MARINE RESERVE IMPLEMENTATION PROGRAMME: CENTRAL WEST COAST

A COLLABORATIVE PROJECT BETWEEN THE CALM MARINE CONSERVATION BRANCH, MIDWEST REGIONAL OFFICE AND MOORA DISTRICT OFFICE

RESULTS OF THE BIOLOGICAL SURVEY OF THE MAJOR BENTHIC HABITATS OF JURIEN BAY AND SURROUNDING WATERS (CERVANTES-GREEN HEAD): 21 April - 9 May 1997

Data Report: MRIP/MW/J - 07/1997

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July 1997

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ACKNOWLEDGEMENTS

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- Mat Vanderklift, Environmental Management Department, Edith Cowan University
- Dr Barry Hutchins, Western Australian Museum
- Dr Eric Paling, School of Biological and Environmental Sciences, Murdoch University
- Peter McCafferty, Chemistry Centre of Western Australia

Funding and resources
- Resources totalling more than $40 000 have been provided by the MCB, including approximately $20 000 of operating funds, as part of the Marine Reserve Implementation Programme
- Resources including, technical assistance and logistical support have been provided by CALM's Midwest Region and Moora District Offices

This report may be cited as:
Burt J S and Anderton S M (1996). Marine Reserve Implementation Programme.Results of the biological survey of the major benthic habitats of Jurien Bay and surrounding waters (Cervantes-Green Head): 21 April - 9 May 1997. Data Report MRIP/MW/J - 07/1997. (Marine Conservation Branch, Department of Conservation and Land Management, 47 Henry St., Fremantle, Western Australia, 6160). Unpublished report.

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SUMMARY

The results of a detailed marine biological survey carried out between 20 April to 9 May 1997, over about 60 km of coastline off the central west coast of Western Australia, from Cervantes to Green Head, are presented. This was the first comprehensive biological survey of the marine flora and fauna undertaken in the waters.

A preliminary analysis of the results indicates that the major benthic habitats of this area have a diverse assemblage of marine flora and fauna. More than 400 marine species were recorded from 39 sites, including about 9 seagrass species, 130 macroalgal species, 200 invertebrate species and 60 fish species. Some of these specimens, particularly a number of the sponges, are possibly new to 'recorded science'. Outstanding features include an interesting mixture of tropical and temperate species, extensive algal and seagrass communities, diverse invertebrate communities, particularly sponges, and a rich fish fauna.

The species diversity and primary production data will be used to provide an estimate of the relative ecological value of different parts of the marine environment of the Jurien Bay area. This information will be used to provide a more detailed ecological perspective of this area for the marine reserve advisory committee assisting CALM with the implementation of the proposed multiple-use marine reserve for Jurien Bay and surrounding waters. This survey will complement CALM's regional survey of the majorhabitats types of the Central West Coast.

The field survey was carried out as part of CALM's Marine Reserve Implementation Programme and was co-ordinated by the Marine Conservation Branch of CALM in collaboration with the Western Australian Museum, Murdoch University, Edith Cowan University and CALM's Midwest Regional and Moora District offices

1 INTRODUCTION

1.1 General background

This report presents the results of a field survey conducted between 20 April to 9 May 1997, to provide a systematic and quantitative description of the marine flora and fauna of the major benthic habitats of the waters off the central west coast of Western Australia from Cervantes to Green Head. Jurien Bay and surrounding waters are recommended in *The Report Of The Marine Parks And Reserves Selection Working Group* (CALM, 1994; known as the Wilson Report) as worthy of consideration for reservation (Figure 1).

The CALM Act (1984), allows for the establishment of multiple-use marine reserves for the purposes of conservation of marine flora and fauna and public recreation. Commercial activities, such as fishing, aquaculture and petroleum exploration and production, are also acceptable within specific zones of multiple-use marine reserves. Commercial and recreational fisheries in marine reserves are managed by the Fisheries Department.

The CALM Act specifies the statutory process for the reservation of marine reserves, including a public planning process via an advisory committee for the development of management zones that allow multiple-use and, if necessary, for the spatial separation of incompatible activities within a reserve. In anticipation of this consultative process, the major marine resources and current uses of areas recommended for reservation in the Wilson Report, are being identified and mapped in a Geographical Information System (GIS) by the Marine Conservation Branch (MCB) as part of the Marine Reserve Implementation Programme.

The formal process for considering Jurien Bay and surrounding waters for marine reservation was recently initiated by the Minister for the Environment through the establishment of a marine reserve advisory committee as the first step in the public consultation process. Recent broad-scale biological (Burt, 1996, Burt *et al.*, 1997) and oceanographic (D'Adamo, 1996, D'Adamo and Monty, 1997) field programmes conducted by the MCB in the Jurien area, were undertaken to provide a better regional ecological perspective of these waters for input into the consultative process.

The species diversity and primary production data collected in this survey will be used to provide an estimate of the relative ecological value of different parts of the marine environment of the Jurien Bay area. This information will be used to provide a more detailed ecological perspective of this area for the marine reserve advisory committee assisting CALM with the implementation of the proposed multiple-use marine reserve for Jurien Bay and surrounding waters.

The field survey was carried out as part of CALM's Marine Reserve Implementation Programme and was co-ordinated by the Marine Conservation Branch of CALM in collaboration with the Western Australian Museum, Murdoch and Edith Cowan Universities and CALM's Midwest Regional and Moora District offices.

1.2 Objectives

Primary objectives:

- quantify the relative species richness and abundance of the macro-benthic communities within the major benthic habitat types;
- quantify the relative species richness and abundance of the large and non-cryptic small fishes within the major benthic habitat types;
- quantify physical parameters such as water depth, seabed 'roughness' and sediment mineralogy within the major benthic habitat types as a surrogate for macro-benthic species richness;
- quantify the relative biomass of the macroalgal and seagrass assemblages within the major benthic habitat types as a surrogate for primary production;

Secondary objectives:

- opportunistic collection of qualitative information (still photography and video footage) on visually dominant marine fauna and flora;

- establish reference collections for each of the major phyla in the study area;

2 METHODS

2.1 Survey area

The waters of the proposed Jurien area are considered to be typical of the Central West Coast zone, one of ten primary geomorphic coastal zones recognised along the Western Australian coast, containing excellent examples of all the characteristic habitat types of that zone (CALM, 1994; known as the Wilson Report). This classification is very similar to the results of a marine bioregionalistion, based on demersal shelf fish populations, conducted by CSIRO as part the Interim Marine and Coastal Regionalisation for Australia (Thackway and Cresswell, 1996).

Searle and Semeniuk (1985) divided the coastal environment of the Central West Coast into five distinct sectors with the waters of the Jurien area occurring within the Wedge Island-Dongara sector. This sector of the coast is micro-tidal, relatively high energy, with a moderately narrow shelf, clear waters and predominately carbonate sediments. The nearshore bathymetry is complex, consisting of ridges and depressions, offshore limestone islands with well developed shallow reef systems, extensive sand banks and several semi-enclosed embayments (e.g. Jurien Bay). Inside the 20 m isobath there is a series of prominent, elongated, offshore limestone reefs, more or less parallel to the shore, protecting inshore lagoons. The adjacent coastline is commonly of long sandy beaches scalloped at a large scale with occasional limestone cliffs and headlands and rocky shores with wide rock platforms.

2.2 Site selection

A primary objective of this survey was to provide a quantitative description of the dominant elements of the marine flora and fauna within the major habitat types of the waters between Green Head and Cervantes. CALM's Marine Conservation Branch recently completed a broad-scale mapping, ground-truthing and classification of the major marine habitats along about100 km of the Central West Coast between Cervantes and Cliff Head (Burt *et al*. 1997). This regional survey classified these waters into the eight broad habitat types listed below.

- seagrass meadow,
- seagrass interspersed with sand patches and some reef, > 10m depth,
- seagrass interspersed with sand patches and some reef, < 10m depth,
- bare sand with sparse seagrass,
- limestone pavement,
- subtidal reef with predominately macroalgal cover, interspersed with sand patches,
- shallow reef platforms,
- limestone pavement interspersed with sand, macroalgae and seagrass.

This regional marine habitat map in conjunction with aerial photographs and bathymetric charts were used to locate representative sampling sites in five of the major habitat types in the study area. Also included, were recreational dive sites considered to have a relatively high abundance or diversity of flora and fauna (e.g. sites 19, 27, 60, 61, 67) and sites with unusual biological features, such as the presence of corals (e.g. site 21 & 65).

Sites were located well away from the boundaries between habitat types to reduce potential sample bias caused by *edge effects*. The 'mixed' seagrass habitats (divided into two depth categories), were sampled as one habitat type. The 'Bare Sand' habitat typically has a low diversity of macro-benthic flora and fauna and an insignificant macrophyte standing crop and, as such, was not included in the study. Limestone pavement does not occur within the study area.

Weather and sea conditions permitting it was anticipated that a total of 66 sites would be sampled during the 15 day survey, with at least four sites completed per day. The number of sites in each habitat type (listed below in parenthesis) relates to the anticipated broad-scale heterogeneity of the habitats within the study area.

- seagrass meadows (12);
- seagrass interspersed with sand patches and some reef (12)
- subtidal reef with predominantly macroalgal cover, interspersed with sand patches (18)
- shallow reef platforms (14)
- limestone pavement with some macroalgal cover, interspersed with patches of sand and seagrass (10)

2.3 Quantitative sampling methodology

The methods outlined below are an adaptation of the methods proposed for the field survey outlined in the CALM Field Programme Report (Burt, 1997).

A combination of visual census, video transect and quadrate sampling was used to quantify the relative species diversity and relative abundance of the fish community, and the dominant components of the macro-benthic (specimens > 10 mm) community at each site. The biological survey consisted of five quantitative elements:

- the relative species richness and abundance of the large and non-cryptic small fishes within the major benthic habitat types;

- the relative species richness and abundance of mobile macro-benthic invertebrates (i.e. Molluscs, Echinoderms & Crustaceans) within the major benthic habitat types;

- the relative species richness and abundance of the sessile macro-benthic invertebrates (i.e. Sponges, Ascidians Cnidarians) within the major benthic habitat types;

- quantify physical parameters such as water depth, seabed 'roughness' and sediment mineralogy within the major benthic habitat types as a surrogate for macro-benthic species richness;

- the relative biomass of the macroalgal and seagrass assemblages within the major benthic habitat types as a surrogate for primary production.

A 200 m weighted and scaled transect line was deployed over the stern of CALM's research vessel *Bidthangara*, in a straight line from east to west. Lengths of railway iron were used to anchor the ends of the transect line which were marked on the surface with dive flags. As the transect line was deployed, numbered quadrates and catch bags were attached at 20 m intervals using shark clips. After deployment the *Bidthangara* was anchored approximately 40 m from the beginning of the transect line (eastern end), adjacent to quadrat 2. The location of each site was recorded using a differential GPS.

The transect line with attached catch bags was usually retrieved over the stern of the *Bidthangara* however an inflatable zodiac was occasionally used in 'rough' or windy conditions.

Only upper surfaces that were approximately horizontal were sampled using the quadrates, and if a quadrate fell on a vertical surface the nearest horizontal surface was sampled. Likewise, if more than 75 % of a quadrate was bare sand the quadrate was moved to the nearest non 'bare sand' habitat. Mobile invertebrates, such as cephalopods, infauna and microbiota, and epiphytic invertebrates attached to the leaves and stems of seagrass and macroalgae were not quantitatively sampled. Site information, such as the location, water depth and a brief habitat description, including the dominant flora and fauna, were recorded for each site on a standard Habitat Data Sheet.

The dive team consisted of five divers, as described below, and operated from the *Bidthangara* supported by a dive supervisor and an assistant. It is estimated that divers required approximately 45-60 minutes bottom time at each site to complete their tasks. Divers always dived with at least one other diver and on completing their tasks always surfaced at a buoy and swam on the surface back to the boat.

Fish assemblages(two divers)

Two divers swimming at a constant speed (~10 m of transect per minute) and height above the seabed (~2 m), conducted a visual census along the 200 m transect line to determine the species composition of the large and, non-cryptic small, fish assemblages at each site (approximate bottom time 20 minutes). The divers swam along the centre of a five meter swath on each side of the 200 m transect line (total sample area 2000 m^2) recording the information on a Fish Data Sheet. Quantitative fish surveys were not conducted if water visibility was less than 3 m, half the swath width. The above is an adaptation of the methodology described by Edgar*et al*. (1997).

On completing the fish census both divers swam back along the transect line. The first diver collected video footage of each quadrate and general underwater footage of the site. Video details of each transect were recorded on a standard Video Data Sheet. The second diver recorded water depth (+/- 0.2 m) and the proportion of bare sand in all ten quadrates and water depth at alternate 10 m intervals along the transect. The proportion of bare sand along the entire transect was also recorded. The mean water depth and standard deviation of the depth (SDD) were calculated for each transect. SDD is used as an approximate index of seabed *roughnes*s, based on the assumption that, over a 200 m transect the effect of seabed slope on the SDD is negligible compared to the effect of variation in seabed topography (Simpson and Ottaway, 1986).

The first diver also collected a one kilogram sample of surficial sediment (top 20 mm), where possible, at each site. The sample was frozen for storage and will be analysed for grain size and organic content. Further technical details on the analytical methodology can be found in Burt and Ebell (1995).

In seagrass meadows the census did not include fishes within the canopy, otherwise the methodology was the same as applied to hard substrate sites.

On completion of these tasks the two divers returned to the beginning of the transect line, surfaced at the dive flag and swam back to the *Bidthangara*.

Invertebrate and macrophyte assemblages (three divers)

Following behind the divers describing the fish assemblages, two divers collected all the mobile invertebrates and non-encrusting sessile invertebrates, such as sponges and ascidians, from ten 0.5 m^2 quadrates attached at 20 m intervals along the 200 m transect line (total sample area of 5 m^2). Pieces of hard corals and encrusting sessile invertebrates were also collected and their dimensions recorded for each quadrate. All data was recorded on a standard Invertebrate Data Sheet.

A third diver harvested the above-ground macrophyte material from five quadrates, at 40 m intervals, along the 200 m transect line. The material from each quadrate was placed in a calico sample bag provided in the catch bag attached to the transect line with each quadrate (see above). The sampling area was 0.25 m^2 for quadrates in reef habitats and 0.1 m^2 in seagrass meadows, providing a total sample area along each transect of 1.25 m^2 and 0.5 m^2 respectively. Data was recorded on a Macrophyte Data Sheet. This diver also checked each quadrate to ensure all the invertebrates had been collected.

On completion of these tasks the three divers surfaced at the dive flag located at the end of the transect line and were retrieved by the dive attendants using the zodiac.

2.4 Sorting and preservation of samples

Macrophyte material was stored on the boat in damp hesian bags and transported back to the field station where it was sorted in the major taxonomic groups, identified if possible or catalogued as a species number. Unidentified specimens or new reference material was preserved as described below.

The total biomass (wet weight) of seagrass and macroalgae and, the biomass of common species, were determined for each quadrat. In addition, the biomass of the major macroalgal groups (i.e. red, brown and green and, coralline and non-coralline algae) was also determined.

A preliminary sorting and identification of faunal material collected from each transect was undertaken onboard the *Bidthangara*. New, interesting or unknown specimens were transported back to the field station for identification. Some material, particular specimens of soft coral, sponges, tunicates and ascidians, were immediately preserved on the boat in 70 % alcohol, other material was stored in damp calico bags for transport back to the field station.

Floral and faunal reference collections were established at the field station to assist with the identification of specimens and provide the basis of an ongoing reference collection for the proposed marine reserve.

Seagrasses and algae were preserved in 2-4 % seawater/formalin, sponges in 70% alcohol and all invertebrate specimens in 4 % formalin buffered with sodium bicarbonate.

2.5 Qualitative sampling

Still photographs and high quality video footage of marine flora and fauna were taken as a **secondary** objective. As the collection of this type of information is dependent on good water clarity, it was undertaken when opportunities become available. General information about each sampling site, particularly observations of important marine wildlife (e.g. seals, whales etc.) were recorded on a standard Habitat Data Sheet.

3 Results

3.1 Species richness

Strong winds and heavy swells for most of the survey created very difficult working and diving conditions resulting in 39 of the scheduled 66 sites being sampled from four habitat types (Figure 1). There was insufficient time to sample the relatively deep sites in the offshore limestone pavement habitat and the heavy swells prevented sampling sites in the shallow subtidal and intertidal reef habitat. Site location details are provided in Appendix I.

A preliminary analysis of the results indicates that the major benthic habitats of this area have a diverse assemblage of marine flora and fauna (Appendix II). Some of the specimens recorded in this survey, particularly a number of the sponges, are possibly new to 'recorded science'. Other outstanding features include an interesting mixture of tropical and temperate species, extensive algal and seagrass communities, diverse invertebrate communities, particularly sponges, and a rich fish fauna.

Four hundred and thirteen marine species from 10 phyla were recorded from 39 sites, including 9 seagrass species, 134 macroalgal species, 206 invertebrate species and 64 fish species (Appendix II). Appendices III to VI summarise the diversity of seagrass, macroalgae, fish and invertebrates species respectively, at each site and within the major benthic habitat types. A detailed species list for the 39 sites is presented in Appendix VII.

The distribution of total species diversity (flora and fauna) between the major habitat types ranged from 78 species recorded in bare sand, approximately 145 species in seagrass meadow/sparse seagrass and more than 240 in subtidal reef (Appendix II).

Floral diversity represented about a third of the total species diversity, with 143 species recorded from four phyla (Appendix II). One hundred and three species of red algae (Rhodophyta) and 23 species of brown algae (Phaeophyta), comprising 72 % and 16 % respectively of the total floristicdiversity, were recorded. A summary of the floral diversity at each site are presented in Appendices III and IV.

A comparison of the floral diversity between the major habitat types shows that diversity ranged from a total of 26 species recorded in bare sand, 48 species in seagrass meadow and approximately 100 species in subtidal reef (Appendix II).

Two hundred and seventy species of fauna, from seven phyla, represented 65 % of the total diversity recorded (Appendix II). The faunal diversity was dominated by fish (Chordata, 24 %) and sponges (Porifera, 31 %) with the remaining diversity largely distributed between two phyla: Ascidians (14 %), and Mollusca (13 %).

A comparison of the faunal diversity between the major habitat types shows that diversity ranged from a total of 52 species recorded in bare sand, more than 100 species in seagrass meadow/sparse seagrass and approximately 140 species in subtidal reef.

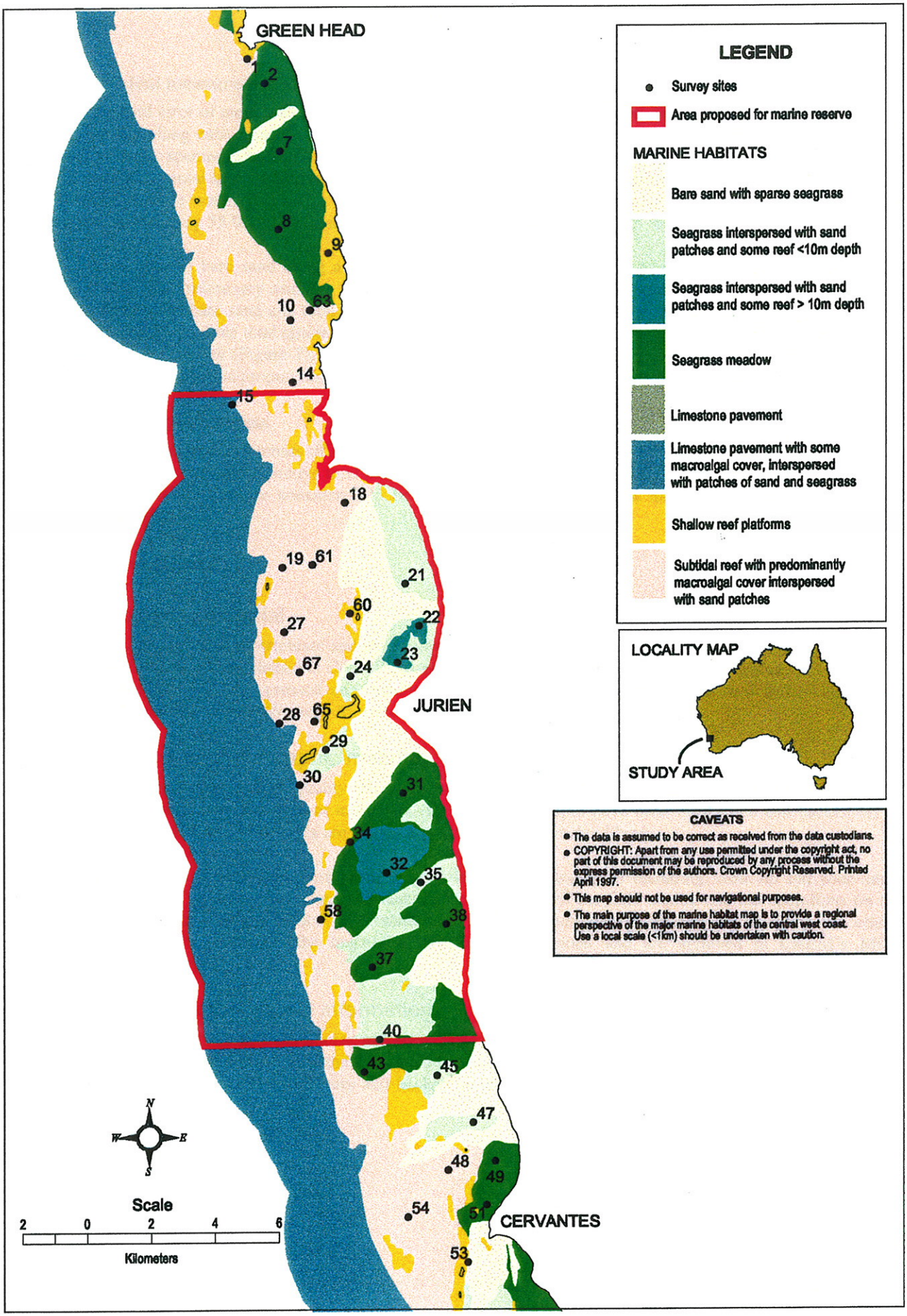


Figure1. Location of sampling sites, and map of the major benthic habitat types in the study area (from Burt et al., 1997)

3.2 Physical measurements

The standard error of mean water depth (SED) were calculated from measurements of water depth recorded at 10 m intervals along each transect, to investigate the use of seabed 'roughness' as an indicator, or surrogate, of macro-benthic species richness (Appendix VIII). Preliminary analyses indicate that SED explains nearly 40 % of the variation in total species diversity suggesting that SED is likely to be a reasonable indicator of benthic species diversity in these waters (Figure 2). SED accounts for nearly 45 % of faunal diversity (fish and invertebrates, Figure 3), including 55 % of fish diversity (Figure 4), but explains less than 25 % of invertebrate diversity.

The proportion of bare sand along a transect can be used as an indicator of habitat diversity or 'patchiness' (Appendix IX). Preliminary analyses indicate that, in reef habitat, there is a strong negative correlation between the proportion of bare sand and total species diversity (Figure 5). The proportion of bare sand in a reef habitat accounts for 65 % of the total species diversity, nearly 60 % of the invertebrate diversity (Figure 6) and about 50 % of the fish diversity (Figure 7). A similar analysis in seagrass habitat however suggests that there is a weak relationship between the proportion of bare sand and the diversity of macro-benthic species.

3.3 Macrophyte biomass

The mean above-ground biomass of seagrass and macroalgal species at each site are presented in Appendix VII. Figures 8 and 9 show the respective total mean biomass of seagrass and macroalgae at each sites in comparison to the biomass values that are considered to be typical of 'healthy' seagrass meadows and reef assemblages (Hillman and Morrison, 1994).

