Coast and Clean Seas Coastal Monitoring Program

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CONTENTS

1 INTRODUCTION

1.1 General

This field program report presents details of CALM and DEP's involvement in the 19 July to 2 August 1999 field survey co-ordinated by the Australian Institute of Marine Science (AIMS). The main objectives of the field survey for CALM and DEP are to spatially rectify the available aerial photography in order to enhance the GIS capability of the Ningaloo reef and groundtruth habitat sites. This work is being done under the umbrella of the CALM program *Establishment of baseline benthic monitoring sites in the Ningaloo Marine Park.*

1.2 Background

In May 1998 the Marine Conservation Branch of CALM, in collaboration with AIMS, established 21 long-term monitoring sites in the Ningaloo Marine Park and proposed southern extension (Figure 1; Cary *et al*. 1998). Seven of these sites were located in 'sanctuary zones' and the remaining 14 in 'general use zones'. At each site a set of re-locatable permanent monitoring transects were established.

The aim of the program *Establishment of baseline benthic monitoring sites in the Ningaloo Marine Park* is to assess the 'health' of major benthic habitats of the marine park and its southern extension.

The NMPMP is linked to the recommendations of the *Ningaloo Marine Park Management Plan 1989-1999*, which are:

- 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 Field trip objectives

The primary objectives of the field trip for AIMS are to:

- Re-survey 19 of the long-term monitoring sites established in the Ningaloo Marine Park by CALM/AIMS in 1998.
- Undertake manta-tow based broadscale surveys around 19 of the long-term monitoring sites established in the Ningaloo Marine Park by CALM/AIMS in 1998.
- Gather data on the size distribution of major coral groups at as many locations as possible, including the long-term monitoring sites.
- Re-survey selected sites for fish and benthos that were previously surveyed by Ayling (1987) and AIMS (1994).
- Survey three or four of the Sanctuary Zones and adjacent areas for benthos and fish.
- Collect a small sample of fish species for later analysis of otoliths for estimates of age structure.

- The primary objectives of the field trip for CALM and DEP are to:
- gather accurate spatial rectification data at pre-selected points. These points will provide the spatial control data need to rectify aerial photography and satellite imagery to facilitate future spatially accurate mapping of the Ningaloo Marine Park.
- gather habitat ground truth data (30 seconds of underwater video footage). Depth and time will also be recorded to aid marine habitat mapping and determination of bathymetry
- opportunistically collect still photographs and video footage of major habitat types and visually dominant flora and fauna.

2 SITE SELECTION, METHODS AND EQUIPMENT

2.1 Site selection

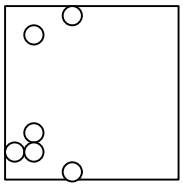
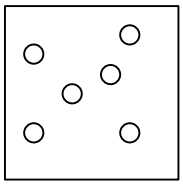
Sites selected for spatial rectification and ground-truthing will be in the vicinity of the long-term monitoring sites established in May 1998 (Figure 1). The data report *Establishment of baseline benthic monitoring sites in Ningaloo Marine Park, 1998* (Cary *et al*. 1998*)* has the DGPS position for each site and will be used to re-locate monitoring sites.

A series of 1:20000 aerial photographs exist along the length of Ningaloo Reef. Spatial control points will be chosen within the extent of the photographs covering each monitoring site. Representative reef areas will also be selected within each photograph to obtain ground truthed habitat data.

2.2 Methods

2.2.1 Spatial Control Points

Five to six spatial control points are required to register each aerial photograph to real world co-ordinates. Control points evenly spaced throughout the photograph are necessary to achieve good registration (ie. not clustered and preferably not all near the edges, due to slight distortion in the photographs at increasing distances from the centre).

WRONG  RIGHT 

Prior to the field trip, the aerial photographs will be scanned and registered to a previously rectified Landsat TM image. Pre-selection of spatial control or rectification points from the photographs prior to entering the field will maximise efficiency and allow an approximate co-ordinate for each preselected point to be calculated from the registered photograph. The co-ordinate can then be loaded to the GPS unit in the field, acting as a way-point. A more accurate fix can be obtained and the opportunity exists to confirm that the co-ordinates collected in the field are close to what they should be.

