 (m)	10.0
Transect	DGPS Lat		DGPS Long	Depth (m)	Picket type	Picket ht (m)
Start	21° 51.383' S		113° 59.944' E	4.0	60cm Star/Steel	0.2
Finish	° ' S		° ' E			

Notes:
Important note: This site was established and filmed from south to north, as opposed to the north to sound direction of the other sites.
Live coral: 21% Dead coral: 73%
Algae: 0% Abiotic: 6%

T3	Length (m)	50	Compass bearing (°)	20		
Transect	DGPS Lat		DGPS Long	Depth (m)	Picket type	Picket ht (m)
Start	21° 51.356' S		113° 59.933' E	4.0	60cm Star/Steel	0.2
Finish	21° 51.334' S		113° 59.916' E	4.0	60cm Star/Steel	0.2

Notes:
Important note: This site was established and filmed from south to north, as opposed to the north to south direction of the other sites.
Live coral: 11% Dead coral: 69%
Algae: 0% Abiotic: 20%

LONG-TERM MONITORING SITE DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				Field Survey		MAY 1998
Site No.	N20	Site Name	JURABI PT	Date	12/5/98	Recorder	Lapwood

GPS Latitude	GPS Longitude	Differential			
21° 51.412 ' S	113° 59.951 ' E	Yes	☐	No	☐

Habitat type	Mariginal Backreef					
Location of nearest transect from GPS position	Transect No.	T	Compass bearing (°)		Distance (m)	

Site Map (include north indicator, scale, vessel location, water depth, transect locations & other features of interest):

Notes:

Important note: This site was established and filmed from south to north, as opposed to the north to south direction of the other sites.

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N20	**Site Name**	Jurabi Pt.	**Date**	12/598	**Recorder**	Myers
Vessel	CALM Zodiac	**Time**	10.15	**Weather**	S/SE 20 knots		
Sea	Swell 1.0m	**Water depth (m)**	4.0	**Water visibility (m)**	15.0-20.0		

GPS Latitude	GPS Longitude	Differential			
21° 51.412' S	113° 59.951' E	**Yes**	☒	**No**	☐

Site location	northern edge of the barrier reef out from Jurabi Pt.

Habitat Description

More lagoonal than backreef site. High energy site with swell and surge. Limeston pavement with many depressions, ridges and overhangs. Dominated by soft coral. Good fish life. Acropora and Pocillopora recruitment.
Live coral: 15% (mean)
Dead coral: 74% (mean)
Algae: 0% (mean)
Abiotic: 12% (mean)

Dominant Species

Seagrass	
Macro-algae	Dictyota sp., Galaxaura marginata
Coral	Dominant—soft corals—Sinularia sp, Lobophtyon sp., Sarcophyton sp.; Heliopora coerulea, Millepora sp., Acropora sp. (digitate), Favites sp.; few Monitopora, Porites, Pocillopora—many recruits
Fish	Many Chaetodontidae, Pomacanthidae & Labridae sps.; few Scaridae
Invertebrates	Many sponges(spirastrella vagabunda), feather stars (few); many Holothurians, urchins, sea stars (Formia indica), few clams

Other Features

1 Cypraea tigris
1 Cypraea teres

Impact or Activity

Evidence of some bleaching on some Acropora & Favites sp.—some recently dead coral, but no Drupella found.

Video reference	NMPMP/bvt/12.05.98 /#4	**Aerial reference**	1994 /WA 3434C /RUN /
Slide reference		**Print reference**	

VIDEO DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				Field Survey		MAY 1998
Site No.	N20	Site Name	Jurabi Pt.	Date	12/5/98	Recorder	Myers
Start time	10.15	Finish time	12.15	Depth (m)	4.0	Visibility (m)	15.0-20.0

Underwater Video System	Blaupunkt CC894 camcorder in StingRay SR-700 housing

Focus mode				Exposure mode				Program mode				White balance mode			
Auto	☐	Manual	☐	Auto	☐	Manual	☐	Sports	☐	High-speed	☐	Auto	☐	Outdoor	☐

Lens system				Filters								Lights			
Wide-angle	☐	Zoom-macro	☐	None	☐	Red	☐	Yellow	☐	Orange	☐	On	☐	Off	☐

Video operator	Grubba/Myers	Tape no.	NMPMP/bvt/ 12.05.98 /# 4	Height above substrate (cm)	30
Time coding for all video footage at site:		From:	: 00 : 06 : 15	To:	: 00 : 24 : 00

Transect time coding	Start	Finish	Total time (mins/secs)
T1	00 : 00 : 06 : 55	00: 00 : 11 : 44	5. 21
T2	00 : 00 : 12 : 51	00 : 00 : 17 : 40	5. 21
T3	00 : 00 : 18 : 49	00 : 00 : 24 : 00	5. 18

Notes:

Tape damaged during flooding. Transect footage recovered. Don't go past 0:24:00. Footage of Exmouth Navy jettty 0:00:00 to 0:06:14

TRANSECT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				Field Survey		MAY 1998
Site No.	N	Site Name		Date	9/5/98	Recorder	Grubba
Time	15.00	Video tape no.	NMPMP/bvt/09.05.98 /# 5			Video operator	Cary/Grubba