3.4 Data curation

3.41 Biological material

Reference specimens of invertebrate and macrophyte material have been identified, to species were possible, and reference collection established at CALM's Marine Conservation Branch, in Fremantle. Specimens of seagrass and macroalgae have been pressed and mounted. Floral and faunal 'type' specimens have been lodged with CALM's Herbarium and the Western Australian Museum respectively.

3.42 Video and photographic material

A considerable amount of high quality (Hi 8) underwater video footage and photographs were obtained of the visually dominant fauna and flora at most sites. The Hi 8video tapes have been catalogued and backed-up on VHF tapes. The Hi8 and VHF tapes are archived in CALM's MCB video library.

A large number of photographs were taken by a professional photographer including, close-up and wide-angle underwater 'shots' of interesting flora and fauna, general footage of the field station and the operations on the *Bidthangara* and a series of 'shots', underwater and on the *Bidthangara*, illustrating the sampling procedure. These photographs, including the negatives, have been catalogued and are archived in CALM's MCB photographic library.

3.43 Data and other digital information

All the original field survey Data Sheets, and transcribed copies, have been archived in the Marine Conservation Branch library. A digital copy of all the data, including the Data Report, is held on floppy discs (IBM format) in the Marine Conservation Branch library and backed up on the t-drive of the Branch's server (t:/JIM/JURIEN/ DATA0497).

Figure 2

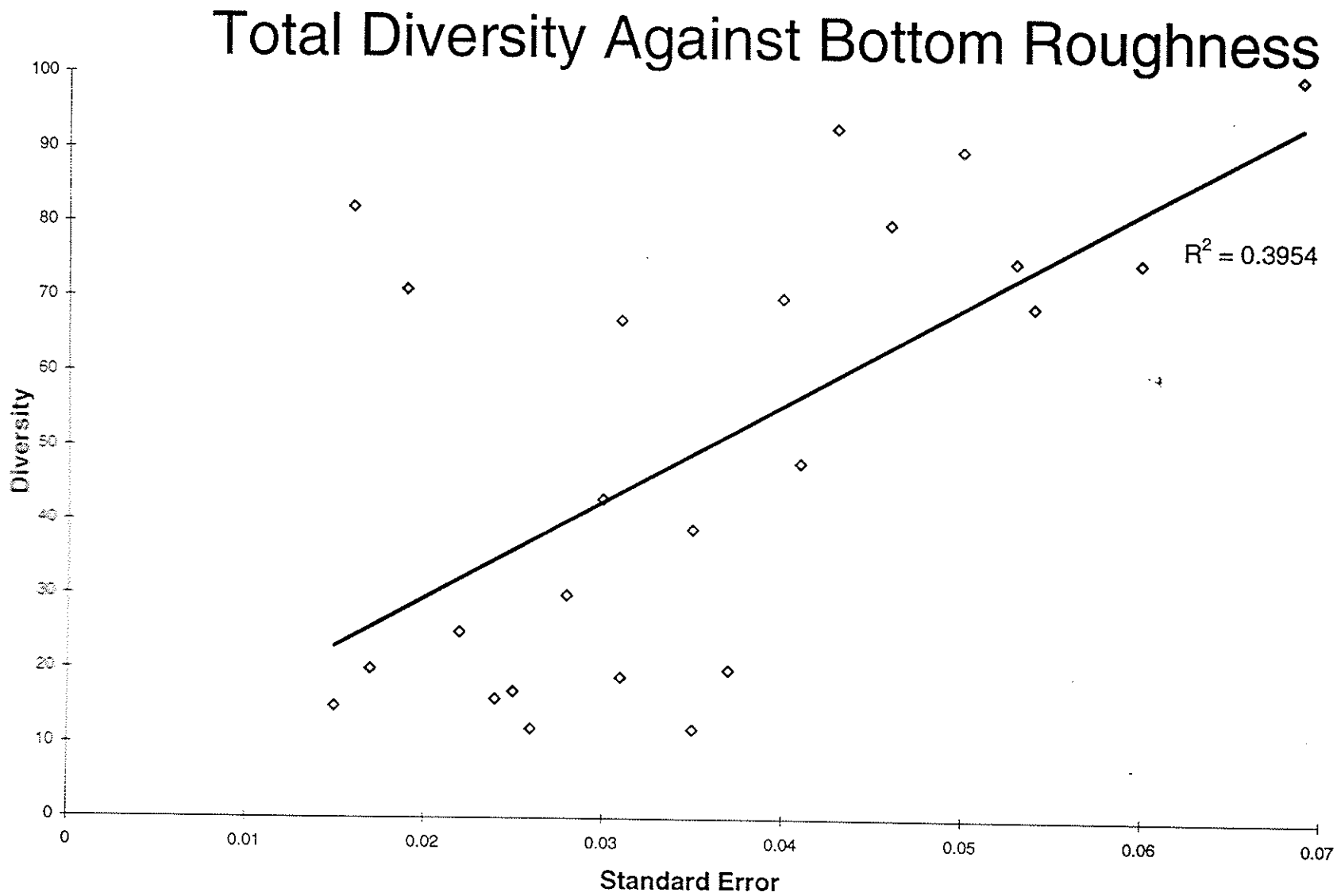

Total Diversity Against Bottom Roughness
Diversity
Standard Error
$R^2 = 0.3954$
0
10
20
30
40
50
60
70
80
90
100
0
0.01
0.02
0.03
0.04
0.05
0.06
0.07

Figure 3

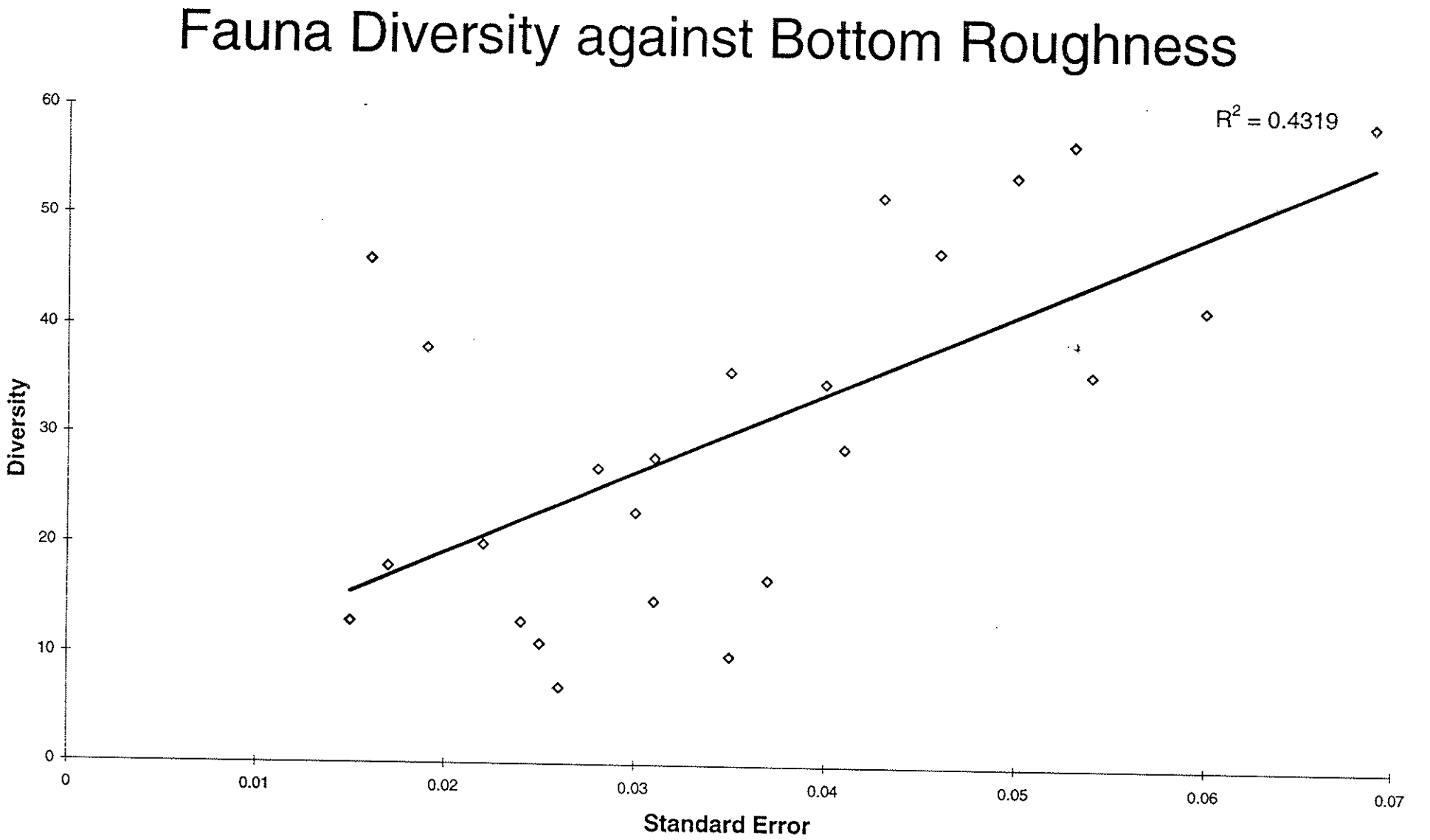
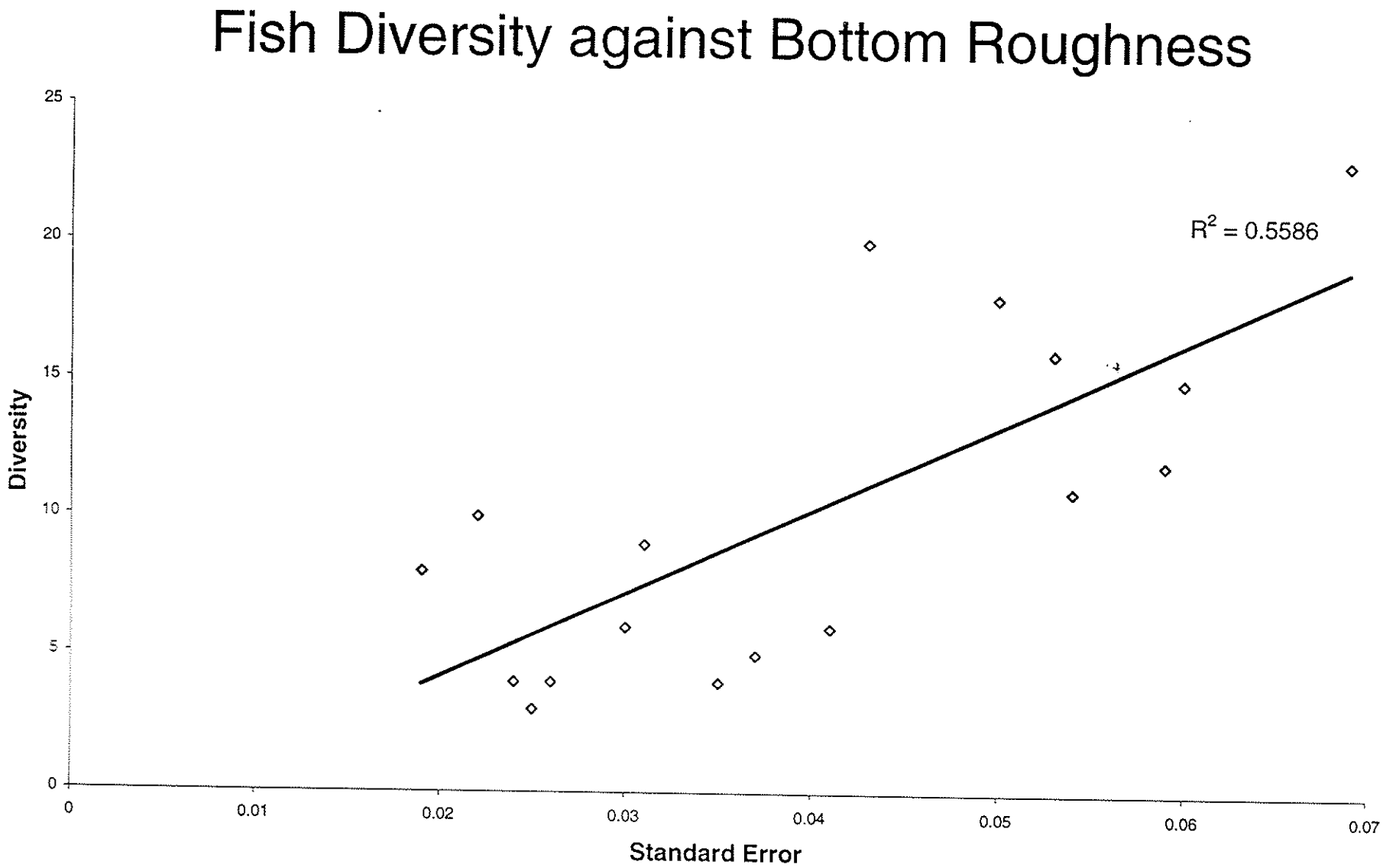

Fauna Diversity against Bottom Roughness
$R^2 = 0.4319$
Diversity
Standard Error
0
10
20
30
40
50
60
0
0.01
0.02
0.03
0.04
0.05
0.06
0.07

Figure 4


Fish Diversity against Bottom Roughness
Diversity
Standard Error
$R^2 = 0.5586$
0
5
10
15
20
25
0
0.01
0.02
0.03
0.04
0.05
0.06
0.07

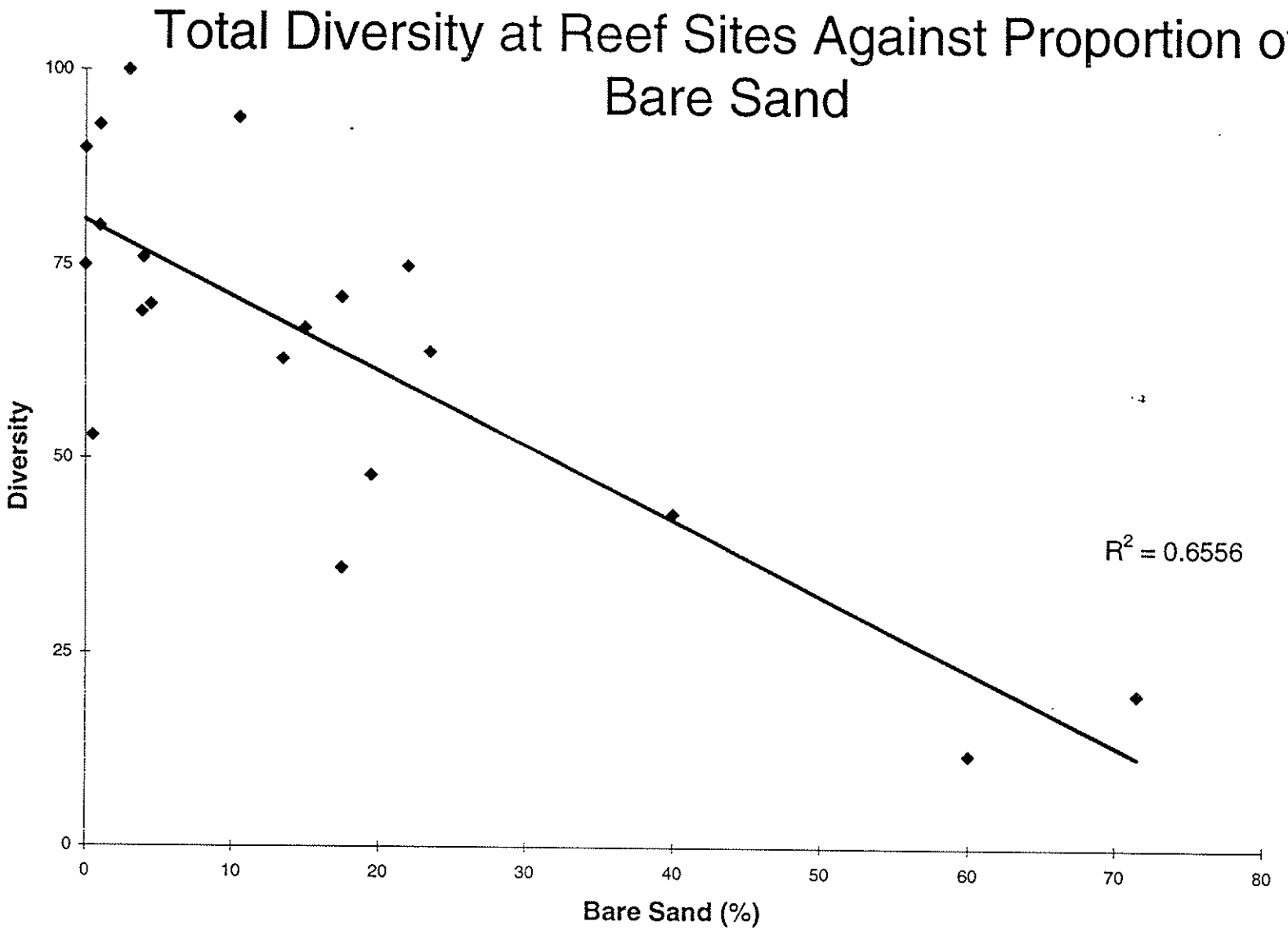

Total Diversity at Reef Sites Against Proportion of Bare Sand
Diversity
100
75
50
25
0
0
10
20
30
40
50
60
70
80
Bare Sand (%)
$R^2 = 0.6556$

