

**MARINE RESERVE IMPLEMENTATION:  
WA SOUTH COAST**

**BIOLOGICAL DATA FROM A SURVEY OF THE MAJOR MARINE  
BENTHIC HABITATS OF THE SOUTH COAST BETWEEN  
RED ISLAND AND STARVATION BOAT HARBOUR  
(23 MARCH-2 APRIL 1998)**

**Data Report: MRI/WSC/FBR - 41/2000**

A collaborative project between the Marine Conservation Branch and the South Coast Region of the Western Australian Department of Conservation and Land Management, and the University of Western Australia

**Prepared by  
K.P. Bancroft & J.A. Davidson  
Marine Conservation Branch**

**November 2000**



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Fremantle, Western Australia, 6160



## ACKNOWLEDGEMENTS

### *CALM Collaboration*

- Tim Daly - Technical Officer, MCB.
- John Watson - Manager, South Coast Region.
- Peter Collins - District Wildlife Officer, Albany District.
- Mark True - Ranger, Fitzgerald River National Park.
- John Lukins - CALM Volunteer.
- Rein von Nordheim - CALM Volunteer.

### *External Collaboration*

- Gary Kendrick - Botany Department, University of Western Australia.
- Simon Montgomery - Botany Department, University of Western Australia.
- Albertus Smit - Botany Department, University of Western Australia.
- Jamie Allnutt - South Coast Regional Co-ordinator, Coastwest-Coastcare.

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Copies of this report may be obtained from:

Marine Conservation Branch

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47 Henry St., Fremantle, Western Australia, 6160  
Ph: 61-8-9432 5100; Fax: 61-8-9430 5408

## SUMMARY

This report presents the results of a shore-based biological field survey of the major benthic habitats of the nearshore marine environment adjacent to the eastern section of the Fitzgerald Biosphere Reserve, from Red Island to Starvation Boat Harbour. The survey was carried out to systematically and quantitatively examine the shallow water fish fauna and macroalgal communities of the major benthic habitats within this region. The field survey was conducted from 23 March 1998 to 2 April 1998 and coordinated by the Western Australian Department of Conservation and Land Management's (CALM's) Marine Conservation Branch in collaboration with staff from CALM's South Coast Region, and marine scientists from the University of Western Australia.

The report of the Marine Parks and Reserves Selection Working Group (CALM, 1994), identified a number of marine areas adjacent to existing terrestrial reserves along the south coast, that were considered suitable candidate areas for possible incorporation into the state system of representative marine conservation reserves. This included several areas adjacent to the Fitzgerald Biosphere Reserves.

As a result of the high conservation value of these areas, a biological field survey of the major benthic habitats adjacent to the western section of the Fitzgerald Biosphere Reserve, from Groper Bluff to Red Island, was undertaken in March 1997. A second biological field survey (presented in this document) was conducted as a follow-up survey, to gather data on the major benthic habitats adjacent to the eastern section of the Fitzgerald Biosphere Reserve, from Red Island to Starvation Boat Harbour.

The primary objectives of this follow-up survey were to provide quantitative information on the fish fauna and macroalgal communities at representative sites within the major benthic habitats and to qualitatively investigate the influence of physical parameters, such as substrate type and wave exposure, on community diversity. The survey also involved the collection of data that can be utilised as baseline information for long-term monitoring of biological communities in these waters. The objectives of the survey were achieved.

The data acquired during this survey is important for the determination of the relative conservation values of the respective major benthic habitats of the nearshore marine environment, adjacent to the eastern section of the Fitzgerald Biosphere Reserve. It will also contribute to the information base that would be required for any future marine conservation reserve planning process, during which marine reserve boundaries and management zones would be considered for areas such as the Fitzgerald River and Stokes Inlet region.



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\* \* \*

## 1 INTRODUCTION

This report presents the results of a shore-based biological field survey, undertaken from 23 March 1998 to 2 April 1998, along the south coast of Western Australia from Red Island to Starvation Boat Harbour. This survey was carried out to systematically and quantitatively examine shallow water fish fauna and macroalgal communities of the major marine benthic habitats along the coast adjacent to the eastern section of the Fitzgerald Biosphere Reserve.

### 1.1 BACKGROUND

The report of the Marine Parks and Reserves Selection Working Group (CALM, 1994), identified a number of marine areas adjacent to existing terrestrial reserves along the south coast, that were considered suitable candidate areas for possible incorporation into the state system of representative marine conservation reserves. This included several areas adjacent to the Fitzgerald Biosphere Reserve. CALM (1994) also identified the lack of information on the marine flora and fauna of the area adjacent to the Fitzgerald Biosphere Reserve.

As a result of the high conservation value of the area and lack of biological information, a biological field survey of the area adjacent to the Fitzgerald Biosphere Reserve was undertaken in March 1997 (Colman, 1997a). The major benthic habitats adjacent to the western section of the Fitzgerald Biosphere Reserve, from Groper Bluff to Red Island were surveyed (Colman, 1997b; 1997c). Poor weather and sea conditions during the first week of the 1997 survey prevented sampling of the limestone reef system from Starvation Boat Harbour to East Mount Barren (apart from two sites immediately adjacent to Hopetoun) and of schist/quartzite reef sites between East Mount Barren and Red Island. During the second week of the 1997 survey, attempts were made to sample additional limestone and schist/quartzite reef sites. As a result of continued poor sea conditions and extremely low in-water visibility, no limestone reef sites were sampled east of Hopetoun and only a further three schist/quartzite reef sites were sampled in the area between Culham Inlet and Point Ann. Consequently, during the course of the 1997 survey only four limestone reef sites and five schist/quartzite reef sites were sampled quantitatively, compared to 18 granite reef sites and 12 seagrass sites.

The second biological field survey (March-April, 1998) was undertaken as a follow-up survey carried out to sample additional limestone reef and schist/quartzite reef sites in order to complete the data sets for the inshore marine environment adjacent to the entire length of the Fitzgerald Biosphere Reserve (Colman, 1998).

The Botany Department, University of Western Australia, undertook preliminary numerical analysis of the fish and macroalgae presence/absence data from the 1997 survey. The analysis indicated that the fish and macroalgae presence/absence data, combined with information on fish abundance and macroalgal biomass, provides sufficient information for an assessment of the relative diversity and conservation values of different inshore areas, both within and between major benthic habitats. Hence, during this follow-up survey only the reef fish fauna and macroalgal assemblages were sampled. There was no sampling made of the mobile macro-epibenthic invertebrate fauna, which were sampled during the 1997 survey (Colman, 1997b; 1997c).

The data acquired during this survey is important for the determination of the relative conservation values of the respective major benthic habitats of the nearshore marine environment, adjacent to the eastern section of the Fitzgerald Biosphere Reserve. It will also contribute to the information base that

would be required for any future marine reserve planning process, during which marine reserve boundaries and zones would be considered for areas such as the Fitzgerald River and Stokes Inlet region. This data will also be of use for ongoing management purposes by providing biological data on the marine flora and fauna for the area, which there is currently a lack of (CALM, 1994).

The field survey was coordinated by the Western Australian Department of Conservation and Land Management's (CALM's) Marine Conservation Branch (MCB) and conducted in collaboration with staff from CALM's South Coast Region, and marine scientists from the University of Western Australia.

## 1.2 OBJECTIVES

### *Primary objectives*

The primary objectives of the field survey were to:

- i. quantitatively describe the fish fauna and macroalgal assemblages at sites, which are representative of the major benthic habitats of the area adjacent to the Fitzgerald Biosphere Reserve, and ;
- ii. collect data on the fauna and flora density and biomass of these representative sites, as baseline information for long-term monitoring of these communities.

### *Secondary objective*

The secondary objective was to:

- i. opportunistically collect qualitative information on visually dominant fauna and flora at sites which are representative of the major benthic habitats of the area adjacent to the Fitzgerald Biosphere Reserve.

## 2 METHODS

### 2.1 SURVEY AREA

The area for this survey was in the nearshore marine environment adjacent to the eastern section of the Fitzgerald Biosphere Reserve from Red Island (119° 45' E) to Starvation Boat Harbour (120° 35' E), and extending seaward to the limit of the State Territorial waters, described as 3nm from the Territorial Sea Baseline (Figure 1).

This nearshore marine environment can be divided into two major coastal types, on the basis of geomorphologic features and these are (Colman, 1998):

1. Limestone shores, with narrow reefs and platforms parallel to the shore (Starvation Boat Harbour to East Mount Barren); and
2. Schist/quartzite cliffs and shores of the meta-sedimentary Barren Ranges (East Mount Barren to Point Ann).

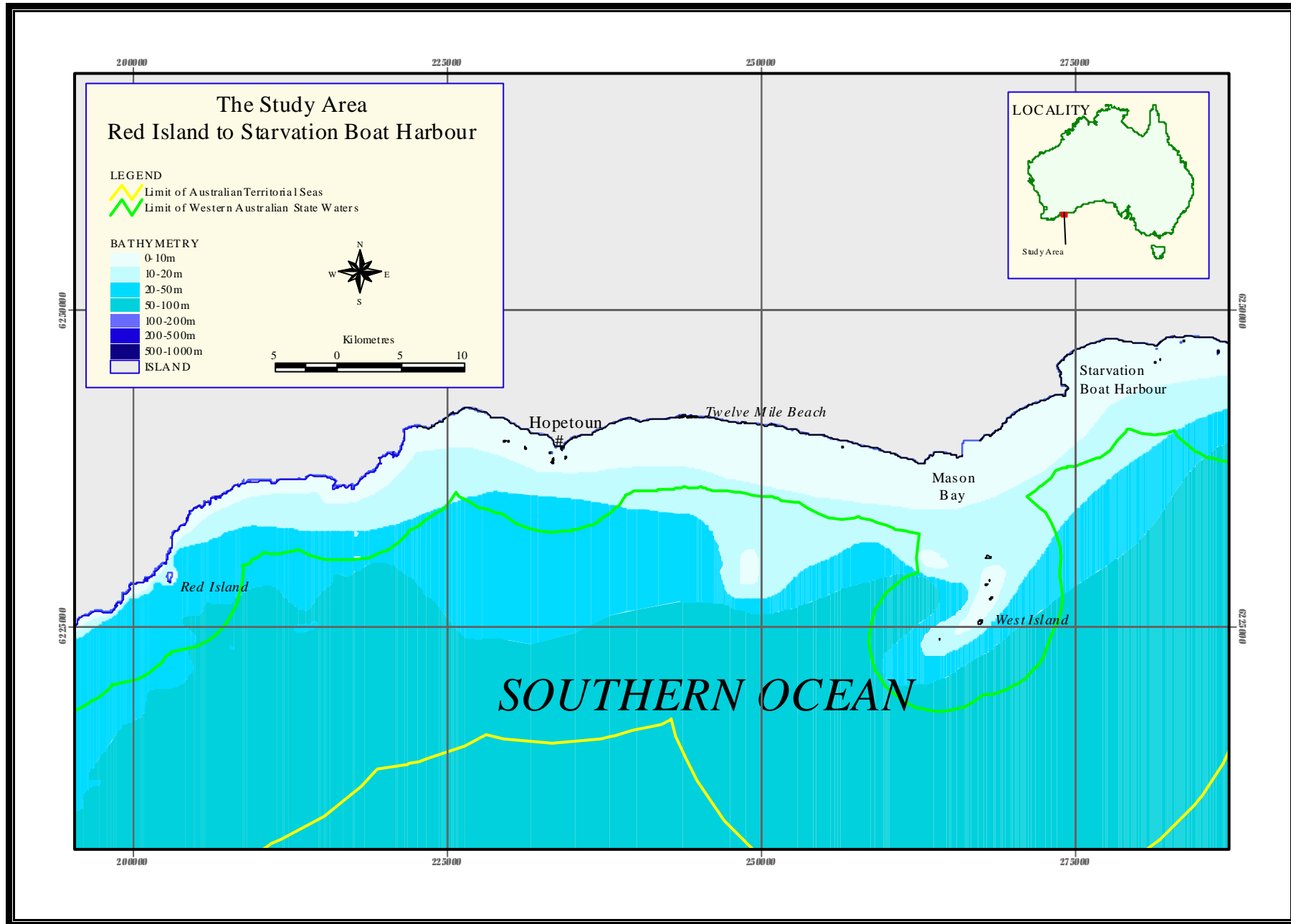


Figure 1. The study area: Red Island to Starvation Boat Harbour



## 2.2 SITE SELECTION

Prior to the field survey, sites were selected with reference to the benthic habitat map produced by Dr Hugh Kirkman CSIRO, in conjunction with aerial photographs and bathymetric charts. The sites were located in areas where the habitat (limestone reef and schist/quartzite reef) was  $\geq 100$  m in length (enough to ensure that the 100 m transects used did not extend on to bare sand). This was to ensure that potential sample bias, caused by 'edge effects', was minimized whenever possible. This is consistent with the methodologies employed for the 1997 Fitzgerald marine biological survey (Colman, 1997a; 1997c). Bare sand habitats were not surveyed during in this survey.

## 2.3 QUANTITATIVE SAMPLING METHODOLOGY

The quantitative sampling methodology carried out for the limestone and schist/quartzite reef sites on the field survey, was adapted from those utilised for the 1997 Fitzgerald marine biological survey (Colman, 1997c) and the short-term monitoring of biotic change in Tasmanian marine reserves (Edgar & Barrett, 1997).

The biological survey consisted of two quantitative elements:

- the relative diversity, species richness and abundance of visually obvious, non-cryptic reef fishes (Section 2.3.1), and;
- the relative diversity, species richness and density of macroalgal assemblages (Section 2.3.2).

A combination of a visual census for fish fauna and quadrat sampling of macroalgal assemblages were employed at each sampling site. Two 100 m transects were deployed from two inflatable dinghy, therefore a 200 m transect was sampled at each site. Site location was recorded using a hand-held Scoutmaster GPS (Appendix I).

### 2.3.1 Visual census of fish fauna

The presence, abundance and estimated size of all visually obvious reef fishes was recorded by two divers (Appendix II & III). They swam at an average speed of  $0.2 \text{ m}\cdot\text{sec}^{-1}$  along the center of a 5 m wide swathe on each side of the 200 m transect line. That is, the two divers remained together separated by a distance of 5 m and they each sampled a width of 5 m and a total length of 200 m. This visual census took approximately 20 minutes to complete. The data was recorded separately for each 50 m section, which were labeled T1 to T4 (i.e. transect 1 to transect 4), representing 4 x 50 m sub-samples for each diver. A total area of  $4 \times 500 \text{ m}^2$  was thus surveyed for reef fish fauna at each site.

Sites 43, 44, 46 and 47 were sampled using fewer sub-samples due to a number of reasons, including difficult weather conditions. The following transects were not sampled:

- T 4 for diver 2, at site 43;
- T 2 for diver 2, at site 44;
- T 4 for diver 1 and transect 3 for diver 2, at site 46, and;
- T 1 and 3 for diver 1, and transects 1 and 4 for diver 2, at site 47.

### 2.3.2 Quadrat sampling of macroalgal assemblages

The second pair of divers entered the water and followed up behind the first pair of divers, placing a 0.25 m<sup>2</sup> quadrat at 20 m intervals along one side of the transect line. The divers recorded an estimated percentage cover for each macroalgal species, using a quadrat without cross wires. This data is presented as Appendix IV.

A total of ten quadrats (2.5 m<sup>2</sup>) were sampled for each 200 m transect. Sites 48, 49, 58, 59 and 60 were sampled by only one diver using twelve quadrats, except site 58, which was sampled using the usual ten quadrats. Only the horizontal upper surfaces were sampled, and if a quadrat falls on a vertical surface the nearest horizontal surface was sampled.

## 2.4 QUALITATIVE SAMPLING METHODOLOGY

Qualitative habitat information was also collected at each site (Appendix V). Divers recorded the depth, substrate type, a description of the biological assemblage, and video footage of visually dominant flora and fauna. The habitats were classified as per the draft classification scheme (Table 1).

## 3 RESULTS

### 3.1 SITE AND HABITAT DATA

A total of 20 sites were sampled in the field (Figure 2). Site information, location, habitat classification and biological assemblage data was collected from these sites (Appendix I & V).

There were three habitat classifications used:

1. Macroalgae dominated limestone reef (9 sites);
2. Macroalgae dominated granite reef (10 sites), and;
3. Reef Platform (1 site).

These categories are briefly described in the draft broadscale marine ecological communities classification scheme presented in Table 1.