T1	Length (m)	50	Compass bearing (°)	170	Distance to T2 (m)	10.0
Transect	DGPS Lat		DGPS Long	Depth (m)	Picket type	Picket ht (m)
Start	22° 18.909' S		113° 47.783' E	1.0	60cm Star/Steel	0.2
Finish	° ' S		° ' E			

Notes: (eg. description of habitat and dominant species along transect)
Dead coral, predominantly Acropora plate (occurred along all three transects).
Live coral: 3% Dead coral: 87%
Algae: 0% Abiotic: 10%

T2	Length (m)	50	Compass bearing (°)	170	Distance to T2 (m)	10.0
Transect	DGPS Lat		DGPS Long	Depth (m)	Picket type	Picket ht (m)
Start	22° 18.929' S		113° 47.779' E	1.0	60cm Star/Steel	0.2
Finish	° ' S		° ' E			

Notes:
Live coral: 5%
Dead coral: 78%
Algae: 0%
Abiotic: 17%

T3	Length (m)	50	Compass bearing (°)	170		
Transect	DGPS Lat		DGPS Long	Depth (m)	Picket type	Picket ht (m)
Start	22° 18.961' S		113° 47.770' E	1.0	60cm Star/Steel	0.2
Finish	22° 18.987' S		113° 47.761' E	1.0	60cm Star/Steel	0.2

Notes:
Live coral: 6%
Dead coral: 89%
Algae: 1%
Abiotic: 6%

LONG-TERM MONITORING SITE DATA SHEET

Project	NINGALOO MARIN E PARK MONITORING PROGRAM				Field Survey		MAY 1998
Site No.	N21	Site Name	Yardie Creek	Date	9/5/98	Recorder	Grubba

GPS Latitude	GPS Longitude	Differential			
22° 18.909' S	113° 47.783' E	Yes	☒	No	☐

Habitat type	Backreef - dominated by dead acropora plates.					
Location of nearest transect from GPS position	Transect No.	T	Compass bearing (°)	170	Distance (m)	

Site Map (include north indicator, scale, vessel location, water depth, transect locations & other features of interest):

Notes:
Acropora plates fused

HABITAT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N21	**Site Name**	Yardie Creek	**Date**	9/5/98	**Recorder**	Cary
Vessel	CB Zodiac	**Time**	15.00	**Weather**			
Sea	Slight sea	**Water depth (m)**	1.0	**Water visibility (m)**	15.0		
GPS Latitude		**GPS Longitude**		**Differential**			
22° 18.909' S		113° 47.783' E		**Yes**	☒	**No**	☐
Site location	Backreef location slightly north of the boatramp						

Habitat Description

backreef habitat - extensive dead coral remains of Acropora hyacynthus plate habitat. High level of recruitent of Acropora spp 3 - 30cm colonies. Death original plates may be veryhistoric (10 years plus).
Live and dead Drupella present, recent feding scars less evident. Massives and encrusting also recruiting.
Live coral: 4% (mean)
Dead coral: 85% (mean)
Algae: 0% (mean)
Abiotic: 11% (mean)

Dominant Species

Seagrass	
Macro-algae	Dictyota, galaxaura marinata, Titanophora weberae
Coral	dominant Acropora recruits 3-30cm, some merulina, favites sp, favia sp, lobophylia, montipora, platygyra, sinularia sp, galaxea, fungia, sarcophyton, millipora, fungia.
Fish	chaetodontidae, Pomacanthidae, Pomacentridae, scaridae
Invertebrates	linkia(starfish), Fromia sp (starfish), echinometra sp, holothuria sp, Drupella cornis

Other Features

Impact or Activity

Extensive death of plate corals may be the result of some natural extreme conditions, extreme low tide (pers comm, Luke Smith and Exmouth locals), Drupella cornis infestation.

Video reference	NMPMP/bvt/09.05.98 /# 5	**Aerial reference**	1994 /WA 3434C /RUN7/ 5013
Slide reference		**Print reference**	

VIDEO DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N21	**Site Name**	Yardie Creek	**Date**	13/5/98	**Recorder**	Cary
Start time	11.00	**Finish time**	12.00	**Depth (m)**	2.0	**Visibility (m)**	15.0

Underwater Video System	Blaupunkt CC894 camcorder in StingRay SR-700 housing											
Focus mode				**Exposure mode**				**Program mode**				**White balance mode**			
Auto	☒	Manual	☐	Auto	☒	Manual	☐	Sports	☒	High-speed	☐	Auto	☒	Outdoor	☐
Lens system				**Filters**								**Lights**			
Wide-angle	☒	Zoom-macro	☐	None	☒	Red	☐	Yellow	☐	Orange	☐	On	☐	Off	☒

Video operator	Grubba	**Tape no.**	NMPMP/bvt/13.05.98 /#5	**Height above substrate (cm)**	30
Time coding for all video footage at site:		**From:**	00:00:00:00	**To:**	00:00:20:22

Transect time coding	**Start**	**Finish**	**Total time (mins/secs)**
T1	00:00:00:16	00:00:06:10	6.34
T2	00:00:07:00	00:00:13:11	5.11
T3	00:00:14:10	00:00:20:00	5.90

Notes:

Due to technical difficulties, this site was filmed at a latter date from when the transect was established.