Figure 6

Invertebrate Diversity at Reef Sites Against Proportion of Bare Sand

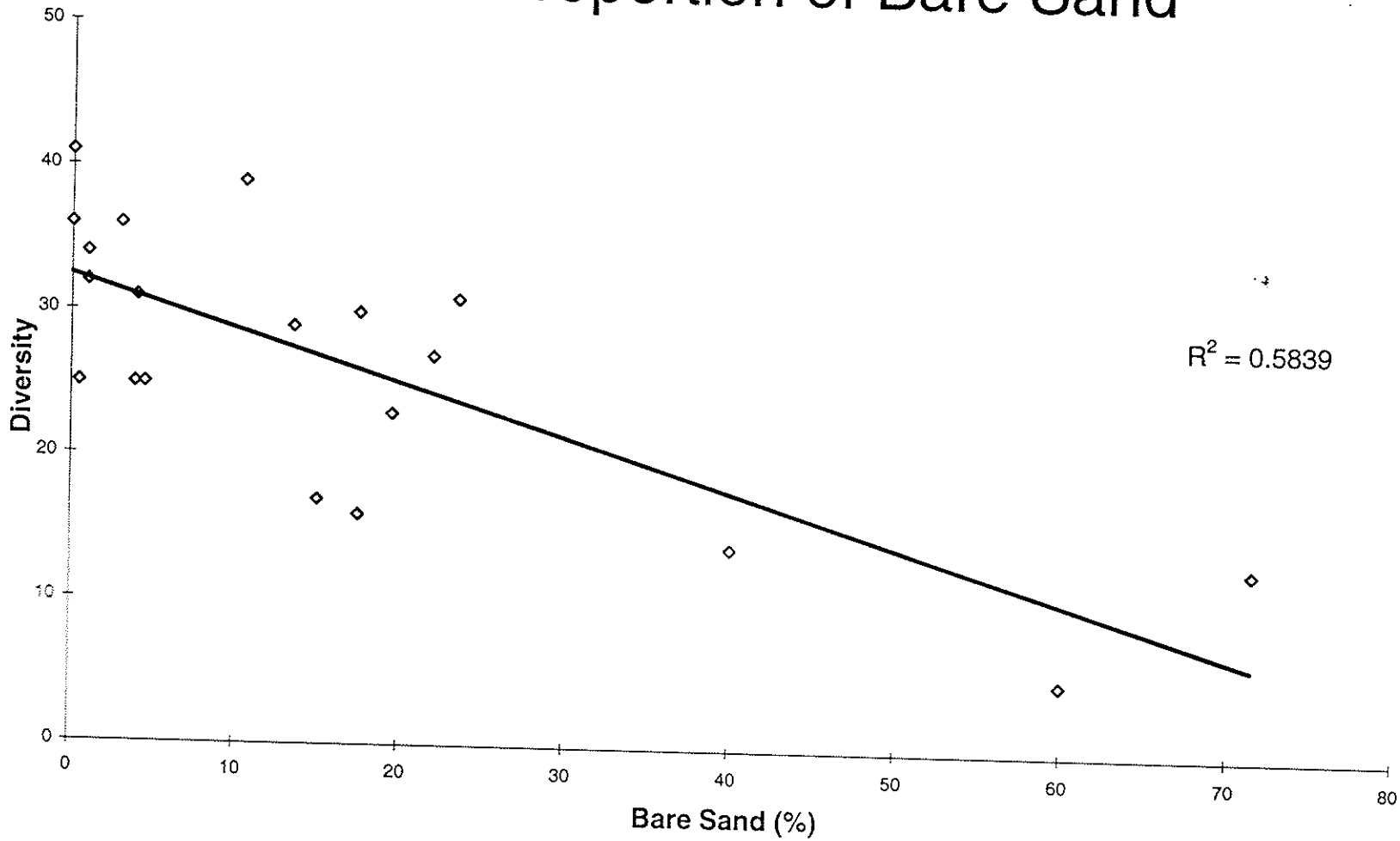


Figure 7

Fish Diversity at Reef Sites Against Proportion of Bare Sand

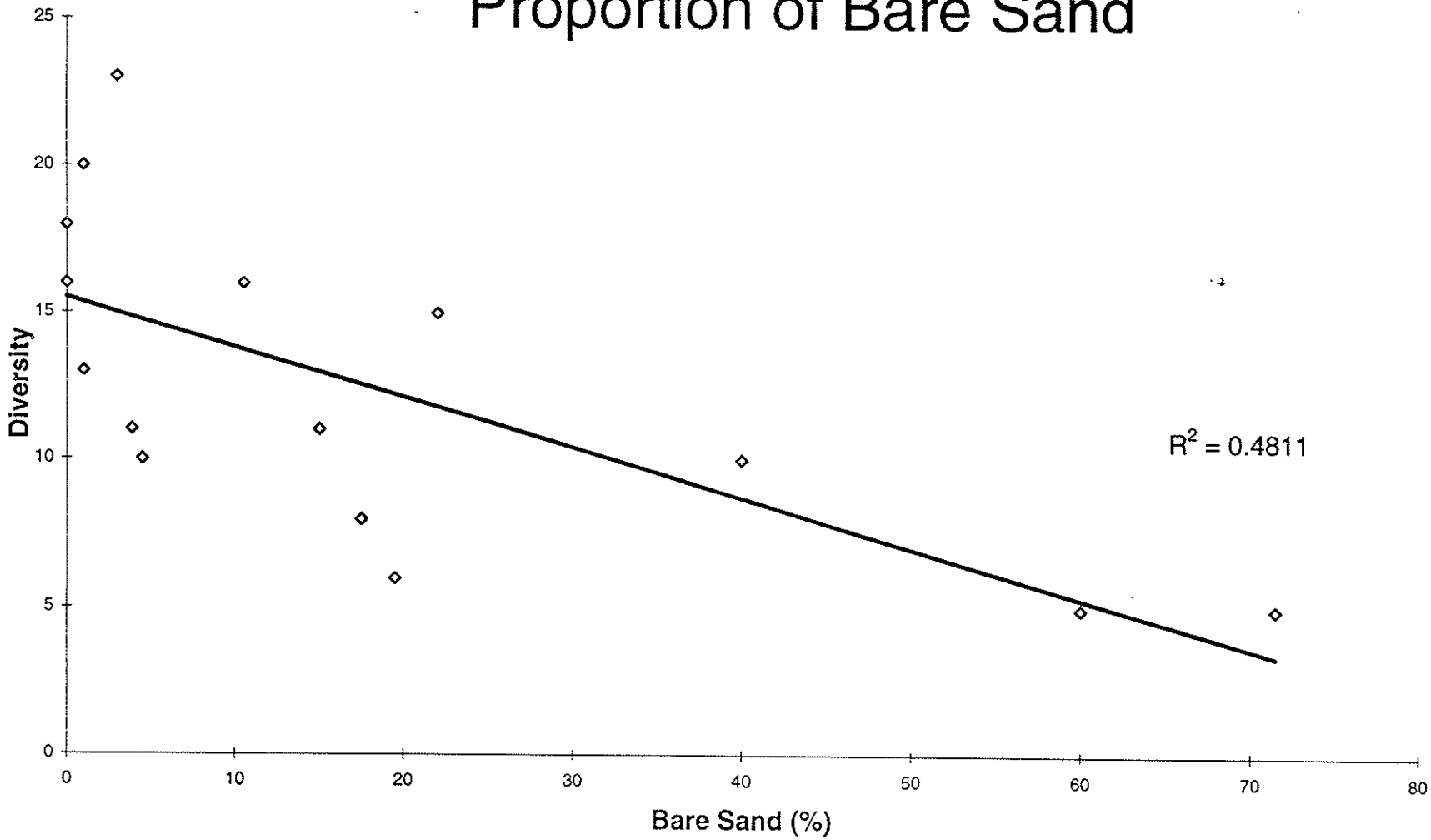


Figure 8

Mean Biomass of Seagrass

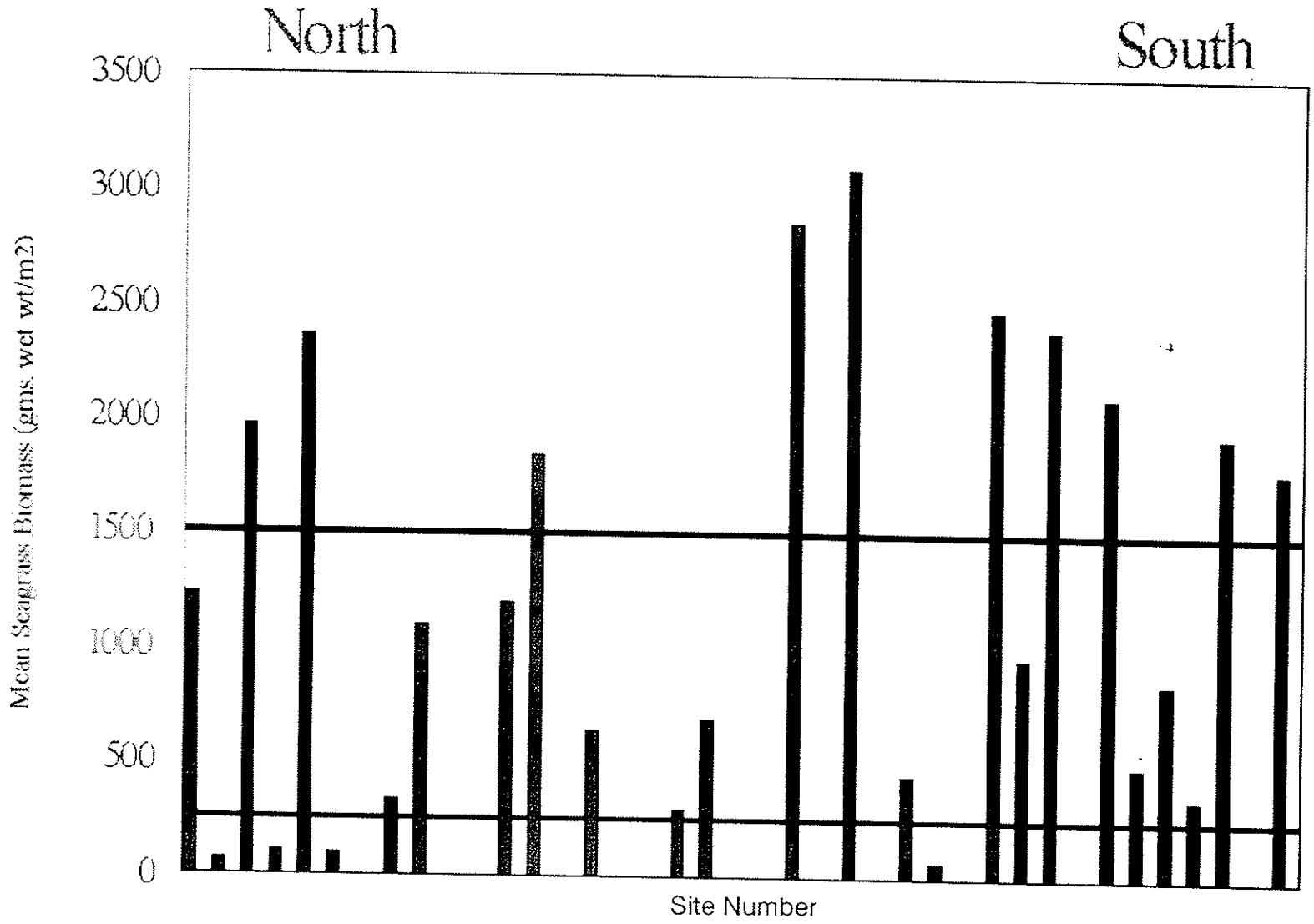
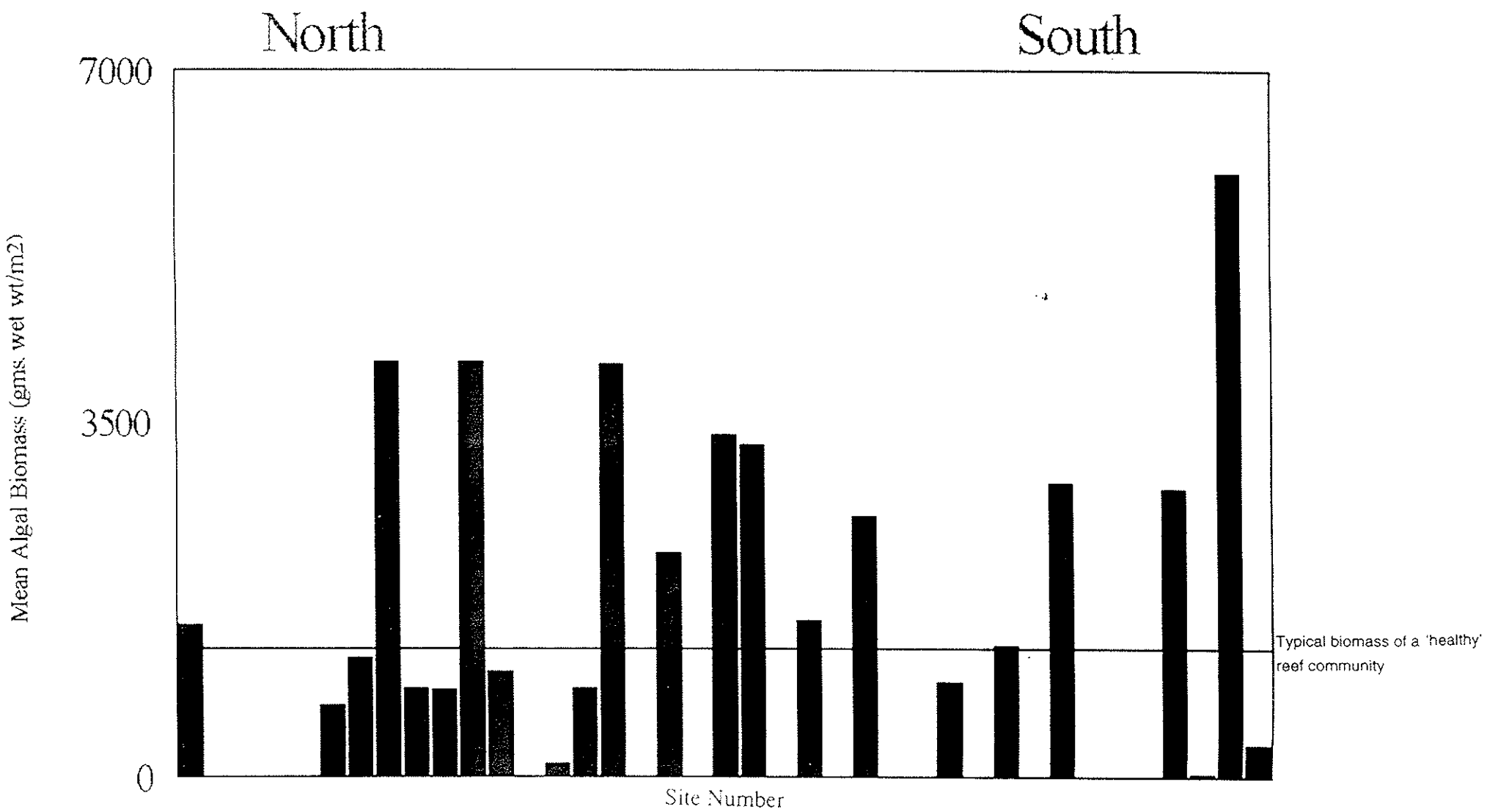


Figure 9

Mean Biomass of Algae



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APPENDIX I

Site locations

Site No.	Site location	Latitude	Longitude	Habitat type
1	Greenhead lagoon, north	30.07842	114.96513	Subtidal reef
2	Greenhead lagoon, north	30.08772	114.97318	S/G meadow
7	Greenhead lagoon, north	30.11360	114.98099	S/G meadow
8	Greenhead lagoon, central	30.14150	114.97757	S/G meadow
9	Greenhead lagoon, south	30.15033	114.99808	Sparse seagrass <10m
10	Sandy Point	30.17418	114.98104	Subtidal reef
14	Jurien Bay, Nth head	30.19701	114.98105	Subtidal reef
15	Jurien Bay, Nth head	30.20435	114.96179	Bare sand
18	Jurien Bay, Nth head	30.24123	115.00303	Subtidal reef
19	Jurien Bay	30.26405	114.97736	Subtidal reef
21	Jurien Bay	30.27169	115.02530	Sparse seagrass <10m
22	Jurien Bay	30.28775	115.03303	Bare sand
23	Jurien Bay	30.29918	115.02374	Bare sand
24	Jurien Bay	30.30522	115.00450	Sparse seagrass <10m
27	Jurien Bay	30.28863	114.97641	Subtidal reef
28	Jurien Bay	30.32113	114.97423	Subtidal reef
29	Hill River lagoon, Nth	30.33126	114.99441	Sparse seagrass <10m
30	Hill River lagoon, Nth	30.34465	114.98432	Subtidal reef
31	Hill River lagoon, Nth	30.34750	115.02503	S/G meadow
32	Hill River lagoon, central	30.37719	115.01833	S/G meadow
34	Hill River lagoon, central	30.36513	114.99623	Subtidal reef
35	Hill River lagoon, central	30.37993	115.03118	Sparse seagrass <10m
37	Hill River lagoon, Sth	30.41184	115.00964	S/G meadow
38	Hill River lagoon, Sth	30.39487	115.04222	S/G meadow
40	Cervantes lagoon, Nth	30.43743	115.01264	S/G meadow
43	Cervantes lagoon, Nth	30.44957	115.00685	Subtidal reef
45	Cervantes lagoon, Nth	30.45134	115.03731	S/G meadow
47	Cervantes lagoon, Nth	30.46969	115.05257	Sparse S/G
48	Cervantes lagoon,Central	30.48591	115.04241	Subtidal reef
49	Cervantes lagoon,Central	30.48270	115.06138	S/G meadow
51	Cervantes lagoon, Sth	30.49879	115.05653	S/G meadow
53	Hangover Bay	30.51980	115.04552	S/G meadow
54	Cervantes lagoon, Sth	30.50304	115.02291	Subtidal reef
58	Hill River lagoon, central	30.39617	114.98452	Subtidal reef
60	Jurien Bay	30.28164	115.00447	Bare sand
61	Jurien Bay	30.26396	114.99024	Subtidal reef
63	Sandy Point	30.17094	114.98951	Subtidal reef
65	Jurien Bay	30.32185	114.98940	Subtidal reef
67	Jurien Bay	30.30370	114.98168	Subtidal reef

APPENDIX II

Summary of the distribution of species between phyla and habitat type

PHYLUM	Number of species in each Habitat					Number of Species in total	Percentage of total number of species
	Bare Sand	Seagrass meadow	Sparse SG <10m	Subtidal Reef <10m	Subtidal Reef >10m		
FLORA							
Rhodophyta	19	25	26	68	79	103	25
Phaeophyta	3	11	5	16	18	23	6
Chlorophyta	0	3	0	3	6	8	2
Angiospermae	4	9	9	6	3	9	2
Flora Total	26	48	40	93	106	143	35
FAUNA							
Commercial fish	1	5	5	4	6	8	2
Recreational fish	2	2	1	5	6	11	3
Other fish	13	14	14	27	29	45	11
Cnidaria	3	6	5	10	7	13	3
Chordata	12	13	21	28	13	39	9
Arthropoda	3	3	6	4	6	14	3
Porifera	3	35	26	53	54	83	20
Echinodermata	5	7	8	7	3	19	5
Mollusca	9	15	16	18	13	36	9
Annelida	1	0	0	0	1	2	0.5
Fauna Total	52	100	102	156	138	270	65
TOTAL	78	148	142	249	244	413	100
GROUPS							
SEAGRASS	4	9	9	6	3	9	2
ALGAE	22	39	31	87	103	134	32
FISH	16	21	16	36	41	64	15
INVERTEBRATES	36	79	74	127	97	206	50

APPENDIX III

Presence of seagrass species at each site

SEAGRASS

HABITAT AND SITE NUMBER

Bare Sand

SPECIES		60	15	23
Amphibolis	antarctica	1	1	
Amphibolis	griffithii	1		
Halophila	australis			1
Halophila	ovalis			
Heterozostera	tasmanica			
Posidonia	coriacea			
Posidonia	sinuosa			
Syringodium	isoetifolium			1
Syringodium	sp.			
Total no. species		2	1	2

Seagrass meadow

SPECIES		31	49	51	2	7	8	37	38	32	53	40	45
Amphibolis	antarctica	1	1	1	1	1	1		1	1		1	
Amphibolis	griffithii	1	1					1	1	1	1	1	1
Halophila	australis				1				1	1			
Halophila	ovalis				1						1	1	1
Heterozostera	tasmanica				1								
Posidonia	coriacea	1							1	1			
Posidonia	sinuosa		1		1	1	1				1		
Syringodium	isoetifolium				1				1	1	1		
Syringodium	sp.						1						
Total no. species		3	3	1	6	2	3	1	5	5	4	3	2

Sparse Seagrass <10m

SPECIES		9	21	24	29	35	47
Amphibolis	antarctica	1	1				
Amphibolis	griffithii	1	1	1	1		
Halophila	australis			1	1	1	
Halophila	ovalis		1	1	1		1
Heterozostera	tasmanica					1	
Posidonia	coriacea					1	
Posidonia	sinuosa	1					
Syringodium	isoetifolium		1			1	
Syringodium	sp.		1				
Total no. species		3	5	3	3	4	1

Subtidal Reef

SPECIES		67	14	1	48	61	53	[illegible]	[illegible]
Amphibolis	antarctica	1				1	1	[illegible]	
Amphibolis	griffithii			1	1	1			
Halophila	australis			1					
Halophila	ovalis			1					[illegible]
Heterozostera	tasmanica								
Posidonia	coriacea								
Posidonia	sinuosa		1						
Syringodium	isoetifolium		1						
Syringodium	sp.								
Total no. species		1	2	3	1	2	1	[illegible]	[illegible]

APPENDIX IV

Presence of macroalgal species at each site

ALGAE

HABITAT AND SITE NUMBER

SPECIES		Bare Sand			Seagrass meadow								Sparse Seagrass <10m	Subtidal reef																
		15	22	23	49	51	37	45	2	7	8	53	21	67	1	34	14	27	58	10	18	19	28	30	48	54	61	63	65	43
Phaeophyta	**(Brown Algae)**																													
Cystophora	sp.											1																		
Dicranema	revolutum	1												1	1															
Dictyopteris	muelleri						1						1		1		1	1		1		1	1	1	1		1	1	1	1
Dictyopteris	plagiogramma				1		1		1					1	1	1	1	1		1					1		1	1		1
Dictyota	naevosa?																			1			1							1
Dictyota	sp.1						1								1		1							1				1		
Dictyota	sp.2																			1								1		
Dilophus	fastigiatus				1								1	1		1	1						1		1					1
Dilophus	robustus						1													1	1						1	1	1	
Ecklonia	radiata													1		1		1	1		1	1				1			1	1
Lobophora	variegata						1			1			1	1	1	1			1		1	1				1	1	1	1	1
Lobospira	bicuspidata											1	1		1		1	1		1		1				1	1	1	1	
Myriodesma	quercifolium							1						1			1	1		1		1	1	1	1	1	1		1	1
Myriodesma	serrulata													1								1								
Platythalia	angustifolia													1			1					1	1						1	
Sargassum	decurrens																			1										
Sargassum	fallax?												1			1														
Sargassum	linearifolium																		1											
Sargassum	puticmum																1													
Sargassum	sp.	1										1		1	1		1		1		1		1		1	1			1	1
Sargassum	tristichum																					1								
Scytothalia	doryocarpa					1								1				1					1			1			1	1
Zonaria	turneriana	1																				1				1			1	
	Total Phaeophyta	3	0	0	2	1	5	1	1	1	0	3	5	10	7	5	9	6	4	8	4	9	7	3	5	7	6	7	10	9
Chlorophyta	**(Green Algae)**																													
Caulerpa	cactoides											1													1			1		
Caulerpa	geminata											1						1												
Caulerpa	simpliciuscula																1													
Cladophora	lehmanniana										1				1			1							1	1				
Codium	galeatum																			1										
Codium	laminarioides																			1										
Codium	mamillosum																			1										
Codium	pomoides																				1									
	Total Chlorophyta	0	0	0	0	0	0	0	0	0	1	2	0	0	1	0	1	2	0	3	1	0	0	0	2	1	0	1	0	0
Rhodophyta	**(Non coralline Red Algae)**																													
Acanthophora	dendroides		1									1				1														
Acrothamnion																					1									
Amansia	mogarthia											1																		
[illegible]	sp.																						1	1					1	
Botryocladia	sonderi	1										1	1	1	1	1	1	1		1	1	1	1		1	1		1		
Callithamnion																													1	
Callophycus	oppositifolius													1				1			1	1	1	1		1			1	1
Callophyllis	rangiferina																												1	
Callophyllis																										1				
Carpopeltis	phyllophora															1	1						1							1
Carpothamnion	gunnianum																				1									
Ceramium	rubrum?																1													
Ceramium	sp.															1														
Champia	sp																			1										
Chauvinella	coriifolia												1								1		1			1		1	1	1
Chondria	dangeardii																				1									
Chondria	sp														1	1														
Cladurus	elatus												1		1		1	1		1			1	1	1		1			1
Claviclonium	ovatum	1					1						1				1	1		1	1	1	1	1	1	1	1		1	1
Claviclonium	sp.															1														
Cliftonaea	pectinata															1				1					1			1		
Coeloclonium														1																
Craspedocarpus	blepharicarpus											1		1			1					1			1			1	1	
Curdiea	irviniae												1			1							1			1			1	1
Curdiea	obesa						1						1	1	1	1	1	1	1	1	1		1				1	1	1	
Dasya	sp.					1							1		1				1			1		1						
Dasyclonium	incisum				1											1					1							1		
Delisea	pulchra															1														
Dictyomenia	sonderi	1				1	1					1	1		1		1	1		1		1	1	1	1	1		1	1	1
Dictyomenia	tridens	1											1	1	1	1	1								1				1	1

ALGAE

HABITAT AND SITE NUMBER

SPECIES		Bare Sand			Seagrass meadow								Sparse Seagrass <10m	Subtidal reef														
		15	22	23	49	51	37	45	2	7	8	53	21	67	1	34	14	27	58	10	18	19	28	30	48	54	61	63	65	43
Echinothamnion	mallardiae												1				1								1					
Enantiocladia	axillaris													1					1				1			1				
Erythrocionium	sonderi																			1						1	1			
Erythrocionium	sp.	1																							1	1			1	1
Eucheuma	speciosum																		1				1		1	1				
Euptilocladia	sponglosa														1					1	1		1							1
Euptilota	articulata												1																	
Galaxaura	obtusata												1																	
Gigartina	disticha	1																				1							1	
Gloiocladia	australe																					1								
Gloiosaccion	brownii			1																1										
Gracilaria	comosa		1																											
Gracilaria	flagelliformis																					1								
Gracilaria	preissiana	1															1				1					1				
Gracilaria	sp																													
Griffithsia	monilis																				1			1						
Griffithsia	teges																	1							1	1				
Haloplegma	preissii						1																							
Hennedya	crispa	1												1				1				1	1						1	
Heterodoxia	denticulata													1	1	1	1	1	1	1		1	1	1		1		1	1	1
Heterosiphonia	crassipes												1					1				1				1			1	
Hymenocladia	usnea																		1	1	1						1			
Hypnea	sp																1							1						
Hypnea	sp 2						1							1					1											
Jeannerettia	pedicellata					1							1		1	1														
Kuetzingia	angusta											1		1	1		1	1		1			1		1	1	1	1		1
Kuetzingia	canaliculata	1															1	1						1		1				1
Laurencia	brongniartii												1	1	1	1	1		1			1	1	1	1	1	1	1	1	1
Laurencia	clavata	1													1				1											
Laurencia	elata														1		1								1			1		
Laurencia	filiformis	1			1	1	1					1				1	1			1	1	1						1		
Laurencia	sp.												1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1
Lenormandia	sp															1														
Lenormandiopsis	latifolia																			1										
Leveillea	jungermannioides				1																									1
Melanamansia	serrata	1							1					1			1	1					1			1			1	
Mychodeophyllom																							1							
Neurymenia	fraxinifolia											1																		
Nizymenia	conferta												1		1			1		1	1									
Nizymenia	furcata													1		1						1				1				1
Nizymenia	sp.																						1			1				
Osmundaria	prolifera													1											1					
Osmundaria	spiralis												1	1	1	1	1		1				1	1	1		1	1		1
Peyssonnelia	novae-hollandiae	1											1	1	1	1	1	1	1	1			1	1				1		
Phacelocarpus	peperocarpos																											1		1
Phacelocarpus	sessilis																								1				1	1
Plocamium	mertensii																	1												
Polysiphonia	decipiens						1					1					1							1					1	
Protokuetzingia	australasica												1	1	1	1	1			1		1			1			1	1	
Psilothallia		1											1																	
Pterocladia	lucida						1																							
Ptilophora	prolifera													1		1	1	1	1	1		1				1		1		
Rhodocallis	elegans																	1					1		1				1	
Rhodopeltis	australis																									1				
Rhodopeltis	borealis																									1			1	
Rhodymenia	sonderi													1		1				1			1							
Sarconema	filiforme													1	1	1		1	1	1		1	1	1	1	1		1	1	1
Scilena	robusta			1												1													1	
Spongoclonium	conspicuum																				1									
Spyridia	filamentosa				1								1								1					1				
Stenocladia	australis																					1								
Symphiocladia	sp.												1				1	1								1				
Thuretia	quercifolia															1														
Tolypiocladia	glomerulata											1																		
Tricleocarpa	cylindrica															1														
Trigenea	australis	1											1				1				1					1			1	
Tylotus	obtusatus													1						1		1				1			1	