**Table 1. Draft broadscale marine ecological communities classification scheme (as at July 1999)**

HABITAT CLASSIFICATION	TIDAL RANGE	SUBSTRATE TYPE	TROPICAL	TEMPERATE	RELIEF	MACROBIOLOGY	COMMENTS
<b>1. Rocky shore</b>	Intertidal	igneous metamorphic sedimentary	✓	✓	high & low	bare	<ul style="list-style-type: none"> <li>• continuous rocky shore</li> <li>• cliff, boulders, pavement</li> <li>• around HWM</li> </ul>
<b>2. Beach</b>	Intertidal	sand	✓	✓	low	bare	<ul style="list-style-type: none"> <li>• continuous intertidal sand</li> </ul>
<b>3. Shoreline reef platform</b>	Intertidal	igneous metamorphic sedimentary	✓	✓	low	bare algal turf	<ul style="list-style-type: none"> <li>• continuous reef platform along the shoreline</li> </ul>
<b>4. Intertidal reef</b>	Intertidal	igneous metamorphic sedimentary	✓	✓	low	coralline algae, macroalgae	<ul style="list-style-type: none"> <li>• offshore</li> </ul>
<b>5. Mangal</b>	Intertidal	N/A	✓	✓	N/A	mangroves	<ul style="list-style-type: none"> <li>• continuous mangrove cover (&lt;1 ha)</li> </ul>
<b>6. Mudflat</b>	Intertidal	mud silts	✓	✓	N/A	bare algal mats	<ul style="list-style-type: none"> <li>• continuous intertidal mudflat</li> <li>• includes flats behind mangals</li> </ul>
<b>7. Salt marsh</b>	Intertidal	mud silt	✓	✓	N/A	samphire	<ul style="list-style-type: none"> <li>• continuous salt marsh cover (&gt;1 ha)</li> <li>• on protected or low energy coastline</li> </ul>

HABITAT CLASSIFICATION	TIDAL RANGE	SUBSTRATE TYPE	TROPICAL	TEMPERATE	RELIEF	MACROBIOLOGY	COMMENTS
<b>8. Coral reef</b>	Intertidal Subtidal	& N/A	✓		high & low	hard & soft corals	<ul style="list-style-type: none"> <li>• typical coral reef community</li> <li>• seaward reef slope, reef crest, back reef, reef flat and individual bommies</li> </ul>
<b>9. Rubble</b>	Subtidal	dead coral	✓		low	sparse live coral sparse vegetation	<ul style="list-style-type: none"> <li>• lagoonal areas</li> <li>• mainly unconsolidated coral rubble</li> </ul>
<b>10. Reef platform</b>	Subtidal	igneous metamorphic sedimentary	✓	✓	low	diverse algae sessile invertebrates (including sponges, sea-whips, sea-pens)	<ul style="list-style-type: none"> <li>• includes limestone pavement or low relief reef</li> </ul>
<b>11. Macroalgae dominated limestone reef</b>	Subtidal	sedimentary		✓	high & low	macroalgae	<ul style="list-style-type: none"> <li>• typically covered in macroalgae (&gt;10%) with diverse invertebrate life in overhangs &amp; caves</li> </ul>
<b>12. Macroalgae dominated granite reef</b>	Subtidal	igneous metamorphic	✓	✓	high & low	macroalgae	<ul style="list-style-type: none"> <li>• typically covered in macroalgae (&gt;10%) with diverse invertebrate life in overhangs &amp; caves</li> </ul>
<b>13. Macroalgal beds</b>	Subtidal	sand pavement	✓	✓	low	macroalgae	<ul style="list-style-type: none"> <li>• continuous macroalgal cover (&gt;1 ha)</li> <li>• seasonal macroalgae % coverage allowance (min 10%)</li> </ul>
<b>14. Seagrass meadows</b>	Subtidal	sand pavement	✓	✓	low	seagrasses	<ul style="list-style-type: none"> <li>• continuous (&gt;10%) seagrass coverage (&gt;1 ha)</li> <li>• perennials/ephemerals</li> </ul>

HABITAT CLASSIFICATION	TIDAL RANGE	SUBSTRATE TYPE	TROPICAL	TEMPERATE	RELIEF	MACROBIOLOGY	COMMENTS
15. Sand	Subtidal	Sand (generally white)	✓	✓	low	bare	<ul style="list-style-type: none"> <li>little or no vegetation</li> </ul>
16. Silt	Subtidal	muds silts	✓	✓	low	bare	<ul style="list-style-type: none"> <li>marine and/or terrigenous muds &amp; silts</li> <li>little or no vegetation</li> </ul>

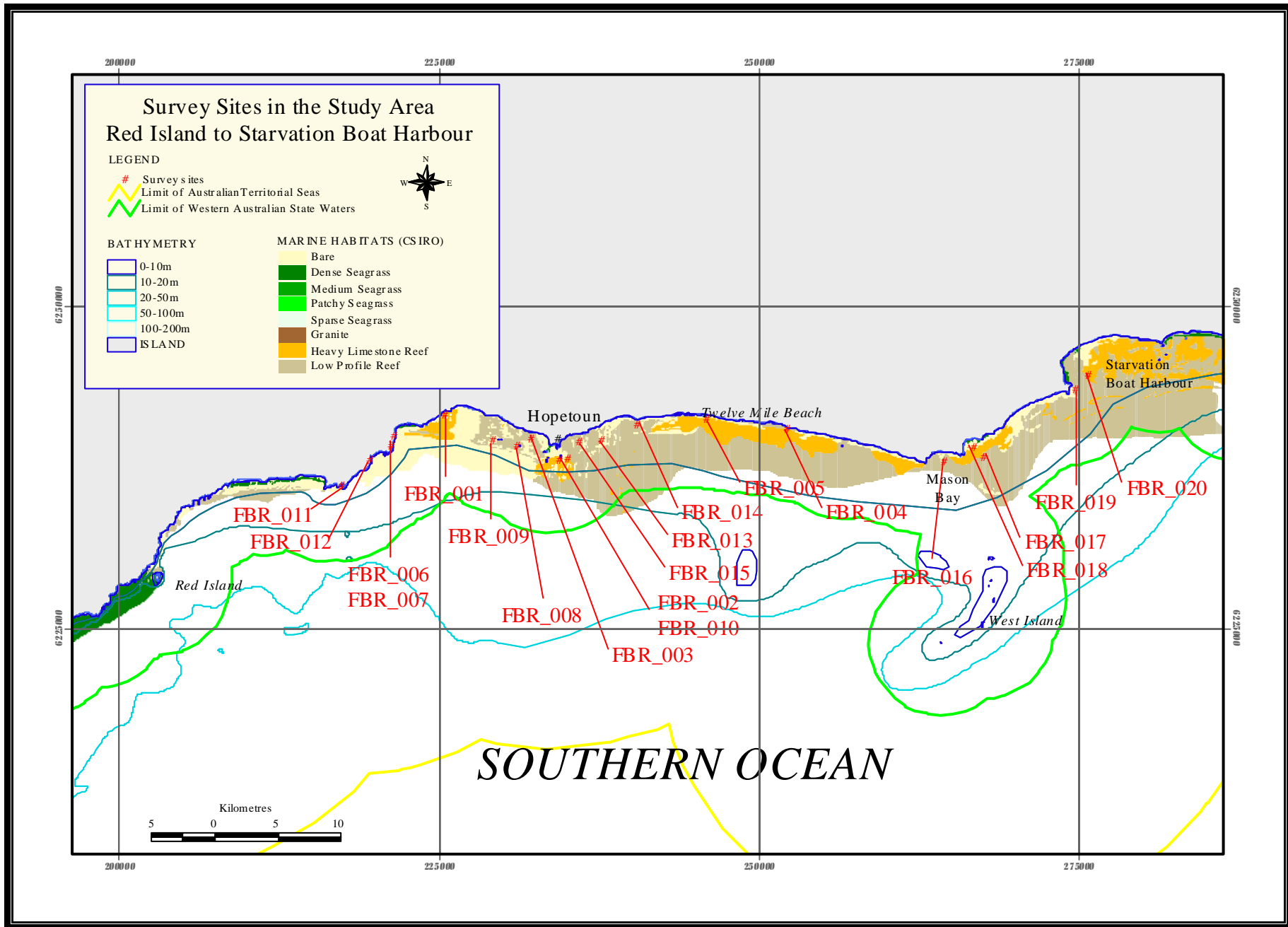


Figure 2. Survey sites in the study area: Red Island to Starvation Boat Harbour



### 3.2 FISH DATA

Presence, abundance and estimated length data of the visually dominant reef fish species were recorded for each site (Appendix II & III) and a species list was compiled (Appendix VI). A total of 88 species of fish were recorded.

The most abundant species were:

- Rough Bullseye;
- Common Bullseye;
- Wood's Siphonfish;
- Silver Trevally;
- Woodward's Pomfret;
- Herring;
- Southern Silverbelly;
- Old Wife;
- Sand Trevally;
- Fusilier Sweep, and;
- Silver Drummer.

The majority of fish recorded were between 1 and 10 inches (2.5-25cm) in length.

### 3.3 MACROALGAE DATA

The macroalgae abundance data was recorded for each site sampled in the study area (Appendix IV). This data was recorded as percentage cover for each species, hence the percentage of macroalgae cover for each quadrat may add up to greater than 100% due to the overlap of macroalgae in-situ. A species list was compiled (Appendix VII).

A total of 365 species of macroalgae were recorded, of which 101 were phaeophytes, 36 were chlorophytes, and 228 were rhodophytes.

Seven species of seagrass (Appendix VII) were also found to be present at some survey sites and subsequently recorded as a component of the macrophyte community. Bare sand/rock was also recorded as a component of the macrophyte community and has been given the codes 1000 and 1001 in the species list under the heading "substrate" (Appendix VII).

## 4 DATA MANAGEMENT

### 4.1 DATA REPORT

Hard copies of this report will be held at three locations:

1. Marine Conservation Branch, Department of Conservation and Land Management, 47 Henry St., Fremantle Western Australia, 6160. Ph. (08) 9432 5100 Fax. (08) 9430 5408.

2. Woodvale Library, Science and Information Division, Ocean Reef Rd., Woodvale, Western Australia, 6026. Ph. (08) 9405 5100 Fax. (08) 9306 1641.
3. Archives, Woodvale Library, Science and Information Division, Ocean Reef Rd., Woodvale, Western Australia, 6026. Ph. (08) 9405 5100 Fax. (08) 9306 1641.

The Marine Conservation Branch will hold digital copies of the Data Report at three locations:

1. The Marine Conservation Branch on-site: CD-ROM [MRI\_4100]
2. The Marine Conservation Branch off-site: CD-ROM [MRI\_4100] (stored with archived hard copy – Archives, Woodvale Library, Science and Information Division)
3. MCB homepage on the Department of Conservation and Land Management Intranet CALMweb:  
[http://calmweb.calm.wa.gov.au/dr/ncd/mcb/rep\\_pdf/mri\\_reps/mri\\_2000/mrirep00.htm#mri\\_4100](http://calmweb.calm.wa.gov.au/dr/ncd/mcb/rep_pdf/mri_reps/mri_2000/mrirep00.htm#mri_4100)

## 4.2 HABITAT DATA

All habitat data is recorded in the MCB habitats database which is located at the following directory pathways:

1. On the Marine Conservation Branch Server:  
T:\144-Marine Conservation Branch\Shared data\Databases\biological inventory\habitats.mdb
2. MCB Server full backup DAT tape, which is held by the MCB administration office:  
[T:\ 144-Marine Conservation Branch\Shared data\Databases\biological inventory\habitats.mdb]

## 5 REFERENCES

- CALM, (1994). A representative marine reserve system for Western Australia. A report of the Marine Parks and Reserves Selection Working Group. Department of Conservation and Land Management, Perth, Western Australia.
- Colman, J.G. (1997a). Biological survey of the major benthic habitats of the South Coast (Starvation Boat Harbour-Groper Bluff) 7-21 March 1997. Field Programme Report: MRIP/SC/F-02/1997. Department of Conservation and Land Management, Perth, Western Australia.
- Colman, J.G. (1997b). South Coast Terrestrial and Marine Reserve Integration Study. Final Report: MRIP/SC-10/1997. Department of Conservation and Land Management.
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Colman, J.G. (1998). Biological survey of the major benthic habitats of the South Coast (Starvation Boat Harbour-Red Island) 23 March-2 April. Field Programme Report: MRIP/SC-12/1998. Department of Conservation and Land Management, Perth, Western Australia.

Edgar, G.J. & Barrett, N.S. (1997). Short term monitoring of biotic change in Tasmanian marine reserves. *Journal of Experimental Marine Biology and Ecology*, Volume 213. pp. 261-279.

## APPENDICES



**APPENDIX I LATITUDE AND LONGITUDES OF SITES SAMPLED IN THE MAJOR BENTHIC HABITATS  
OF THE STUDY AREA**

Site No	Location	Latitude	Longitude	Time	Date	GPS type	Datum
FBR_001	Barrens Beach	-33.92917	120.03167	1000	24/03/98	GPS	WGS84
FBR_002	Seal Island	-33.96352	120.12715	0900	25/03/98	GPS	WGS84
FBR_003	Hopetoun	-33.94743	120.1042	1100	25/03/98	GPS	WGS84
FBR_004	Eleven Mile Beach	-33.94667	120.32067	1000	26/03/98	GPS	WGS84
FBR_005	Eleven Mile Beach	-33.93795	120.25308	1230	26/03/98	GPS	WGS84
FBR_006	Cave Point	-33.94943	120.98617	0930	27/03/98	GPS	WGS84
FBR_007	Mylies Beach West	-33.9431	119.9875	1100	27/03/98	GPS	WGS84
FBR_008	Hopetoun outer reef 1	-33.95217	120.09167	0815	28/03/98	GPS	WGS84
FBR_009	Hopetoun outer reef 2	-33.94802	120.07157	1000	23/03/98	GPS	WGS84
FBR_010	Seal Island east	-33.96183	120.13367	1230	28/03/98	GPS	WGS84
FBR_011	Edward's Point	-33.97702	119.94223	0900	29/03/98	GPS	WGS84
FBR_012	West Beach	-33.95855	119.96688	1030	29/03/98	GPS	WGS84
FBR_013	Two Mile Reef	-33.94957	120.1633	0900	30/03/98	GPS	WGS84
FBR_014	Three Mile Reef	-33.94022	120.19338	1100	30/03/98	GPS	WGS84
FBR_015	Hopetoun east	-33.95145	120.14433	1300	30/03/98	GPS	WGS84
FBR_016	Mason point	-33.97133	120.45205	0830	31/03/98	GPS	WGS84
FBR_017	Mason Bay south	-33.96862	120.4861	1100	31/03/98	GPS	WGS84
FBR_018	Mason Bay north	-33.96272	120.47768	1230	31/03/98	GPS	WGS84
FBR_019	Starvation Boat Harbour west	-33.92373	120.56535	0830	1/04/98	GPS	WGS84
FBR_020	Starvation Boat Harbour east	-33.91307	120.57582	1030	1/04/98	GPS	WGS84

<b>APPENDIX II ABUNDANCE AND ESTIMATED FISH LENGTH DATA COLLECTED IN THE STUDY AREA</b>
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Site	Date	Diver		Species	Estimated Fish Length (inches)																	
		No.	Transect		1	2	3	4	5	6	8	10	12	15	20	25	30	35	40			
F43	24-Mar-98	1	1	Dusky Morwong															1			
				Footballer sweep			1	3														
				McCulloch's Scalyfin								1										
				Old wife						1												
F43	24-Mar-98	1	2	Maori wrasse										1		1						
				Rough bullseye			7	3														
F43	24-Mar-98	1	3	Rough bullseye	55	12	6	2														
				McCulloch's Scalyfin								1										
				Common scalyfin								2										
				Old wife						2	1											
				Blue-spotted goatfish										2								
				Maori wrasse															1			
				Senator wrasse								1										
F43	24-Mar-98	1	4	Zebra fish					1				1									
				Old wife								2										
				Herring								3										
				McCulloch's Scalyfin								1										
				Maori wrasse							2	1	1									
				Horseshoe leatherjacket										1								
				Brown-spotted wrasse														1				
				Footballer sweep							3											
				Roughy										1								
				Western sea carp																1		
				Herring cale										1								
				Rough bullseye								1										
				F43	24-Mar-98	2	1	Footballer sweep					1									
McCulloch's Scalyfin												1										
Common scalyfin													1									
Yellow-striped leatherjacket													1									
Maori wrasse																		1				
Old wife												1	1									
Herring cale																					1	
F43	24-Mar-98	2	2	McCulloch's Scalyfin								2										
				Brownfield's wrasse				2	2													
				Herring cale								2	1									
				Maori wrasse							1	1	2	2								
				Rough bullseye				2	5	4	1											
				Brown-spotted wrasse										1								