TRANSECT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				Field Survey		MAY 1998
Site No.	N	Site Name		Date	21/5/98	Recorder	Grubba
Time	12.00	Video tape no.	NMPMP/bvt/21.05.98 /#8			Video operator	Myers

T1	Length (m)	50	Compass bearing (°)		Distance to T2 (m)	10.0
Transect	DGPS Lat	DGPS Long	Depth (m)	Picket type	Picket ht (m)	
Start	23° 05.942' S	113° 44.397' E	1.0	90cm Star/Steel	0.15	
Finish	° ' S	° ' E				

Notes: (eg. description of habitat and dominant species along transect)
Live coral: 8%
Dead coral: 84%
Algae: 0%
Abiotic: 8%

T2	Length (m)	50	Compass bearing (°)		Distance to T2 (m)	10.0
Transect	DGPS Lat	DGPS Long	Depth (m)	Picket type	Picket ht (m)	
Start	23° 05.978' S	113° 44.390' E	1.0	90cm Star/Steel	0.15	
Finish	° ' S	° ' E				

Notes:
Live coral: 5%
Dead coral: 89%
Algae: 5%
Abiotic: 1%

T3	Length (m)	50	Compass bearing (°)			
Transect	DGPS Lat	DGPS Long	Depth (m)	Picket type	Picket ht (m)	
Start	23° 05.990' S	113° 44.394' E	2.0	90cm Star/Steel	0.15	
Finish	23° 06.034' S	113° 44.390' E	2.0	90cm Star/Steel	0.15	

Notes:
Live coral: 14%
Dead coral: 66%
Algae: 3%
Abiotic: 16%

LONG-TERM MONITORING SITE DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				Field Survey		MAY 1998
Site No.	N22	Site Name	Coral Bay North	Date	21/5/98	Recorder	Daly

GPS Latitude	GPS Longitude	Differential			
23 ° 05.942 ' S	113 ° 44.397 ' E	Yes	☐	No	☐

Habitat type	Backreef -coral					
Location of nearest transect from GPS position	Transect No.	T	Compass bearing (°)		Distance (m)	

Site Map (include north indicator, scale, vessel location, water depth, transect locations & other features of interest):

Notes:

HABITAT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N22	**Site Name**	Coral Bay North	**Date**	21/5/98	**Recorder**	Myers
Vessel	CALM Zodiac		**Time**	12.00	**Weather**	S 15 knots	
Sea			**Water depth (m)**	2.5	**Water visibility (m)**	15.0	

GPS Latitude	GPS Longitude	Differential			
23° 05.942' S	113° 44.397' E	**Yes**	☒	**No**	☐

Site location	east of marker than defines the bend in the sanctuary zone.

Habitat Description

Backreef dominated by old (dead) Acropora plates (1.0m diam.) with about 5 % live coral cover. Many juvenile recruits seen of Acropora and a few Favites sp. Areas of sand and rubble seen—storm damage present. Few Drupella found and few scars seen. Diverse fish life. Some seagrass (Halophila) present.
Live coral: 9% (mean)
Dead coral: 80% (mean)
Algae: 3% (mean)
Abiotic: 8% (mean)

Dominant Species

Seagrass	Halophila ovalis (sparse)
Macro-algae	Turbinaria sp, Dictyota sp., Filamentous blue-green algae, Valonia ventricosa
Coral	Dominant—Acropora sp. (plates & digitifera); few Platygyra sp. & Favites sp.; few Montipora sp.; few soft
Fish	Dominated by Labridae,Pomacentridae, Pomacanthidae and some schools of Chaetodontide; some Monacanthidae, Amphiprion sp. (Anemonefish); few Scarids
Invertebrates	Few Holothurians, Echinometra sp.; seastars (Linckia sp., Formia indica); few Anemone within rubble; giant clams

Other Features

Impact or Activity

High energy site; evidence of storm damage, minimal Drupella impact seen

Video reference	NMPMP/bvt/21.05.98 /#8	**Aerial reference**	1994 /WA 3434C /RUN16/ 5165
Slide reference		**Print reference**	

Project	NINGALOO MARINE PARK MONITORING PROGRAM				Field Survey		MAY 1998
Site No.	N22	Site Name	Coral Bay North	Date	21/5/98	Recorder	Myers
Start time	11.30	Finish time	13.00	Depth (m)	2.5	Visibility (m)	15.0

Underwater Video System	Blaupunkt CC894 camcorder in StingRay SR-700 housing

Focus mode				Exposure mode				Program mode				White balance mode			
Auto	☒	Manual	☐	Auto	☒	Manual	☐	Sports	☒	High-speed	☐	Auto	☒	Outdoor	☐

Lens system				Filters								Lights			
Wide-angle	☒	Zoom-macro	☐	None	☒	Red	☐	Yellow	☐	Orange	☐	On	☐	Off	☒

Video operator	Myers	Tape no.	NMPMP/bvt/21.05.98 /#8	Height above substrate (cm)	30
Time coding for all video footage at site:		From:	00:00:22:04	To:	00:00:40:32