Points will be selected primarily for their suitability for spatial control. Ease of access and ease of field identification are also important considerations in point selection. Use of the DGPS and the photographs simultaneously in the field is a useful means of navigation. An approximate target point can be identified from which it is possible to navigate to the actual site by feature recognition using the photos. Areas that can be easily located both on the photograph and in the field, such as isolated coral bommies or channel intersections on reef edges, provide a good starting point.

Having reached what is thought to be a preselected site, a thorough check of the surrounding features against the photograph should be made to confirm the location. An identifiable point on the feature should be selected for sampling (eg. centre of feature, corner, between features etc.) and the photograph marked accordingly. Taking into account tide and wind drift the boat should be positioned so that the GPS receiving aerial is above the selected point. DGPS position, time and depth should then be recorded manually on a field data sheet, along with the aerial photograph number, monitoring site number and the number of the DGPS reading for that site (eg. Reading number 3 for site number 24).

2.2.2 Benthic Habitat Groundtruthing

After recording spatial position data and notes describing the control points, an impression of the habitat types present at the site is required in the remaining time available. The aerial photographs should be used to choose representative habitat types to ground truth. Upon reaching each representative habitat, a DGPS fix should be obtained and the position marked on the photograph/site map. The substrate and dominant habitat type will be recorded according to a classification scheme:

The data sheet in Appendix 1 should be completed for each habitat ground truthed.

Once the major habitat types within homogeneous areas of the photograph have been recorded, particular attention should be paid to obtaining ground truth for habitat areas that are not easily discriminated from each other in the photograph. These areas will be the most difficult to classify on broader scales and are likely areas of confusion. A more accurate classification will be obtained if sufficient ground truth data is available to distinguish similar habitat types.