Site	Date	Diver No.	Transect	Species	Estimated Fish Length (inches)															
					1	2	3	4	5	6	8	10	12	15	20	25	30	35	40	
				Horseshoe leatherjacket					2											
				False senator Wrasse				1												
				Senator wrasse				1												
<b>F43</b>	24-Mar-98	2	3	McCulloch's Scalyfin	1		1													
				Common scalyfin			1													
				Herring cale					1											
				Senator wrasse			1													
				Rough bullseye	80	30	5													
				Maori wrasse				1												
				Footballer sweep	1	1														
				Maori wrasse					2	2										
				Herring cale					1											
				Herring			2	7	2											
				Horseshoe leatherjacket					1											
				Moonlighter				1												

Site	Date	Diver No.	Transect	Species	Estimated Fish Length (inches)															
					1	2	3	4	5	6	8	10	12	15	20	25	30	35	40	
<b>F44</b>	25-Mar-98	1	1	Herring cale					3	1										
				Herring					5	7	2									
<b>F44</b>	25-Mar-98	1	2	Herring cale					1											
<b>F44</b>	25-Mar-98	1	3	Common bullseye	10															
				Wood's siphonfish	15															
				Sea sweep					1		2									
				Footballer sweep			2	3												
				Zebra fish									1							
				McCulloch's Scalyfin						1										
				Old wife				1												
				Western blue Groper							1									
				Senator wrasse				1												
<b>F44</b>	25-Mar-98	1	4	McCulloch's Scalyfin					3	1										
				Common scalyfin					1											
				Common bullseye	18	5														
				Moonlighter							1									
				Herring cale					3	2										
				Banded sweep						1										
				Old wife				2	8	1										
				Horseshoe leatherjacket							2									
				Western blue Groper						1										
				Sea sweep						1										
				Southern silverbelly				1												
				Maori wrasse					1											
				Blue-spotted toadfish						1										





Site	Date	Diver No.	Transect	Species	Estimated Fish Length (inches)															
					1	2	3	4	5	6	8	10	12	15	20	25	30	35	40	
				Blue-lined Leatherjacket							2									
				Horseshoe leatherjacket							2	1								
				Western sea carp														1		
				Pencil weed whiting				1												

Site	Date	Diver No.	Transect	Species	Estimated Fish Length (inches)															
					1	2	3	4	5	6	8	10	12	15	20	25	30	35	40	
<b>F46</b>	26-Mar-98	1	1	Banded sweep								1								
				Herring cale							1	1								
				Blue-spotted toadfish				1												
<b>F46</b>	26-Mar-98	1	2	Moonlighter							1									
				Herring cale								1								
				Maori wrasse								1								
<b>F46</b>	26-Mar-98	1	3	Herring cale								1								
				Silver trevally	5	5														
				Moonlighter								1								
				Maori wrasse								1								
<b>F46</b>	26-Mar-98	2	1	Banded sweep									1							
<b>F46</b>	26-Mar-98	2	2	Brown-spotted wrasse					1											
<b>F46</b>	26-Mar-98		4	Maori wrasse									1	1						
				Banded sweep								1		1						
				Herring cale										1						

Site	Date	Diver No.	Transect	Species	Estimated Fish Length (inches)															
					1	2	3	4	5	6	8	10	12	15	20	25	30	35	40	
<b>F47</b>	26-Mar-98	1	2	Blue-spotted goatfish							1									
				Herring cale									1							
<b>F47</b>	26-Mar-98	1	4	Brown-spotted wrasse										1						
<b>F47</b>	26-Mar-	2	2	Brown-spotted wrasse								1								

98

**F47** 26-Mar-98 2 3 Silver trevally 15  
Mosaic Leatherjacket 1

Site	Date	Diver No.	Transect	Species	Estimated Fish Length (inches)															
					1	2	3	4	5	6	8	10	12	15	20	25	30	35	40	
<b>F48</b>	27-Mar-98	1	1	Moonlighter					2											
				Banded sweep				1	1	2	1									
				Herring cale						1	1									
				Brown-spotted wrasse					1											
				McCulloch's Scalyfin				1												
				Common scalyfin					1											
				Black-spotted wrasse			2	2												
				Little rainbow wrasse		1														
				Red-banded wrasse				3												
				Pencil weed whiting			12													
				Sea sweep				2	1											
				Common bullseye					2											
<b>F48</b>	27-Mar-98			Yellow-headed prettyfin			3													
				Zebra fish						1										
				Western foxfish										1						
				Western blue Groper											1					
				Long-finned pike												22				
<b>F48</b>	27-Mar-98	1	2	Banded sweep						1	1									
				Herring cale						1	1									
				Sea sweep			2	3	2	3										
				Wood's siphonfish		7														
				Footballer sweep			1													
<b>F48</b>	27-Mar-98	1	3	Herring cale					2	1	2									
				Sea sweep				2	2											
				Rough bullseye		12														
				Sand trevally			6													
				Silver drummer									2	1						
				Maori wrasse			1													
				Brown-spotted wrasse				2			1									
				Senator wrasse				2												
				Zebra fish							1									
				Banded sweep							1									
				Footballer sweep			3													
<b>F48</b>	27-Mar-98	1	4	Western blue Groper										1						
				Woodward's pomfret			80													
				Brown-spotted wrasse				5	1	1										
				Footballer sweep			2													
				Herring cale							3									
				Senator wrasse				1												
				Silver drummer						2	5	5	2	1						

Site	Date	Diver No.	Transect	Species	Estimated Fish Length (inches)															
					1	2	3	4	5	6	8	10	12	15	20	25	30	35	40	
				Silver trevally			1													
				Banded sweep					1											
				Sea sweep				2	2	1										
				Moonlighter						1										
				McCulloch's Scalyfin					1											
				Breaksea cod								1								
				Red-banded wrasse				2	1											
<b>F48</b>	27-Mar-98	2	1	Footballer sweep		1	1	1												
				Banded sweep						1	3	3	2	1						
				Maori wrasse				4												
				Spotted pipefish			4													
				Blue-spotted toadfish			1													
<b>F48</b>	27-Mar-98	2	2	Banded sweep				2	3	3	3	1	2							
				Footballer sweep		2	3	1												
				Silver trevally		4	3													
				Moonlighter							1									
				Herring cale									1							
				Common scalyfin						1										
<b>F48</b>	27-Mar-98	2	3	Herring cale							1	1	2	2						
				Banded sweep				1	1	2	2	3	1							
				Footballer sweep		3	5	7	1	2										
				Silver trevally		6	3													
				Silver drummer									3	5	8	3				
				Moonlighter								1								
				Banded sweep							2	3	4	5						
<b>F48</b>	27-Mar-98	2	3	Brown-spotted wrasse									1							
<b>F48</b>	27-Mar-98	2	4	Silver drummer									1	4	4	2				
				Banded sweep							2	3	4	5	1					
				Footballer sweep		2	3	2												
				Herring cale									1							
				Silver trevally		3	2													
				Brown-spotted wrasse									1							

Site	Date	Diver No.	Transect	Species	Estimated Fish Length (inches)															
					1	2	3	4	5	6	8	10	12	15	20	25	30	35	40	
<b>F49</b>	27-Mar-98	1	1	Sea sweep							2	1								
				Banded sweep							1									
				Brown-spotted wrasse				2						1						
				Silver drummer							5	5	10							
				Old wife				4	3											
				Red-banded wrasse						2										
				Moonlighter						2										
				Magpie perch								2								



Site	Date	Diver No.	Transect	Species	Estimated Fish Length (inches)															
					1	2	3	4	5	6	8	10	12	15	20	25	30	35	40	
				Black-spotted wrasse			1													
				Western blue Groper									1							
				McCulloch's Scalyfin								1								
				Common scalyfin							1									
				Common bullseye							2									
				Harlequin fish															1	
				Herring			200													
<b>F49</b>	27-Mar-98	1	2	Zebra fish															1	
				Footballer sweep			3	3												
				Maori wrasse			1		1						1					
				Sand trevally			1													
				Old wife							2									
				Little rainbow wrasse			3													
				Sea sweep							5	9								
				Herring cale										1					1	
				Blue-lined Leatherjacket										1						
				Black-spotted wrasse			1													
				Senator wrasse			1													
				Moonlighter															1	
				Brown-spotted wrasse															1	
<b>F49</b>	27-Mar-98	1	3	Maori wrasse															2	1
				Footballer sweep			1	3	3											
				Sea sweep															3	1
				Little rainbow wrasse							5	1								
				Red-banded wrasse																1
				McCulloch's Scalyfin																1
				Brown-spotted wrasse																1
<b>F49</b>	27-Mar-98	1	4	Western sea carp																1
				Old wife																1
				Red-banded wrasse																2
				Little rainbow wrasse			1	5	2											
				Senator wrasse			4	2												
<b>F49</b>	27-Mar-98	1	4	Footballer sweep							4	3								
				Sea sweep																2
				Moonlighter							1	1	4	3						
				Herring cale																3
				Maori wrasse																1
				Blue-spotted goatfish																1
				McCulloch's Scalyfin																1
				Common scalyfin																1
<b>F49</b>	27-Mar-98	2	1	Sea sweep																2
																				4
																				1

Site	Date	Diver No.	Transect	Species	Estimated Fish Length (inches)															
					1	2	3	4	5	6	8	10	12	15	20	25	30	35	40	
				Silver drummer						1	2	2	2	2						
				Old wife					1	1										
				Prickly toadfish				1												
				Rough bullseye	1	3	2													
				Footballer sweep			1	1												
				Brown-spotted wrasse					1											
				Moonlighter						1		1								
<b>F49</b>	27-Mar-98	2	2	Moonlighter						1	1									
				Sea sweep					2	4	3	3								
				Old wife					1	1										
				Footballer sweep		1	2	3	2	1										
				Silver drummer						2	3	4	3	3	1					
				Herring cale										1						
				Maori wrasse						1										
<b>F49</b>	27-Mar-98	2	3	Maori wrasse						2			1							
				Footballer sweep					2	1										
				Sea sweep					2	4	4	3	2							
				Herring cale								1								
				Brown-spotted wrasse			1			1	1									
				Yellowtail mackerel								20								
				McCulloch's Scalyfin								1								
<b>F49</b>	27-Mar-98	2	4	Maori wrasse				1		2		1		1						
				Sea sweep						3	1	2	1							
				Banded sweep						1	2	1								
				Footballer sweep		1	2	1	2											
				Senator wrasse					2											
				Brown-spotted wrasse					1											
				McCulloch's Scalyfin						1										
				Common scalyfin						1										
				Zebra fish								1		1						
				Herring cale										1						

Site	Date	Diver No.	Transect	Species	Estimated Fish Length (inches)															
					1	2	3	4	5	6	8	10	12	15	20	25	30	35	40	
<b>F50</b>	28-Mar-98	1	1	McCulloch's Scalyfin						1										
			2	Wood's siphonfish		6														
				Herring cale						3										
				Yellow-striped leatherjacket							1									
				Sea sweep							1	1								
				Rough bullseye						1										
<b>F50</b>	28-Mar-98	1	3	Dusky Morwong													1			
				Western king wrasse							1									

Site	Date	Diver No.	Transect	Species	Estimated Fish Length (inches)															
					1	2	3	4	5	6	8	10	12	15	20	25	30	35	40	
				Maori wrasse				2	2	2	2	1								
				Sea sweep								6	1							
				McCulloch's Scalyfin					1											
				Common scalyfin			1													
				Herring cale						1										
				Brown-spotted wrasse				1		1										
				Western sea carp									1	1						
				Old wife					1	1										
				Footballer sweep					1											
				Moonlighter					2											
				Blue-spotted toadfish						1										
<b>F50</b>	28-Mar-98	1	4	Senator wrasse				2												
				Maori wrasse				2	1	1										
<b>F50</b>	28-Mar-98	2	1	Western king wrasse					1											
				Sea sweep								1		1						
				Western blue Groper						1										
				Footballer sweep			1	2	1											
				Common seadragon								1								
				Maori wrasse								1								
				Moonlighter					1											
				Brownfeild's wrasse			2	2												
<b>F50</b>	28-Mar-98	2	2	Maori wrasse					1											
				Brownfeild's wrasse			1	1												
				Silver trevally									3							
				Rough bullseye			3	5	1											
<b>F50</b>	28-Mar-98	2	3	Maori wrasse				3	1	1										
				Blue-spotted goatfish			1													
				Brownfeild's wrasse				4												
				Sea sweep								1	2							
				Brown-spotted wrasse						2										
				Old wife					1											
				Moonlighter					2											
				McCulloch's Scalyfin					1											
				Western sea carp									1	1						
				Banded sweep						1										
				Rough bullseye			80													
				Horseshoe leatherjacket					1											
				Footballer sweep					2											
<b>F50</b>	28-Mar-98	2	4	Senator wrasse					1											
				Leafy seadragon									1							
				Footballer sweep					1											

Site	Date	Diver No.	Transect	Species	Estimated Fish Length (inches)																
					1	2	3	4	5	6	8	10	12	15	20	25	30	35	40		
F50	28-Mar-98	1	1	Sea sweep														1			
				Maori wrasse				1													
				Herring cale							1	1									
				Brownfeild's wrasse				9													
				McCulloch's Scalyfin								1									
				Horseshoe leatherjacket									1								
				Yellow-striped leatherjacket																1	
F50	28-Mar-98	1	2	Sea sweep													2	1			
				Maori wrasse				2	1				1								
				Brown-spotted wrasse					2				1	1							
				Snakeskin wrasse									1								
				Little rainbow wrasse				4													
				Senator wrasse					1				1								
				Herring cale										1							
				Brownfeild's wrasse																1	
				F50	28-Mar-98	1	3	Little rainbow wrasse													
Herring cale																			1		
Rough bullseye									4	1											
Senator wrasse									1	2											
F50	28-Mar-98	1	4	Herring cale													3	1			
				McCulloch's Scalyfin																1	
				Maori wrasse																1	
F50	28-Mar-98	2	1	Senator wrasse														1			
				Sea sweep																1	
				Common scalyfin																	1
				Maori wrasse					1	2											
				Little rainbow wrasse						2											
				Footballer sweep					1	2											
				Herring cale																	1
F50	28-Mar-98	2	2	Maori wrasse														2	1		
				Sea sweep															1	1	
				Rough bullseye																16	
				Zebra fish																1	2
				Brownfeild's wrasse																10	
				Footballer sweep																1	
F50	28-Mar-98	2	3	Brown-spotted wrasse															1		
				Brownfeild's wrasse																5	
				Blue-spotted goatfish																	1
				Black-spotted wrasse																	1
				Maori wrasse																2	1

				Sea sweep						1				
				Footballer sweep				1	2					
				Western sea carp										2
				Banded sweep							1			
				McCulloch's Scalyfin								1		
				Southern silverbelly				1						
				Rough bullseye				1						

				<b>Estimated Fish Length (inches)</b>															
Site	Date	Diver No.	Transect	Species	1	2	3	4	5	6	8	10	12	15	20	25	30	35	40
F50	28-Mar-98	2	4	Maori wrasse	1				1										
				Black-spotted wrasse								1							
				Footballer sweep					1										
				McCulloch's Scalyfin									1						

				<b>Estimated Fish Length (inches)</b>															
Site	Date	Diver No.	Transect	Species	1	2	3	4	5	6	8	10	12	15	20	25	30	35	40
F52	28-Mar-98	1	1	Black-headed puller															1
				Senator wrasse				1											
				Little rainbow wrasse			1												
				McCulloch's Scalyfin															1
				Footballer sweep				1											
				Western sea carp												1			
				Silver trevally															20
				Southern silverbelly															150
				Herring cale															1

F52	28-Mar-98	1	2	Maori wrasse				3											
				Brown-spotted wrasse															1
				Black-spotted wrasse				1	1										
				Senator wrasse															2
				Wood's siphonfish			1												
				Sea sweep															1
				Footballer sweep															1
				Moonlighter															1
				Horseshoe leatherjacket															1
				Yellow-striped leatherjacket															1
				McCulloch's Scalyfin															1
				Common scalyfin															1
				Herring cale															2

F52	28-Mar-98	1	3	McCulloch's Scalyfin															1
				Common scalyfin															2
				Rough bullseye															1
				Maori wrasse															2 4 1
				Herring cale															1 1
				Southern silverbelly															1 1
				Footballer sweep															1
				Black-spotted wrasse															1
				Banded sweep															1 1
				Little rainbow wrasse															1
				Sea sweep															1