ALGAE

HABITAT AND SITE NUMBER

SPECIES		Bare Sand			Seagrass meadow								Sparse Seagrass <10m
Rhodophyta	**(Coralline Red Algae)**	15	22	23	49	51	37	45	2	7	8	53	21
Amphiroa	anceps						1						1
Amphiroa	gracilis				1								1
Haliptilon	roseum											1	
Metagoniolithon	chara												
Metagoniolithon	radiatum												1
Metamastophora	flabellata						1						
	Total Rhodophyta	15	2	2	5	4	10	0	1	0	0	11	26
	Total Algae	18	2	2	7	5	15	1	2	1	1	16	31

SPECIES		Subtidal reef																
Rhodophyta	**(Coralline Red Algae)**	67	1	34	14	27	58	10	18	19	28	30	48	54	61	53	[illegible]	[illegible]
Amphiroa	anceps	1	1	1	1	1	1	1	1	1	1		1	1	1	[illegible]	[illegible]	[illegible]
Amphiroa	gracilis	1	1	1	1	1										[illegible]	[illegible]	[illegible]
Haliptilon	roseum				1			1			1					[illegible]	[illegible]	[illegible]
Metagoniolithon	chara	1														[illegible]	[illegible]	[illegible]
Metagoniolithon	radiatum						1	1								[illegible]	[illegible]	[illegible]
Metamastophora	flabellata	1	1	1	1	1	1	1	1	1	1		1	1		[illegible]	[illegible]	[illegible]
	Total Rhodophyta	30	22	28	33	25	14	28	22	24	29	17	25	31	11	25	30	[illegible]
	Total Algae	40	30	33	43	33	18	39	27	33	36	20	32	39	17	33	40	[illegible]

APPENDIX V

Presence of fish species at each site

Please Note changes which have been made to the digital copies of this report regarding the fish species list:

- The scientific name of the Red-striped Cardinal fish is *Apogon victoriae*, not *A. aureus*
- The Baldchin Groper is *Choerodon rubescens*, not *C. cyanodus*
- The scientific name for the Pink snapper has been changed from *Chrysophrys auratus* to *Pagrus auratus*
- The fish recorded as "Common toadfish" are "Banded toadfish"
- The fish recorded as "Red-lined wrasse" are "Red-banded wrasse"

FISH

HABITAT AND SITE NUMBER

SPECIES		Bare Sand				Seagrass meadow									Sparse Seagrass < 10m				Subtidal Reef															
		60	15	22	23	32	49	51	2	7	8	31	38	53	24	29	21	9	1	34	58	67	14	27	30	54	61	63	65	10	18	19	28	43
COMMERCIAL																																		
Panulirus cygnus	w. rock lobster																													1				
	Total commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
AQUARIUM																																		
Pentapodus vitta	butterfish			1	1								1																					
Chaetodon assarius	butterflyfish; western								1								1	1								1			1	1				1
Apogon aureus	cardinalfish; red striped					1			1		1			1			1	1						1			1	1		1	1	1	1	
Chelmonops truncatus	coralfish, truncate																			1						1			1				1	
Chaetoderma penicilligera	leatherjacket; prickly														1		1																	
Penicipelta vittiger	leatherjacket; toothbrush										1	1				1											1							
Enoplosus armatus	old wife							1			1							1	1										1					
	Total aquarium	0	0	1	1	1	0	1	2	0	3	1	1	1	1	1	3	3	1	1	0	0	0	1	0	2	2	1	3	2	1	1	2	1
RECREATIONAL																																		
Cnidoglanis macrocephalus	cobbler	1																																
Epinephelides armatus	cod; breaksea		1																		1					1						1	1	
Glaucosoma hebraicum	dhufish																													1				
Bodianus frenchii	fox fish																																1	
Choerodon cyanodus	groper; baldchin									1							1		1		1				1			1		1	1	1	1	1
Achoerodus gouldii	groper; blue																																	
Othos dentex	harlequin fish																					1											1	
Seriola hippos	samson fish																					1												
Chrysophrys auratus	snapper; pink																														1			
Pseudocaranx dentex	trevally; silver																		1			1												
Sillaginodes punctata	whiting; king george											1																						
	Total recreational	1	1	0	0	0	0	0	0	1	0	1	0	0	0	0	1	0	2	0	2	3	0	0	1	1	0	1	0	2	2	2	4	1
OTHER																																		
	Sp1																				1	1		1			1							
Pempheris multiradiatus	bullseye; common								1			1	1			1										1						1	1	
Pempheris klunzingeri	bullseye; rough	1																1											1	1		1		
Parapriacanthus elongatus	bullseye; slender							1	1								1											1		1				
Parascyllium variolatum	catshark; varied																										1							
Labracinus lineata	dottyback; lined																			1														
Kyphosus sydneyanus	drummer; silver																				1	1							1				1	
Kyphosus cornelii	drummer; western																					1												
Parupeneus bifasciatus	goatfish; blackspotted																1					1								1				
Upeneichthys vlamingii	goatfish; blue spotted																											1						
Parupeneus chrysopleuron	goatfish; yellow striped		1	1												1																		
Apogon rueppellii	gobbleguts	1		1	1	1	1	1	1	1	1	1	1						1									1	1					
Parapercis haackei	grubfish; wavy																1																	1
Siganus fuscescens	happy moments												1																					
Odax cyanomelas	herring cale																				1	1				1			1			1	1	
Meuschenia hippocrepis	leatherjacket; horseshoe																					1							1					
Scobinichthys granulatus	leatherjacket; rough										1																							
Cheilodactylus rubrolabiatus	morwong; red-lipped																												1					
Schuettea woodwardi	pomfret; woodwards																												1					
Chromis klunzingeri	puller; black headed																					1												
Odax acroptilus	rainbowfish																		1															
Megalaspis cordyla	scad	1																																
Parma mccullochi	scalyfin; mccullochs		1						1					1			1		1	1	1	1				1			1	1			1	1
Parma occidentalis	scalyfin; western																															1		
Sphyraena obtusata	seapike; striped		1																															
Parequula melbournensis	silverbelly												1						1															
Sphyraena novaehollandiae	snook																																	
Scorpis georgianus	sweep; banded																		1	1	1	1							1			1	1	
Neatypus obliquus	sweep; footballer																			1		1				1		1	1	1		1		
Plectorhinchus flavomaculatus	sweetlips; gold spotted																	1												1				
Torquigener pleurogramma	toadfish; banded								1																									
Tetractenos hamiltoni	toadfish; common								1	1	1		1		1				1			1												
Pelsartia humeralis	trumpeter; sea												1																					
Pelates sexlineatus	trumpeter; striped																	1										1						
Austrolabrus maculatus	wrasse; black spotted		1						1					1					1	1	1	1		1					1	1		1	1	

HABITAT AND SITE NUMBER:

SPECIES		Bare Sand				Seagrass meadow									Sparse Seagrass < 10m				Subtidal Reef													
		60	15	22	23	32	49	51	2	7	8	31	38	53	24	29	21	9	1	34	58	67	14	27	30	54	61	63	65	10	18	19	28	43
OTHER																																		
Pseudolabrus parilus	wrasse; brown spotted	1	1			1	1		1		1	1	1	1	1	1	1	1	1	1	1	1		1		1			1	1	1	1	1
Halichoeres brownfieldi	wrasse; brownfields			1	1	1			1	1	1		1	1	1	1	1	1	1	1	1	1		1		1	1	1	1	1	1	1	1
Thalassoma lutescens	wrasse; green moon																				1											
Ophthalmolepis lineolatus	wrasse; maori		1																	1	1	1		1			1	1	1	1	1	1
Pseudolabrus biserialis	wrasse; red banded																				1	1		1		1			1	1	1	1
Halichoeres biocellatus	wrasse; red lined		1															1			1	1							1			
Pictilabrus laticlavius	wrasse; senator																				1	1				1			1			1
Coris auricularis	wrasse; western king		1	1					1		1		1	1		1	1	1			1	1		1			1					1
Trachurus novaezelandiae	yellowtail		1																1	1	1	1		1		1	1	1	1	1	1	1
Girella zebra	zebra fish																															
	Total other	4	9	4	2	3	2	2	10	3	6	3	9	5	3	5	8	6	10	10	14	20	0	7	0	8	4	8	17	11	1	12	12	8
	Total species	5	10	5	3	4	2	3	12	4	9	5	10	6	4	6	12	9	13	11	16	23	0	8	1	11	6	10	20	16	4	15	18	10

APPENDIX VI

Presence of invertebrate species at each site

HABITAT AND SITE NUMBER

CNIDARIA / ANTHOZOA	Bare sand				Seagrass meadow												Sparse seagrass <10m						Subtidal reef																	
	15	22	23	60	31	32	2	7	8	37	38	40	45	49	51	53	24	21	29	35	47	9	1	14	27	34	58	67	10	18	19	43	28	30	48	54	61	63	65
Actinaria Sp 1	1		1																																					
Actinaria Sp 7		1																																						
Isaurus cliftoni							1																																	
Montipora mollis																																							
Pleisiastrea versipora																1						1																			
Soft Coral Sp 1										1								1				1		1			1	1	1	1									1	1
Soft Coral Sp 2																		1									1			1				1						
Soft Coral Sp 3																1											1													
Turbinaria bifrons																											1													
Zoanthid Sp 3	1																1	1						1	1	1		1		1						1				
Zoanthid Sp 4							1											1					1	1							1			1	1			1	
Zoanthid Sp 5							1			1													1				1													
Zoanthus prolongus																		1					1		1					1			1			1		1	
Total Cnidaria	2	1	1	0	0	0	3	0	0	2	0	0	0	0	0	2	1	5	0	0	0	1	4	3	2	2	6	2	1	3	1	2	0	1	4	3	1	3	4
CHORDATA																																							
Ascidean Sp 66																		1													1	1		1	1				
Ascidian Sp 12																												1											
Ascidian Sp 3	1									1						1	1					1	1	1	1	1	1	1	1		1	1	1	1		1	1	1	1
Ascidian Sp 48																		1																					
Ascidian Sp 50																		1																					
Ascidian Sp 51																		1																					
Ascidian Sp 53																		1																					
Ascidian Sp 54																		1																					
Ascidian Sp 59																																							
Ascidian Sp 6	1																				1									1									1
Ascidian Sp 63									1															1		1	1			1	1	1	1	1				1
Ascidian Sp 8	1																1																1						
Ascidiidae? Sp 1																											1					1	1	1	1	1			
Botrylloides perspicuum											1			1							1						1												
Colonial Ascidean Sp 1																							1																
Didemnidae Sp 1			1																													1							
Didemnidae Sp 2																											1		1	1									
Herdmania momas										1						1		1				1		1					1										1
Polyandracarpa nigrans		1			1	1	1			1	1				1			1			1	1		1		1	1	1		1	1	1	1	1					1
Polycitor giganteus																		1	1	1										1						1	1		
Polycitor Sp 2	1																	1									1	1		1		1				1	1		
Polycitoridae Sp 2																														1	1	1	1						
Polycitoridae Sp 3																														1						1			
Polycitoridae Sp 4	1															1																			1				
Polycitoridae Sp 5																								1								1							1
Polyclinidae Sp 1	1								1	1								1												1						1			
Pyura australis						1																		1		1		1		1	1		1			1	1		
Pyura Sp 1																																		1				1	

HABITAT AND SITE NUMBER

	Bare sand				Seagrass meadow											Sparse seagrass <10m						Subtidal reef <10m												Subtidal reef >10m											
CHORDATA	15	22	23	60	31	32	2	7	8	37	38	40	45	49	51	53	24	21	29	35	47	9	1	14	27	34	58	67	10	18	19	43	28	30	48	54	61	63	65					
Pyura Sp 2												1															1				1	1											
Pyura Sp 3																			1																								
Pyura Sp 4																		1		1	1																						
Pyura Sp 5																		1																									
Sigillina cyanea	1																	1																									
Sticopus mollis		1																			1																					
Styelidae Sp 2							1			1																						1						1			
Styelidae Sp 3			1																																						
Styelidae Sp 4		1					1																									1									
Styelidae Sp 5							1			1												1																				
Sycozoa cerebriformis										1					1			1															1									
Total Chordata	7	3	2	0	1	2	4	0	2	7	1	2	0	0	3	3	1	15	1	3	5	3	3	5	1	3	5	7	5	6	11	6	18	7	5	6	6	3	7					
ARTHROPODA																																												
CRUSTACEA																																												
Actaea savignyi																	1																										
Alpheus sp.								1		1		1	1	1			1			1	1	1			1																		
Calcinus ? sp.				1							1																	1	1														
Dromidiopsis? sp																	1					1			1																		
Isopod Sp 1																																												
Majidae Sp 1																																												
Pagurus sp1																																												
Pagurus sp2			1																																								
Panulirus cygnus																																												
Shrimp Sp 1																																												
Shrimp Sp 3																																												
Shrimp Sp 4																																												
Thalamita sp.		1					1																																				
Xanthid Sp 1																																												
Total Arthropoda	0	1	1	1	0	0	1	1	0	1	1	1	1	1	0	0	4	0	0	1	1	4	1	0	3	0	0	1	3	2	1	0	1	0	1	0	1	1	0					
PORIFERA																																												
CALCAREA																																												
Calc Sp 1							1			1						1	1						1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1				
Calc Sp 10							1														1			1																		
Calc Sp 12										1																																		
Calc Sp 13																										1	1				1												
Calc Sp 18																											1																
Calc Sp 19																												1	1	1		1	1									
Calc Sp 2										1																																		
Calc Sp 3							1	1																																			
Calc Sp 4							1			1													1		1	1	1					1										
Calc Sp 5	1										1				1								1	1	1		1	1		1	1	1	1	1	1	1	1	1		1	
Calc Sp 6							1			1												1						1														
																							1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	

HABITAT AND SITE NUMBER

DEMOSPONGIAE	Bare sand				Seagrass meadow												Sparse seagrass <10m						Subtidal reef																
	15	22	23	60	31	32	2	7	8	37	38	40	45	49	51	53	24	21	29	35	47	9	1	14	27	34	58	67	10	18	19	43	28	30	48	54	61	63	65
Calc Sp 7										1																		1	1			1							
Calc Sp 9																											1		1		1								
Ancorinidae Sp 1																						1							1					1					
Ancorinidae Sp 2																						1																	
Ancorinidae Sp 3							1																1			1	1	1	1						1			1	
Ancorinidae Sp 4																										1			1										
Ancorinidae Sp 5																		1						1															
Axinellidae Sp 1																																					1	1	
Axinellidae Sp 2	1																						1																
Axinellidae Sp 3										1						1						1		1			1		1	1					1		1		
Axinellidae Sp 6																														1									
Axinellidae Sp 7																											1												
Chalinidae Sp 1																											1		1										
Chalinidae Sp 2																1	1								1		1					1						1	
Chalinidae Sp 3																							1						1									1	
Chalinidae Sp 4																																						1	
Chalinidae Sp 5										1																		4	1								1		
Chalinidae? Sp 7																												1											
Chondrillidae australiensis																					1																		
Chondrillidae Sp1																												1	1										
Desmacellidae Sp 1																						1																	
Desmacellidae Sp 3																															1								
Desmacellidae Sp 4										1												1				1	1					1	1						
Dysideidae Sp 1																	1								1														
Dysideidae Sp 2																1																			1				
Dysideidae Sp 4														1																									
Dysideidae Sp 5																												1											
Geodiidae Sp																	1								1		1		1										1
Hadromerida? Sp																																			1				
Irciniidae Sp 1																		1					1						1								1	1	
Irciniidae Sp 13																1										1				1									
Irciniidae Sp 14																										1		1											
Irciniidae Sp 2																		1					1	1		1	1						1		1			1	
Irciniidae Sp 3																													1									1	
Irciniidae Sp 4																													1										
Irciniidae Sp 6										1								1					1	1			1	1	1			1	1						1
Irciniidae Sp 7										1						1	1								1	1		1		1									
Irciniidae Sp 8										1																											1		
Latrunculidae Sp 1																																			1				
Microcionidae Sp 1	1									1							1	1					1	1	1	1		1		1	1		1		1	1	1	1	1
Microcionidae Sp 12							1																																
Microcionidae Sp 13														1																									
Microcionidae Sp 14																												1											
Microcionidae Sp 2								1																											1			1	
Microcionidae Sp 3	1						1	1															1	1		1	1	1		1	1		1						1
Microcionidae Sp 5										1							1								1			1			1								

HABITAT AND SITE NUMBER

DEMOSPONGIAE	Bare sand				Seagrass meadow											Sparse seagrass <10m						Subtidal reef																	
	15	22	23	60	31	32	2	7	8	37	38	40	45	49	51	53	24	21	29	35	47	9	1	14	27	34	58	67	10	18	19	43	28	30	48	54	61	63	65
Microcionidae Sp 6								1									1							1	1	1		1				1	1		1	1			1
Microcionidae Sp 7																	1								1			1											
Microcionidae Sp 9																																			1				
Myxillidae Sp																								1		1	1								1				
Niphatidae Sp 3																													1										
Niphatidae? Sp 1																						1																	
Niphatidae? Sp 2																								1					1						1			1	
Niphatidae? Sp4																																					1		
Oceanapia? Sp 2										1																	1								1				
Spongiidae Sp 1							1									1							1	1	1	1	1	1		1	1	1	1	1		1	1	1
Spongiidae Sp 10																	1								1														
Spongiidae Sp 12										1													1																
Spongiidae Sp 16										1																													
Spongiidae Sp 2										1																													
Spongiidae Sp 21																															1	1		1			1		
Spongiidae Sp 22																											1												
Spongiidae Sp 3																											1												
Spongiidae Sp 4										1																									1				
Spongiidae Sp 6																											1		1						1			1	
Spongiidae Sp 7																								1															
Spongiidae Sp 8																								1														1	1
Spongiidae Sp 9										1																												1	
Suberitiidae Sp																							1	1				1	1	1			1		1			1	1
Tethyidae Sp 1								1								1	1	1			1						1											
Tethyidae Sp 2																					1		1		1				1	1								
Tethyidae Sp 3																					1					1												
Total Porifera	3	0	0	0	1	0	9	5	0	20	1	0	0	3	0	8	14	7	0	0	4	8	17	18	14	17	24	20	24	12	11	12	13	6	19	4	10	19	12
ECHINODERMATA																																							
Amblypneustes pallidus					1															1	1																		
Aporometra? Sp 1																															1								
Asteroid Sp 2																				1																			
Astropecten wappi																										1	1												
Centrostephanus tenuispinus																												1											
Comatula purpurea																																							
Coscinaster calmaria		1	1																																				
Goniodiscaster serratus		1																																					
Heliocidaris erythrogramma										1																													
Holopneustes porosissimus																																							
Jujubinus lepidus			1		1	1		1	1		1		1	1	1	1																							
Nepanthia crassa					1																																		
Nepanthia troughtoni																																							
Ophiothrix spongicola								1																	1														
Paranepanthia rosea					1			1			1																													
Patenella brevspina		1																																					

INVERTEBRATES

HABITAT AND SITE NUMBER

	Bare sand				Seagrass meadow												Sparse seagrass <10m						Subtidal reef																			
ECHINODERMATA	15	22	23	60	31	32	2	7	8	37	38	40	45	49	51	53	24	21	29	35	47	9	1	14	27	34	58	67	10	18	19	43	28	30	48	54	61	63	65		
Peronella lesueuri									1																																
Phyllacanthus irregularis																	1						1																		
Temnopleurus michaelseni		1																																						
Total Echinodermata	0	4	2	0	4	1	0	3	2	1	2	0	1	1	1	1	4	1	1	2	2	2	3	1	2	2	2	2	1	0	1	1	1	0	1	1	0	0	1		
MOLLUSCA																																									
Acrosterigma reeveanum																		1					1																		
Angaria tyria																	1	1			1			1	1				1	1		1	1			1	1	1	1	
Aplysia Sp 1																		1						1					1	1								1		
Atrina tasmanica																				1																				
Australium squamifera																								1			1													
Australium tentorium																							1																	
Barbatia pistachia (or *B. helblingii*)																																								
Botrylloides perspicuum												1			1																									
Branchidontes ustulatus																																								
Campanile symbolicum													1																											
Cantharidus lehmanni				1						1		1	1					1										1			1					1		1	
Conus dorrensis	1																						1																
Cronia avellana				1						1															1															
Dentimitrella menkeana?																															1					1				
Glossodoris atromarginata																																								
Haliotis scalaris																																								
Jujubinus lepidus					1																																			
Microcolus sp											1																													
Nassarius particeps f. rufula					1																																			
Octapod Sp 1																					1																			
Phasianella australis			1								1								1																					
Phasianella ventricosa																																								
Phasianotrochus apicinus					1						1			1	1	1																			1		1			
Pinna bicolor		1			1																																			
Pteracolidia ianthina		1																																						
Pyrene bidentata		1	1	1		1		1	1			1		1	1			1					1	1	1	1	1					1							1	
Ranella australasia																																							1	
Rhinoclavis bituberculatum																	1	1					1		1			1			1								
Sabia conica																	1								1														
Scutus antipodes																																				1				
Septifer bilocularis																										1														
Thais orbita									1																		1								1				1	
Thalotia chlorostoma				1	1				1		1																													
Thalotia conica	1		1		1						1		1	1	1	1																							
Turbo jourdani										1																														
Turbo torquatus																																								
Total Mollusca	2	3	3	4	6	0	1	0	2	5	5	2	4	2	4	3	8	6	1	1	3	0	6	4	8	1	4	4	5	2	2	4	3	2	1	3	5	3	7		

HABITAT AND SITE NUMBER

ANNELIDA / POLYCHAETA	Bare sand				Seagrass meadow												Sparse seagrass <10m						Subtidal reef																
	15	22	23	60	31	32	2	7	8	37	38	40	45	49	51	53	24	21	29	35	47	9	1	14	27	34	58	67	10	18	19	43	28	30	48	54	61	63	65
Sabellid Sp 1																																							
Tube worms (various) not coll.		1	1																																				1
Total Annelida	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total species	14	13	10	5	12	3	18	9	6	36	10	5	6	7	8	17	32	34	3	7	15	18	34	31	30	25	41	36	39	25	27	25	36	16	31	17	23	29	32

APPENDIX VII

Species lists for the 39 sites

SITE:	1	WATER DEPTH:	5m	WATER VISIBILITY:	10m
HABITAT TYPE:	Subtidal Reef <10m				

ALGAE

Biomass of dominant species [gms (wet wt) / m2]

		QUADRAT 1	2	3	4	5	6	7	8	9	10	SUM	MEAN	SE
Amphiroa	*anceps*										331.2			
Cladurus	*elatus*		924											
Curdiea	*obesa*		1164								878.4			
Dictyomenia	*sonderi*										203.2			
Dictyomenia	*tridens*		227.2											
Dictyopteris	*muelleri*		286.8											
Hennedya	*crispa*										298.8			
Laurencia	*filiformis*		919.2											
Osmundaria	*spiralis*		198.8								299.6			
Polysiphonia	*decipiens*										251.2			
Total Reds (Non coralline)			3899		0		0		243.2		2472	6614	1322.8	794.4046
Total Reds (coralline)			136.8		0		0		0		435.2	572	114.4	84.46197
Total Browns			286.8		0		0		0		0	286.8	57.36	57.36
Total Greens			0		0		0		0		0	0	0	0
Total Algal Biomass			4322		0		0		243.2		2907	7472.8	1494.56	895.1411