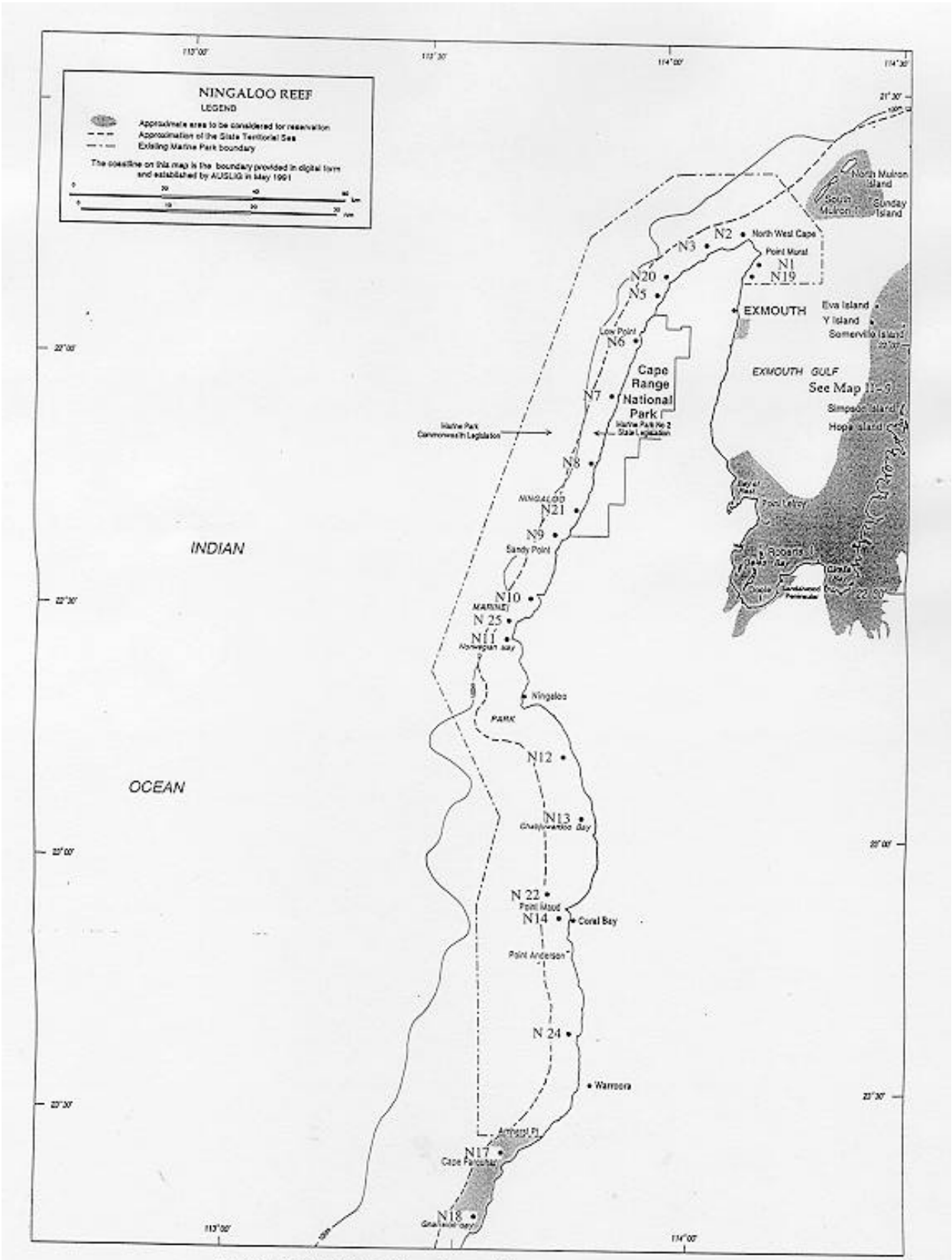


Figure 2: Approximate locations of proposed long-term monitoring sites established in May 1998

2.3 Equipment

2.3.1 Drop Down Video systems

- Drop-down video camera and umbilical
- Video recorder/TV
- Backup video/TV
- Backup umbilical cable
- 6 *180 VHS tapes
- Clapboard and chalk
- Video data sheets

2.3.3 Still photography

- Camera 1: Nikonos V, 35mm lens, 15mm lens, SB102 strobe unit and close up kit
- Land Camera
- 15 rolls of 36 exposure slide film
- Log books for cameras
- Kit of camera spares

2.3.4 Information

- Marine Charts: Satellite photos, coastal maps, sanctuary zone maps with latitudes and longitudes
- Reference books for the identification of corals,
- Landsat imagery of Ningaloo Marine Park and southern extension
- Full set of aerial photographs of Ningaloo Marine Park
- Laminated scanned copies of aerial photographs of the sites for field use.
- Groundtruthing data sheets 200 (and electronic)
- 1 laptop computer plus 5 floppy discs and charger

2.3.5 Diving

SCUBA

- Personal dive gear
- 2 CALM/1 DEP BCDs
- 2 CALM/1 DEP regulators with alternate air-source and gauges
- 3 CALM/1 DEP masks, snorkels, fins
- 2 CALM dive computers
- 3 CALM/2 DEP weight belts,
- 2 compasses
- 3 pocket size underwater slates, grips and pencils

Accessories

- field notebooks
- 1 stationary box
- 1 viewfinder
- equipment log book
- Scuba log book

Vessels (inflatables)

- AIMS to supply vessels

Vehicles

- MCB Mitsabishi Triton for 5 days.

2.3.6 Position fixing, communications and habitat data recording

Position fixing

- 1 hand held GPS units and accessories
- 1 Omni star differential GPS unit, antennae and accessories
- Back-up DGPS unit

Other items

- 50 AA batteries (back-up for DGPS)
- 7 motorbike batteries and two chargers
- batteries for torches

2.3.7 Camping equipment

- 2 swags

3 FIELD PROGRAMME

3.1 Field itinerary

The field itinerary for the field survey period 19 July to 2 August, including travel details, is given in Table 1.

3.2 Equipment suppliers and relevant contacts

The following list gives contact details of the suppliers of major items of equipment.