Site	Date	Diver No.	Transect	Species	Estimated Fish Length (inches)															
					1	2	3	4	5	6	8	10	12	15	20	25	30	35	40	
				Wood's siphonfish	1															
<b>F52</b>	28-Mar-98	1	4	Brownfeild's wrasse			7	1												
				Maori wrasse				2		1										
				Little rainbow wrasse	1			1												
				Southern silverbelly			1													
				Brown-spotted wrasse				1												
				Blue-spotted goatfish					1											
				Herring cale										1						
				Banded sweep											1					
				McCulloch's Scalyfin					1											
				Western king wrasse					1											
				Horseshoe leatherjacket						1										
<b>F52</b>	28-Mar-98	2	1	Herring cale											1					
				Brownfeild's wrasse					1											
<b>F52</b>	28-Mar-98	2	2	Red-banded wrasse							1									
				McCulloch's Scalyfin						1			1							
				Common scalyfin									1							
				Footballer sweep			1													
				Sea sweep									1	1						
				Banded sweep								1	1	1						
				Maori wrasse										1						
				Southern silverbelly	4	5														
				Blue-lined Leatherjacket										1						
<b>F52</b>	28-Mar-98	2	3	Sea sweep															1	
				Banded sweep															1	
				Maori wrasse					1	2	1	1								
				Footballer sweep					1	1										
				Brown-spotted wrasse							1									
<b>F52</b>	28-Mar-98	2	4	Horseshoe leatherjacket											1					
				Maori wrasse		1		1	2	1	2									
				Southern silverbelly		1	2													
				McCulloch's Scalyfin												1				
				Common scalyfin							1									
				Banded sweep									1	1						
				Black-spotted wrasse						1										
				Rough bullseye		1	2													
				Toothbrush Leatherjacket											2					
				Brown-spotted wrasse											1					

Site	Date	Diver No.	Transect	Species	Estimated Fish Length (inches)															
					1	2	3	4	5	6	8	10	12	15	20	25	30	35	40	
F53	29-Mar-98	1	1	Banded sweep														1		
				Brown-spotted wrasse					1	1										
				Senator wrasse				1												
				Sea sweep					1	1										
				Herring cale									1	1	1					
				False senator wrasse								1								
				Old wife							3	7								
				Moonlighter										1						
F53	29-Mar-98	1	2	Brown-spotted wrasse							2	2								
				Old wife				1	8	10										
				Footballer sweep				3												
				Moonlighter								1								
				Herring cale							2	1								
				Sea sweep							1	2								
				McCulloch's scalyfin							1									
				Herring															2	
				F53	29-Mar-98	1	3	Sea sweep					1	3	5					
Footballer sweep								3												
Blue-lined Leatherjacket													2							
McCulloch's scalyfin												1								
Silver Trevally									12											
Brown-spotted wrasse																	1			
Blue-spotted Toadfish														1						
F53	29-Mar-98	1	3	Moonlighter							1									
F53	29-Mar-98	1	4	Brown-spotted wrasse					2	1										
				Blue-spotted Toadfish					1											
				Herring cale									2							
				Footballer sweep					1	1										
				Moonlighter									2							
				McCulloch's scalyfin									1							
				Rough Bullseye						2	3									
F53	29-Mar-98	2	1	Banded Sweep						1	1	1								
				Sea sweep							2	1								
				Herring cale												2				
				Rough Bullseye									1							
				Old wife								2	2	1						
				Brown-spotted wrasse									1							
F53	29-Mar-98	2	2	Herring cale													1			
				Old wife					4	12	7	5	1							
				Sea sweep							1	3	4	1						

Site	Date	Diver No.	Transect	Species	Estimated Fish Length (inches)															
					1	2	3	4	5	6	8	10	12	15	20	25	30	35	40	
				Footballer sweep			1	1												
				Blue-lined Leatherjacket															1	
				Zebra fish															1	
<b>F53</b>	29-Mar-98	2	3	Sea sweep					1	3	3	1								
				Black-spotted Wrasse				1												
				McCulloch's scalyfin									1							
				Common Scalyfin							1									
				Zebra fish							2	2	1							
				Banded Sweep										1						
				Old wife					1	3	1									
				Brown-spotted wrasse										1						
<b>F53</b>	29-Mar-98	2	4	Herring cale															1	
				Footballer sweep			1	3												
				Rough Bullseye			1		1	2										
				Sea sweep							2	3								
				Moonlighter															1	

Site	Date	Diver No.	Transect	Species	Estimated Fish Length (inches)															
					1	2	3	4	5	6	8	10	12	15	20	25	30	35	40	
<b>F54</b>	29-Mar-98	1	1	Brown-spotted wrasse																1
				Southern Silverbelly				1												
				Sea sweep							2									
				Maori Wrasse																1
				McCulloch's scalyfin								1								
				Senator wrasse				1												
				Rough Bullseye				2	1											
				False senator wrasse																1
<b>F54</b>	29-Mar-98	1	2	Brown-spotted wrasse								1								
				Western Blue Groper																1
				Banded Sweep																1
<b>F54</b>	29-Mar-98	1	2	McCulloch's scalyfin																1
				Rough Bullseye						1										
				Silver Drummer																1
				Maori Wrasse								1								
				Sand Trevally							3									
<b>F54</b>	29-Mar-98	1	3	Moonlighter																1
				Footballer sweep																1
				Maori Wrasse																1
				Red-banded Wrasse																1
				Herring cale																1
				Brown-spotted wrasse																1



Site	Date	Diver No.	Transect	Species	Estimated Fish Length (inches)																	
					1	2	3	4	5	6	8	10	12	15	20	25	30	35	40			
F54	29-Mar-98	1	4	Red-banded Wrasse			2	3														
				Maori Wrasse							2	1										
				Senator wrasse							1											
				Herring cale									1	3								
				Little rainbow Wrasse					1													
				Rough Bullseye					1													
				Sand Trevally					50													
				Sea sweep											1							
				Queen Snapper																1		
				Footballer sweep							1											
F54	29-Mar-98	2	1	Sea sweep							1	1										
				Brown-spotted wrasse						1												
				Moonlighter									1	1								
F54	29-Mar-98	2	2	Maori Wrasse								1										
				Footballer sweep						2	1											
				Rough Bullseye			2	3	2				3									
				Sea sweep						1	1	2	2									
				Horseshoe Leatherjacket												3						
				Silver Drummer																2		
				Southern Silverbelly					3													
F54	29-Mar-98	2	3	Red-banded Wrasse					1	2												
				Sea sweep								1	1									
				Footballer sweep							1											
				Maori Wrasse									1									
				Western Blue Groper												1			1			
				Moonlighter										1								
F54	29-Mar-98	2	4	Maori Wrasse							1					1						
				Senator wrasse							1											
				Sea sweep									2	2								
				Herring cale													1					
				McCulloch's scalyfin												1						
				Sand Trevally						40												
				Footballer sweep										1								

Site	Date	Diver No.	Transect	Species	Estimated Fish Length (inches)																
					1	2	3	4	5	6	8	10	12	15	20	25	30	35	40		
F55	30-Mar-98	1	1	Magpie Perch														1			
				Brown-spotted wrasse								1									
				Blue-lined Leatherjacket										1							
				Blue-spotted Goatfish											2						
F55	30-Mar-98	1	2	Banded Sweep								1									
				Moonlighter									1								
				Magpie Perch											1						
				Maori Wrasse							1				1	2					

Site	Date	Diver No.	Transect	Species	Estimated Fish Length (inches)																
					1	2	3	4	5	6	8	10	12	15	20	25	30	35	40		
				Horseshoe Leatherjacket														1			
				McCulloch's scalyfin														1			
				Senator wrasse				1	1												
<b>F55</b>	30-Mar-98	1	3	Maori Wrasse															2		
				Common Scalyfin														1			
<b>F55</b>	30-Mar-98	1	4	McCulloch's scalyfin															1		
				Yellow-striped Leatherjacket															2		
				Maori Wrasse														1	1	2	
				Brown-spotted wrasse															1		
				Footballer sweep															2	1	
				Senator wrasse															1	1	
				Little rainbow Wrasse															1	1	
<b>F55</b>	30-Mar-98	2	1	Old wife																2	
				McCulloch's scalyfin																1	
				Blue-spotted Goatfish																1	
				Moonlighter																1	1
<b>F55</b>	30-Mar-98	2	2	Banded Sweep																1	
				Common Seadragon																1	
				Footballer sweep																1	
				Maori Wrasse																1	
<b>F55</b>	30-Mar-98	2	3	Maori Wrasse																1	
				Footballer sweep																1	
<b>F55</b>	30-Mar-98	2	4	Maori Wrasse																2	1
				Common Scalyfin																1	
				Herring cale																1	
				Moonlighter																1	
				Magpie Perch																1	
				Horseshoe Leatherjacket																1	1
				Footballer sweep																1	2
				Brown-spotted wrasse																1	

Site	Date	Diver No.	Transect	Species	Estimated Fish Length (inches)																			
					1	2	3	4	5	6	8	10	12	15	20	25	30	35	40					
<b>F56</b>	30-Mar-98	1	1	Fusilier Sweep																	120			
				McCulloch's scalyfin																	2			
				Common Scalyfin																	3			
				Rough Bullseye																	1			
				Senator wrasse																	1	1		
<b>F56</b>	30-Mar-98	1	1	Herring cale																	2	1	2	2
				Sea sweep																			1	
				Maori Wrasse																			2	
				Western Blue Groper																			1	
<b>F56</b>	30-Mar-98	1	2	Sea sweep																			1	

Site	Date	Diver No.	Transect	Species	Estimated Fish Length (in che:)															
					1	2	3	4	5	6	8	10	12	15	20	25	30	35	40	
				Herring cale								2	1							
				McCulloch's scalyfin						1	1									
				Maori Wrasse						1	1									
<b>F56</b>	30-Mar-98	1	3	Common Scalyfin						1										
				Senator wrasse			2	4												
				Brown-spotted wrasse								1								
				Unidentified			1													
				Maori Wrasse								1								
<b>F56</b>	30-Mar-98	1	4	Footballer sweep			3													
				Sea sweep							1	1	1							
				McCulloch's scalyfin						2	1									
				Common Scalyfin						1	1									
				Brown-spotted wrasse						1		1								
				Maori Wrasse								1	1							
				Senator wrasse				1												
				Zebra fish								1	1							
				Banded Sweep							1									
				Little rainbow Wrasse			1													
				Herring cale									1							
				Horseshoe Leatherjacket								1								
<b>F56</b>	30-Mar-98	2	1	McCulloch's scalyfin						1	1									
				Herring cale									1							
				Brownfield's Wrasse				4												
				Maori Wrasse								1								
				Senator wrasse				1												
<b>F56</b>	30-Mar-98	2	2	Brownfield's Wrasse			2													
				McCulloch's scalyfin							1	1								
				Common Scalyfin						1										
				Old wife								1								
				Rough Bullseye			1	1												
				Sea sweep								1	1							
<b>F56</b>	30-Mar-98	2	3	Footballer sweep						1										
				Common Scalyfin								1								
				Herring cale						1										
<b>F56</b>	30-Mar-98	2	4	McCulloch's scalyfin							1	1								
				Maori Wrasse									1	1						
				Sea sweep			1	1			1	1	1							
				Footballer sweep			2	1												
				Brown-spotted wrasse							1									
				Zebra fish									1							

Site	Date	Diver No.	Transect	Species	Estimated Fish Length (inches)																	
					1	2	3	4	5	6	8	10	12	15	20	25	30	35	40			
F57	30-Mar-98	1	1	Brownfield's Wrasse	1	1																
				Footballer sweep	2	3																
				Maori Wrasse			3	1	1	1												
				Sea sweep									1	1								
				Black-spotted Wrasse					2													
				Brown-spotted wrasse					2													
				McCulloch's scalyfin					1					1								
				Common Scalyfin					1					1								
				Sand Trevally						6												
				Moonlighter					1													
				Horseshoe Leatherjacket										2								
				Senator wrasse						1												
				Little rainbow Wrasse					2	1												
				Blue-spotted Goatfish										1								
Zebra fish															3							
F57	30-Mar-98	1	2	Maori Wrasse				3	1	3	1											
				Footballer sweep				3	1													
				Moonlighter				2														
				Sea sweep							1					1						
				Senator wrasse				1														
				McCulloch's scalyfin							1											
				Black-spotted Wrasse							3											
				Brown-spotted wrasse							2	2										
				Blue-lined Leatherjacket								1										
				Western Blue Groper													1					
				Yellow-striped Leatherjacket										1								
F57	30-Mar-98	1	3	Black-spotted Wrasse				1														
				Footballer sweep				2	4	3												
				Silver Drummer												2	3	4				
				Zebra fish												1	1					
				Banded Sweep												1						
				Woodward's Pomfret							20											
				Western king Wrasse							1											
				Brown-spotted wrasse						1	1	1										
				Sea sweep													2					
				Maori Wrasse								1	1	2								
Yellow-striped Leatherjacket													1									
F57	30-Mar-98	1	4	Senator wrasse			1	2														
				Maori Wrasse				1	1	1												
				Western king Wrasse					1				1									
				Sea sweep									1	2								
				Blue-spotted Goatfish												1						
				Yellow-striped Leatherjacket														1				
				Brownfield's Wrasse						2	1											
				Footballer sweep							1	1										
				Moonlighter													1					
Southern Silverbelly															1							

Site	Date	Diver No.	Transect	Species	Estimated Fish Length (inches)																
					1	2	3	4	5	6	8	10	12	15	20	25	30	35	40		
F57	30-Mar-98	2	1	Footballer sweep			1	1	1												
				Maori Wrasse									1								
				Sea sweep									1	1	1						
				Zebra fish											1	2					
				Banded Sweep										1							
				Black-spotted Wrasse						1											
				Moonlighter						1											
				Brown-spotted wrasse										1							
				Yellow-striped Leatherjacket												1					
F57	30-Mar-98	2	2	Brown-spotted wrasse					1		1										
				Footballer sweep			2	2	2												
				Sea sweep									1	2	2						
				Western king Wrasse						1	1										
				Western Blue Groper																1	
				Zebra fish															1		
				Maori Wrasse										1							
								Yellow-striped Leatherjacket						1							
F57	30-Mar-98	2	3	Banded Sweep									1								
				Sea sweep						1	2	2	1	1							
				Footballer sweep			1	2	1												
				Maori Wrasse						1	2	1	1								
				Rough Bullseye						1											
				Western Blue Groper																	1
				Blue-lined Leatherjacket											1						
				Yellow-striped Leatherjacket										1							
				Brown-spotted wrasse										1							
				Horseshoe Leatherjacket											1						
								Silver Drummer									1	2	1		
F57	30-Mar-98	2	4	Horseshoe Leatherjacket						2											
				Silver Drummer									2	2	1						
				Herring cale										1							
				Common Scalyfin										1							
				Banded Sweep									1	1							
				Sea sweep										2	1						
				Moonlighter								1	1								
				Zebra fish															1		
								Footballer sweep			1	2									

Site	Date	Diver No.	Transect	Species	Estimated Fish Length (inches)															
					1	2	3	4	5	6	8	10	12	15	20	25	30	35	40	
F58	31-Mar-98	1	1	Maori Wrasse										2						
				Herring									150							
				Sea sweep										1		1				
F58	31-Mar-98	1	2	Sea sweep										1						
				Maori Wrasse										3		1				

Site	Date	Diver No.	Transect	Species	Estimated Fish Length (inches)															
					1	2	3	4	5	6	8	10	12	15	20	25	30	35	40	
F58	31-Mar-98	1	3	Maori Wrasse							2	1								
				Sea sweep								2	1	1						
				Sand Trevally			8													
				Banded Sweep									1							
F58	31-Mar-98	1	4	Sand Trevally			1													
				Sea sweep									1							
				Maori Wrasse				1		1	3	1								
F58	31-Mar-98	2	1	Maori Wrasse								1	1							
				Sea sweep									1							
				Banded Sweep										1						
F58	31-Mar-98	2	2	Maori Wrasse							1									
				Sea sweep									1							
F58	31-Mar-98	2	3	Sea sweep										1	1					
				Maori Wrasse							1	1								
F58	31-Mar-98	2	4	Maori Wrasse										1						

Site	Date	Diver No.	Transect	Species	Estimated Fish Length (inches)															
					1	2	3	4	5	6	8	10	12	15	20	25	30	35	40	
F59	31-Mar-98	1	1	Moonlighter							1									
				McCulloch's scalyfin								1								
				Common Scalyfin								2								
				Maori Wrasse				3			1									
				Dusky Morwong																1
				Western Blue Groper													1			
				Queen Snapper															1	
				Western king Wrasse							2	3								
				Yellow-headed Prettyfin					6											
				Little rainbow Wrasse					1											
				Pencil weed Whiting						1										
				F59	31-Mar-98	1	2	Maori Wrasse				3		1						
Western Blue Groper													2							
Brown-spotted wrasse									1											
Rough Bullseye											1									
Little rainbow Wrasse									1											
Senator wrasse									2											
F59	31-Mar-98	1	3	Herring cale							1									
				Little rainbow Wrasse				2												
				Western Blue Groper										1						
				Maori Wrasse							1									
F59	31-Mar-98	1	4	Footballer sweep					2											
				Maori Wrasse							3									
				Sea sweep								1	1							