Complete Presence/Absence data

Amphiroa	*gracilis*		1								1
Amphiroa	*anceps*		1						1		1
Botryocladia	*sonderi*		1								1
Chondria	*sp*										1
Cladophora	*lehmanniana*						1		1		
Cladurus	*elatus*		1								
Curdiea	*obesa*		1								1
Dasya	*sp.*		1				1				
Dicranema	*revolutum*		1								
Dictyomenia	*tridens*		1								
Dictyomenia	*sonderi*								1		1
Dictyopteris	*plagiogramma*										1
Dictyopteris	*muelleri*		1		1						
Dictyota	*sp.*										1
Euptilocladia	*spongiosa*								1		1
Hennedya	*crispa*										1
Jeannerettia	*pedicellata*								1		
Kuetzingia	*canaliculata*		1								
Laurencia	*brongniartii*										1
Laurencia	*clavata*										1
Laurencia	*filiformis*		1								1
Lobophora	*variegata*								1		1
Lobospira	*bicuspidata*						1				
Metamastophora	*flabellata*										1
Neurymenia	*fraxinifolia*		1		1						1
Osmundaria	*spiralis*		1						1		1
Osmundaria	*prolifera*		1								
Polysiphonia	*decipiens*		1						1		1
Rhodymenia	*sonderi*		1								
Sargassum	*sp.*		1								1

SEAGRASS

Biomass of dominant species [gms (wet wt) / m2]

Amphibolis	*antarctica*		1685		2154		973		1208					
Halophila	*ovalis*						127.2					SUM	MEAN	SE
Total seagrass biomass			1685		2154		1100		1208		0	6147.2	1229.44	359.9327

Complete Presence/Absence data

Amphibolis	*antarctica*		1		1		1		1		
Amphibolis	*griffithii*				1						
Halophila	*ovalis*						1				

INVERTEBRATES

Sessile animals (percentage cover)

	QUADRAT									
	1	2	3	4	5	6	7	8	9	10
Calc Sp 1									2	2
Calc Sp 3			1							
Calc Sp 4	6	1	4						1	
Calc Sp 5			5	2						
Calc Sp 6										1
Spongiidae Sp 1			1							
Tethyidae Sp 1			1							
Microcionidae Sp 1									1	
Ancorinidae Sp 3										1
Chalinidae Sp 3		1							1	
Irciniidae Sp 2										1
Spongiidae Sp 9		1								
Axinellidae Sp 2	1		1							
Irciniidae Sp 1			1							
Irciniidae Sp 6	2	1		1				1		
Microcionidae Sp 3	2	1	2						1	2
Spongiidae Sp 12					1					
Ascidian Sp 3		1								
Ascidian Sp 63										1
Botrylloides perspicuum								1		
Isaurus cliftoni					1					
Xanthid Sp 1								1		
Zoanthid Sp 4		4								
Zoanthid Sp 5				5				1		
Zoanthus prolongus									1	

Mobile Animals (number per quadrat)

Campanile symbolicum	2								2	
Cantharidus lehmanni						1				
Heliocidaris erythrogramma			3							
Phyllacanthus irregularis										1
Pyrene bidentata		3						2		2
Rhinoclavis bituberculatum						1				
Acrosterigma reevanum	No quadrat data recorded									
Pateriella brevspina	No quadrat data recorded									

FISH

Latin name	Common name
Choerodon cyanodus	groper; baldchin
Pseudocaranx dentex	trevally; silver
Enoplosus armatus	old wife
Apogon rueppellii	gobbleguts
Odax acroptilus	rainbowfish
Parma mccullochi	scalyfin; mccullochs
Parequula melbournensis	silverbelly
Scorpis georgianus	sweep; banded
Tetractenos hamiltoni	toadfish;common
Austrolabrus maculatus	wrasse; black spotted
Pseudolabrus parilus	wrasse; brown spotted
Halichoeres brownfieldi	wrasse; brownfields
Coris auricularis	wrasse; western king

SITE:	2	WATER DEPTH:	8m	WATER VISIBILITY:	10m
HABITAT TYPE:	Seagrass meadow				

ALGAE

Biomass of dominant species [gms (wet wt) / m2]
None recorded

Complete Presence/Absence data

		QUADRAT									
		1	2	3	4	5	6	7	8	9	10
Dictyopteris	*plagiogramma*		1								
Melanamansia	*serrata*						1				

SEAGRASS

Biomass of dominant species [gms (wet wt) / m2]

Halophila	*ovalis*				321						SUM	MEAN	SE
Total seagrass biomass			0		321		0		0		321	64.2	64.2

Complete Presence/Absence data

Amphibolis	*antarctica*		1							
Halophila	*australis*						1		1	1
Halophila	*ovalis*				1		1		1	1
Heterozostera	*tasmanica*						1		1	1
Posidonia	*sinuosa*		1				1			1
Syringodium	*isoetifolium*		1				1			1

INVERTEBRATES

Sessile animals (percentage cover)

Calc Sp 1	11		6							
Calc Sp 3	2									
Calc Sp 4			1							
Calc Sp 6	1	1								
Calc Sp 10		1								
Spongiidae Sp 1							1			
Ancorinidae Sp 3		1								
Microcionidae Sp 3	4	2	1							
Microcionidae Sp 12			1							
Isaurus cliftoni			1							
Polyandracarpa nigrans		2								
Stylidae Sp 2							1			
Stylidae Sp 4		2								
Stylidae Sp 5		1								
Zoanthid Sp 4		1								
Zoanthid Sp 5			1							

Mobile Animals (number per quadrat)

Pyrene bidentata	2						1			
Shrimp Sp 4			1							

FISH

Latin name	Common name
Chaetodon assarius	butterflyfish; western
Apogon aureus	cardinalfish; red striped
Pempheris multiradiatus	bullseye; common
Parapriacanthus elongatus	bullseye; slender
Apogon rueppellii	gobbleguts
Parma mccullochi	scalyfin; mccullochs
Torquigener pleurogramma	toadfish; banded
Tetractenos hamiltoni	toadfish;common
Austrolabrus maculatus	wrasse; black spotted
Pseudolabrus parilus	wrasse; brown spotted
Halichoeres brownfieldi	wrasse; brownfields
Coris auricularis	wrasse; western king

SITE:	7	WATER DEPTH:	5m	WATER VISIBILITY:	7m
HABITAT TYPE:		Seagrass meadow			

ALGAE

Biomass of dominant species [gms (wet wt) / m2]
None recorded

Complete Presence/Absence data

		QUADRAT									
		1	2	3	4	5	6	7	8	9	10
Lobophora	*variegata*		1								

SEAGRASS

Biomass of dominant species [gms (wet wt) / m2]

Posidonia	*sinuosa*		2082		1282		2027		2502		1934	SUM	MEAN	SE
Total seagrass biomass			2082		1282		2027		2502		1934	9827	1965.4	196.64

Complete Presence/Absence data

Amphibolis	*antarctica*				1						
Posidonia	*sinuosa*		1		1		1		1		1

INVERTEBRATES

Sessile animals (percentage cover)

Calc Sp 3		1								
Tethyidae Sp 1						1				
Microcionidae Sp 2		1								
Microcionidae Sp 3		1								
Microcionidae Sp 6		1								

Mobile Animals (number per quadrat)

Paranepanthia rosea									1	
Calcinus ? sp.				1						
Jujubinus lepidus	20	52	32	36	20	24	20	20	20	24
Pateriella brevspina						1				

FISH

Latin name	Common name
Choerodon cyanodus	groper; baldchin
Apogon rueppellii	gobbleguts
Tetractenos hamiltoni	toadfish;common
Halichoeres brownfieldi	wrasse; brownfields

SITE:	8	WATER DEPTH:	8.6m	WATER VISIBILITY:	10m
HABITAT TYPE:	Seagrass meadow				

ALGAE

Biomass of dominant species [gms (wet wt) / m2]
None recorded

Complete Presence/Absence data

		QUADRAT									
		1	2	3	4	5	6	7	8	9	10
Cladophora	*lehmanniana*						1				

SEAGRASS

Biomass of dominant species [gms (wet wt) / m2]

Amphibolis	*antarctica*						1078				836			
Posidonia	*sinuosa*		798						1640		974	SUM	MEAN	SE
Total Seagrass Biomass			798		0		1078		1640		1810	5326	1065	323

Complete Presence/Absence data

Amphibolis	*antarctica*						1				1
Posidonia	*sinuosa*		1						1		1
Syringodium	*sp.*						1				

INVERTEBRATES

Sessile animals (percentage cover)

Ascidian Sp 63					1					
Polyclinidae Sp 1					2					

Mobile Animals (number per quadrat)

Jujubinus lepidus	6	9	2	8	24	2	1	5	2	7
Peronella lesueuri	1									
Pyrene bidentata			1							
Thalotia chlorostoma		1	1		1			1	1	

FISH

Latin name	Common name
Apogon aureus	cardinalfish; red striped
Penicipelta vittiger	leatherjacket; toothbrush
Enoplosus armatus	old wife
Apogon rueppellii	gobbleguts
Scobinichthys granulatus	leatherjacket; rough
Tetractenos hamiltoni	toadfish;common
Pseudolabrus parilus	wrasse; brown spotted
Halichoeres brownfieldi	wrasse; brownfields
Coris auricularis	wrasse; western king

SITE:	9	WATER DEPTH:	2.5m	WATER VISIBILITY:	2.5m
HABITAT TYPE:	Sparse Seagrass <10m				

QUADRAT

1	2	3	4	5	6	7	8	9	10

ALGAE

None present

SEAGRASS

Biomass of dominant species [gms (wet wt) / m2]

Amphibolis	*antarctica*		2405		7335		2201		987		242				
Amphibolis	*griffithii*						398								
Posidonia	*sinuosa*		121		1465				1900		1756	SUM	MEAN	SE	
Total Seagrass Biomass			2526		1800		2599		2887		1998	11810	2362	200.88	

Complete Presence/Absence data

Amphibolis	*antarctica*		1		1		1		1		1
Amphibolis	*griffithii*						1				
Posidonia	*sinuosa*		1		1				1		1

INVERTEBRATES

Sessile animals (percentage cover)

Calc Sp 4		2			2					
Calc Sp 6		1		1						
Ancorinidae Sp 1	7									
Niphatidae? Sp 1										2
Desmacellidae Sp 1								4		
Ancorinidae Sp 2								1		
Axinellidae Sp 3						4				
Desmacellidae Sp 4					1					
Ascidian Sp 3			1							
Pleisiatrea versipora	1	1				1				
Styelidae Sp 4	1									
Xanthid Sp 1							2	2		

Mobile Animals (number per quadrat)

Nepanthia crassa					1					
Herdmania momas	1									
Calcinus ? sp.		1								
Pagurus sp1										1
Jujubinus lepidus			1	2						
Shrimp Sp 1										1

FISH

Latin name	Common name
Chaetodon assarius	butterflyfish; western
Apogon aureus	cardinalfish; red striped
Enoplosus armatus	old wife
Pempheris klunzingeri	bullseye; rough
Plectorhinchus flavomaculatus	sweetlips; gold spotted
Pelates sexlineatus	trumpeter; striped
Pseudolabrus parilus	wrasse; brown spotted
Halichoeres brownfieldi	wrasse; brownfields
Coris auricularis	wrasse; western king

SITE:	10	WATER DEPTH:	10.4m	WATER VISIBILITY:	3m
HABITAT TYPE:		Subtidal reef >10m			

ALGAE

Biomass of dominant species [gms (wet wt) / m2]

		QUADRAT												
		1	2	3	4	5	6	7	8	9	10	SUM	MEAN	SE
Amphiroa	*anceps*						451.6							
Cladurus	*elatus*				171.2		4				1070			
Claviclonium	*ovatum*				328						237.2			
Codium	*galeatum*										256			
Codium	*mamillosum*										37.2			
Curdiea	*obesa*						361.6							
Dictyomenia	*sonderi*		199.6	?							196.8			
Dictyopteris	*muelleri*										92			
Dictyopteris	*plagiogramma*		102.8						42.4		15.6			
Dilophus	*robustus*		116.4											
Hennedya	*crispa*										293.6			
Heterosiphonia	*crassipes*										36.8			
Jeannerettia	*pedicellata*										83.2			
Kuetzingia	*canaliculata*						278				448			
Laurencia	*elata*		161.2								176			
Laurencia	*filiformis*		211.6		490						152.8			
Osmundaria	*spiralis*						525.6				191.2			
Polysiphonia	*decipiens*										280.4			
Pterocladia	*lucida*				21.8									
Total Reds (Non coralline)			0		1700.4		0		306.4		3353	5360	1072	651.2
Total Reds (coralline)			0		0		0		0		98	98	19.6	19.6
Total Browns			0		176		0		16.4		107.2	299.6	59.92	35.2
Total Greens			0		0		0		52.68		0	52.68	10.54	10.54
Total Algal Biomass			0		1876.4		0		375.5		3558	5810	1162	691.7

Complete Presence/Absence data

Amphiroa	*anceps*						1				1
Botryocladia	*sonderi*						1		1		1
Champia	*sp.*								1		
Cladurus	*elatus*				1						1
Claviclonium	*ovatum*				1						1
Cliftonaea	*pectinata*		1								
Codium	*galeatum*										1
Codium	*mamillosum*										1
Curdiea	*obesa*		1		1		1				1
Dictyomenia	*sonderi*		1		1		1		1		1
Dictyopteris	*muelleri*										1
Dictyopteris	*plagiogramma*		1		1		1		1		1
Dictyota	*naevosa?*		1				1				
Dictyota	*sp.*				1						
Dilophus	*robustus*		1		1		1		1		1
Erythroclonium	*sonderi*								1		
Euptilocladia	*spongiosa*		1				1				
Gloiosaccion	*brownii*										1
Haliptilon	*roseum*				1						
Hennedya	*crispa*		1				1				1
Heterosiphonia	*crassipes*										1
Jeannerettia	*pedicellata*						1		1		1
Kuetzingia	*canaliculata*						1				1
Laurencia	*clavata*		1		1						1
Laurencia	*elata*		1								1
Laurencia	*filiformis*		1		1		1		1		1
Lobospira	*bicuspidata*				1						
Metagoniolithon	*radiatum*										1
Metamastophora	*flabellata*		1		1				1		
Myriodesma	*quercifolium*		1						1		1
Osmundaria	*prolifera*		1								
Osmundaria	*spiralis*						1				1
Polysiphonia	*decipiens*				1						1
Pterocladia	*lucida*				1						
Rhodopeltis	*borealis*										1
Rhodymenia	*sonderi*		1								1
Sargassum	*decurrens*						1				
Tylotus	*obtusatus*		1								

SEAGRASS

None present

INVERTEBRATES

Sessile animals (percentage cover)

	QUADRAT									
	1	2	3	4	5	6	7	8	9	10
Calc Sp 2	1	1	15							
Calc Sp 5				1					1	
Calc Sp 6						1				
Calc Sp 7		1	1					1	1	
Calc Sp 9			1			1				
Ancorinidae Sp 1		1								
Spongiidae Sp 1			1		1	1			2	
Tethyidae Sp 1				1						
Chalinidae Sp 1			1							
Chondrillidae Sp1								2		
Spongiidae Sp 4	1	10								
Ancorinidae Sp 3				4						
Chalinidae Sp 3		1								
Niphatidae? Sp 2		1				2				
Spongiidae Sp 9	4	1								
Axinellidae Sp 3				1	2	5		1		
Irciniidae Sp 3	5		2	2		2	10	5	1	
Ancorinidae Sp 4					1					
Chalinidae Sp 5				1						
Geodiidae Sp				1						
Irciniidae Sp 4						1				
Niphatidae Sp 3				1						
Irciniidae Sp 1		1	1						1	
Irciniidae Sp 6									1	
Ascidian Sp 12		1								
Ascidian Sp 3					1	2				
Ascidiidae? Sp 1				2						
Plesiastrea versipora			2		15					
Polycitor giganteus				1						
Sycozoa ceribriformis				1						
Actaea savignyi					1					

Mobile Animals (number per quadrat)

Campanile symbolicum									1	
Pyrene bidentata			1							
Heliocidaris erythrogramma									1	
Australium sqamifera			1			1			1	
Australium tentorium			2			1			1	
Angaria tyria		1								
Calcinus ? sp.	1	1			1				1	
Xanthid Sp 1										1

FISH

Latin name	Common name
Panulirus cygnus	w. rock lobster
Glaucosoma hebraicum	dhufish
Choerodon cyanodus	groper; baldchin
Chaetodon assarius	butterflyfish; western
Apogon aureus	cardinalfish; red striped
Pempheris klunzingeri	bullseye; rough
Parapriacanthus elongatus	bullseye; slender
Parupeneus bifasciatus	goatfish; blackspotted
Parma mccullochi	scalyfin; mccullochs
Scorpis georgianus	sweep; footballer
Plectorhinchus flavomaculatus	sweetlips; gold spotted
Austrolabrus maculatus	wrasse; black spotted
Pseudolabrus parilus	wrasse; brown spotted
Halichoeres brownfieldi	wrasse; brownfields
Ophthalmolepis lineolatus	wrasse; maori
Coris auricularis	wrasse; western king

SITE:	14	WATER DEPTH:	7.5m	WATER VISIBILITY:	2m
HABITAT TYPE:		Subtidal reef <10m			

ALGAE

Biomass of dominant species [gms (wet wt) / m2]

		QUADRAT 1	2	3	4	5	6	7	8	9	10	SUM	MEAN	SE
Botryocladia	*sonderi*										130			
Cladurus	*elatus*		309											
Claviclonium	*ovatum*		132				266							
Curdiea	*obesa*		312								219			
Dictyomenia	*sonderi*		158	?			436		187		1074			
Hennedya	*crispa*								222					
Kuetzingia	*canaliculata*						1008							
Kuetzingia	*angusta*						210							
Laurencia	*filiformis*		1482				1684		3596		1147			
Melanamansia	*serrata*		898				128							
Nizymenia	*conferta*		692											
Osmundaria	*prolifera*		378											
Osmundaria	*spiralis*						240		232		376			
Total Reds (Non coralline)			4072		2421		4486		5042		3801	19822	3964	439.05
Total Reds (coralline)			166		0		0		0		0	165.6	33.12	33.12
Total Browns			0		303		304		0		0	607.2	121.4	74.367
Total Greens			0		0		0		0		0	0	0	0
Total Algal Biomass			4237		2724		4790		5042		3801	20595	4119	410.15

Complete Presence/Absence data

Amphiroa	*anceps*		1				1		1		
Amphiroa	*gracilis*										1
Botryocladia	*sonderi*				1				1		1
Carpopeltis	*phyllophora*		1								
Caulerpa	*simpliciuscula*		1								
Ceramium	*rubrum?*		1								
Cladurus	*elatus*		1				1				1
Claviclonium	*ovatum*		1				1				
Craspedocarpus	*blepharicarpus*								1		
Curdiea	*obesa*		1		1						1
Dictyomenia	*sonderi*		1		1		1		1		1
Dictyomenia	*tridens*								1		
Dictyopteris	*muelleri*		1				1				1
Dictyopteris	*plagiogramma*		1		1						
Dictyota	*sp.*				1						
Dilophus	*fastigiatus*		1								1
Echinothamnion	*mallardiae*								1		
Gracilaria	*preissiana*								1		
Haliptilon	*roseum*				1						
Hennedya	*crispa*		1						1		
Hymenocladia	*usnea*						1				
Jeannerettia	*pedicellata*				1						1
Kuetzingia	*canaliculata*						1				
Kuetzingia	*angusta*						1				
Laurencia	*sp.*										1
Laurencia	*clavata*										1
Laurencia	*elata*										1
Laurencia	*filiformis*		1		1		1		1		1
Lobospira	*bicuspidata*				1						1
Melanamansia	*serrata*		1				1		1		
Metamastophora	*flabellata*		1				1		1		1
Myriodesma	*quercifolium*						1				
Nizymenia	*conferta*		1								

		QUADRAT									
		1	2	3	4	5	6	7	8	9	10
Osmundaria	*prolifera*		1								
Osmundaria	*spiralis*		1				1		1		1
Platythalia	*angustifolia*		1		1						
Plocamium	*mertensii*								1		
Polysiphonia	*decipiens*				1		1				1
Pterocladia	*lucida*								1		
Sargassum	*sp.*				1						
Sargassum	*puticmum*						1				
Thuretia	*quercifolia*		1								
Trigenea	*australis*		1								

SEAGRASS

Biomass of dominant species [gms (wet wt) / m2]

Posidonia	*sinuosa*				677									
Syringodium	*isoetifolium*				955							SUM	MEAN	SE
Total Seagrass Biomass			0		1632		0		0		0	1632	326.4	326.4

Complete Presence/Absence data

Posidonia	*sinuosa*				1						
Syringodium	*isoetifolium*				1						

INVERTEBRATES

Sessile animals (percentage cover)

Calc Sp 1	5	2	1		2	4		7	5	2
Calc Sp 3		1					1			
Calc Sp 4					1			1	1	
Calc Sp 6	1	1	1	1	1	2		1	1	1
Calc Sp 10				1						
Spongiidae Sp 1				1						
Microcionidae Sp 1					1					
Spongiidae Sp 6									1	
Spongiidae Sp 7								1		
Irciniidae Sp 2				1				1		
Niphatidae? Sp 2	1								1	
Spongiidae Sp 9	1	2		2						
Axinellidae Sp 3									1	
Irciniidae Sp 6	2	1						1		1
Ancorinidae Sp 5						1				
Microcionidae Sp 3		1	1							
Microcionidae Sp 6		2		1	1	1		2	2	
Myxillidae Sp								1		
Ascidian Sp 3		1	1			2		6	2	5
Ascidian Sp 6			1							
Heliocidaris erythrogramma	1				2			1		
Herdmania momas	1							1		
Pleisiatrea versipora	1			1				1		
Polycitoridae Sp 1								5	1	
Polycitoridae Sp 4					1			1		
Zoanthid Sp 3		2	1		2		1	1		
Zoanthid Sp 4	1			1				2	1	

Mobile Animals (number per quadrat)

Australium sqamifera			1						
Australium tentorium						1		1	
Pyrene bidentata				3					
Campanile symbolicum				1	1			1	1

FISH

None sampled

SITE:	15	WATER DEPTH:	13m	WATER VISIBILITY:	2m
HABITAT TYPE:	Bare Sand				

ALGAE

Biomass of dominant species [gms (wet wt) / m2]

		QUADRAT 1	2	3	4	5	6	7	8	9	10	SUM	MEAN	SE
Dictyomenia	*sonderi*						1098							
Hennedya	*crispa*						319							
Kuetzingia	*canaliculata*						142							
Laurencia	*filiformis*				1489									
Total Reds (Non coralline)			156		1524		2628		0		0	4308	861.6	526
Total Reds (coralline)			0		0		0		0		0	0	0	0
Total Browns			0		0		0		0		0	0	0	0
Total Greens			0		0		0		0		0	0	0	0
Total Algal Biomass			156		1524		2628		0		0	4308	861.6	526

Complete Presence/Absence data

Botryocladia	*sonderi*						1				
Claviclonium	*ovatum*		1								
Dicranema	*revolutum*				1						
Dictyomenia	*sonderi*						1				
Dictyomenia	*tridens*		1								
Erythroclonium	*sp.*				1						
Gigartina	*disticha*		1								
Gracilaria	*preissiana*						1				
Hennedya	*crispa*						1				
Kuetzingia	*canaliculata*		1				1				
Laurencia	*clavata*						1				
Laurencia	*filiformis*		1		1						
Melanamansia	*serrata*		1								
Peyssonnelia	*novae-hollandiae*						1				
Psilothallia					1						
Sargassum	*sp.*						1				
Trigenea	*australis*						1				
Zonaria	*turneriana*						1				

SEAGRASS

Biomass of dominant species [gms (wet wt) / m2]

											SUM	MEAN	SE
Amphibolis	*antarctica*	2025		3448									
Total Seagrass Biomass		2025		3448		0		0		0	5473	1095	707

Complete Presence/Absence data

Amphibolis	*antarctica*		1		1						

INVERTEBRATES

Sessile animals (percentage cover)

Microcionidae Sp 1						2				
Axinellidae Sp 2						1				
Microcionidae Sp 3	1					1				
Ascidian Sp 3	1				1	5				
Ascidian Sp 6						1				
Ascidian Sp 8						1				
Polycitor Sp 2					6					
Polycitoridae Sp 1						2				
Polycitoridae Sp 4		1				1				