Transect time coding	Start	Finish	Total time (mins/secs)
T1	00:00:23:22	00:00:28:16	4.54
T2	00:00:29:51	00:00:34:39	4.48
T3	00:00:34:59	00:00:40:32	5.33

Notes:

Transect 3 35:43 Pectina paeonia (Pectiniidae)

TRANSECT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				Field Survey		MAY 1998
Site No.	N	Site Name		Date	22/5/98	Recorder	Parker
Time	12.00	Video tape no.	NMPMP/bvt/22.05.98 /# 8			Video operator	Myers

T1	Length (m)	50	Compass bearing (°)		Distance to T2 (m)	10.0
Transect	DGPS Lat	DGPS Long	Depth (m)	Picket type	Picket ht (m)	
Start	23° 20.023' S	113° 46.671' E	1.5	90cm Star/Steel	0.15	
Finish	° ' S	° ' E				

Notes: (eg. description of habitat and dominant species along transect)
Live coral: 30%
Dead coral: 60%
Algae: 2%
Abiotic: 4%

T2	Length (m)	50	Compass bearing (°)		Distance to T2 (m)	10.0
Transect	DGPS Lat	DGPS Long	Depth (m)	Picket type	Picket ht (m)	
Start	23° 20.055' S	113° 46.668' E	1.5	90cm Star/Steel	0.15	
Finish	° ' S	° ' E				

Notes:
Live coral: 65%
Dead coral: 31%
Algae: 0%
Abiotic: 4%

T3	Length (m)	50	Compass bearing (°)			
Transect	DGPS Lat	DGPS Long	Depth (m)	Picket type	Picket ht (m)	
Start	23° 20.085' S	113° 46.670' E	1.5	90cm Star/Steel	0.15	
Finish	23° 20.109' S	113° 46.672' E	1.5	90cm Star/Steel	0.15	

Notes:
Live coral: 62%
Dead coral: 41%
Algae: 0%
Abiotic: 6%

LONG-TERM MONITORING SITE DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				Field Survey		MAY 1998
Site No.	N24	Site Name	Pelican Sanctuary.	Date	22/5/98	Recorder	Daly

GPS Latitude	GPS Longitude	Differential			
23 ° 20.023 ' S	113 ° 46.671 ' E	Yes	☐	No	☐

Habitat type	Backreef - coral					
Location of nearest transect from GPS position	Transect No.	T	Compass bearing (°)		Distance (m)	

Site Map (include north indicator, scale, vessel location, water depth, transect locations & other features of interest):

Notes:

HABITAT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N24	**Site Name**	Pelican Sanctuary.	**Date**	22/5/98	**Recorder**	Myers
Vessel	CALM Zodiac	**Time**	12.00	**Weather**			
Sea		**Water depth (m)**	1.5	**Water visibility (m)**	10.0		

GPS Latitude	GPS Longitude	Differential			
23° 20.023' S	113° 46.671' E	**Yes**	☒	**No**	☐

Site location	

Habitat Description

Backreef dominated by Acropora plates; plate sizes 0.5m-2.0+m in diameter. 60-70% live Acropora sp. Some areas of sand and some damaged/overturned plates. Evidence of recruitment. Drupella found easily, but there was minimal scarring seen.
Live coral: 53% (mean)
Dead coral: 41% (mean)
Algae: 1% (mean)
Abiotic: 5% (mean)

Dominant Species

Seagrass	
Macro-algae	Dictyota sp., Turbinaria sp., Filamentous blue-green algae, Coralline red alage
Coral	Acropora sp. (plates) (digitifera and others); some branching Acropora sp.; few Fungidae, few soft coral—Sinularia sp.; some encrusting Monitpora sp.
Fish	Dominant—Pomacentridae, Pomacanthidae; schools of Labridae and med-sized Scarids; few Monacanthidae and flutemouth fish
Invertebrates	Sea stars (Formia indica); few Holothurians, urchins, clams

Other Features

Impact or Activity

Some (but little) storm damage seen. Drupella was abundant, but scarring was relatively minimal

Video reference	NMPMP/bvt/ 22.05.98 /# 8	**Aerial reference**	1994 /WA 3434C /RUN17/ 5126
Slide reference		**Print reference**	

VIDEO DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N24	**Site Name**	Pelican Sanctuary	**Date**	22/5/98	**Recorder**	Myers
Start time	12.00	**Finish time**	13.10	**Depth (m)**	2.0	**Visibility (m)**	10.0

Underwater Video System	Blaupunkt CC894 camcorder in StingRay SR-700 housing

Focus mode				**Exposure mode**				**Program mode**				**White balance mode**			
Auto	☒	Manual	☐	Auto	☒	Manual	☐	Sports	☒	High-speed	☐	Auto	☒	Outdoor	☐
Lens system				**Filters**								**Lights**			
Wide-angle	☒	Zoom-macro	☐	None	☒	Red	☐	Yellow	☐	Orange	☐	On	☐	Off	☒

Video operator	Myers	**Tape no.**	NMPMP/bvt/22.05.98 /#8	**Height above substrate (cm)**	30
Time coding for all video footage at site:		**From:**	00:00:40:32	**To:**	00:01:02:13