Site	Date	Diver No.	Transect	Species	Estimated Fish Length (inches)															
					1	2	3	4	5	6	8	10	12	15	20	25	30	35	40	
				Little rainbow Wrasse			2													
				Herring cale						1										
<b>F59</b>	31-Mar-98	2	1	Moonlighter						1	1									
				Maori Wrasse					1											
<b>F59</b>	31-Mar-98	2	2	Herring cale											1					
				Maori Wrasse						1										
<b>F59</b>	31-Mar-98	2	3	Black-spotted Wrasse				1	1											
				Maori Wrasse						1					1					
				McCulloch's scalyfin											1					
<b>F59</b>	31-Mar-98	2	4	Footballer sweep						1										
				Herring cale													1			
				Sea sweep											1					

Site	Date	Diver No.	Transect	Species	Estimated Fish Length (inches)															
					1	2	3	4	5	6	8	10	12	15	20	25	30	35	40	
<b>F60</b>	31-Mar-98	1	1	Brown-spotted wrasse	1		1	2												
				Brownfield's Wrasse			1	1												
				Western Blue Groper							1									
		1	2	Brown-spotted wrasse					2	1										
				Brownfield's Wrasse	1		1	1												
				Blue-spotted Goatfish	1															
<b>F60</b>	31-Mar-98	1	3	Moonlighter						3										
				Banded Sweep										1						
				Brown-spotted wrasse			1	2	5	1										
				Footballer sweep					1											
				False senator wrasse					1											
<b>F60</b>	31-Mar-98	1	4	Brown-spotted wrasse					10	1	1									
				Horseshoe Leatherjacket							1									
				Senator wrasse				3	3											
				Zebra fish										2						
				Brownfield's Wrasse				3	1											
				Little rainbow Wrasse			3													
				Footballer sweep				1												
				Moonlighter					1											
				Western Blue Groper											1					
<b>F60</b>	31-Mar-98	2	1	Brown-spotted wrasse					1	1										
<b>F60</b>	31-Mar-98	2	2	Red-banded Wrasse				1	1											
				Western Blue Groper											1					
<b>F60</b>	31-Mar-98	2	3	Rough Bullseye				1	2											
				Footballer sweep											1					
				Senator wrasse						1										

Site	Date	Diver No.	Transect	Species	Estimated Fish Length (inches)															
					1	2	3	4	5	6	8	10	12	15	20	25	30	35	40	
				Moonlighter							1									
<b>F60</b>	31-Mar-98	2	4	Horseshoe Leatherjacket							1									
				Brown-spotted wrasse				1	1	1										
				Zebra fish									1	1						
				Western Blue Groper									1							
				Black-spotted Wrasse			2													
				Footballer sweep						1										

Site	Date	Diver No.	Transect	Species	Estimated Fish Length (inches)															
					1	2	3	4	5	6	8	10	12	15	20	25	30	35	40	
<b>F61</b>	1-Apr-98	1	1	Zebra fish									2							
				Footballer sweep				1												
				Maori Wrasse					1	3	1									
				Red-banded Wrasse				1												
				Common Scalyfin					1											
				Wood's Siphonfish	45															
				Brown-spotted wrasse				1												
				Snakeskin Wrasse					1											
				Black-spotted Wrasse				1												
				Senator wrasse						1										
<b>F61</b>	1-Apr-98	1	2	Pencil weed Whiting			1													
				Maori Wrasse									1							
<b>F61</b>	1-Apr-98	1	3	Wood's Siphonfish	30															
				Footballer sweep				1												
				Black-spotted Wrasse				1												
				Maori Wrasse									1							
<b>F61</b>	1-Apr-98	1	4	Blue-lined Leatherjacket					1											
				Senator wrasse					1											
				Herring cale								1								
				Blue-spotted Goatfish								1								
<b>F61</b>	1-Apr-98	2	1	Maori Wrasse								2	1							
				Wood's Siphonfish	30															
				Rough Bullseye				2	3	2										
<b>F61</b>	1-Apr-98	2	2	Maori Wrasse			1		1	2	1									
				Footballer sweep				1	1											
<b>F61</b>	1-Apr-98	2	3	Unidentified				1												
				Common Scalyfin					1											
				Blue-spotted Goatfish								1								
				Maori Wrasse						1	1									
<b>F61</b>	1-Apr-98	2	4	Maori Wrasse						1	1									
				Footballer sweep						1										



Site	Date	Diver No.	Transect	Species	Estimated Fish Length: (inches)															
					1	2	3	4	5	6	8	10	12	15	20	25	30	35	40	
F62	1-Apr-98	1	1	Brownfield's Wrasse			2	5												
				Pencil weed Whiting			4													
				Maori Wrasse				1												
				Little rainbow Wrasse				1												
				McCulloch's scalyfin								1								
F62	1-Apr-98	1	2	Western rock blackfish										2						
				McCulloch's scalyfin							1									
				Red-banded Wrasse							1									
F62	1-Apr-98	1	3	Common Scalyfin								1								
				Maori Wrasse							2	1								
				Herring cale									1							
				Common bullseye			22	2												
F62	1-Apr-98	1	4	Old wife					1	1										
				Common Scalyfin							1									
				Maori Wrasse							1									
				Brown-spotted wrasse						1										
				McCulloch's scalyfin									3							
				Herring										15						
				Sea sweep								1				1				
				Herring cale										1						
				Rough Bullseye			20													
F62	1-Apr-98	2	1	McCulloch's scalyfin										1						
				Maori Wrasse									1							
				Rough Bullseye						1										
				Brownfield's Wrasse						3										
F62	1-Apr-98	2	2	Blue-spotted Goatfish										1						
				McCulloch's scalyfin								1		2						
				Maori Wrasse							1		2		1					
				Rough Bullseye						1										
				Herring cale									1	1						
				Sea sweep										1					1	
F62	1-Apr-98	2	3	Snakeskin Wrasse				1												
				Maori Wrasse									1							
				McCulloch's scalyfin											1					
F62	1-Apr-98	2	4	Maori Wrasse									1		1					
				McCulloch's scalyfin										1						
				Old wife									1	1						
				Herring cale											1					

**APPENDIX III PRESENCE/ABSENCE DATA OF FISH SPECIES RECORDED IN LIMESTONE, GRANITE AND SCHIST/QUARTZITE HABITATS OF THE STUDY AREA.**

Species	Limestone Reef										Granite Reef				Schist/Quartzite Reef					
	43	44	45	50	51	52	57	59	60	62	46	47	58	61	48	49	53	54	55	56
Banded Sweep		1	1	1	1	1	1		1		1		1		1	1	1	1	1	1
Black-headed Puller						1														
Black-spotted Wrasse			1		1	1	1	1	1				1		1	1	1			
Blue-lined Leatherjacket			1			1	1						1			1			1	
Blue-spotted Goatfish	1	1		1	1	1	1		1	1		1				1			1	
Blue-spotted Toadfish		1		1							1				1		1			
Breaksea Cod															1					
Brownfield's Wrasse	1			1	1	1	1		1	1										1
Brown-spotted Wrasse	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1
Common Bullseye		1	1												1	1				1
Common Scalyfin	1	1	1	1	1	1	1	1	1	1			1		1	1	1		1	1
Common Seadragon				1															1	
Dusky Morwong	1		1	1				1												
False senator Wrasse	1								1								1	1		
Footballer Sweep	1	1		1	1	1	1	1	1	1			1		1	1	1	1	1	1
Fusilier Sweep																				1
Harlequin fish																1				
Herring cale	1	1		1	1	1	1	1		1	1	1	1		1	1	1	1	1	1
Horseshoe Leatherjacket	1	1	1	1	1	1	1		1								1	1	1	1
Leafy Seadragon				1																
Little Rainbow wrasse					1	1	1	1	1	1					1	1		1	1	1
Long-finned Pike															1					
Magpie Perch																1			1	
Maori Wrasse	1	1	1	1	1	1	1	1		1		1	1		1	1		1	1	1
McCulloch's Scalyfin	1	1	1	1	1	1	1	1							1	1	1	1	1	1
Moonlighter	1	1	1	1		1	1	1	1		1				1	1	1	1	1	
Mosaic Leatherjacket												1								

Species	Limestone Reef										Granite Reef				Schist/Quartzite Reef					
	43	44	45	50	51	52	57	59	60	62	46	47	58	61	48	49	53	54	55	56
Old Wife	1	1		1												1	1		1	1
Pencil weed Whiting				1				1		1			1		1					
Prickly Toadfish																1				
Queen Snapper								1										1		
Red-banded Wrasse						1			1	1			1		1	1		1		
Rough Bullseye	1	1	1	1	1	1	1	1	1	1			1		1	1	1	1		1
Roughy	1																			
Sand Trevally							1						1			1		1		
Sea Sweep		1	1	1	1	1	1	1					1		1	1	1	1		1
Senator Wrasse	1	1	1	1	1	1	1	1	1				1		1	1	1	1	1	1
Silver Drummer			1				1								1	1		1		
Silver Trevally				1		1					1	1					1			
Six-spined Leatherjacket			1																	
Snakeskin Wrasse					1								1							1
Southern Silverbelly		1			1	1	1											1		
Spotted Pipefish															1					
Tommy Ruff	1	1											1			1	1			1
Toothbrush Leatherjacket						1														
Unidentified fish													1							1
Western Blue Groper		1	1	1				1	1	1					1	1		1		1
Western Foxfish															1					
Western King Wrasse				1		1	1	1												
Western rock blackfish																				1
Western Sea Carp	1		1	1	1	1														
Wood's Siphonfish		1		1		1								1						
Woodward's Pomfret							1													
Yellow-headed Prettyfin								1												
Yellow-striped Leatherjacket	1		1	1	1	1	1												1	
Yellowtail Mackerel																1				
Zebra fish	1	1	1		1		1			1			1		1	1	1			1
<b>Total Number of Species</b>	<b>20</b>	<b>21</b>	<b>21</b>	<b>25</b>	<b>20</b>	<b>26</b>	<b>25</b>	<b>18</b>	<b>15</b>	<b>17</b>	<b>7</b>	<b>5</b>	<b>5</b>	<b>16</b>	<b>29</b>	<b>28</b>	<b>18</b>	<b>19</b>	<b>17</b>	<b>18</b>



**APPENDIX IV MACROALGAE PERCENTAGE COVER DATA FOR THE STUDY AREA**

Site	Depth	Date	Diver No.	Species Code	Macroalgae Quadrat No												
					1	2	3	4	5	6	7	8	9	10			
F43	6	24-Mar-98	3	322	5	80		30	20	40	10	50		40			
				702	1		5								1		
				507			1									1	
				702	1	1	5	1			1	1	1	10	5		
				841		10	10	10									
				853						70			80		80		
				858	5	1		20	1	15				5		1	
				842	5	5	10									1	
				320	1			1									
				854									1				
				389	20								5			5	1
				893	1								1				
				845	15	1	10						15	1		10	10
				859	5	20	20						10	10	1	10	20
				399	40	40	10	5	20	10	30	10	30	10	5	20	
				398	50	60	10	15	50	50	40	80	70	60			
				862			15										
				430			1				10	5			1	5	
				861								1	1	1	1	15	
				394								1					
400								1									
354									1								
1000								80		15							
F43	6	24-Mar-98	4	389	5									5			
				858				10				5		5			
				842			15						1				
				320				1									
				845	30		5										
				805			20					1			1		
				322	10		10	10				10	20	40			
				399	15												
				398	30		80	10	100				50	100	10		
				702	1		5										
				702	1		5				15						
				841	1		15		5								
				507								1					
				862			10										
				430							5		5		5		
				853					80			30					
				354											5		
				859	5							15	15	70	40	35	
				838	1												
				313						5							

Site	Depth	Date	Diver No.	Species Code	Macroalgae Quadrat No										
					1	2	3	4	5	6	7	8	9	10	
F43	6	24-Mar-98	4	864						10	5				
				305						1					
				400								5			
				396										10	
				1000			100		95						

Site	Depth	Date	Diver No.	Species Code	Macroalgae Quadrat No											
					1	2	3	4	5	6	7	8	9	10		
F44	6	25-Mar-98	3	838	30			40	40					60		
				322	70	40	100	40	60		5	70		25		
				398	90	90	95	90	90	95	95	90	60	50		
				399	10	10	1	10	10	1	1	1	20	30		
				335		40		20		70				1		
				344	1	1				5	1	1	1	1		
				858								10				
				841									30	40	40	
				353									10		10	
				859									1	5	5	
				336											5	
				509											5	10
				864											1	1
				1000												

F44	6	25-Mar-98	4	322	100	100	10	100	30		30		20		
				398	100	100	100	100	100					100	
				805		1					100				
				838			80								
				858					70						45
				841							20			15	5
				313							15		10		
				304							20	10			
				320							1				
				501							5				
				1000							100		100		
				564										15	
				865										20	15
				873										1	
				874										1	
				509										1	10
				853											60
				353											
702												5			

Site	Depth	Date	Diver No.	Species Code	Macroalgae Quadrat No												
					1	2	3	4	5	6	7	8	9	10			
F45	5	25-Mar-98	3	846	20	5	10			10	5				1		
				312	60	1	5			1	5		5				
				865	10					1	1						
				858	1						1				1		
				358	15											10	
				379	10	5	5	1	10	15	1	20	5	20			
				902	1	1	1	1	1		1		1		1		
				871	1			20						1			
				509	5	1		1	1			1					
				867													1
				346	1							1	5	1			
				304	1					1		5			5		
				859	1						1		1				1
				344	5	1		1	1	1	1	1	1				1
				352		5						20	5				
				869		5	10	5	10				1	1			5
				377					5								
				702		5	1										
				864		1								5		1	
				360		10						5					10
				353		10	15					20	15	25	1		5
				354		5								1			10
				430		1											
				394		1		15						10	5		
				868		1	1							1	1		5
				824		5		1				5				1	
				351			40	15	5	15					30		
				398	20	15	30	5	10	5	15	10					20
				399	1	1		5	1		1	1		1			1
				1000	30	10	10	80	30	60	30	15	100				5
				400		10	10	10	10	1	15	10					5
				385													5
				862													1
				336			1										5
				805			1								1		
				453			5		1	1	5	1					1
339			10			30					15		5				
829			1	1							1						
320			10	10													
366						15											
322										1							
872											15		15				
845											10						
371											5						
337												20					
313												30					
507												1					
866													1				

Site	Depth	Date	Diver No.	Species Code	Macroalgae Quadrat No											
					1	2	3	4	5	6	7	8	9	10		
F45	5	25-Mar-98	4	846	15		1	10		15	30		1			
				379	30	20	1	10		20		40	20			
				352	5	5		1								
				358	1	5	5	1	15			1	1	1	1	
				353	10	25	1	10	5	30	5	10	10	30		
				354	1			5		1						
				351			15			5				30		
				360									1			
				398	20	20	30		1				10			
				344		15		1				5				1
				805		15	25					1			5	
				872			40						5	5		
				869				5	5	5			5			1
				824				1								
				400				5	1							
				865					1	1						
				365					1							
				829								1				
				859								1				1
				339												5
845												15				
385												1				
346	15	1		1	1	1			1							
867			1				1	1		1						

Site	Depth	Date	Diver No.	Species Code	Macroalgae Quadrat No											
					1	2	3	4	5	6	7	8	9	10		
F46	8	26-Mar-98	4	838	95	10	70	40		50		100	100			
				322	5	70	20	40	50	50						
				893	5											
				398	100	100	80	100		100		50				
				389								5				
				384								5				
				877								1				
				1000												100
				400										15		
F46	8	26-Mar-98	3	322	60	30	5	30	5	60	10					
				838	10	40	80	20	95	10	80	5	100	70		
				893		1			10	15	30		1	1		
				885			5	1		1						
				389			1								1	



Site	Depth	Date	Diver No.	Species Code	Macroalgae Quadrat No												
					1	2	3	4	5	6	7	8	9	10			
F46	8	26-Mar-98	3	509			1			5	10		1				
				344			1										
				394			1							1	1		
				373			1										
				879								5					
				882									10		1	1	
				837										60			
				313										1			
				398				30	30	40	40	60	40	30		80	70
				399				30	20	10	10	20	30	10		10	20
				1000						30	10				100		10