	QUADRAT									
	1	2	3	4	5	6	7	8	9	10
Sigillina cyanea						1				
Zoanthid Sp 3		1			1					

Mobile Animals (number per quadrat)

Actinaria Sp 1						1				
Conus doreensis						1				
Thalotia conica				2						

FISH

Latin name	Common name
Epinephelides armatus	cod; breaksea
Parupeneus chrysopleuron	goatfish; yellow striped
Parma mccullochi	scalyfin; mccullochs
Sphyraena obtusata	seapike; striped
Austrolabrus maculatus	wrasse; black spotted
Pseudolabrus parilus	wrasse; brown spotted
Ophthalmolepis lineolatus	wrasse; maori
Halichoeres biocellatus	wrasse; red lined
Coris auricularis	wrasse; western king
Trachurus novaezelandiae	yellowtail

SITE:	18	WATER DEPTH:	16m	WATER VISIBILITY:	2.5m
HABITAT TYPE:	Subtidal reef >10m				

ALGAE

Biomass of dominant species [gms (wet wt) / m2]

		QUADRAT 1	2	3	4	5	6	7	8	9	10	SUM	MEAN	SE
Amphiroa	*anceps*								124					
Botryocladia	*sonderi*										181			
Callophycus	*oppositifolius*								513					
Claviclonium	*ovatum*										1258			
Codium	*pomoides*										269			
Dasyclonium	*incisum*						167							
Laurencia	*elata*		352						266					
Osmundaria	*spiralis*		350						1		239	SUM	MEAN	SE
Total Reds (Non coralline)			899		0		180		1068		1888	4036	807.2	338
Total Reds (coralline)			0		0		0		236		0	236	47.12	47.1
Total Browns			0		0		0		0		0	0	0	0
Total Greens			0		0		0		0		0	0	0	0
Total Algal Biomass			899		0		180		1304		1888	4272	854.32	351

Complete Presence/Absence data

Acrosorium									1		
Amphiroa	*anceps*		1		1		1		1		1
Botryocladia	*sonderi*		1								1
Callophycus	*oppositifolius*								1		
Carpothamnion	*gunnianum*						1				
Chauviniella	*coriifolia*								1		1
Chondria	*dangeardii*								1		
Claviclonium	*ovatum*										1
Codium	*pomoides*										1
Curdiea	*obesa*		1								
Dasyclonium	*incisum*		1				1		1		
Dilophus	*robustus*		1								1
Ecklonia	*radiata*						1				
Euptilocladia	*spongiosa*				1				1		
Gracilaria	*preissiana*								1		
Griffithsia	*monilis*								1		
Heterosiphonia	*crassipes*		1		1				1		1
Laurencia	*elata*		1						1		
Laurencia	*filiformis*		1		1				1		1
Lenormandia	*sp.*						1				
Lobophora	*variegata*		1		1						
Metamastophora	*flabellata*								1		
Neurymenia	*fraxinifolia*		1								
Osmundaria	*spiralis*		1						1		1
Sargassum	*sp.*		1								
Spongoclonium	*conspicuum*								1		
Spyridia	*filamentosa*								1		

SEAGRASS

Biomass of dominant species [gms (wet wt) / m2]

None recorded

Complete Presence/Absence data

Halophila	*ovalis*						1				

INVERTEBRATES

Sessile animals (percentage cover)

	QUADRAT									
	1	2	3	4	5	6	7	8	9	10
Calc Sp 1		6		1	1		1			
Calc Sp 2		2								
Calc Sp 4								1		
Calc Sp 6									1	
Tethyidae Sp 1						1				
Microcionidae Sp 1	2									
Spongiidae Sp 9	1	1			2					
Axinellidae Sp 3	1					1	1			
Microcionidae Sp 3	1				1			1		
Irciniidae Sp 7	2									
Irciniidae Sp 13		2								
Axinellidae Sp 6	1									
Ascidian Sp 59								1		
Didemnidae Sp 1							1			
Didemnidae Sp 2					5	1		2	1	
Herdmania momas	2			1		1	2		1	
Pleisiatrea versipora			1		1	1				
Polycitoridae Sp 1							2			
Soft Coral Sp 1	4									
Sycozoa ceribriformis		1								
Actaea savignyi		1								
Zoanthid Sp 3			1		1	1	2	1		

Mobile Animals (number per quadrat)

Australium sqamifera					2		4	2		
Australium tentorium	2	1	1		1		2		3	
Calcinus ? sp.	1	1		2						1

FISH

Latin name	Common name
Choerodon cyanodus	groper; baldchin
Chrysophrys auratus	snapper; pink
Apogon aureus	cardinalfish; red striped
Pseudolabrus parilus	wrasse; brown spotted

SITE:	19	WATER DEPTH:	13m	WATER VISIBILITY:	6m
HABITAT TYPE:		Subtidal reef >10m			

ALGAE

Biomass of dominant species [gms (wet wt) / m2]

		QUADRAT												
		1	2	3	4	5	6	7	8	9	10	SUM	MEAN	SE
Callophycus	*oppositifolius*				1340									
Dasya	*sp.*						446							
Dictyomenia	*sonderi*								1344					
Ecklonia	*radiata*		1294		2646		2208							
Hennedya	*crispa*		1464		354						1469			
Myriodesma	*serrulata*										836			
Stenocladia	*australis*				885									
Trigenea	*australis*		716											
Total Reds (Non coralline)			3258		3778		922		1934		2604	12496	2499	501
Total Reds (coralline)			0		0		32.4		310		0	342.4	68.48	60.7
Total Browns			1294		2646		2208		99.6		1471	7718	1544	436
Total Greens			0		0		0		0		0	0	0	0
Total Algal Biomass			4552		6424		3163		2344		4075	20557	4111	692

Complete Presence/Absence data

Amphiroa	*anceps*								1		
Botryocladia	*sonderi*		1								
Callophycus	*oppositifolius*		1		1		1				
Claviclonium	*ovatum*								1		1
Craspedocarpus	*blepharicarpus*										1
Dasya	*sp.*						1		1		
Dictyomenia	*sonderi*		1						1		
Dictyopteris	*muelleri*								1		
Ecklonia	*radiata*		1		1		1				
Gigartina	*disticha*										1
Gloiocladia	*australe*								1		
Gracilaria	*flagelliformis*										1
Haloplegma	*preissii*		1				1		1		
Hennedya	*crispa*		1		1		1				1
Heterodoxia	*denticulata*		1		1		1				
Kuetzingia	*canaliculata*						1		1		1
Laurencia	*elata*										1
Laurencia	*filiformis*				1		1		1		1
Lobophora	*variegata*								1		
Lobospira	*bicuspidata*										1
Metamastophora	*flabellata*						1				
Myriodesma	*quercifolium*										1
Myriodesma	*serrulata*										1
Neurymenia	*fraxinifolia*								1		
Platythalia	*angustifolia*										1
Polysiphonia	*decipiens*								1		
Pterocladia	*lucida*						1				
Rhodymenia	*sonderi*		1						1		
Sargassum	*tristichum*										1
Stenocladia	*australis*		1		1						1
Trigenea	*australis*		1		1						1
Tylotus	*obtusatus*		1				1				
Zonaria	*turneriana*								1		

SEAGRASS

None present

INVERTEBRATES

	QUADRAT									
	1	2	3	4	5	6	7	8	9	10
Sessile animals (percentage cover)										
Calc Sp 1	2		2	2	6	1	4	1	7	1
Calc Sp 2			6						2	
Calc Sp 4		1			1				1	
Calc Sp 6					1					
Calc Sp 9	1			2					1	
Spongiidae Sp 1		1	?							
Spongiidae Sp 2						1	1			
Microcionidae Sp 1		1								
Desmacellidae Sp 3	2									
Microcionidae Sp 3	1									
Microcionidae Sp 5		1								
Ascidian Sp 3		1			1		1			
Ascidian Sp 6	1	7								2
Didemnidae Sp 1		1								
Polyandracarpa nigrans					1	1				
Polycitor giganteus							1			
Polycitor Sp 2			1				1			
Polycitoridae Sp 1		1								
Polycitoridae Sp 2		1								
Polycitoridae Sp 5						1		1		
Sycozoa ceribriformis	1									
Xanthid Sp 1							3			
Zoanthus prolongus						1				
Mobile Animals (number per quadrat)										
Cronia avellana			1							
Asteroid Sp 2					1					
Turbo torquatus		2								
Herdmania momas	1									

FISH

Latin name	Common name
Epinephelides armatus	cod; breaksea
Choerodon cyanodus	groper; baldchin
Apogon aureus	cardinalfish; red striped
Pempheris multiradiatus	bullseye; common
Pempheris klunzingeri	bullseye; rough
Odax cyanomelas	herring cale
Parma occidentalis	scalyfin; western
Scorpis georgianus	sweep; banded
Neatypus obliquus	sweep; footballer
Austrolabrus maculatus	wrasse; black spotted
Pseudolabrus parilus	wrasse; brown spotted
Halichoeres brownfieldi	wrasse; brownfields
Ophthalmolepis lineolatus	wrasse; maori
Pseudolabrus biserialis	wrasse; red banded
Coris auricularis	wrasse; western king

SITE:	21	WATER DEPTH:	8m	WATER VISIBILITY:	3m
HABITAT TYPE:		Sparse seagrass <10m			

QUADRAT

1	2	3	4	5	6	7	8	9	10

ALGAE

Biomass of dominant species [gms (wet wt) / m2]

Botryocladia	*sonderi*						681						
Cladurus	*elatus*									428			
Curdiea	*obesa*									120			
Dictyomenia	*sonderi*									409			
Kuetzingia	*canaliculata*						145						
Neurymenia	*fraxinifolia*									962			
Osmundaria	*spiralis*		425		354		202			2438	SUM	MEAN	SE
Total Reds (Non coralline)			598		422		1332		1934	1161	4286.4	857.3	311.8
Total Reds (coralline)			0		0		0		0	0	0	0	0
Total Browns			0		0		0		0	0	0	0	0
Total Greens			0		0		0		0	0	0	0	0
Total Algal Biomass			598		422		1332		1934	0	4286.4	857.3	344.8

Complete Presence/Absence data

Amphiroa	*anceps*		1				1			1
Amphiroa	*gracilis*									1
Botryocladia	*sonderi*		1				1			
Chauviniella	*coriifolia*									1
Cladurus	*elatus*						1			1
Claviclonium	*ovatum*						1			
Curdiea	*irviniae*							1		
Curdiea	*obesa*									1
Dasya	*sp.*							1		1
Dictyomenia	*sonderi*									1
Dictyomenia	*tridens*						1			
Dictyopteris	*muelleri*							1		1
Dilophus	*fastigiatus*									1
Echinothamnion	*mallardiae*									1
Galaxaura	*obtusata*		1							
Heterodoxia	*denticulata*									1
Jeannerettia	*pedicellata*						1			1
Kuetzingia	*canaliculata*						1			1
Laurencia	*filiformis*		1		1		1		1	
Lobophora	*variegata*									1
Lobospira	*bicuspidata*									1
Metagoniolithon	*radiatum*						1			
Neurymenia	*fraxinifolia*		1							1
Osmundaria	*prolifera*				1				1	
Osmundaria	*spiralis*		1		1		1			1
Polysiphonia	*decipiens*		1		1		1			1
Protokuetzingia	*australasica*						1			
Sargassum	*fallax?*						1			
Spyridia	*filamentosa*						1			
Symphiocladia	*sp.*								1	
Trigenea	*australis*									1

SEAGRASS

Biomass of dominant species [gms (wet wt) / m2]

Amphibolis	*antarctica*				480								
Amphibolis	*griffithii*		1113						850				
Syringodium	*isoetifolium*						738				SUM	MEAN	SE
Total Seagrass Biomass			1113		480		738		850	0	3181	636.2	188.8

		QUADRAT									
		1	2	3	4	5	6	7	8	9	10
Complete Presence/Absence data											
Amphibolis	*antarctica*				1						
Amphibolis	*griffithii*		1						1		
Halophila	*ovalis*								1		
Syringodium	*isoetifolium*						1				
Syringodium	*sp.*								1		

INVERTEBRATES

Sessile animals (percentage cover)

Calc Sp 4				1			2			1
Tethyidae Sp 1		1								
Microcionidae Sp 1										1
Irciniidae Sp 2									1	
Irciniidae Sp 1									2	1
Irciniidae Sp 6	1		1			2	1		1	
Ancorinidae Sp 5					1					
Ascidean Sp 66					1			1		1
Ascidian Sp 48							1			
Ascidian Sp 50										2
Ascidian Sp 51					2					1
Ascidian Sp 53	1									
Ascidian Sp 54		1				1				
Didemnidae Sp 2						1				
Herdmania momas						1				1
Pleisiatrea versipora	2		1	1		1				
Polyandracarpa nigrans							1			
Polycitor giganteus		1						1	2	
Polycitoridae Sp 1		2								
Pyura Sp 5		1		1						
Sigillina cyanea							2			
Soft Coral Sp 1										1
Sycozoa ceribriformis		1	1							
Zoanthid Sp 3		4	2		2	5	4			
Zoanthid Sp 4		2	4				1			
Zoanthus prolongus		1						1		

Mobile Animals (number per quadrat)

Angaria tyria										1
Australium sqamifera						1				1
Pyrene bidentata			1							
Rhinoclavis bituberculatum							1			
Campanile symbolicum										1
Australium tentorium										1
Sticopus mollis							1			
Holopneustes porosissimus					1					

FISH

Latin name	Common name
Choerodon cyanodus	groper; baldchin
Chaetodon assarius	butterflyfish; western
Apogon aureus	cardinalfish; red striped
Chaetoderma penicilligera	leatherjacket; prickly
Parapriacanthus elongatus	bullseye; slender
Parupeneus bifasciatus	goatfish; blackspotted
Parapercis haackei	grubfish; wavy
Parma mccullochi	scalyfin; mccullochs
Pseudolabrus parilus	wrasse; brown spotted
Halichoeres brownfieldi	wrasse; brownfields
Pseudolabrus biserialis	wrasse; red banded
Coris auricularis	wrasse; western king

SITE:	22	WATER DEPTH:	12m	WATER VISIBILITY:	3m
HABITAT TYPE:	Bare Sand				

ALGAE

Biomass of dominant species [gms (wet wt) / m2]

		QUADRAT 1	2	3	4	5	6	7	8	9	10	SUM	MEAN	SE
Gracilaria	*comosa*		519		28		2.4		13					
Total Reds (Non coralline)			519		28		2.4		13		49.6	612	122.4	99.46636
Total Reds (coralline)			0		0		0		0		0	0	0	0
Total Browns			0		0		0		0		0	0	0	0
Total Greens			0		0		0		0		0	0	0	0
Total Algal Biomass			519		28		2.4		13		49.6	612	122.4	99.46636

Complete Presence/Absence data

Gracilaria	*comosa*		1		1		1		1		
Acanthophora	*dendroides*										1

SEAGRASS

None present

INVERTEBRATES

Sessile animals (percentage cover)

Polyandracarpa nigrans					2		1		2	
Styelidae Sp 4			4				1			

Mobile Animals (number per quadrat)

Actinaria Sp 7		1	5	3		6		2		
Coscinaster calimaria										1
Thalamita sp.			1							
Pyrene bidentata			1							1
Goniodiscaster seriatus							1			
Pateriella brevspina			1		1					
Pinna bicolor										1
Pteraeolidia ianthina			2							
Sticopus mollis			1							
Temnopleurus michaelseni						1				
Tube worms (various) not coll.				2						

FISH

Latin name	Common name
Pentapodus vitta	butterfish
Parupeneus chrysopleuron	goatfish; yellow striped
Apogon rueppellii	gobbleguts
Halichoeres brownfieldi	wrasse; brownfields
Coris auricularis	wrasse; western king

SITE: 23	WATER DEPTH: 12m	WATER VISIBILITY: 3m
HABITAT TYPE:	Bare Sand	

ALGAE

Complete Presence/Absence data

		QUADRAT
Gloiosaccion	*brownii*	No quadrat data recorded
Solieria	*robusta*	No quadrat data recorded

SEAGRASS

Biomass of dominant species [gms (wet wt) / m2]
None recorded

Complete Presence/Absence data

		QUADRAT									
		1	2	3	4	5	6	7	8	9	10
Halophila	*australis*				1						
Syringodium	*isoetifolium*				1						

INVERTEBRATES

Sessile animals (percentage cover)

		QUADRAT									
		1	2	3	4	5	6	7	8	9	10
Didemnidae Sp 1											1
Styelidae Sp 3											2

Mobile Animals (number per quadrat)

		QUADRAT									
		1	2	3	4	5	6	7	8	9	10
Actinaria Sp 1								2			
Coscinaster calimaria						1					
Pyrene bidentata						2					
Pagurus sp2		1									
Jujubinus lepidus											1
Phasianella australis											1
Thalotia conica				1							
Tube worms (various) not coll.		5	3	2							

FISH

Latin name	Common name
Pentapodus vitta	butterfish
Apogon rueppellii	gobbleguts
Halichoeres brownfieldi	wrasse; brownfields

SITE:	24	WATER DEPTH:	7.9m	WATER VISIBILITY:	5m
HABITAT TYPE:	Sparse seagrass <10m				

ALGAE

None present

SEAGRASS

Biomass of dominant species [gms (wet wt) / m2]

		QUADRAT 1	2	3	4	5	6	7	8	9	10	SUM	MEAN	SE
Amphibolis	*griffithii*		1321											
Halophila	*australis*		444								796			
Halophila	*ovalis*				344		148		381					
Total Seagrass Biomass			1765		344		148		381		796	3434	686.8	289.4625

Complete Presence/Absence data

Amphibolis	*griffithii*		1								
Halophila	*australis*		1								1
Halophila	*ovalis*				1		1		1		

INVERTEBRATES

Sessile animals (percentage cover)

Calc Sp 1	2	2	1		2	2		4	1	2
Calc Sp 4	1	1				1	2			1
Calc Sp 6					1					
Spongiidae Sp 1				1						
Tethyidae Sp 1						2				
Microcionidae Sp 1								1	2	1
Chalinidae Sp 2			2		1					
Geodiidae Sp						7				
Microcionidae Sp 5					1					
Dysideidae Sp 1								1	1	
Spongiidae Sp 10								1		
Irciniidae Sp 7	7									
Microcionidae Sp 6			4							
Microcionidae Sp 7		1								
Ascidian Sp 3				2						
Australium sqamifera	1		1					1		
Branchidontes ustulatus									1	
Cantharidus lehmanni							1			
Cronia avellana									4	
Dentimitrella menkeana?			1							
Haliotis scalaris				1						
Heliocidaris erythrogramma		2		5						
Calcinus ? sp.	1			1					4	
Majidae Sp 1				1						
Ophiothrix spongicola				1					1	
Rhinoclavis bituberculatum								1		
Sabia conica					7					
Alpheus sp.				1						
Xanthid Sp 1	1	2		2	5	4	4	4	7	2
Zoanthid Sp 3					1					

Mobile Animals (number per quadrat)

Amblypneustes pallidus							1			
Temnopleurus michaelseni										1

FISH

Latin name	Common name
Chaetoderma penicilligera	leatherjacket; prickly
Tetractenos hamiltoni	toadfish;common
Pseudolabrus parilus	wrasse; brown spotted
Halichoeres brownfieldi	wrasse; brownfields

SITE:	27	WATER DEPTH:	9.8m	WATER VISIBILITY:	6m
HABITAT TYPE:		Subtidal reef <10m			

ALGAE

Biomass of dominant species [gms (wet wt) / m2]

		QUADRAT												
		1	2	3	4	5	6	7	8	9	10			
Amphiroa	*gracilis*										28			
Cladophora	*lehmanniana*						10.4							
Cladurus	*elatus*		2644				526							
Dictyomenia	*sonderi*		909		1296		1938		2794		674			
Dictyopteris	*muelleri*		354											
Hennedya	*crispa*				724									
Melanamansia	*serrata*				290									
Metamastophora	*flabellata*				261									
Myriodesma	*quercifolium*										2498			
Thuretia	*quercifolia*		359									SUM	MEAN	SE
Total Reds (Non coralline)			4741		3024		3360		4010		1085	16219.6	3243.92	614.4687
Total Reds (coralline)			68.4		0		33.2		132		0	233.2	46.64	24.72136
Total Browns			354		176		119		580		2498	3726.4	745.28	445.4089
Total Greens			0		166		10.4		84.8		0	261.2	52.24	32.5654
Total Algal Biomass			5163		3366		3523		4807		3582	20440.4	4088.08	372.0761

Complete Presence/Absence data

Amphiroa	*anceps*		1				1		1		
Amphiroa	*gracilis*										1
Botryocladia	*sonderi*		1								
Callophycus	*oppositifolius*						1				
Caulerpa	*geminata*				1						
Cladophora	*lehmanniana*						1		1		
Cladurus	*elatus*		1				1				
Claviclonium	*ovatum*						1				1
Curdiea	*obesa*		1		1						
Dictyomenia	*sonderi*		1		1		1		1		1
Dictyopteris	*muelleri*		1								
Dictyopteris	*plagiogramma*				1		1		1		
Ecklonia	*radiata*								1		
Griffithsia	*teges*				1						
Haloplegma	*preissii*		1								
Hennedya	*crispa*		1		1				1		
Heterodoxia	*denticulata*				1		1				
Jeannerettia	*pedicellata*		1				1				
Kuetzingia	*canaliculata*				1		1		1		
Kuetzingia	*angusta*								1		
Laurencia	*filiformis*										1
Lobospira	*bicuspidata*				1		1				
Melanamansia	*serrata*				1				1		
Metamastophora	*flabellata*		1		1		1		1		
Myriodesma	*quercifolium*								1		1
Neurymenia	*fraxinifolia*		1								
Osmundaria	*spiralis*		1								
Phacelocarpus	*sessilis*						1				
Pterocladia	*lucida*		1								1
Ptilophora	*prolifera*				1		1				
Rhodymenia	*sonderi*		1		1				1		1
Scytothalia	*doryocarpa*				1						
Thuretia	*quercifolia*		1								

SEAGRASS

None present

INVERTEBRATES

Sessile animals (percentage cover)

	QUADRAT									
	1	2	3	4	5	6	7	8	9	10
Calc Sp 1	2	2	1		2	2		4	1	2
Calc Sp 4	1	1				1	2			1
Calc Sp 6					1					
Spongiidae Sp 1				1						
Tethyidae Sp 1						2				
Microcionidae Sp 1								1	2	1
Chalinidae Sp 2			2		1					
Geodiidae Sp						1				
Microcionidae Sp 5					1					
Dysideidae Sp 1				?				1	1	
Spongiidae Sp 10								1		
Irciniidae Sp 7	7									
Microcionidae Sp 6			1							
Microcionidae Sp 7		1								
Ascidian Sp 3				2						
Zoanthid Sp 3					1					
Zoanthus prolongus	1	2		2	5	4	4	4	7	2

Mobile Animals (number per quadrat)

Haliotis scalaris				1						
Alpheus sp.				1						
Ophiothrix spongicola				1					1	
Rhinoclavis bituberculatum								1		
Sabia conica					6					
Dentimitrella menkeana?			1							
Branchidontes ustulatus									1	
Cantharidus lehmanni							1			
Cronia avellana									3	
Heliocidaris erythrogramma		2		4						
Australium sqamifera	1		1					1		
Calcinus ? sp.	1			1					3	
Majidae Sp 1				1						

FISH

Latin name	Common name
Apogon aureus	cardinalfish; red striped
	Sp1
Austrolabrus maculatus	wrasse; black spotted
Pseudolabrus parilus	wrasse; brown spotted
Halichoeres brownfieldi	wrasse; brownfields
Ophthalmolepis lineolatus	wrasse; maori
Pictilabrus laticlavius	wrasse; senator
Coris auricularis	wrasse; western king