Transect time coding	**Start**	**Finish**	**Total time (mins/secs)**
T1	00:00:41:07	00:00:47:25	6.16
T2	00:00:48:21	00:00:54:25	6.04
T3	00:00:55:14	00:01:00:58	5.44

Notes:

1:00:58—1:02:13 General reef footage showing Drupella and coral recruitment

TRANSECT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				Field Survey		MAY 1998
Site No.	N	Site Name		Date	15/5/98	Recorder	Lapwood
Time	15.00	Video tape no.	NMPMP/bvt/15.05.98 /#7			Video operator	Grubba/Cary

T1	Length (m)	50	Compass bearing (°)	210	Distance to T2 (m)	10.0
Transect	DGPS Lat		DGPS Long	Depth (m)	Picket type	Picket ht (m)
Start	22° 33.105' S		113° 39.407' E	1.5	60cm Star/Steel	0.15
Finish	° ' S		° ' E			

Notes: (eg. description of habitat and dominant species along transect)
Depth: 0.5-1.5m
Large coral bommies, large depth variation
Live coral: 20% Dead coral: 78%
Algae: 0% Abiotic: 0%

T2	Length (m)	50	Compass bearing (°)	210	Distance to T2 (m)	10.0
Transect	DGPS Lat		DGPS Long	Depth (m)	Picket type	Picket ht (m)
Start	22° 33.138' S		113° 39.412' E	1.0	60cm Star/Steel	0.15
Finish	° ' S		° ' E			

Notes:
Flat substrate, dominanted by Acropora platess/digitate corals
Depth 0.5-1.0m
Live coral: 10% Dead coral: 76%
Algae: 0% Abiotic: 14%

T3	Length (m)	50	Compass bearing (°)	210		
Transect	DGPS Lat		DGPS Long	Depth (m)	Picket type	Picket ht (m)
Start	22°33.160' S		113° 39.416' E	1.0	60cm Star/Steel	0.15
Finish	22° 33.192' S		113° 39.388' E	1.0	60cm Star/Steel	0.15

Notes:
Wash zone - dominated by Acropora sp.
Depth 0.5-1.0m
Live coral: 2% Dead coral: 69%
Algae: 0% Abiotic: 27%

LONG-TERM MONITORING SITE DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				Field Survey		MAY 1998
Site No.	N25	Site Name	Pt. Billy	Date	15/5/98	Recorder	Lapwood

GPS Latitude	GPS Longitude	Differential			
22° 33.106' S	113° 39.407' E	Yes	☒	No	☐

Habitat type	Backreef coral - beginning of transect in channel

Location of nearest transect from GPS position	Transect No.	T	Compass bearing (°)		Distance (m)	

Site Map (include north indicator, scale, vessel location, water depth, transect locations & other features of interest):

Notes:
Compass bearing 210
no SCUBA used

HABITAT DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				**Field Survey**		MAY 1998
Site No.	N25	**Site Name**	Pt. Billy	**Date**	15/5/98	**Recorder**	Cary
Vessel	CALM Zodiac		**Time**	15.00	**Weather**		
Sea		**Water depth (m)**	0.5-1.0	**Water visibility (m)**	15.0		

GPS Latitude	GPS Longitude	Differential			
22 ° 33.105 ' S	113 ° 39.407 ' E	**Yes**	☐	**No**	☐

Site location	Off Pt Billy - Transect starts near channel and runs approximately south.

Habitat Description

Three diferent habitat types through trasnects 1, 2, and 3
T1, Channel - large bommies
T2 Backreef dominanted by Acropora plate
T3 Wash zone - coral rubble and Acropora
Live coral: 11% (mean)
Dead coral: 74% (mean)
Algae: 0% (mean)
Abiotic: 14% (mean)

Dominant Species

Seagrass	
Macro-algae	Filamentous Blue-green algae, Dictyota sp., Turbinaria sp.
Coral	Acropora plate & massives dominated at T1; some Millepora, Lobophyllia, Favids, Favites, Galaxea
Fish	Acanthuridae, Pomacentridae, Labridae
Invertebrates	

Other Features

Impact or Activity

Some Drupella in T3

Video reference	NMPMP/bvt/15.05.98 /#7	**Aerial reference**	1994 /WA 3434C /RUN /
Slide reference		**Print reference**	

VIDEO DATA SHEET

Project	NINGALOO MARINE PARK MONITORING PROGRAM				Field Survey		MAY 1998
Site No.	N25	Site Name	Pt. Billy	Date	15/5/98	Recorder	Grubba/Cary
Start time	15.00	Finish time	15.30	Depth (m)	1.0	Visibility (m)	15.0

Underwater Video System	Blaupunkt CC894 camcorder in StingRay SR-700 housing

Focus mode				Exposure mode				Program mode				White balance mode			
Auto	☒	Manual	☐	Auto	☒	Manual	☐	Sports	☒	High-speed	☐	Auto	☒	Outdoor	☐

Lens system				Filters								Lights			
Wide-angle	☒	Zoom-macro	☐	None	☒	Red	☐	Yellow	☐	Orange	☐	On	☒	Off	☐

Video operator	Grubba/cary	Tape no.	NMPMP/bvt/15.05.98 /#7	Height above substrate (cm)	30
Time coding for all video footage at site:		From:	00:00:21:00	To:	00:00:36:59

Transect time coding	Start	Finish	Total time (mins/secs)
T1	00:00:23:39	00:00:27:41	4.02
T2	00:00:28:05	00:00:30:57	2.52
T3	00:00:31:26	00:00:34:56	3.30

Notes:

T1 was filmed breifly then aborted due to currents. Was latter refilmed
Battery in video low, Transects filmed at a faster rate.