Site	Depth	Date	Diver No.	Species Code	Macroalgae Quadrat No												
					1	2	3	4	5	6	7	8	9	10			
F47	12	26-Mar-98	5	838				1	100	80	80	60	40	20			
				806				5		1			10				
				389				1		10							
				453					5								
				879							1		1	1			
				322									10	40			
				509									1				
				313												40	
				841												20	
				858												1	
				399							5	10		10			
				398							10	40	30	40	40	60	40
				1000					100	100	100	60	50	20			60

F47	12	26-Mar-98	3	833	5										
				453	10										
				820	1										
				389	1		1		1	5					1
				880	1	1									
				509	10										
				821	10										
				881	5	80									
				322		5				5			10		
				351		5									
				402		1									
				879			1				1		1		
				838			90	80	50	70	70	60			50
				394				1	1	5	1		1		1
				806					20	30	20		10	20	10
				313							1				10

Site	Depth	Date	Diver No.	Species Code	Macroalgae Quadrat No												
					1	2	3	4	5	6	7	8	9	10			
F47	12	26-Mar-98	3	337					1								
				882						1							
				877										80			
				310												25	
				893												1	
				399	20	20	5							20	5		
				398	20	20	50	50	50	50	80	90					30
				1000	50	30	30	20	25	10						100	50
				884												1	

Site	Depth	Date	Diver No.	Species Code	Macroalgae Quadrat No															
					1	2	3	4	5	6	7	8	9	10	11	12				
F48	10	27-Mar-98	3	322	20		40	30				60	60	50	10	10	5			
				313	20															
				856	10	5														
				858	5	10	10	10	5											
				336	1	10	10													
				840	10	5						5					20			
				859	5			1	1						1	1	1	1	1	1
				308	5	5														
				310		10							70							
				438		1														
				878		15														
				334		5							5							
				838			5	20	70	15	35	40	20	20	1					
				868			5								5	5				1
				343				5							5					
				883				5	15											
				875					5											
				395						1										
				841														10		5
				853														20		90
				320																1
				453														1	1	
				379														1		
				394															1	
				398	60	10	70	90	40	30	30	5	70	70	80	60				
				399	1			1	65		40	40	30	30	40	10				
				1000	20	90	5	5	5	50	20	5								
				344				1	5	5					5	5	5			1



Site	Depth	Date	Diver No.	Species Code	Macroalgae Quadrat No															
					1	2	3	4	5	6	7	8	9	10						
				836					1											
				343					1											
				354						10										
				308							20									5
				841							30		30							10
				353							5	60	10							
				307							1	1								10
				438								20								
				1000								20	15	100	30					
				842								10								
				702								5								
				319										5						
				353										10						
				825																10
				344																1
<b>F50</b>	8	28-Mar-98	4	308	10								5							10
				389	15															
				859	50	5	10	5	1	1										
				842	10	1														
				384	1															
				344	5	1	5	5				1	1	1						
				430	1			1												
				888	1	10	1													
				509	1	1														1
				346	1															
				399	1															
				322	1	60	30	5												
				890		5		5												
				353		1						50	40							1
				858			5		5											
				845			5													
				342			1													
				320			1													
				895				1												
				805				1	1					1						
				893				1												
				400				1	1			1								1
				829				1												
				398	50	100	100	100	100	50	50	50	50	50	50	30				
				399	10															
				864						5										
				886																1
				410																5
				887																1
				825																1
				896																1
				840																10
				841																50
																				70
																				15
<b>F50</b>	8	28-Mar-98	4	820									1	1	1	5				
				702									5							

Site	Depth	Date	Diver No.	Species Code	Macroalgae Quadrat No												
					1	2	3	4	5	6	7	8	9	10			
				853						75							
				869							1						
				379							1						
				1000							100			50	100		

Site	Depth	Date	Diver No.	Species Code	Macroalgae Quadrat No															
					1	2	3	4	5	6	7	8	9	10						
F51	11	28-Mar-98	4	841	10		15	5				5								
				858	5									20						
				864	10		20								15	40				
				820	15	1	5	5												
				509	15															
				322		50	30	15	10	40	15					5				
				394		1														
				859		1	1			1	1	1	1	1	1	1	1	1	1	1
				860		1														
				805		1						1			1					
				589				5												
				826				1												
				825				5							1					
				892				5												
				845								1								
				313											5					
				509											1					
				395											5					
				887												1				
				885																1
400						1					1					1				
398					50	100	100	100	100	100	100	90	90	70	50					
344					10	5				5	1						20			

F51	11	28-Mar-98	3	322	20	50	20	70		80	20	20					80		
				841	30							5			1	1			
				840	20					5									
				820	5					5									5
				859	20	5	5											5	5
				395	10									5			5	10	
				868	1					1									
				858	10	25		20					80	40	80	10			
				877		5													
				343		1													
				509		1								10	5	5	5		
				890		10	5	10					1	5					
				887		1					1			5	10	10	10		

F51	11	28-Mar-98	3	394		1		1									
				853				80									
				872						1						1	

Site	Depth	Date	Diver No.	Species Code	Macroalgae Quadrat No									
					1	2	3	4	5	6	7	8	9	10
				888				1			1	1		
				523					5					
				310					15					
				365					5					
				438					15					
				379					30					
				unknown								10	10	1
				885				1	1			1	1	5
				344		20		1		5	15	5	5	10
				398	60	60	80	60		80	60	60	70	60
				399	20	15	20	10		20	5	5	20	10
				1000	40	20		30	100		75	30	10	30

Site	Depth	Date	Diver No.	Species Code	Macroalgae Quadrat No												
					1	2	3	4	5	6	7	8	9	10			
F52	11	28-Mar-98	3	322	20	10	10	60		100	20	30	30	40			
				838	70	5							70	1			
				430	5	5	20	10	10	30	20	10					
				859	10	5	30	1	10	10	1	1					
				890	5						5	20				5	
				845	5	1	10	10	1	1	10	5				1	
				438	5							1					
				893	20	70	25	20		30	20	5		20		5	
				858		5	20										10
				825			10			10		10	5				
				853			20			40							
				509			5	1	10	20	10	1					
				355			20			15		1					
				868			5	1									
				389				5				10	5				
				805				5									
				702								10					
				864								10					
				841											30		
				889											20		
				826											5		
				887												1	
				394													1
344							1	5	1	1			10				
885							1		1								
F52	11	28-Mar-98	3	400		10	30	10	40		20	20		10			
				398	70	60	40	40	30	50	40	20	50	50			
				399	30	20	20	20	10	20	10	20	10	20			
				1000			1	20	20			40	40	20			
F52	11	28-Mar-98	4	838	40	40											

Site	Depth	Date	Diver No.	Species Code	Macroalgae Quadrat No										
					1	2	3	4	5	6	7	8	9	10	
				845	1		1		5	1					5
				859	1	1	10			1					1
				893	5	5	70	1		5					10
				322		40				50		40	5		5
				805		1				1					
				430			5	20	15	5					
				394			1							1	
				702				10			1			1	
				400				20							
				892				1							1
				389					5						5
				825					5		1				1
				509					5						
				841					1		5				
				890					1						
				363							5				
				379					1		1				
				886							1				
				869							1				
				885										1	
				509											1
				400										5	
				344					5	1				5	
				398	100	100		5		100	30	50			30
				1000							70	50			

Site	Depth	Date	Diver No.	Species Code	Macroalgae Quadrat No						
					1	2	3	4	5	6	
F53	6	29-Mar-98	3	322	30	20	20	20			
				838	70	80	30	15	75		
				859	5	1		5	5	1	
				806	10	10		5	5		
				833	1	10		5	1	5	
				343	10	10	5	10	5	5	
				879	1	1					
				349				5	5	10	
				841					60	20	
				812					5	5	
F53	6	29-Mar-98	3	890				1	1	1	
				354					1	1	
				310						60	
				308						30	
				357						5	
				874						1	
				509						5	
F53	6	29-Mar-98	5	838	90	95	50	30			
				322	10	5	30	15	10		

Site	Depth	Date	Diver No.	Species Code	Macroalgae Quadrat No.						
					1	2	3	4	5	6	
				833	1					1	
				398	90	60	60	70	70		
				1000	10						
				845	1						
				399	1	40	10	5	5		
				320		5					
				344		1				1	
				999		1					
				863			1	1	5		
				343			1				
				1001			30	5	5		
				349			1		1		
				890			5		5		
				841				60	10		
				319				5			
				859				1	5		
				874				1	1		
				400				5			
				308						90	

Site	Depth	Date	Diver No.	Species Code	Macroalgae Quadrat No.											
					1	2	3	4	5	6	7	8	9	10		
<b>F54</b>	6	29-Mar-98	3	310	20	40	10	60	40							
				308	40	15	70	20	30	35						
				509	10	5	1	1	10	20	5	1				5
				809	5	1										
				806	80	20	20	40								1
				833	5	30	40	20	5	5	1					1
				859					5		1	1	5	10		
				300	1											
				841	1	5		1		5						1
				840		30	5	10	10							
				858											15	10
				864		5	10	10	10	30	40	60	15	10		
				<b>F54</b>	6	29-Mar-98	3	351		30	40					20
812			1												1	
349								1	5	5	30	10	10	5		
829								1								
877									5	5						
389									1							
337										5						
336											5	5	5			
878												5	5			
322													20	60	80	
344	1	1	1					1	5	5	1	25	1	5		
885														1	5	
398								1	1	10	20	20	40	80	80	
399								1	1	10	20	20	10	20	15	



Site	Depth	Date	Diver No.	Species Code	Macroalgae Quadrat No.															
					1	2	3	4	5	6	7	8	9	10						
				1000	20	50	30	40	20	50	60	50								
				430									1							
<b>F54</b>	6	29-Mar-98	5	308	40	70		40	10		10									
				840	10	20														
				845	50	15	15	10							1	5				
				806	40	25	20	20							5					
				1000	40	50	20	50	20	90	80									
				343	1		5			5								5		
				319		5														
				846		1														
				858			25	5	10	10	60			80	20					
				353		5	1													
				312			5	10												
				349				1	5				1	1	5					
				344				1					1	5	10					
				890	5					5										
				310						50	10									
				320							15	10								
				398	10	15	20	50	90	5			80	80	90					
				874							1									
				322									100	40	80					
				336									5	1						
				859									1							
				1001														5		
				313			1													

Site	Depth	Date	Diver No.	Species Code	Macroalgae Quadrat No.															
					1	2	3	4	5	6	7	8	9	10						
<b>F55</b>	9	30-Mar-98	4	374	5															
				337	5															
				379	5														5	
				320	5															
				344	1	5						1	10	5						
				862	5															
				343	5	1														
				822	1															
				509	10						1									
				400	1															
				859	1				1											
				841	1	25														
				840		35		35	15		15	25	15	10						
				875		1	1			1				1						
				859		1							1	1						
				833		1							1	1						
				308			50													
				846			20													
				886				1	20	60	1							20		

					Macroalgae Quadrat No.										
Site	Depth	Date	Diver												
			No.	Species Code	1	2	3	4	5	6	7	8	9	10	
				349				1	10		5		15	5	
				351				1							
				313				5							
				881					5	10	5				
				702					1					1	
				310							5				
				309							5				
				871							30				
				888							1				
				353							1				5
				853								60			
				322								5			
				399						10			40		
				398		100	100	70	70	50	40	40	40	10	50
				1000		80		30	20	50		20	90	50	
<b>F55</b>	9	30-Mar-98	5	322		50				5		15	5		
				846		10						1			
				353		5	25								15
				313		10							5		
				859		5						5		5	5
				805		5			10			5	5		
				398		60			30		30			40	20
				344		5			5					5	
				349		5			5			10	5		
				881		1									
				1000			90	100	100		100	10	30		
				897			5								
				841					50				30	40	30
				864					10				20		5
				858					5			15	15		
				809					1						1
<b>F55</b>	9	30-Mar-98	5	320						5					
				890						15					
				871							5				
				312								5			
				373								10			10
				845								1			
				509									5		
				354									1		
				357									1		
				853										50	15
				308										1	20
				897											1

					Macroalgae Quadrat No.									
Site	Depth	Date	Diver											
			No.	Species Code	1	2	3	4	5	6	7	8	9	10

Site	Depth	Date	Diver No.	Species Code	Macroalgae Quadrat No											
					1	2	3	4	5	6	7	8	9	10		
F56	7	30-Mar-98	4	310	25	5			1			30	40			
				308	5											
				389	1											
				897	1											
				877	5								40	30	40	
				838		50	60	10		10						
				322		5				15						
				313		1										
				349	1	1										
				892	5											
				888	1											
				509		1						1				
				859		1										
				344		5	1					1				
				853		5		80								
				343			1									
				890				1				1				
				841								25				
				840								15				
				864								5				
				320								10				
				893									1			
				853									1			
				313										20		70
				395										1		
				881										1		
				859										1		
				353												1
				398	40	30	100	100	60	100	90	60	50	50		
				399	10	20							10	40	50	50
				1000	50						40					
				F56	7	30-Mar-98	5	841	50				5			
313	10										20	50	30	5		
308	40								10		1					
874	10															
349	5									5						
398	50	70	70					80	5		60	70	40	50		
322		40	10					10	25		10		5	10		
864		40									5		15	90		
509		5						1	1							
898	10	10										10				
831			10					90		10				10		
858			90													
859									1	1		5		5		
344										5						
877	877												10			
881												5				
853												5				
874													50	40		
312														5		
846															40	
809															15	

Site	Depth	Date	Diver No.	Species Code	Macroalgae Quadrat No																
					1	2	3	4	5	6	7	8	9	10							
F57	9	30-Mar-98	5	825						10	5										
				859						10											
				355						20											
				430								15		10							
				841										5	30	50	1				
				344										1	5	1					
				858										15							
				887										5							
				358										5							
				852					5							10				5	
				897														5		5	
				824																1	
				805																5	
				822																1	
				871					10												
				349					5	10						5			5		
				351					10						10					5	
				353					5	10			5	40						5	
352					1	30	1	5	10			1	5	15							
F57	9	30-Mar-98	5	389										10							
				1000	50	10	90			60	60				30	40					
				886	1						15										
				320	1	5															
				398	1	10				40	5			20	30	5					
				890	20																
				313		40															
				859		5															
				509		1															
				354		1															
				868		1															
				374		1					15				1		40	85			
				823			10														
				337			1									5					
				1001							10										
				313									40								
				308									15	30	30						
				874					5				5		5	5			40		
898									5												
F57	9	30-Mar-98	4	353	25	5			5				5	5	1						
				320	5																
				886	5						1										
				374	5	5			30								5				
				379	1																
				871			5					1									
322			5																		

Site	Depth	Date	Diver No.	Species Code	Macroalgae Quadrat No										
					1	2	3	4	5	6	7	8	9	10	
				352		1			1	1	5			5	5
				366		5	1	10	1	10				5	
				822		5									
				846		5		5							
				400		30									
				892			60	1		1	20	20			15
				308			5	1	5					30	
				885			1			5					
				825			1		5						
				357			1								
				833			1					1	1		
				362			1								
				320			1								
				309						5					
				874						1					
				344						1	1	5			1
				340							30	5			
				841									40	20	
				339								5			
				389						1		15			
				859										1	
<b>F57</b>	9	30-Mar-98	4	343									1		
				355											1
				354											1
				398		20	80	70	70	100	50			50	
				399			10								
				1000	100	50		50	10					5	

Site	Depth	Date	Diver No.	Species Code	Macroalgae Quadrat No										
					1	2	3	4	5	6	7	8	9	10	
<b>F58</b>	11	31-Mar-98	3	322	30	40	20							20	
				838	60	60	80								100
				874	5	5	1								
				888	1	5	10	10	15	20		1	5	1	
				373	5	1	1								1
				879	1		1						1		
				371	1	1	5								10
				509	5	1		25	1			30	1	1	
				343		1	1								1
				900										1	
				859		5	10							1	5
				806		5	15		5	5	20	10	1	5	
				389			5	10						5	35
				805			5							1	
				430		1	5							10	10
				523										15	

Site	Depth	Date	Diver No.	Species Code	Macroalgae Quadrat No									
					1	2	3	4	5	6	7	8	9	10
				905			5	5	5		15	5	5	
				823				5			1			
				402				10		5	5			
				822				5					5	
				353				10						
				351				5				10	30	
				904				1			5			
				864				5				5	1	
				878				1	40	35	35	5		
				702				1						
				858				1				1	1	
				379				10	5	10	20	10	1	
				840					20		20			
				812					5		15	10		
				384					5	15		5		
				801							10			
				359							1			
				438								5		
				841								30		
				853									5	
				885			1							1
<b>F58</b>	11	31-Mar-98	3	398	60	50	30	5				20	30	70
				399	40	50	30	5					10	5
				1000			30	80	100	100	100	80	30	10
				839									5	
				900										1