SITE	28	WATER DEPTH:	12.5m	WATER VISIBILITY:	15m
HABITAT TYPE:		Subtidal reef >10m			

ALGAE

Biomass of dominant species [gms (wet wt) / m2]

		QUADRAT 1	2	3	4	5	6	7	8	9	10	SUM	MEAN	SE
Amphiroa	*anceps*								159					
Botryocladia	*sonderi*				149.6									
Callophycus	*oppositifolius*						266							
Chauviniella	*coriifolia*		218				622				344			
Cladurus	*elatus*		763											
Claviclonium	*ovatum*										190			
Dictyomenia	*sonderi*		768				759							
Dictyopteris	*muelleri*		365											
Hennedya	*crispa*						374				294			
Laurencia	*filiformis*				290									
Metamastophora	*flabellata*				224				163					
Myriodesma	*quercifolium*		410				1128				466			
Nizymenia	*conferta*		472		170.8		336							
Platythalia	*angustifolia*										1139			
Ptilophora	*prolifera*				930.8									
Scytothalia	*doryocarpa*								782		3122			
Total Reds (Non coralline)			2845		1942		2728		0		1062	8578	1716	534.9
Total Reds (coralline)			0		257.6		0		339		0	596.8	119.4	74.22
Total Browns			828		0		1168		782		4953	7732	1546	872.9
Total Greens			0		0		0		0		0	0	0	0
Total Algal Biomass			3673		2200		3897		1122		6016	16906	3381	830.4

Complete Presence/Absence data

Amphiroa	*anceps*								1		
Areschougia	*sp.*		1								
Botryocladia	*sonderi*				1						
Callophycus	*oppositifolius*						1				
Carpopeltis	*phyllophora*				1						
Chauviniella	*coriifolia*		1		1		1				1
Cladurus	*elatus*		1								
Claviclonium	*ovatum*		1		1		1				1
Curdiea	*irviniae*						1				
Curdiea	*obesa*								1		
Dictyomenia	*sonderi*		1				1				
Dictyopteris	*muelleri*		1								
Dictyota	*naevosa?*										1
Dilophus	*fastigiatus*		1				1				
Enantiocladia	*axillaris*		1								
Erythroclonium	*sp.*		1		1						
Euptilocladia	*spongiosa*										1
Haliptilon	*roseum*				1						
Haloplegma	*preissii*				1						1
Hennedya	*crispa*						1				1
Jeannerettia	*pedicellata*		1						1		
Kuetzingia	*canaliculata*		1		1						1
Laurencia	*filiformis*		1		1						
Melanamansia	*serrata*				1						
Metamastophora	*flabellata*				1		1		1		
Mychodeophyllom					1						
Myriodesma	*quercifolium*		1				1				1

		QUADRAT									
		1	2	3	4	5	6	7	8	9	10
Nizymenia	*conferta*		1		1		1				1
Nizymenia	*furcata*						1				
Osmundaria	*prolifera*										1
Platythalia	*angustifolia*						1				1
Ptilophora	*prolifera*				1						1
Rhodocallis	*elegans*										1?
Rhodopeltis	*borealis*				1						
Rhodymenia	*sonderi*								1		1
Sargassum	*sp.*										1
Scytothalia	*doryocarpa*						1		1		1

SEAGRASS

None present

INVERTEBRATES

Sessile animals (percentage cover)

Calc Sp 1	14	6	9	2	5	4	2	5	1	16
Calc Sp 2	1					1	2		1	
Calc Sp 3			2	2	2					
Calc Sp 4	2		1	2	2	1				
Calc Sp 6					1		2	1		
Spongiidae Sp 1			2							
Microcionidae Sp 1	2	1	1	2	1		2		1	2
Irciniidae Sp 2				4						
Spongiidae Sp 9	1		2			1	1	2		
Irciniidae Sp 6	1	1	1							
Microcionidae Sp 3	2	1	1	4	1	1	2	4	1	2
Microcionidae Sp 6									1	
Ascidean Sp 66	1									
Desmacellidae Sp 4		2		1			2	1	2	
Ascidian Sp 3	5	7	11	9	11	2	9	10	5	2
Ascidian Sp 59							2			
Ascidian Sp 6										7
Ascidian Sp 8		5	6		5	4	4			
Colonial Ascidean Sp 1		1								
Didemnidae Sp 1	1		2	1				1	1	
Didemnidae Sp 2		9							2	
Herdmania momas			2	1		1	2	4	5	9
Polycitor giganteus				1						2
Polycitor Sp 2						1	1			4
Polycitoridae Sp 1	4	1				2		2	1	
Polycitoridae Sp 4										1
Pyura Sp 2			1							
Sigillina cyanea				1		1				
Styelidae Sp 2			1							
Styelidae Sp 5								1		
Sycozoa ceribriformis										1

Mobile Animals (number per quadrat)

Australium sqamifera				1						
Holopneustes porosissimus		1								
Turbo torquatus			1		1			2	1	
Calcinus ? sp.			1							
Pyrene bidentata						1				

FISH

Latin name	Common name
Epinephelides armatus	cod; breaksea
Bodianus frenchii	fox fish
Choerodon cyanodus	groper; baldchin
Othos dentex	harlequin fish
Apogon aureus	cardinalfish; red striped
Chelmonops truncatus	coralfish; truncate
Pempheris multiradiatus	bullseye; common
Kyphosus sydneyanus	drummer; silver
Odax cyanomelas	herring cale
Parma mccullochi	scalyfin; mccullochs
Scorpis georgianus	sweep; banded
Austrolabrus maculatus	wrasse; black spotted
Pseudolabrus parilus	wrasse; brown spotted
Halichoeres brownfieldi	wrasse; brownfields
Ophthalmolepis lineolatus	wrasse; maori
Halichoeres biocellatus	wrasse; red lined
Coris auricularis	wrasse; western king
Girella zebra	zebra fish

SITE	29	WATER DEPTH:	6.5m
HABITAT TYPE:		Sparse seagrass <10m	

WATER VISIBILITY:	4m

QUADRAT

1	2	3	4	5	6	7	8	9	10

ALGAE

None present

SEAGRASS

Biomass of dominant species [gms (wet wt) / m2]

Amphibolis	*griffithii*								3037		9565								
Halophila	*australis*				755		671												
Halophila	*ovalis*		237																
Total Seagrass Biomass			237		755		671		3037		9565					SUM	MEAN	SE	
																14265	2853	1747.727	

Complete Presence/Absence data

Amphibolis	*griffithii*								1		1								
Halophila	*australis*				1		1												
Halophila	*ovalis*		1																

INVERTEBRATES

Sessile animals (percentage cover)

Polyandracarpa nigrans									1										

Mobile Animals (number per quadrat)

Nepanthia crassa								1											
Phasianella australis							1												

FISH

Latin name	Common name
Penicipelta vittiger	leatherjacket; toothbrush
Pempheris multiradiatus	bullseye; common
Parupeneus chrysopleuron	goatfish; yellow striped
Pseudolabrus parilus	wrasse; brown spotted
Halichoeres brownfieldi	wrasse; brownfields
Coris auricularis	wrasse; western king

SITE:	30	WATER DEPTH:	11m	WATER VISIBILITY:	5m
HABITAT TYPE:		Subtidal Reef >10m			

ALGAE

Biomass of dominant species [gms (wet wt) / m2]

		QUADRAT												
		1	2	3	4	5	6	7	8	9	10			
Cladurus	*elatus*										2868			
Dictyomenia	*sonderi*								260		432			
Dictyopteris	*muelleri*								52		684			
Myriodesma	*quercifolium*								84		844	SUM	MEAN	SE
Total Reds (Non coralline)			0		0		0		696		5188	5884	1177	1012
Total Reds (coralline)			0		0		0		0		0	0	0	0
Total Browns			0		0		0		228		1588	1816	363.2	309
Total Greens			0		0		0		0		0	0	0	0
Total Algal Biomass			0		0		0		924		6776	7700	1540	1321

Complete Presence/Absence data

Areschougia	sp.										1
Callophycus	oppositifolius								1		
Cladurus	elatus								1		1
Claviclonium	ovatum								1		1
Dasya	sp.										1
Dictyomenia	sonderi								1		1
Dictyopteris	muelleri								1		1
Dictyota	sp. 1										1
Gracilaria	sp.								1		
Hennedya	crispa								1		1
Hymenocladia	usnea										1
Kuetzingia	canaliculata								1		1
Kuetzingia	angusta										1
Laurencia	sp.										1
Laurencia	filiformis										1
Melanamansia	serrata								1		1
Myriodesma	quercifolium								1		1
Osmundaria	spiralis								1		1
Plocamium	mertensii										1
Rhodymenia	sonderi										1

SEAGRASS

None present

INVERTEBRATES

Sessile animals (percentage cover)

Calc Sp 1		27.2			8.64	7.41			1.23	
Calc Sp 2					1.23	1.23				
Calc Sp 4					8.64					
Ancorinidae Sp 1						4.94			2.47	
Spongiidae Sp 1						1.23				
Spongiidae Sp 2									4.94	
Ascidian Sp 3		9.88		2.47	14.8	25.9	24.7		1.23	
Ascidian Sp 6						1.23				
Ascidian Sp 8		11.1							2.47	
Herdmania momas									1.23	
Polycitor Sp 2						2.47				
Pyura Sp 1						1.23			1.23	
Styelidae Sp 4									1.23	
Zoanthus prolongus			4.94				1.23	1.235		1.23

Mobile Animals (number per quadrat)

Aplysia Sp 1			1							
Turbo torquatus								1	9	

FISH

not sampled - visiblity too poor

SITE: 31	WATER DEPTH: 7.6m	WATER VISIBILITY: 6m
HABITAT TYPE: Seagrass meadow		

ALGAE

None present

SEAGRASS

Biomass of dominant species [gms (wet wt) / m2]

		QUADRAT 1	2	3	4	5	6	7	8	9	10	SUM	MEAN	SE
Amphibolis	*antarctica*		899		1705						2088			
Amphibolis	*griffithii*		1452		1741				3908		2113			
Posidinia	*coriacea*						1545							
Total Seagrass Biomass			2351		3446		1545		3908		4201	15451	3090.2	498.163

Complete Presence/Absence data

Amphibolis	*antarctica*		1		1						1
Amphibolis	*griffithii*		1		1				1		1
Posidinia	*coriacea*						1				

INVERTEBRATES

Sessile animals (percentage cover)

Calc Sp 5	2	2	6		1	2	1	4		
Polyandracarpa nigrans						1		2		1

Mobile Animals (number per quadrat)

Aporometrida? Sp 1					1					
Jujubinus lepidus	5		1	4	1	11	2	3	5	4
Nassarius particeps f. rufula							1			
Nepanthia troughtoni							1			
Pateriella brevspina							3			
Phasianotrochus apicinus		2			1				1	2
Pinna bicolor							3			
Thalotia chlorostoma						1				
Thalotia conica	1	2	3	11	10	2	5	4	14	8

FISH

Latin name	Common name
Sillaginodes punctata	whiting; king george
Penicipelta vittiger	leatherjacket; toothbrush
Pempheris multiradiatus	bullseye; common
Apogon rueppellii	gobbleguts
Pseudolabrus parilus	wrasse; brown spotted

SITE: 32	WATER DEPTH: 13.9m	WATER VISIBILITY: 4m
HABITAT TYPE:	Seagrass meadow	

ALGAE

None present

SEAGRASS

Biomass of dominant species [gms (wet wt) / m2]

		QUADRAT 1	2	3	4	5	6	7	8	9	10	SUM	MEAN	SE
Amphibolis	*antarctica*				88				54					
Amphibolis	*griffithii*		271		409				808					
Halophila	*australis*				6		36							
Posidinia	*coriacea*		21				60				98			
Syringodium	*isoetifolium*		26		41		283							
Total Seagrass Biomass			318		544		379		862		98	2201	440.2	127.3713

Complete Presence/Absence data

Amphibolis	*antarctica*		1		1				1		
Amphibolis	*griffithii*		1		1		1		1		
Halophila	*australis*				1		1				
Posidinia	*coriacea*		1		1		1				1
Syringodium	*isoetifolium*		1		1		1				

INVERTEBRATES

Sessile animals (percentage cover)

Pyura australis					1				1	
Polyandracarpa nigrans	1	1		2		1			1	1

Mobile Animals (number per quadrat)

Jujubinus lepidus		2								

FISH

Latin name	Common name
Apogon aureus	cardinalfish; red striped
Apogon rueppellii	gobbleguts
Pseudolabrus parilus	wrasse; brown spotted
Halichoeres brownfieldi	wrasse; brownfields

SITE: 34 **WATER DEPTH:** 5.3m **WATER VISIBILITY:** 10m

HABITAT TYPE: Subtidal Reef <10m

ALGAE

Biomass of dominant species [gms (wet wt) / m2]

		QUADRAT 1	2	3	4	5	6	7	8	9	10	SUM	MEAN	SE
Amphiroa	*anceps*		252								126			
Curdiea	*irviniae*				284									
Curdiea	*obesa*		1445						485					
Delisea	*pulchra*								1417					
Dictyomenia	*tridens*						155.6				138			
Dilophus	*fastigiatus*						339.6							
Ecklonia	*radiata*								4112					
Hypnea	*sp 2*						328.8				824			
Kuetzingia	*canaliculata*				137									
Laurencia	*elata*				414				172					
Lobophora	*variegata*										159			
Sarconema	*filiforme*						3367							
Sargassum	*fallax?*										695			
Total Reds (Non coralline)			1899		819		1065		2271		1169	7222.4	1444.5	274
Total Reds (coralline)			344		122		0		159		130	754.8	150.96	55.4
Total Browns			0		0		0		4112		853	4965.2	993.04	797
Total Greens			0		0		0		0		0	0	0	0
Total Algal Biomass			2243		940.4		1065.2		6542		2152	12942	2588.5	1024

Complete Presence/Absence data

Acanthophora	*dendroides*				1						
Amphiroa	*anceps*		1		1				1		1
Amphiroa	*gracilis*		1		1						
Botryocladia	*sonderi*		1								
Carpopeltis	*phyllophora*		1								
Ceramium	*sp.*						1		1		
Chondria	*sp*		1								
Claviclonium	*sp.*						1				
Cliftonaea	*pectinata*				1						
Curdiea	*irviniae*				1						
Curdiea	*obesa*		1				1		1		
Dasyclonium	*incisum*		1		1						
Delisea	*pulchra*								1		
Dictyomenia	*tridens*						1				
Dictyopteris	*plagiogramma*										1
Dilophus	*fastigiatus*						1				
Ecklonia	*radiata*								1		
Hennedya	*crispa*								1		
Hypnea	*sp 2*						1				1
Kuetzingia	*canaliculata*				1		1				1
Laurencia	*elata*				1				1		
Laurencia	*filiformis*		1								
Lobophora	*variegata*		1						1		1
Metamastophora	*flabellata*		1						1		
Neurymenia	*fraxinifolia*								1		
Osmundaria	*spiralis*										1
Polysiphonia	*decipiens*		1		1						1
Pterocladia	*lucida*								1		
Rhodopeltis	*borealis*								1		
Rhodymenia	*sonderi*								1		
Sarconema	*filiforme*						1				
Sargassum	*fallax?*										1
Tricleocarpa	*cylindrica*										1

SEAGRASS

None present

INVERTEBRATES

Sessile animals (percentage cover)

	QUADRAT									
	1	2	3	4	5	6	7	8	9	10
Calc Sp 1	15	4	2	1	5		5	1		
Calc Sp 3	2		2				1	1		
Calc Sp 4			2	1						
Calc Sp 6		1					2	4		
Calc Sp 18								1		
Spongiidae Sp 1							1			
Microcionidae Sp 1					1		1			
Spongiidae Sp 4		1								
Ancorinidae Sp 3								1		
Irciniidae Sp 2							1			
Ancorinidae Sp 4								1		
Microcionidae Sp 3		1	1			1	2	1		
Irciniidae Sp 7								5		
Microcionidae Sp 6				2	1		1			
Myxillidae Sp							1			
Desmacellidae Sp 4								2		
Tethyidae Sp 3								1		
Irciniidae Sp 13			1				1			
Chalinidae? Sp 7		1								
Microcionidae Sp 14		2								
Irciniidae Sp 14								1		
Spongiidae Sp 22						1				
Ascidian Sp 3			2		10		4	5		
Ascidian Sp 6			1							
Ascidian Sp 8					1					
Campanile symbolicum						2				
Herdmania momas	2				2		1	1		
Holopneustes porosissimus	2					1		1		
Isaurus cliftoni									1	
Polycitoridae Sp 1		1	1		5		2	4		
Polycitoridae Sp 4					2					
Sigillina cyanea			1							
Soft Coral Sp 1						1				
Zoanthid Sp 3				2			1		5	

Mobile Animals (number per quadrat)

Australium sqamifera					1					
Haliotis scalaris			1							
Heliocidaris erythrogramma		1	2					1		
Pyrene bidentata	1				2		2	1	1	
Septifer bilocularis	1									
Calcinus ? sp.		1								

FISH

Latin name	Common name
Parma mccullochi	coralfish; truncate
Labracinus lineata	dottyback; lined
Parma mccullochi	scalyfin; mccullochs
Scorpis georgianus	sweep; banded
Neatypus obliquus	sweep; footballer
Austrolabrus maculatus	wrasse; black spotted
Pseudolabrus parilus	wrasse; brown spotted
Halichoeres brownfieldi	wrasse; brownfields
Thalassoma lutescens	wrasse; green moon
Ophthalmolepis lineolatus	wrasse; maori
Coris auricularis	wrasse; western king

SITE:	35	WATER DEPTH:	8.8m	WATER VISIBILITY:	4m
HABITAT TYPE:		Sparse seagrass <10m			

ALGAE

None present

SEAGRASS

Biomass of dominant species [gms (wet wt) / m2]

		QUADRAT 1	2	3	4	5	6	7	8	9	10	SUM	MEAN	SE
Halophila	*australis*				9		30		41		90			
Heterozostera	*tasmanica*										7			
Posidinia	*coriacea*										66			
Syringodium	*isoetifolium*										84			
Total Seagrass Biomass			0		9		30		41		247	327	65.4	45.98

Complete Presence/Absence data

Halophila	*australis*		1		1		1		1		1
Heterozostera	*tasmanica*										1
Posidinia	*coriacea*										1
Syringodium	*isoetifolium*										1

INVERTEBRATES

Sessile animals (percentage cover)

Polyandracarpa nigrans								1		1
Pyura Sp 4							1			
Pyura Sp 5		2	1			1				

Mobile Animals (number per quadrat)

Atrina tasmanica									1	
Calcinus ? sp.							2			
Amblypneustes pallidus	1	3				1			2	
Astropecten vappa		1								

FISH

None seen

SITE:	37	WATER DEPTH:	7m
HABITAT TYPE:		Seagrass meadow	

WATER VISIBILITY:	2m

ALGAE

QUADRAT

1	2	3	4	5	6	7	8	9	10

Biomass of dominant species [gms (wet wt) / m2]

Amphiroa	*anceps*						99.2							
Dictyomenia	*sonderi*						3803							
Dilophus	*robustus*						100							
Laurencia	*filiformis*						679							
Total Reds (Non coralline)			462		0		4985		0		0	5447	1089	978
Total Reds (coralline)			202		0		199		0		0	401	80.16	49.1
Total Browns			385		0		0		0		0	385	76.96	77
Total Greens			0		0		198		0		0	198	39.52	39.5
Total Algal Biomass			1048		0		5382		0		0	6430	1286	1044

Complete Presence/Absence data

Amphiroa	*anceps*		1				1				
Claviclonium	*ovatum*						1				
Curdiea	*obesa*						1				
Dictyomenia	*sonderi*		1				1				
Dictyopteris	*muelleri*				1						
Dictyopteris	*plagiogramma*						1				
Dictyota	*sp.*						1				
Dilophus	*robustus*						1				
Haloplegma	*preissii*						1				
Hypnea	*sp 2*						1				
Laurencia	*filiformis*						1				
Lobophora	*variegata*						1				
Metamastophora	*flabellata*						1				
Polysiphonia	*decipiens*						1				
Pterocladia	*lucida*						1				

SEAGRASS

Biomass of dominant species [gms (wet wt) / m2]

Amphibolis	*griffithii*				1379				2230		1177	SUM	MEAN	SE
Total Seagrass Biomass			0		1379		0		2230		1177	4786	957.2	429

Complete Presence/Absence data

Amphibolis	*griffithii*				1				1		1

INVERTEBRATES

Sessile animals (percentage cover)

Calc Sp 1		15		12		4	5				
Calc Sp 2		1	1	2			1				
Calc Sp 4						1					
Calc Sp 6		1		1			4				
Calc Sp 7						1	4				
Calc Sp 12							1				
Spongiidae Sp 2		2	4		1	2					

	QUADRAT									
	1	2	3	4	5	6	7	8	9	10
Microcionidae Sp 1						2				
Spongiidae Sp 4					7					
Spongiidae Sp 9				5			9			
Axinellidae Sp 3				2						
Chalinidae Sp 5				2		4				
Ircinidae Sp 6								1		
Microcionidae Sp 5				1						
Ircinidae Sp 7				2						
Ircinidae Sp 8		1								
Oceanapia? Sp 2					2	1				
Spongiidae Sp 12	17				16			9	10	2
Desmacellidae Sp 4		1				1				
Spongiidae Sp 16						1				
Ascidian Sp 3		2		2		4				
Herdmania momas			5		2					
Polyandracarpa nigrans									4	
Polycitoridae Sp 1		2					5			
Soft Coral Sp 1						1		1		
Styelidae Sp 2						1				
Styelidae Sp 5			2							
Sycozoa ceribriformis						1				
Zoanthid Sp 5		5					15			

Mobile Animals (number per quadrat)

Cantharidus lehmanni	1									
Cronia avellana							1			
Pyrene bidentata						30	8	1		
Turbo jourdani						1				
Calcinus ? sp.	1									
Thais orbita					1					
Heliocidaris erythrogramma		1		2						

FISH

Not sampled - visibility too poor

SITE: 38	WATER DEPTH: 6.9m	WATER VISIBILITY: 5m
HABITAT TYPE:	Seagrass meadow	

ALGAE

None present

SEAGRASS

Biomass of dominant species [gms (wet wt) / m2]

	QUADRAT 1	2	3	4	5	6	7	8	9	10	SUM	MEAN	SE
Amphibolis antarctica				28						2038			
Amphibolis griffithii		2463		790				4655		2230			
Halophila australis						52							
Posidinia coriacea				45									
Syringodium isoetifolium						68							
Total Seagrass Biomass		2463		863		120		4655		4268	12369	2473.8	897.551

Complete Presence/Absence data

Amphibolis antarctica				1						1
Amphibolis griffithii		1		1				1		1
Halophila australis						1				
Posidinia coriacea				1						
Syringodium isoetifolium						1				

INVERTEBRATES

Sessile animals (percentage cover)

Calc Sp 5		1								10
Polyandracarpa nigrans	1		4	2	1					

Mobile Animals (number per quadrat)

Microcolus sp.									1	
Isopod Sp 1	1									
Jujubinus lepidus						2	5	2	1	1
Pateriella brevspina			3	1			1			
Phasianella varigata?			1							
Phasianotrochus apicinus		2								
Thalotia chlorostoma		1								
Thalotia conica	1	25	8	3				6	5	2

FISH

Latin name	Common name
Pentapodus vitta	butterfish
Pempheris multiradiatus	bullseye; common
Apogon rueppellii	gobbleguts
Siganus fuscescens	happy moments
Parequula melbournensis	silverbelly
Tetractenos hamiltoni	toadfish;common
Pelsartia humeralis	trumpeter; sea
Pseudolabrus parilus	wrasse; brown spotted
Halichoeres brownfieldi	wrasse; brownfields
Coris auricularis	wrasse; western king