6 REFERENCES

Christie C A, Bass D K, Neale S J, Osborne K and Oxley W G (1996). Surveys of sessile benthic communities using the video technique. Long-term monitoring of the Great Barrier Reef. Standard Operational Procedure Number 2. Australian Institute of Marine Science, Townsville, Queensland.

Department of Conservation and Land Management (1989). Ningaloo Marine Park Management Plan 1989-1999. Management Plan No. 12. Department of Conservation and Land Management, Perth, Western Australia.

APPENDIX 1

Historical Site Information from Osborne and Williams (in preparation).

1998 SITE REF #	SITE	DEPTH	Latitude (S)	Longitude (E)
N1	Bundegi (transect 2)	4.0 m	21° 15.002’	114° 10.779’
N6	Ned’s camp (transect 3)	1.0 - 1.5m	21° 58.560’	113° 55.280’
N7	Turquoise Bay (transects 1-3)	1.5 - 2.0m	22° 06.717’ 22° 06.867’ 22° 07.178’	113° 52.734’ 113° 53.668’ 113° 52.763’
N8	Osprey Sanctuary (transects 1-3)	1.0 - 1.5m	22° 14.884’ 22° 15.336’ 22° 14.644’	113° 49.731’ 113° 49.481’ 113° 49.718’
N9	Bundera (transect 1)	1.0 - 1.5m	22° 23.685’	113° 44.716’
N10	Lefroy Bay (transects 1-3)	2.0 - 3.0m	22° 31.598’ 22° 31.615’ 22° 31.679’	113° 40.628’ 113° 40.685’ 113° 40.646’
N11	Pt Cloates (transect 1)	1.5m	22° 40.817’	113° 38.525’
N13	Bruboodijoo (transect 2)	0.5 - 1.5m	22° 56.416’	113° 46.708’
N14	Coral Bay (transects 1-3 on back reef)	1.0m	23° 09.241’ 23° 09.005’ 23° 09.227’	113° 45.030’ 113° 45.020’ 113° 45.103’
N24[#1]	Pelican (Pt. Anderson) (Transect 2)	1.0 - 2.0m	23° 20.027’	113° 46.721’

Note: [#1] Site 14b Pelican Pt/Pt/Anderson is an additional site
Latitude and Longitude of transects are extracted from Osborne (in preparation) 1991 data collections. Listed coordinates correspond to the proposed locations of the 1998 long term monitoring sites.

APPENDIX 2

Historical Data on % cover of live coral, substrate type and Drupella density from Osborne and Williams (in preparation)

Site N1	**Bundegi: back reef**	**1991**	**1994**
	Live Hard Coral	52.0%	79.0%
	Soft Substrate	2.0%	1.0%
	Hard Substrate	46.4%	25.0%
	Drupella (live)	1.62	0.77
	Drupella (dead)	0.04	0.01

Site N5	**Tantabiddi: mid lagoon**	**1991**	**1994**
	Live Hard Coral	52.9%	38.0%
	Soft Substrate	2.6%	5.0%
	Hard Substrate	44.5%	56.0%
	Drupella (live)	3.04	2.72
	Drupella (dead)	0.26	0.30

Site N6	**Ned's Camp: back reef**	**1991**	**1994**
	Live Hard Coral	3.8%	6.0%
	Soft Substrate	20.8%	19.0%
	Hard Substrate	75.4%	74.0%
	Drupella (live)	0.30	0.05
	Drupella (dead)	0.38	0.11

Site N7	**Turquoise Bay: back reef**	**1991**	**1994**
	Live Hard Coral	11.1%	14.0%
	Soft Substrate	25.7%	32.0%
	Hard Substrate	63.3%	51.0%
	Drupella (live)	0.39	0.51
	Drupella (dead)	0.10	0.18

Site N8	**Osprey Sanctuary: back reef**	**1991**	**1994**
	Live Hard Coral	16.2%	31.0%
	Soft Substrate	20.3%	15.0%
	Hard Substrate	63.5%	54.0%
	Drupella (live)	0.05	1.56
	Drupella (dead)	0.04	0.21

Site N9	**Bunderra: back reef**	**1991**	**1994**
	Live Hard Coral	14.8%	9.0%
	Soft Substrate	13.1%	20.0%
	Hard Substrate	72.1%	71.0%
	Drupella (live)	2.01	1.00
	Drupella (dead)	0.18	0.09

Appendix 2 continued.