Site	Depth	Date	Diver No.	Species Code	Macroalgae Quadrat No												
					1	2	3	4	5	6	7	8	9	10	11	12	
<b>F59</b>	11	31-Mar-98	3	317	5					5							
				853	90	65	60	40	70	80	80		5	80			
				322	5	30	5	40		5	15	80	40	40	30		
				308	1		5			1		5			5		
				901	1												
				859		5	20			5		5	1				
				868		10	20		5			1	10	10	5		
				858		5		5		1		1		40			
				334			5					1	10				
				890			10	30		15		1	10	10	20	10	
				430			5	20	5	10		1		5	1	5	
				898			5	5		5							
				389				5		10		1				5	
				373				10				1	1	5			
				509				10	10	10	5	20	5			5	
				842				5									
				343					5			10				1	
				354							1						
				905				1				1	1	5		5	5

Site	Depth	Date	Diver No.	Species Code	Macroalgae Quadrat No												
					1	2	3	4	5	6	7	8	9	10	11	12	
				453									10				
				425									1				
				889										10			
				841										10			
				888											5	10	10
				825												5	
				313													10
				885				1		1	1						5
				398	40	60	30	40	30	60	50	60	50	80	70	70	
				399	40	20	30	20	30	40	10	10	20	10	10	10	
				1001	20	20	30	20	10		20					10	

Site	Depth	Date	Diver No.	Species Code	Macroalgae Quadrat No													
					1	2	3	4	5	6	7	8	9	10	11	12		
F60	3	31-Mar-98	3	331	20	10	10	20	20	5			30	5	20			
				823	20	30	30	30			5	5						
				304	10	10	15	5	20	10	10	10	30	10	5	5		
				308	10	10	10	5	5		60	20		20				
				379	10	10	15	15	10	10	30	40	30	25	25	10		
				822	10								1					
				509	10	10	10	5	10	30	10	5	5	20	5			
				507		10	5		10	10								
				846		10	10	10	20	10			5	10	15	10		
				402		1							1					
				351				5		15	5		20	5	30	30		
				864					5	10			5	10	10	5		
				906					1						5			
				903								1						
				867									1					
				874														5
				354														5
				902														1
				400	10	20	30	30	20	10	40	30	20	15	30	20		
				398			1			1	10	1	1	1	1	1		
399								1	1									
1000	80	70	60	70	80	80	80	50	60	70	70	60	70					

Site	Depth	Date	Diver No.	Species Code	Macroalgae Quadrat No										
					1	2	3	4	5	6	7	8	9	10	
F61	12	01-Apr-98	5	353	5										
				438	5	10		5				5	1		
				320	5	5	1	1							
				805	5										
				319		1									
				702		1							5	10	
				897		1									

Site	Depth	Date	Diver No.	Species Code	Macroalgae Quadrat No															
					1	2	3	4	5	6	7	8	9	10						
				357		1														
				838		10	10		10											
				858		5														
				886			5													
				841			20	15												
				313			20					15								
				400			5													
				888			1					5				5				
				898				5				5				5				
				859				5	10	5										
				344				1												
				853					20	95										
				894					5											
				845					1											
<b>F61</b>	12	01-Apr-98	5	389																1
				881								5								
				899																5
				1002			5													
				398				30	30	70	50									
				1000		80	90	5	70	30	10	100	100	95	90					
				?898					5											1
				399				5												
			3	349		5														
				858		5		1					1							
				366		60														
				351		5														
				823		5		1												
				453		1		1												
				438		1														
				385		1		1												
				379		5		5		1			1							5
				841		5	10		20											
				833		5	10			1	5	5								
				876		1	1	1		1	5									
				822		1		1												
				430		10		10					1							
				840			20	1		10				30						
				838			20		80		70									10
				322			20			10										
				888			1		100			15	10	10	15					
				509			1		10	10		10	10	15						
				886				40	1	1										10
				310				20												80
				906				20	10											
				874				1												
				887				10	5	15	5									
				812				1												
				897				1												
				373					5	1										
				815					1	1				5						
				881																5



Site	Depth	Date	Diver No.	Species Code	Macroalgae Quadrat No									
					1	2	3	4	5	6	7	8	9	10
				859							10	5	5	10
				371							1		5	
				875							5			
				853								80		70
				806				1	1			5	5	
				523								1	5	
				845								5		
				320									20	
				907									5	
				880										20
				400					20					1
				1001	20		10	10	1		15			1
				1000	10		10		10		5	10	10	100
<b>F61</b>	12	01-Apr-98	5	398	40	65	60	80	60	80	60	70	60	
				399	10	20	20	10	15	20	20	20	10	

Site	Depth	Date	Diver No.	SpeciesCode	Macroalgae Quadrat No									
					1	2	3	4	5	6	7	8	9	10
<b>F62</b>	8	01-Apr-98	3	840	20									
				853	80			30						
				859	20	15	10	5	40	10	5	20	30	20
				833	10	5	5	5	5				10	20
				890	10	5	1		5					
				430	5				10	20		10		
				320	10			20						
				858	10	10	10			10	5		10	5
				509	10		10	5	5		10	10	5	5
				322		60	20	10	80	80	10			10
				842		5								
				884			1			1				
				888				20	20					
				893				40	5			1		5
				806				5	5					5
				702						5		5		10
				861						10	5			1
				805						1				
				394						5	5			1
				901							5			
				841							10	50	30	
				389							5	5		1
				354							5			
				521							1			
				351									40	
				1002									5	
				358										1
				361										1
				845										10
				357										1

Site	Depth	Date	Diver No.	SpeciesCode	Macroalgae Quadrat No										
					1	2	3	4	5	6	7	8	9	10	
				907											1
				885			1					5			
				344				1				1	1	1	
				398	60	80	65	30	40	50	50	30	60	20	
				399	20	10	5	30	5			30	40	20	
				1000		10	30			30	40				
				1001	5								10		
<b>F62</b>	8	01-Apr-98	5	322	70			25		50		80			
				1000	20	40									
				398	70		95	95	95	95	90	90	90	90	
				859	5	5	5	40	20	10	40		15	10	
<b>F62</b>	8	01-Apr-98	5	836	1	5		20				10	10		
				894	1	30									
				858		15									
				841		10		15			40		50		
				438		5		1							
				320		1									
				898	1	1	5								
				853			100		10						15
				509			5	5			15		5		
				845				10		1			5	1	
				357				1							
				430				5	15			20			
				888					10	5					
				892					10			20			
				805					5	5					
				344					5						1
				354						1					
				902								5			
				400								5			20
				702									10		
				389									5	5	
				908										5	5
				349											1

<b>APPENDIX V HABITAT DATA FOR THE SITES SAMPLED IN THE STUDY AREA</b>
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Site No	Location	Habitat type	Substrate	Latitude	Longitude	Depth	Biological assemblage	Recorder	Observation	MPRSW G	Bioregion
FBR_001	Barrens Beach	Macroalgae dominated limestone reef	Limestone	-33.92917	120.03167	-6	High profile limestone reef, kelp covered, interspersed with sand patches. Some large bommies up to 1.5-2m high, and sand flooded channels. Dominant macroalgae sp. Ecklonia radiata. Platythalia quercifolia, Cystophora pectinata. F43	JCO	Direct	FBR	WSC
FBR_002	Seal Island	Macroalgae dominated limestone reef	Limestone	-33.96352	120.12715	-4	High profile limestone reef - heavy kelp cover, some ledges and holes at northern end of transect. Dominant macroalgae sp. Ecklonia radiata, Scytothalia dorycarpa. Some debris (craypots) at northern end of transect. F44	JCO	Direct	FBR	WSC
FBR_003	Hopetoun	Macroalgae dominated limestone reef	Limestone	-33.94743	120.1042	-4	Low profile limestone reef, with some holes, large gutters and swim throughs. Occasional small sand patches. Dense cover of macroalgae, predominately greens and browns. Dominant macroalgae sp. Caulerpa spp. F45	JCO	Direct	FBR	WSC
FBR_004	Eleven Mile Beach	Macroalgae dominated granite reef	Granite	-33.94667	120.32067	-8	Granite boulders, kelp covered, sand at 8m. Dominant macroalgae sp. Ecklonia radiata, Scytothalia dorycarpa. Very heavy surge and poor visibility. F46	JCO	Direct	FBR	WSC
FBR_005	Eleven Mile Beach	Macroalgae dominated granite reef	Granite	-33.93795	120.25308	-16	Mixed granite boulder and limestone reef, kelp covered with extensive area of bare sand below 12-13m. Dominant macroalgae sp. Ecklonia radiata, Scytothalia dorycarpa (on granite), Cystophora retorta (on limestone). Very lg. Surge, poor visibility. F47	JCO	Direct	FBR	WSC
FBR_006	Cave Point	Macroalgae dominated granite reef	Schist/ quartzite	-33.94943	119.98617	-10	Schist/quartzite reef, kelp covered, boulders, gutters, ledges. Lg. overhang, underside has sponges,	JCO	Direct	FBR	WSC

Site No	Location	Habitat type	Substrate	Latitude	Longitude	Depth	Biological assemblage	Recorder	Observation	MPRSW G	Bioregion
							gorgonians, ascidians, bryzoans and soft corals. Dom. coral; Turbinaria sp., Scolymia and Plesiastrea. Dom. macroalgae; Scytothalia dorycarpa, E. radiata. F48				
FBR_007	Mylies Beach West	Macroalgae dominated granite reef	Schist/quartzite	-33.9431	119.9875	-8	Schist/quartzite, kelp covered, v. broken, lg. gutters and ledges, some holes with pebbles and lg. boulders. Dom. Macroalgae; Cystophora spp., Ecklonia radiata. Lots of fish.F49	JCO	Direct	FBR	WSC
FBR_008	Hopetoun outer reef 1	Macroalgae dominated limestone reef	Limestone	-33.95217	120.09167	-8.3	High profile limestone reef, kelp covered, some pavement areas, occasional sand patches. V. exposed. Dom. macroalgae; Ecklonia radiata, Cystophora expansa, C. racimosa. F50	JCO	Direct	FBR	WSC
FBR_009	Hopetoun outer reef 2	Macroalgae dominated limestone reef	Limestone	-33.94802	120.07157	-11	High profile limestone reef, kelp covered, some lg. overhangs and ledges. V. exposed, little sessile invertebrate cover on underside of ledges. Some sand patches. Dom. Macroalgae; Ecklonia radiata, Sargassum tristicum. F51	JCO	Direct	FBR	WSC
FBR_010	Seal Island east	Macroalgae dominated limestone reef	Limestone	-33.96183	120.13367	-10	High profile limestone reef, some sand patches, lg. bommies and reef flats with numerous small holes. Dom. macroalgae; Ecklonia radiata, Scytothalia dorycarpa. Dom. coral; Tubinaria sp. F52	JCO	Direct	FBR	WSC
FBR_011	Edward's Point	Macroalgae dominated granite reef	Schist/quartzite	-33.97702	119.94223	-7	Schist/quartzite reef kelp cover. Dom. macroalgae; Ecklonia radiata, Scytothalia dorycarpa. F53	JCO	Direct	FBR	WSC
FBR_012	West Beach	Macroalgae dominated granite reef	Schist/quartzite	-33.95855	119.96688	-7	Schist/quartzite reef. Kelp covered, some boulders and sand patches (north end). V. lg. rock pillar extending from 8m up to 2m (south end). Dom. macroalgae; Cystophora spp. (north), Sargassum spp. (south). F54	JCO	Direct	FBR	WSC
FBR_013	Two Mile Reef	Macroalgae dominated	Schist/quartzite	-33.94957	120.1633	-9	Schist/quartzite reef, kelp covered, some sand patches.	JCO	Direct	FBR	WSC

Site No	Location	Habitat type	Substrate	Latitude	Longitude	Depth	Biological assemblage	Recorder	Observation	MPRSW G	Bioregion
		granite reef					Dom. macroalgae; Cystophora spp., Ecklonia radiata. F55				
FBR_014	Three Mile Reef	Macroalgae dominated granite reef	Schist/ quartzite	-33.94022	120.19338	-7	Schist/quartzite reef, kelp covered, 3-7m deep. Dom. macroalgae; Platythalia quercifolia, Cystophora spp. F56	JCO	Direct	FBR	WSC
FBR_015	Hopetoun east	Macroalgae dominated limestone reef	Limestone	-33.95145	120.14433	-9	Limestone reef with some Schist/quartzite patches, kelp covered. Dom. macroalgae; Caulerpa spp., Cystophora spp., Sargassum spp.. Halimeda laevigata on schist patches. F57	JCO	Direct	FBR	WSC
FBR_016	Mason point	Macroalgae dominated granite reef	Granite/ gneissic	-33.97133	120.45205	-13	Gneissic/granite reef, some limestone outcrops, kelp covered. Also some Amphibolis antarctica. V. heavy surge on seabed. F58	JCO	Direct	FBR	WSC
FBR_017	Mason Bay south	Macroalgae dominated limestone reef	Limestone	-33.96862	120.4861	-11	Limestone reef, kelp covered, some sand patches. F59	JCO	Direct	FBR	WSC
FBR_018	Mason Bay north	Reef platform	Limestone	-33.96272	120.47768	-3	Shallow limestone reef, low profile, some sand patches. Dom. coral; turbinaria sp.. F60	JCO	Direct	FBR	WSC
FBR_019	Starvation Boat Harbour west	Macroalgae dominated granite reef	Granite/ gneissic	-33.92373	120.56535	-12	Gneissic/granite reef, some limestone patches. Halimeda laevigata (dom. invertebrate). F61	JCO	Direct	FBR	WSC
FBR_020	Starvation Boat Harbour east	Macroalgae dominated limestone reef	Limestone	-33.91307	120.57582	-8	High profile reef, kelp covered, sand (8m) reef (4-5m), lg. holes and gutters. Little sessile invertebrate life on underside of overhangs. Dom. coral; Turbinaria sp., Coscinaraea marshallae. Dom. invertebrate; Turbo torquatus, T. jordani, Centrostephanus sp. F62	JCO	Direct	FBR	WSC

<b>APPENDIX VI FISH SPECIES RECORDED IN THE STUDY AREA</b>
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Species	Common Name
<i>Achoerodus gouldii</i>	Groper, Western blue
<i>Anoplocapros amygdaloides</i>	Boxfish, Western smooth
<i>Anoplocapros lenticularis</i>	Boxfish, White-barred
<i>Aplodactylus westralis</i>	Carp, Western sea
<i>Arripis georgianus</i>	Tommy ruff
<i>Austrolabrus maculatus</i>	Wrasse, Black-spotted
<i>Bodianus frenchi</i>	Foxfish, Western
<i>Caesiopropis theagenes</i>	Sweep, Fusilier
<i>Caranx dentex</i>	Trevally, Silver
<i>Caranx wrighti</i>	Trevally, Sand
<i>Centroberyx lineatus</i>	Swallowtail
<i>Cephaloscyllium laticeps</i>	Shark, Draughtboard
<i>Cheilodactylus rubrolabiatus</i>	Morwong, Red-lipped
<i>Cheilodactylus nigripes</i>	Perch, Magpie
<i>Chelmonops curiosus</i>	Talma, Western
<i>Chironemus georgianus</i>	Kelp fish, Western
<i>Chromis hypsilepis</i>	Puller, One spot
<i>Chromis klunzingeri</i>	Puller, Black-headed
<i>Cnidogobius macrocephalus</i>	Cobbler
<i>Conger verreauxi</i>	Eel, Southern conger
<i>Contusus brevicaudus</i>	Toadfish, Prickly
<i>Coris auricularis</i>	Wrasse, Western king
<i>Dactylophora nigricans</i>	Morwong, Dusky
<i>Dinolestes lewini</i>	Pike, Long-finned
<i>Dotalabrus alleni</i>	Wrasse, Little rainbow
<i>Dotalabrus aurantiacus</i>	Wrasse, Pretty polly
<i>Enoplosus armatus</i>	Old wife
<i>Epinephelides armatus</i>	Cod, Breaksea
<i>Eubalichthys mosaicus</i>	Leatherjacket, Mosaic
<i>Eupetrichthys angustipes</i>	Wrasse, Snakeskin
<i>Girella tephraeops</i>	Blackfish, Western rock
<i>Girella zebra</i>	Zebra fish
<i>Halichoeres brownfieldi</i>	Wrasse, Brownfield's
<i>Heterodontus portusjackson</i>	Shark, Port Jackson
<i>Hypoplectrodes nigrorubrum</i>	Sea perch, Black-banded
<i>Kathetostoma laevis</i>	Stargazer, Common
<i>Kyphosus sydneyanus</i>	Drummer, Silver
<i>Maxillicosta scabriceps</i>	Scorpion fish, Little
<i>Meuschenia flavolineata</i>	Leatherjacket, Yellow-striped
<i>Meuschenia freycineti</i>	Leatherjacket, Six-spined
<i>Meuschenia galii</i>	Leatherjacket, Blue-lined
<i>Meuschenia hippocrepis</i>	Leatherjacket, Horseshoe
<i>Monacanthus chinensis</i>	Leatherjacket, Fan-bellied
<i>Neatypus obliquus</i>	Sweep, Footballer
<i>Nemadactylus valenciennes</i>	Snapper, Queen
<i>Neodax balteatus</i>	Whiting, Little weed
<i>Notalabrus parilus</i>	Wrasse, Brown-spotted
<i>Odax acroptilus</i>	Rainbow fish
<i>Odax cyanomelas</i>	Herring Cale
<i>Omegophora armilla</i>	Toadfish, Ringed
<i>Omegophora cyanopunctata</i>	Toadfish, Blue-spotted
<i>Ophthalmolepis lineolata</i>	Wrasse, Maori