Aerial photos: DOLA, Gary Caporn, Ph. 92737209
Ansett: Flights, Ph. 131644
Calm, Exmouth: Ph. (08) 99 491676 (fax) (08) 99 491580
Transport: Cape Transport (Mick & Jane Stamp, or Shane) Ph. 08 99491041
Car: Budget, Todd Maskiell, Ph. 4791919
Drop-down camera: Cunard Technologies, Mark Harris (014 884 006/458 4022
Exmouth automotive and marine Alan Waddingham; (08) 99492795
John Houghton (Courier Service Exmouth to Mildura via Coral Bay): 08 99491020
Omnistar differential GPS: Fugro Pty Ltd, Gary Allen, Ph. 93225295
Pickets: supplied by: Whites wires, Lindsay, Ph 9353 2771 fax 9353 2776
galvanising: Lyons Galvanising, Paul, Ph 9356 1797
Scoutmaster GPS: Benchmark, Rob Fergusen, Ph. 08 2325405
Transport: cape Transport, Mick Stamp, Ph (08) 99 491041
Underwater video system: Sea Optics, David Hull, Ph. 08 3626161
Ningaloo Homestead: (Jane & Billy) Ph. (08) 9 942 5936
Warroora gate key: Leonie Horrick (Gate Key): Exmouth Wk. Ph. (08) 9 949 1144, Exmouth Hm. Ph. (08) 9 949 2727
Exmouth Tourist Bureau: (08) 9 949 1176

3.3 Emergency contacts

General
CALM, Exmouth: Ph.(08) 9 949 1676 and (08) 9 949 2113, Fax (08) 9 949 1580
CALM, Marine Conservation Branch, Fremantle: Ph (08) 9 432 5100; Fax (08) 9 430 5408
Fisheries Department, Exmouth: Ph (08) 9 949 2755
Coral Bay Nursing Post: Ph. (08) 9 942 5828 (Maureen Woodhams private Ph. (08) 9 942 5825)
Exmouth Dive Centre: Coral Bay Ph (08) 9 942 5824; Exmouth Ph (08) 9 949 1201
Exmouth Hospital/Ambulance: Ph.(08) 9 949 1011, fax (08) 9 949 1017
Exmouth Police: Ph. (08) 9 949 2444

Fremantle Hyperbaric/Diving Service: (08) 9 431 2233 or (08) 9 431 3333
Royal Flying Doctor Service: Admin., Ph (08) 9 414 1200
Coral Bay Volunteer Rescue Group: Ph. (08) 9 942 5933 , Call Sign: VMR679, Channel 90 (UHF,VHF)
Emouth Sea Rescue Group: Ph. (08) 9 949 2382, Call Sign: VMR682, Channel 90 (UHF, VHF)

AIMS Satellite Phone: Ph. 0415 110476

Radio
CALM VHF Radio: Monitored at Exmouth office, use channel 11 (north of Yardie Creek) and channel 17 (south of Yardie Creek).
Marine HF - channel 2182, 4620. These channels will establish contact with:
Royal Flying Doctor Service: HF radio frequencies monitored 24 hrs are :
4045,4030,4010,5300,5360,6880,6890,6960 from Operations Centre, Jandakot.

4 SAFETY

CALM staff will be adhering to the AIMS diving and boating policy.

5 BUDGET

A budget of $2 600.00 has been allocated by CALM for this survey.

TRANSPORT		
2800 km Ningaloo to Perth;		
=2800km/car/day @ 45c/km		1260
Airfare (Exmouth/Perth		
-Jennie Cary (one way)		336
-Ben Radford (one way)		336
SUNDRY CONSUMABLES		
7* 60m DV tapes		175
Video film		334
5 * 12V @ $20.40 batteries		102
12 *'C'$1.00		12
30 *'AA @ $1.00	30	
Data sheet printed on underwater paper		75
OTHER		
Volunteer medical		140
TL3 course		275
Food		100
TOTAL		

In kind support for this project:
Jennie Cary: 15 days @ $604.00 is $9 060.00
Ray Lawrie: 10 days @ $518.00 is $5 180.00
Mike Lapwood: 3 days @ 360.00 is $1 080.00
Ben Radford (volunteer): 20days

Total in kind support from CALM is $15 320.00

Table 1 Field itinerary for DEP and CALM staff the period 19 July to 3 August.