Site N10	Lefroy Bay: back reef	1991	1994
	Live Hard Coral	45.0%	41.0%
	Soft Substrate	3.7%	7.0%
	Hard Substrate	51.2%	55.0%
	Drupella (live)	3.49	3.30
	Drupella (dead)	0.32	0.30

Site N11	Pt Cloates: back reef	1991	1994
	Live Hard Coral	18.5%	14.0%
	Soft Substrate	22.2%	31.0%
	Hard Substrate	51.3%	55.0%
	Drupella (live)	0.02	1.01
	Drupella (dead)	0.06	0.08

Site N13	Bruboodijoo: back reef	1991	1994
	Live Hard Coral	19.7%	28.0%
	Soft Substrate	17.3%	18.0%
	Hard Substrate	63.0%	54.0%
	Drupella (live)	2.04	3.48
	Drupella (dead)	0.09	0.10

Site N14	Coral Bay: back reef	1991	1994
	Live Hard Coral	10.6%	9.0%
	Soft Substrate	9.4%	14.0%
	Hard Substrate	80.0%	77.0%
	Drupella (live)	3.93	1.60
	Drupella (dead)	0.27	0.91

Site N15	Pelican: back reef	1991	1994
	Live Hard Coral	80.0%	60.0%
	Soft Substrate	5.1%	3.0%
	Hard Substrate	15.1%	37.0%
	Drupella (live)	18.77	10.06
	Drupella (dead)	0.36	0.33

Note: Live Hard Coral, Soft Substrate and Hard Substrate data is mean % cover
Drupella data is mean estimated density (snails/m^2)

Appendix 3

Sampling methodology for the collection of benthic habitat video imagery

This sampling technique is adapted from the AIMS Standard Operating Procedure No. 2 (Christie *et al.*, 1996). The steps required for preparation of the underwater housing and video camcorder are included in Appendix III. The recording of data for each transect should be carried out according to the following steps:

1 Fill out the details on the in-water data sheet (located on the top of the housing) identifying the transect. Record the site number, date, transect number, and recorder's name.

2 Set the camcorder to **autofocus**, press REC and video a panoramic shot of the start of the transect. Start at the star picket, hold the camera in a horizontal position and turn slowly clockwise, videoing the immediate surroundings and ending at the initial view. Move in on the top of the star picket to record the site number and transect number written on the white plastic cap. Press STBY.

3 Record the start time code on the data sheet. Press REC and video the base of the star picket for a few seconds and then move along the tape or scaled rope, keeping it approximately 10 cm in from the right hand side of the field of view. Keep the housing lens parallel to the substrate at a distance of 30 cm.

4 Follow the transect line keeping the housing at the set height of 30 cm, ensuring that the screen image is in focus. Adjust your swimming speed so that it is constant and you cover approximately 10 m every minute, and not faster. This is important to ensure a high quality of image. The entire transect should take between 5 and 6 minutes in total. At the end of the transect video the base of the star picket for a few seconds and then press STBY.

5 Record the finish time code on the data sheet.

6 If video recording along a transect has to be aborted for any reason, or if there is considerable variation in the height or speed of the recorder, then the entire transect should be re-sampled, beginning again from the start point of the transect. It is important that the new start and finish time codes for any repeated transects are clearly recorded on the data sheets.

7 Proceed to the next transect. Once all three transects at a site have been completed and the tape has been viewed and checked back on the vessel, full details must be recorded on the main video transect data sheet (Appendix II). Any repeated or incomplete transects, or situations where transects were recorded out of order or with false starts should be noted on the data sheets.

8 A total of three sites should be recorded on each 90 min Hi8 tape. The tape and tape cover should be clearly labeled (using a permanent marker) with the designated tape number (Appendix III), the site number and date of recording. The red copy protect switch on the tape should be switched on to prevent accidental recording over any data, and the tapes should be stored in a waterproof case at all times.

9 At the end of the field trip and before data analysis the tapes must be duplicated, either in Hi8 or VHS format, and the originals archived and stored separately from the duplicates.

Appendix 4

Establishment of permanent 'transect sites'

The following sequence describes the basic field procedure that was followed to establish three permanent transects at each site. The entire procedure took between 2 and 4 hours, depending on *in situ* conditions, enabling at least two sites to be visited a day.

Daily procedure summary

1. Personnel and equipment leave main camp and move to 'day camp' (a point on the beach as close as possible to the site).

2. Boats are launched, gear made ready.

3. Boat 1 leaves the beach followed by boat 2 about 15 minutes later.

4. Transect lines are set, filmed and retrieved as described in the methods below.

5. Boats 1 and 2 takes divers back to 'day camp' to change air tanks, camera batteries etc. and check video footage. Boat 2 also brings backs site data (start and end point coordinates, transect layout sketch, dive times, video times etc.) for shore person to enter onto data sheets.

6. Boats are retrieved and gear stored.

7. Personnel and equipment leave day base to either return to base camp or move directly to second site (if applicable) and setup second 'day camp'.

8. Steps 2 through 7 are then repeated.

Establishment of transect using boat.

To be used in calm conditions with low current and relatively flat bathymetry. The transect lines will be laid out and retrieved by boat rather than by divers.

<u>Boat 1 (2 persons: 1 boat operator, 1 field crew)</u>

1. Boat 1 will reconnoiter general area using pre-marked aerial photographs and GPS readings as guidance.

2. The site is viewed using a viewfinder or a snorkel diver to confirm suitability of the site.

3. The end of the transect line is clipped to the weight of the start point marker buoy as it is deployed.

4. The transect lines are run out by driving the boat in a straight line on a predetermined compass bearing.

5. When the end of each transect line is reached it is clipped to the weight of the end point marker buoy as it is deployed.