Species	Common Name
<i>Othos dentex</i>	Harlequin fish
<i>Paraplesiops meleagris</i>	Blue devil, Western
<i>Parapriacanthus elongatus</i>	Bullseye, Slender
<i>Parascyllium variolatum</i>	Catshark, Varied
<i>Parequula melbournensis</i>	Silverbelly, Southern
<i>Parma mccullochi</i>	Scalyfin, McCulloch's
<i>Parma victoriae</i>	Scalyfin, Common
<i>Pelsartia humeralis</i>	Trumpeter, Sea
<i>Pempheris klunzingeri</i>	Bullseye, Rough
<i>Pempheris multiradiata</i>	Bullseye, Common
<i>Penicipelta vittiger</i>	Leatherjacket, Toothbrush
<i>Phycodurus eques</i>	Seadragon, Leafy
<i>Phyllopteryx taeniolatus</i>	Seadragon, Common
<i>Pictilabrus laticlavus</i>	Wrasse, Senator
<i>Pictilabrus sp.</i>	Wrasse, False senator
<i>Pseudolabrus biserialis</i>	Wrasse, Red-banded
<i>Schuettea woodwardi</i>	Pomfret, Woodward's
<i>Scobinichthys granulatus</i>	Leatherjacket, Rough
<i>Scorpis aequipinnis</i>	Sweep, Sea
<i>Scorpis georgiana</i>	Sweep, Banded
<i>Seriola lalandi</i>	Kingfish, Yellowtail
<i>Siphamia cephalotes</i>	Siphonfish, Wood's
<i>Siphamia sp.</i>	Cardinal fish
<i>Siphognathus attenuatus</i>	Whiting, Slender weed
<i>Siphonognathus beddomei</i>	Whiting, Pencil weed
<i>Siphonognathus caninus</i>	Whiting
<i>Siphonognathus radiatus</i>	Whiting, Long-rayed weed
<i>Stigmatopora argus</i>	Pipefish, Spotted
<i>Tilodon sexfasciatum</i>	Moonlighter
<i>Trachichthys australis</i>	Roughy
<i>Trachinops brauni</i>	Prettyfin, Yellow-headed
<i>Trachinops noarlungae</i>	Prettyfin, Yellow-headed
<i>Trachurus novaezelandiae</i>	Mackerel, Yellowtail
<i>Trygonoptera ovalis</i>	Stingaree
Unidentified fish	
<i>Upeneichthys vlamingii</i>	Goatfish, Blue-spotted

<b>APPENDIX VII MACROPHYTE SPECIES SAMPLED IN THE STUDY AREA</b>
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<b>MACROPHYTES</b>	<b>Code</b>
<b>Brown Algae</b>	
<i>Acrocarpia paniculata</i>	300
<i>Acrocarpia robusta</i>	839
<i>Asperococcus bullosus</i>	503
<i>Bellofia eriophorum</i>	301
<i>Brown algae w/i</i>	843
<i>Carpoglossum confluens</i>	302
<i>Carpomitra costata</i>	345
<i>Caulocustis uvifera</i>	304
<i>Caulocystis cephalomithos</i>	303
<i>Cladostephus spongiosus</i>	416
<i>Colpomenia perigrina</i>	346
<i>Colpomenia sinuosa</i>	305
<i>Cystophora botryocystis</i>	306
<i>Cystophora brownii</i>	307
<i>Cystophora congesta</i>	504
<i>Cystophora expansa</i>	308
<i>Cystophora gracilis</i>	852
<i>Cystophora grevillea</i>	508
<i>Cystophora harveyi</i>	846
<i>Cystophora monilifera</i>	309
<i>Cystophora moniliformis</i>	310
<i>Cystophora pectinata</i>	840
<i>Cystophora platylobium</i>	311
<i>Cystophora polycistidea</i>	312
<i>Cystophora racemosa</i>	841
<i>Cystophora retorta</i>	313
<i>Cystophora retroflexa</i>	314
<i>Cystophora siliquosa</i>	315
<i>Cystophora spp.</i>	828
<i>Cystophora subfarinata</i>	316
<i>Cystophora torulosa</i>	317
<i>Cystophora xiphocarpa</i>	318
<i>Desmarestia ligulata</i>	602
<i>Dictyopteris australis</i>	906
<i>Dictyopteris muelleri</i>	319
<i>Dictyopteris muelleri</i>	874
<i>Dictyopteris-like (thick)</i>	854
<i>Dictyota (fine)</i>	507
<i>Dictyota dichotoma</i>	320
<i>Dictyota?/Dilophus (wide)?</i>	820
<i>Dilophus intermedius</i>	703
<i>Dilophus marginatus</i>	812
<i>Dilophus robusta</i>	875
<i>Dilophus?</i>	348
<i>Distromium spp.</i>	502



<b>MACROPHYTES</b>	<b>Code</b>
<i>Durvillaea potatorum</i>	321
<i>Ecklonia juveniles</i>	885
<i>Ecklonia radiata</i>	322
<i>Ectocarpus spp.</i>	323
<i>Filamentous browns</i>	506
<i>Glossophora nigricans</i>	904
<i>Halophila ovata</i>	808
<i>Halopteris spp.</i>	324
<i>Homeostrichus sp.</i>	328
<i>Hormosira banksii</i>	325
<i>Hydroclathrus clathratus</i>	867
<i>Leathesia difformis</i>	326
<i>Lessonia corrugata</i>	327
<i>Lobophora variegata</i>	509
<i>Lobospira bicuspidata</i>	702
<i>Macrocystis angustifolia</i>	329
<i>Macrocystis pyrifera</i>	330
<i>Myriodesma calophyllum</i>	877
<i>Myriodesma quercifolia</i>	676
<i>Padina fraseri</i>	331
<i>Padina indescent (Distromium)</i>	810
<i>Padina sanctae-cruciae</i>	903
<i>Padina sp.</i>	809
<i>Perithalia cordata</i>	332
<i>Petalonia</i>	700
<i>Phyllospora comosa</i>	333
<i>Platythalia quercifolia</i>	853
<i>Ralfsia crust</i>	898
<i>Sargassum decipiens</i>	347
<i>Sargassum decurrens</i>	883
<i>Sargassum fallax</i>	334
<i>Sargassum heteromorphum</i>	500
<i>Sargassum lacerifolium</i>	501
<i>Sargassum lacerifolium</i>	807
<i>Sargassum linearifolium</i>	864
<i>Sargassum sonderi</i>	350
<i>Sargassum spinuligerum</i>	865
<i>Sargassum spp. (juveniles)</i>	344
<i>Sargassum tristichum</i>	858
<i>Sargassum varians</i>	349
<i>Sargassum verruculosum</i>	336
<i>Sargassum vestitum</i>	335
<i>Scaberia agardhii</i>	337
<i>Scytosiphon lomentaria</i>	701
<i>Scytothalia dorycarpa</i>	838
<i>Seirococcus axillaris</i>	338
<i>Sporochnus sp.</i>	821
<i>Sporochnus spp.</i>	339
<i>Undaria pinatifida</i>	505
<i>Xiphophora chondrophylla</i>	340
<i>Xiphophora gladiata</i>	341

MACROPHYTES	Code
<i>Zonaria angustata</i>	342
<i>Zonaria crenata</i>	876
<i>Zonaria diesingana?</i>	811
<i>Zonaria spiralis</i>	842
<i>Zonaria turneriana</i>	343

### Green Algae

<i>Abjohnia laetevirens</i>	521
<i>Bryopsis plumosa</i>	873
<i>Caulerpa ?remotifolia</i>	513
<i>Caulerpa annulata</i>	368
<i>Caulerpa brownii</i>	351
<i>Caulerpa cactoides</i>	352
<i>Caulerpa cf browni (v. fine ramuli)</i>	849
<i>Caulerpa distichophylla</i>	856
<i>Caulerpa flexilis</i>	353
<i>Caulerpa flexilis var. muelleri</i>	369
<i>Caulerpa geminata</i>	354
<i>Caulerpa longifolia</i>	355
<i>Caulerpa obscura</i>	366
<i>Caulerpa papillosa</i>	356
<i>Caulerpa racemosa</i>	830
<i>Caulerpa scalpelliformis</i>	357
<i>Caulerpa simplisciucula</i>	358
<i>Caulerpa trifaria</i>	359
<i>Caulerpa vesiculifera</i>	360
<i>Chaetomorpha billardieri</i>	700
<i>Chaetomorpha sp.</i>	514
<i>Chaetomorpha sp.</i>	526
<i>Cladophora spp.</i>	361
<i>Codium australicum (Dk)</i>	524
<i>Codium dimorphum</i>	525
<i>Codium duthae</i>	523
<i>Codium fragile</i>	362
<i>Codium harveyi</i>	527
<i>Codium lucasii</i>	894
<i>Codium mamillosum</i>	874
<i>Codium pomoides</i>	364
<i>Codium spongiosum</i>	862
<i>Codium spp.</i>	363
<i>Dictyosphaeria serica</i>	367
<i>Halimeda cuneata</i>	866
<i>Ulva spp.</i>	365

### Red Algae

<i>Acrosorium uncinatum</i>	433
<i>Amphiroa anceps</i>	859
<i>Amphiroa gracilis</i>	805
<i>Areschougia</i>	803
<i>Areschougia spp.</i>	441

<b>MACROPHYTES</b>	<b>Code</b>
<i>Asparagopsis</i> spp.	438
<i>Ballia</i> (fine red)	428
<i>Ballia callitricha</i>	370
<i>Ballia scoparia</i>	423
<i>Bangia</i> spp.	411
<i>Botrocladia obovata</i>	822
<i>Botryocystis browni</i>	440
<i>Callophycus dorsiferus</i>	893
<i>Callophycus oppositifolia</i>	835
<i>Callophyllis lambertii</i>	425
<i>Callophyllis rangiferinus</i>	371
<i>Carpopeltis elata</i>	882
<i>Carpothamnion gunnianum</i>	814
<i>Carpothamnion</i> sp.	802
<i>Champia viridis</i>	372
<i>Chauvinella coriofolia</i>	887
<i>Chondria viridis</i>	422
<i>Claudea elegans</i>	824
<i>Cliftonia pectinata</i>	897
<i>Corallines</i>	398
<i>Craspedecarpes ramentosus</i>	419
<i>Craspedecarpus venosus</i>	884
<i>Curdiea irwinii</i>	860
<i>Dasya</i>	453
<i>Delisea pulchra</i>	373
<i>Dictyomenia harveyana</i>	414
<i>Dictyomenia sonderi</i>	886
<i>Dictyomenia tridens</i>	881
<i>Echinothamnion hystrix</i>	374
<i>Echinothamnion</i> sp.	801
<i>Epimenia</i>	432
<i>Erythremenia minuta</i>	421
<i>Erythroclonium</i>	834
<i>Euptilota articulata</i>	410
<i>Euptilota</i> sp.2	443
<i>Filamentous red algae</i>	400
<i>Galaxauria obtusata</i>	907
<i>Gelidium glandulaefolium</i>	512
<i>Gelidium</i> spp.	511
<i>Gigartina crassicaulis</i>	375
<i>Gigartina</i> sp.	405
<i>Glaphrymeniasp.</i>	900
<i>Gracilaria secundata</i>	857
<i>Grateloupia filicina</i>	417
<i>Griffithia</i> sp.	815
<i>Gymnogongrus</i> sp.	895
<i>Halicnide similans</i>	427
<i>Halicnide-like (gigartinale)</i>	439

MACROPHYTES	Code
<i>Haliptilon roseum</i>	806
<i>Halopregma preissi</i>	826
<i>Halymenia floresii</i>	901
<i>Hemineura frondosa</i>	376
<i>Hemmedya crispa</i>	892
<i>Heterodoxa?</i>	435
<i>Heterodoxia denticulata</i>	413
<i>Heterosiphonia sp.</i>	902
<i>Hymenema?</i>	447
<i>Hymenemia curde?</i>	418
<i>Hypnea filiformis</i>	869
<i>Hypnea ramentacea</i>	377
<i>Jania</i>	829
<i>Jeannerettia lobata</i>	378
<i>Kallymenia cribrosa</i>	437
<i>Kallymenia tasmanica</i>	436
<i>Kuetzingia sp.</i>	889
<i>Laurencia elata</i>	448
<i>Laurencia spp.</i>	379
<i>Lenormandia marginata</i>	380
<i>Lenormandia muelleri</i>	381
<i>Long flat red like webervanbossia</i>	434
<i>Martensia australis</i>	804
<i>Melanthalia obtusata</i>	382
<i>Metagoniolithon</i>	833
<i>Metagoniolithon radiatum</i>	868
<i>Metagoniolithon stelliferum</i>	836
<i>Metamastophora</i>	845
<i>Myriogramme gunniana</i>	431
<i>Nemalionales unknown</i>	896
<i>Nemastoma feredayae</i>	420
<i>Nitophyllum</i>	800
<i>Osmundaria prolifera</i>	823
<i>Osmundaria(Vidalia) spiralis</i>	871
<i>Other thallose red alga</i>	399
<i>Peltasta</i>	449
<i>Peyssonelia novaehollandiae</i>	430
<i>Phacellocarpus alatus</i>	395
<i>Phacellocarpus peperocarpus</i>	383
<i>Plocanium angustum</i>	384
<i>Plocanium cartilagineum</i>	385
<i>Plocanium costatum</i>	386
<i>Plocanium dilatatum</i>	387
<i>Plocanium leptophyllum</i>	388
<i>Plocanium mertensii</i>	389
<i>Plocanium potagiatum</i>	390
<i>Plocanium pressianum</i>	412
<i>Polyopes constrictus</i>	898
<i>Polysiphonia</i>	426

<b>MACROPHYTES</b>	<b>Code</b>
<i>Polysiphonia decipiens</i>	890
<i>Pterocladia capillacea</i>	396
<i>Pterocladia lucida</i>	861
<i>Ptilonia australicum</i>	415
<i>Rhodomenia sp.</i>	394
<i>Rhodopeltis purpuratum</i>	879
<i>Rhodophyllis membranacea</i>	393
<i>Sarcomenia delesseriodes</i>	825
<i>Sarcomenia delleserioides</i>	872
<i>Sarcomenia filiformis</i>	832
<i>Schizymenia sp.</i>	397
<i>Sim ?Areschougia (finer)</i>	442
<i>Soliera robusta</i>	880
<i>Sonderopelta coriacea</i>	429
<i>Sonderopelta/Peyssonelia</i>	391
<i>Spyridia filamentosa</i>	891
<i>Stenocladia australis</i>	905
<i>Stenogramme interrupta</i>	452
<i>Thamnion</i>	403
<i>Thamnoclonium dichotomum</i>	392
<i>Thamnophyllis lacerata</i>	444
<i>Thuretia furetia</i>	898
<i>Tricleocarpa cylindrica</i>	1002
<i>Trigenia sp.</i>	888
<i>Tylotus obtusatus</i>	908
<i>Unknown</i>	999
<b>Seagrass</b>	
<i>Amphibolis antarctica</i>	402
<i>Amphibolis griffithi</i>	847
<i>Halophila australis</i>	451
<i>Heterozostera tasmanica</i>	401
<i>Posidonia australis</i>	450
<i>Posidonia sinuosa</i>	855
<i>Zostera capricorni</i>	404
<b>Substrate</b>	
Bare sand/rock	1000
Bare sand/rock	1001