Date	day	Site number location	Activity
19 July	M		Ray Lawrie and Ben Radford leave Perth 6.00am and arrive Coral Bay 5.00 pm. Meet boat at Pelican Point Katrina Baxter (DEP) flies into Learmouth 13:15 (Flight AN6563) – picked up by AIMS –AIMS drive to Coral Bay. Boat leaves early evening for Pelican Point site N24.
20	T	N24	Field work: Field team: Ray Lawrie, Ben Radford and Katrina Baxter
21	W	N14 and N22	Field work
22	Th	N13 and N12	Field work: Mike Fuller (DEP) arrives in Learmouth 12:40 (Flight AN6563) - AIMS car picks him up and takes him to boat
23	F	N11 and N25	Field work: Ray Lawrie leaves boat 7.00am and drives back to Perth Field crew: Ben Radford, Katrina Baxter and Mike Fuller
24	S	N10 and N9	Field work
25	S	N21	Field work
26	M	N8 and N7	Field work
27	T	N6	Field work
28	W	N5	Field work
29	Th	N20	Field work : Jennie Cary flies to Learmouth –AIMS vehicle picks her up and drives her to Boat
30	F	N3 and N2	Field work (field crew: Ben Radford, Katrina Baxter, Mike Fuller and Jennie Cary
31	S	N1	Field work
1 August	S	N19	Field work
2	M	Arrive Exmouth	Unpack; CALM field team arrive from Perth for 3 week field trip. Jennie Cary joins CALM field team and organises AIMS boat to be delivered to CALM camp. Cary and Radford stay at CALM house.
3	T		Katrina Baxter, Mike Fuller and Ben Radford fly back to Perth 13:35

SITE ID	1.		
LAT	……..°……..'S	**LONG**	….……°…….…'E
UTM N		**UTM E**	

COMMUNITY TYPE 1. CORALS 2. PORITES 3. MACROALGAE 4. SEAGRASS **5.** SAND		**% COVER** <10% 10-50% >50%
SUBSTRATE TYPE		**% COVER** <10% 10-50% >50%
ZONE		

DESCRIPTION OF BIOLOGICAL ASSEMBLAGE

…
…
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…
…

ICON SPECIES OR EVENTS

…
…
…

DATE		**TIME**	
DEPTH(m)		**DATUM**	
RECORDER		**OBSERVATION METHOD**	
VIDEO TAPE No.		**MINUTES**	

SITE ID	2.		
LAT	……..°……..'S	**LONG**	….……°…….…'E
UTM N		**UTM E**	

COMMUNITY TYPE 1. CORALS 2. PORITES 3. MACROALGAE 4. SEAGRASS **5.** SAND		**% COVER** <10% 10-50% >50%
SUBSTRATE TYPE		**% COVER** <10% 10-50% >50%
ZONE		

DESCRIPTION OF BIOLOGICAL ASSEMBLAGE

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ICON SPECIES OR EVENTS

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DATE		**TIME**	
DEPTH(m)		**DATUM**	
RECORDER		**OBSERVATION METHOD**	
VIDEO TAPE No.		**MINUTES**	

COMMUNITY

1. CORALS
2. PORITES
3. MACROALGAE
4. SEAGRASS
5. SAND
6.

SUBSTRATE

1. SAND
2. LIMESTONE PAVEMENT (LOW RELIEF)
3. LIMESTONE FRAMEWORK (HIGH RELIEF)
4. CORAL RUBBLE
5. MIXED SAND + FRAMEWORK
6. MIXED SAND + PAVEMENT
7.
8.

ZONE

1. OUTER REEF
2. REEF CREST
3. BACK REEF
4. LAGOON
5. CHANNEL
6. NOT CLASSIFIED