6. This process is repeated for the last two transects.

7. Boat 1 deploys a snorkeler to check that the transect line was laid straight. If possible the snorkeler straightens the transect line where necessary. If the snorkeler is unable to correct the transect line, that person informs one of the SCUBA equipped divers whom will make the necessary adjustments.

8. Boat 1 stands by as it waits for boat 2 divers to install star pickets and video the transects. Boat 1 then retrieves it's divers.

9. Boat 1 then takes DGPS readings at the marker buoys to determine the positions of the beginning of each transects and the end of transect 3.

10. Boat 1 then retrieves the transect lines, and in the event of the line becoming snagged a diver from boat 2 (or a snorkeller from boat 1) enters the water to unsnag the line.

Boat 2 (4 persons: 1 boat operator, 3 divers)

1. As soon as the first transect is set, boat 2 with three divers moves into position over the beginning of transect 1. The three divers are deployed. One diver has the role of video camera operator, the second divers is a data recorder, and the third diver installs the star pickets.

2. The three divers descend to the beginning of the first transect designated by the weight of the marker buoy.

3. The installation diver then hammers a star picket into the substrate at the beginning of the transect, attaches the polypipe extension and positions the weight adjacent to the picket.

4. The camera operator films the surrounding reef. Anything that is of significance is also taped. The site and transect details inscribed on the first picket are taped. Then the diver proceeds video taping along the transect line (Section 2.2.2).

5. The data recorder diver follows the diver video taping the transect. This diver is making general observations about the reef, any visual impacts etc. This diver can also draw mud-maps of the location of the star picket in relation to coral/sand landmarks.

6. The diver installing the pickets, after securing the first picket swims to the end of the first transect plus the 10m extension and hammers another picket into the substrate to define the start point of the second transect. This process is continued for the third transect and a final picket is driven in at the end of the third transect.

7. The other two divers collecting data repeat steps 4 through 5 for the remaining transects.

8. The divers then return to the boat 2 which will be waiting at the end of transect 3. Boat 2 stands by as boat 1 takes a DGPS fix and completes the retrieval of the transect lines. Boat 2 deploys a diver if the transect line becomes snagged during retrieval. Both boats then return to the launch site.

Establishment of transect by divers.

To be used when adverse wind, current or irregular bathymetry make the previous procedure impractical.

Boat 1 (3 persons, boat person and 2 divers)

1. Boat 1 will reconnoiter general area using pre-marked aerial photographs and GPS readings as guidance.

2. The site is viewed using a viewfinder or a snorkel diver to confirm suitability of the site.

3. A weight and float will be deployed at the start point of the first transect.

4. Boat 1 deploys divers with pickets, hammer and transect line (still on reel) at transect 1 start point.

5. Divers hammer star picket in substrate, attach the polypipe extension and position weighted marker float adjacent to picket.

6. Divers clip the transect line to the marker weight and run it out on a predetermined compass bearing.

7. At the end of the transect the divers hammer a star picket into the substrate, and attach the polypipe extension.

8. Divers continue to run transect line out for 10m (unmarked colored line). At the end of 10m the star picket marking the start of transect 2 is driven into the substrate and polypipe extension attached. Another marker buoy attached to a weight is positioned adjacent to the star picket.

9. The divers then repeat steps 5 through 8 for the last two transects and place a marker buoy at the end of transect 3

10. Divers then surface and are retrieved by boat 1. Boat 1 will standby until boat 2 has retrieved it's divers.

11. Boat 1 then takes DGPS coordinates of the transect start points. Boat 1 then retrieves the transects lines. In the event of the transect line becoming snagged a snorkeller from boat 1 re-enters the water to un-snag the line.

Boat 2 (3 persons: 1 boat operator, 2 divers)

1. As soon as boat 1 has completed the laying of transect 1, the two video divers are deployed. One diver has the role of video camera operator, and the second is data recorder. Diver 1 descends with the video camera, diver 2 with underwater slates.

2. The divers descend to the beginning of transect 1. The camera operator films the surrounding reef. Anything that is of significance is also taped. The site and transect details inscribed on the first picket are taped. Then the diver proceeds video taping along the transect line (Section 2.2.2).

3. Diver 2 removes the end of the transect line from the star picket and then follows diver 1 who is video taping the transect. Diver 2 also records general observations about the reef, any visual impacts etc. Diver 2 will also draw mud-maps of the location of the star picket in relation to coral/sand landmarks.

4. Steps 2 through 3 are repeated for transects 2 and 3 .

5. The divers then return to boat 2and standby as boat 1 completes the retrieval of the transect lines. Then both boats return to the launch site.

Appendix 5
Launch Site Descriptions

Distribution List

Ningaloo Marine Park Monitoring program. Initialisation of Long-term Benthic Monitoring Sites: May 1998

Kieran McNamara, Director, Nature Conservation Division, CALM
Dr Chris Simpson, Manager, Marine Conservation Branch, CALM
Chris Muller, Manager, Pilbara Region, CALM
Doug Myers, Manger, Exmouth District, CALM
Dr Andrew Heyward, Officer in Charge, WA branch AIMS