SITE: 40	WATER DEPTH: 9m	WATER VISIBILITY: 1m
HABITAT TYPE:	Seagrass meadow	

ALGAE

None present

SEAGRASS

Biomass of dominant species [gms (wet wt) / m2]

	QUADRAT 1	2	3	4	5	6	7	8	9	10	SUM	MEAN	SE
Amphibolis antarctica		1326											
Amphibolis griffithii		350		2519	?	1340		3868		2564			
Total Seagrass Biomass		1676		2519		1340		3868		2564	11967	2393.4	438.3856

Complete Presence/Absence data

Amphibolis antarctica		1								
Amphibolis griffithii		1		1		1		1		1
Halophila ovalis						1				

INVERTEBRATES

Sessile animals (percentage cover)

Botrylloides perspicuum		4								

Mobile Animals (number per quadrat)

Cantharidus lehmanni							2	4		4
Calcinus ? sp.							1			
Pyura Sp 3			1							

FISH

Not sampled - visibility too poor

SITE:	43	WATER DEPTH:	12m	WATER VISIBILITY:	3m
HABITAT TYPE:		Subtidal Reef >10m			

ALGAE

Biomass of dominant species [gms (wet wt) / m2]

		QUADRAT 1	2	3	4	5	6	7	8	9	10	SUM	MEAN	SE
Callophycus	*oppositifolius*										586			
Claviclonium	*ovatum*		444		137				216					
Dictyomenia	*sonderi*		840				652		368		446			
Dictyomenia	*tridens*		148											
Erythroclonium	*sp.*				255									
Hennedya	*crispa*		155						1307					
Kuetzingia	*canaliculata*		823						96.8					
Kuetzingia	*angusta*						462							
Laurencia	*filiformis*						1098							
Melanamansia	*serrata*				710		221		665					
Metamastophora	*flabellata*						184							
Myriodesma	*quercifolium*								108					
Osmundaria	*prolifera*				350									
Sargassum	*sp.*								162					
Total Reds (Non coralline)			3285		2531		3050		3538		1478	13882	2776	364.5
Total Reds (coralline)			0		0		179		0		0	179.2	35.84	35.84
Total Browns			0		0		276		247		0	522.4	104.5	64.14
Total Greens			0		0		0		0		0	0	0	0
Total Algal Biomass			3285		2531		3505		3784		1478	14584	2917	415.4

Complete Presence/Absence data

Amphiroa	*anceps*								1		
Callophycus	*oppositifolius*										1
Carpopeltis	*phyllophora*				1		1				
Chauviniella	*coriifolia*								1		1
Cladurus	*elatus*						1		1		
Claviclonium	*ovatum*		1		1		1		1		
Curdiea	*irviniae*				1						
Dictyomenia	*sonderi*		1		1		1		1		1
Dictyomenia	*tridens*		1								
Dictyopteris	*muelleri*		1		1						
Dictyopteris	*plagiogramma*		1		1				1		
Dictyota	*naevosa?*		1								
Dilophus	*fastigiatus*		1		1		1				1
Ecklonia	*radiata*				1						
Erythroclonium	*sp.*				1				1		
Euptilocladia	*spongiosa*		1								
Haliptilon	*roseum*		1		1						
Hennedya	*crispa*		1		1				1		
Jeannerettia	*pedicellata*										1
Kuetzingia	*canaliculata*		1		1		1		1		1
Kuetzingia	*angusta*						1				
Laurencia	*filiformis*						1		1		
Lenormandiopsis	*latifolia*				1						
Lobophora	*variegata*								1		
Melanamansia	*serrata*		1		1		1		1		
Metamastophora	*flabellata*		1		1		1				
Mychodeophyllom					1						
Myriodesma	*quercifolium*						1		1		
Nizymenia	*conferta*				1						
Osmundaria	*prolifera*				1						
Peyssonnelia	*novae-hollandiae*				1						
Phacelocarpus	*peperocarpos*								1		

		QUADRAT									
		1	2	3	4	5	6	7	8	9	10
Rhodymenia	*sonderi*						1				
Sargassum	*sp.*		1				1		1		
Scytothalia	*doryocarpa*		1								1

SEAGRASS

None present

INVERTEBRATES

Sessile animals (percentage cover)

Calc Sp 1	5	2				2	6	2		5
Calc Sp 4		1					1	1		2
Calc Sp 6		1					1			1
Calc Sp 13						1	2			
Spongiidae Sp 1							1			
Spongiidae Sp 2	1							1		2
Chalinidae Sp 2							5	4		6
Irciniidae Sp 6	2					1				
Microcionidae Sp 6								1		
Oceanapia? Sp 2										1
Ascidean Sp 66								1		2
Desmacellidae Sp 4										2
Ascidian Sp 3						4	5	2		6
Ascidian Sp 6	1	2								
Isaurus cliftoni		2	4	3	1	2		2	2	1
Polycitor Sp 2		1								
Pyura Sp 2										1
Herdmania momas	1						2			5
Zoanthid Sp 4	1		4	1	2	1		1	2	2

Mobile Animals (number per quadrat)

Australium sqamifera			1							
Rhinoclavis bituberculatum				1						
Campanile symbolicum	1					1		1	2	
Holopneustes porosissimus		1								
Turbo torquatus		2						2		

FISH

Latin name	Common name
Choerodon cyanodus	groper; baldchin
Chaetodon assarius	butterflyfish; western
Parapercis haackei	grubfish; wavy
Parma mccullochi	scalyfin; mccullochs
Pseudolabrus parilus	wrasse; brown spotted
Halichoeres brownfieldi	wrasse; brownfields
Ophthalmolepis lineolatus	wrasse; maori
Halichoeres biocellatus	wrasse; red lined
Pictilabras laticlavius	wrasse; senator
Coris auricularis	wrasse; western king

SITE:	45	WATER DEPTH:	7m	WATER VISIBILITY:	1m
HABITAT TYPE:		Seagrass meadow			

ALGAE

Biomass of dominant species [gms (wet wt) / m2]
None recorded

Complete Presence/Absence data

	QUADRAT									
	1	2	3	4	5	6	7	8	9	10
Myriodesma quercifolium								1		

SEAGRASS

Biomass of dominant species [gms (wet wt) / m2]

Amphibolis griffithii		3514		1038		1828		1863		2265	SUM	MEAN	SE
Total Seagrass Biomass		3514		1038		1828		1863		2265	10508	2101.6	405.3

Complete Presence/Absence data

Amphibolis griffithii		1		1		1		1		1
Halophila ovalis				1						

INVERTEBRATES

Sessile animals (percentage cover)
None present

Mobile Animals (number per quadrat)

Campanile symbolicum	1					1				
Cantharidus lehmanni						1		1		
Calcinus ? sp.							1			
Jujubinus lepidus								1		
Pyrene bidentata						1	1			
Thalotia conica	1	1	1	1			1			

FISH
Not sampled - visibility too poor

SITE:	47	WATER DEPTH:	7m	WATER VISIBILITY:	1m
HABITAT TYPE:	Sparse seagrass <10m				

ALGAE

None present

SEAGRASS

Biomass of dominant species [gms (wet wt) / m2]

		QUADRAT 1	2	3	4	5	6	7	8	9	10	SUM	MEAN	SE
Halophila	ovalis				583		832		1018					
Total Seagrass Biomass			0		583		832		1018		0	2433	486.6	210

Complete Presence/Absence data

Halophila	ovalis				1		1		1		1

INVERTEBRATES

Sessile animals (percentage cover)

Tethyidae Sp 1	1									
Tethyidae Sp 2	1									
Ascidian Sp 6					2					
Ascidiidae? Sp 1	1	1								
Herdmania momas	1									
Pyura Sp 5			1							
Styelidae Sp 2	5									
Calc Sp 10	1									

Mobile Animals (number per quadrat)

Amblypneustes pallidus						1	3	7	18	1
Jujubinus lepidus						7	1			
Australium sqamifera	1									
Calcinus ? sp.	2									
Pinna bicolor			1							
Octapod Sp 1							1			

FISH

Not sampled - visibility too poor

SITE:	48	WATER DEPTH:	11m	WATER VISIBILITY:	1m
HABITAT TYPE:		Subtidal reef >10m			

ALGAE

Biomass of dominant species [gms (wet wt) / m2]

		QUADRAT 1	2	3	4	5	6	7	8	9	10	SUM	MEAN	SE
Amphiroa	*anceps*								92.8					
Botryocladia	*sonderi*		269											
Cladurus	*elatus*		5637		307				174.3*4					
Claviclonium	*ovatum*				350									
Dictyomenia	*sonderi*		120		54		79.2		122					
Dictyomenia	*tridens*								909					
Dilophus	*fastigiatus*						71.6							
Erythroclonium	*sp.*				122									
Laurencia	*filiformis*						336							
Melanamansia	*serrata*								443					
Myriodesma	*quercifolium*				74.4									
Osmundaria	*prolifera*				477		2473		130					
Osmundaria	*spiralis*				63.2									
Total Reds (Non coralline)			6111		1503		2883		3487		0	13984	2797	1024
Total Reds (coralline)			0		0		0		92.8		0	92.8	18.56	18.6
Total Browns			0		76		87.6		0		0	163.6	32.72	20.1
Total Greens			0		0		0		0		0	0	0	0
Total Algal Biomass			6111		1579		2970		3580		0	14240	2848	1023

Complete Presence/Absence data

Amphiroa	*anceps*						1			
Botryocladia	*sonderi*	1								
Caulerpa	*cactoides*	1								
Cladophora	*lehmanniana*	1					1			
Cladurus	*elatus*	1		1			1			
Claviclonium	*ovatum*			1			1			
Cliftonaea	*pectinata*	1								
Craspedocarpus	*blepharicarpus*						1			
Dictyomenia	*sonderi*	1		1		1	1			
Dictyomenia	*tridens*						1			
Dictyopteris	*muelleri*						1			
Dictyopteris	*plagiogramma*					1	1			
Dilophus	*fastigiatus*					1				
Echinothamnion	*mallardiae*	1								
Erythroclonium	*sp.*			1		1				
Griffithsia	*teges*	1								
Jeannerettia	*pedicellata*	1								
Kuetzingia	*canaliculata*						1			
Laurencia	*clavata*	1		1			1			
Laurencia	*filiformis*			1		1				
Melanamansia	*serrata*						1			
Metamastophora	*flabellata*	1					1			
Myriodesma	*quercifolium*			1						
Neurymenia	*fraxinifolia*						1			
Osmundaria	*prolifera*			1		1	1			
Osmundaria	*spiralis*			1						
Phacelocarpus	*peperocarpos*						1			
Polysiphonia	*decipiens*						1			
Ptilophora	*prolifera*						1			
Rhodymenia	*sonderi*						1			
Sargassum	*sp.*	1								
Spyridia	*filamentosa*					1				

	QUADRAT												
	1	2	3	4	5	6	7	8	9	10	SUM	MEAN	SE
SEAGRASS													
Biomass of dominant species [gms (wet wt) / m2]													
Amphibolis griffithii				803		931					1734	346.8	213
Total Seagrass Biomass		0		803		931		0		0			
Complete Presence/Absence data													
Amphibolis griffithii				1		1							
INVERTEBRATES													
Sessile animals (percentage cover)													
Calc Sp 1	1												
Calc Sp 4	1		2							2			
Spongiidae Sp 1	1									1			
Spongiidae Sp 3	1												
Microcionidae Sp 1	1				1					5			
Spongiidae Sp 4	1												
Ancorinidae Sp 3										2			
Ircinidae Sp 2			1										
Microcionidae Sp 2			1										
Niphatidae? Sp 2			1										
Spongiidae Sp 9								1					
Axinellidae Sp 3	1	1	4					1					
Latrunculidae Sp 1								1					
Microcionidae Sp 6		1						1					
Oceanapia? Sp 2			1										
Ascidean Sp 66	1												
Microcionidae Sp 9			1										
Myxillidae Sp		1											
Hadromerida? Sp								1					
Dysideidae Sp 2										1			
Ascidian Sp 6										2			
Ascidian Sp 63						2							
Ascidian Sp 8	1												
Isaurus cliftoni	2							1	1				
Pleisiatrea versipora								2					
Polycitoridae Sp 3		1											
Soft Coral Sp 1	1												
Zoanthid Sp 4		1		1						1			
Mobile Animals (number per quadrat)													
Panuliris cygnus								1					
Heliocidaris erythrogramma			1										
Phasianella ventricosa								1					

FISH

Not sampled - visibility too poor

SITE:	49	WATER DEPTH:	7m	WATER VISIBILITY:	4m
HABITAT TYPE:		Seagrass meadow			

ALGAE

QUADRAT

Biomass of dominant species [gms (wet wt) / m2]
None recorded

Complete Presence/Absence data

		1	2	3	4	5	6	7	8	9	10
Amphiroa	*gracilis*								1		
Dasyclonium	*incisum*				*						1
Dictyopteris	*plagiogramma*		1		1						
Dilophus	*fastigiatus*						1				
Laurencia	*filiformis*		1		1						1
Leveillea	*jungermannioides*						1				
Spyridia	*filamentosa*						1		1		

SEAGRASS

Biomass of dominant species [gms (wet wt) / m2]

											SUM	MEAN	SE
Amphibolis	*antarctica*		1062		1266				360				
Amphibolis	*griffithii*									852			
Posidonia	*sinuosa*						689						
Total Seagrass Biomass			1062		1266		689		360	852	4229	845.8	156

Complete Presence/Absence data

Amphibolis	*antarctica*		1		1				1		
Amphibolis	*griffithii*									1	
Posidonia	*sinuosa*						1		1		

INVERTEBRATES

Sessile animals (percentage cover)

Calc Sp 5										1
Microcionidae Sp 13					1	1				
Dysideidae Sp 4										2

Mobile Animals (number per quadrat)

Phasianotrochus apicinus	1									
Calcinus ? sp.				1						
Thalotia conica	3	1			1	1		1		1
Jujubinus lepidus	2	9	5	7	5	1	3		1	4

FISH

Latin name	Common name
Apogon rueppellii	gobbleguts
Pseudolabrus parilus	wrasse; brown spotted

SITE:	51	WATER DEPTH:	2.5m	WATER VISIBILITY:	5m
HABITAT TYPE:		Seagrass meadow			

ALGAE

Biomass of dominant species [gms (wet wt) / m2]

	QUADRAT 1	2	3	4	5	6	7	8	9	10	SUM	MEAN	SE
Scytothalia doryocarpa										150	SUM	MEAN	SE
Total Reds (Non coralline)		0		0		0		0		0	0	0	0
Total Reds (coralline)		0		0		0		0		0	0	0	0
Total Browns		0		0		0		0		0	0	0	0
Total Greens		0		0		0		0		150	150	30	30
Total Algal Biomass		0		0		0		0		150	150	30	30

Complete Presence/Absence data

Dasya sp.				1						
Dictyomenia sonderi										1
Jeannerettia pedicellata								1		
Laurencia filiformis				1						1
Scytothalia doryocarpa										1

SEAGRASS

Biomass of dominant species [gms (wet wt) / m2]

Amphibolis antarctica		1410		1141		2988		2857		1261	SUM	MEAN	SE
Total Seagrass Biomass		1410		1141		2988		2857		1261	9657	1931	407

Complete Presence/Absence data

Amphibolis antarctica		1		1		1		1		1

INVERTEBRATES

Sessile animals (percentage cover)

Botrylloides perspicuum			1							
Sycozoa ceribriformis								1		
Polyandracarpa nigrans			4					1		

Mobile Animals (number per quadrat)

Phasianotrochus apicinus	19	2	4	7	4	8	2	1		2
Thalotia conica	9	4	2	1	3	3				
Jujubinus lepidus	12	18	25	32	17	18	7	6	3	19
Pyrene bidentata	6	6	14	18	13	16	14	5	10	12

FISH

Latin name	Common name
Enoplosus armatus	old wife
Parapriacanthus elongatus	bullseye; slender
Apogon rueppellii	gobbleguts

SITE:	53	WATER DEPTH:	3m	WATER VISIBILITY:	5m
HABITAT TYPE:		Seagrass meadow			

ALGAE

Biomass of dominant species [gms (wet wt) / m2]

		QUADRAT												
		1	2	3	4	5	6	7	8	9	10			
Amansia	*rhodantha*										974.8			
Botryocladia	*sonderi*										144			
Caulerpa	*cactoides*										182.8	SUM	MEAN	SE
Total Reds (Non coralline)			0		0		0		169.6		1230	1399	279.8	240
Total Reds (coralline)			0		0		0		0		0	0	0	0
Total Browns			0		0		0		0		0	0	0	0
Total Greens			0		0		0		0		150	150	30	30
Total Algal Biomass			0		0		0		169.6		1380	1549	309.8	269

Complete Presence/Absence data

Acanthophora	*dendroides*										1
Amansia	*rhodantha*										1
Botryocladia	*sonderi*										1
Caulerpa	*cactoides*										1
Caulerpa	*geminata*										1
Craspedocarpus	*blepharicarpus*								1		
Cystophora	*sp.*		1								
Dictyomenia	*sonderi*		1								
Haliptilon	*roseum*						1				
Kuetzingia	*angusta*								1		
Laurencia	*filiformis*						1		1		1
Lobospira	*bicuspidata*		1								
Neurymenia	*fraxinifolia*						1				
Polysiphonia	*decipiens*								1		1
Sargassum	*sp.*		1								
Tolypiocladia	*glomerulata*										1

SEAGRASS

Biomass of dominant species [gms (wet wt) / m2]

Amphibolis	*griffithii*						2978		2778					
Posidonia	*sinuosa*		1157		1684									
Syringodium	*isoetifolium*						297							
Total Seagrass Biomass			1157		1684		3275		2778		0	SUM	MEAN	SE
												8894	1779	583

Complete Presence/Absence data

Amphibolis	*griffithii*						1		1		
Halophila	*ovalis*		1								
Posidonia	*sinuosa*		1		1						
Syringodium	*isoetifolium*						1				

INVERTEBRATES

Sessile animals (percentage cover)

Calc Sp 1										4
Spongiidae Sp 1									1	
Tethyidae Sp 1									1	
Chalinidae Sp 2										1
Axinellidae Sp 3									3	

	QUADRAT									
	1	2	3	4	5	6	7	8	9	10
Irciniidae Sp 7										4
Dysideidae Sp 2										1
Irciniidae Sp 13										2
Ascidian Sp 3									3	7
Herdmania momas									6	4
Pleisiatrea versipora										1
Polycitoridae Sp 4										1
Soft coral sp 3					1					

Mobile Animals (number per quadrat)

Phasianotrochus apicinus		1								
Jujubinus lepidus	5			1	9					
Pyrene bidentata		5	2	1	1					4
Thalotia conica	49	10	3	1						

FISH

Latin name	Common name
Apogon aureus	cardinalfish; red striped
Parma mccullochi	scalyfin; mccullochs
Austrolabrus maculatus	wrasse; black spotted
Pseudolabrus parilus	wrasse; brown spotted
Halichoeres brownfieldi	wrasse; brownfields
Coris auricularis	wrasse; western king

SITE:	54	WATER DEPTH:	10.2 m	WATER VISIBILITY:	3m
HABITAT TYPE:		Subtidal reef >10m			

ALGAE

Biomass of dominant species [gms (wet wt) / m2]

		QUADRAT 1	2	3	4	5	6	7	8	9	10				
Callophycus	*oppositifolius*				192.8				1478						
Claviclonium	*ovatum*										731.6				
Dictyomenia	*sonderi*		579						713.6		1145				
Ecklonia	*radiata*		318		3502		3707								
Erythroclonium	*sp.*				?				334.8						
Hennedya	*crispa*				146.8						215.2				
Kuetzingia	*canaliculata*		577								272				
Laurencia	*filiformis*								217.4						
Melanamansia	*serrata*								328.4		150.8				
Metamastophora	*flabellata*		200												
Nizymenia	*conferta*				134				508		317.6				
Nizymenia	*furcata*						129								
Sargassum	*sp.*				7132										
Scytothalia	*doryocarpa*						3197								
Thuretia	*quercifolia*										170	SUM	MEAN	SE	
Total Reds (Non coralline)			2576		770.8		286		4210		3951	11793	2358.6	801	
Total Reds (coralline)			227		0		0		0		80.4	307.2	61.44	44.2	
Total Browns			484		10634		6534		0		0	17653	3530.6	2164	
Total Greens			0		0		0		0		150	150	30	30	
Total Algal Biomass			3288		11405		6820		4209.6		4181.2	29904	5980.7	1479	

Complete Presence/Absence data

Amphiroa	*anceps*		1				1		1		1
Botryocladia	*sonderi*		1								
Callophycus	*oppositifolius*				1		1		1		
Callophyllis					1						
Chauviniella	*coriifolia*						1				
Cladophora	*lehmanniana*		1				1		1		1
Claviclonium	*ovatum*		1		1		1		1		1
Curdiea	*irviniae*										1
Dictyomenia	*sonderi*		1						1		1
Ecklonia	*radiata*		1		1		1				
Enantiocladia	*axillaris*								1		
Erythroclonium	*sp.*								1		
Erythroclonium	*sonderi*										1
Gracilaria	*preissiana*		1								
Griffithsia	*teges*		1								
Hennedya	*crispa*		1		1		1		1		1
Heterodoxia	*denticulata*		1								1
Jeannerettia	*pedicellata*		1								
Kuetzingia	*canaliculata*		1						1		1
Kuetzingia	*angusta*										1
Laurencia	*filiformis*		1						1		1
Lobophora	*variegata*										1
Lobospira	*bicuspidata*		1								
Melanamansia	*serrata*		1						1		1
Metamastophora	*flabellata*		1						1		1
Myriodesma	*quercifolium*		1						1		
Nizymenia	*conferta*		1		1		1		1		1
Nizymenia	*furcata*						1				
Nizymenia	*sp.*				1						
Pterocladia	*lucida*						1				
Rhodocallis	*elegans*		1		1		1		1		
Rhodopeltis	*australis*										1

		QUADRAT									
		1	2	3	4	5	6	7	8	9	10
Rhodymenia	*sonderi*		1		1						1
Sargassum	*sp.*		1		1						
Scytothalia	*doryocarpa*				1		1				
Thuretia	*quercifolia*										1
Trigenea	*australis*				1						
Tylotus	*obtusatus*				1						1
Zonaria	*turneriana*		1								

SEAGRASS

None present

INVERTEBRATES

Sessile animals (percentage cover)

Calc Sp 1	1		1	2	4	5				1
Calc Sp 4	2			1						
Microcionidae Sp 1				1		2	1	1		
Microcionidae Sp 6	5			4		1	1			
Ascidean Sp 66				1						
Ascidian Sp 3		1	2	1				1		
Ascidian Sp 8						1			1	
Heliocidaris erythrogramma						1				
Isaurus cliftoni			4							
Polycitor giganteus		1				1				
Polycitoridae Sp 1						1				
Polycitoridae Sp 5		1								
Zoanthid Sp 4										1
Zoanthus prolongus		2								

Mobile Animals (number per quadrat)

Turbo torquatus							2		1	
Thais orbita	1									
Australium sqamifera			1							2

FISH

Latin name	Common name
Epinephelides armatus	cod; breaksea
	butterflyfish; western
Chelmonops truncatus	coralfish; truncate
Pempheris multiradiatus	bullseye; common
Odax cyanomelas	herring cale
Parma mccullochi	scalyfin; mccullochs
Neatypus obliquus	sweep; footballer
Pseudolabrus parilus	wrasse; brown spotted
Ophthalmolepis lineolatus	wrasse; maori
Halichoeres biocellatus	wrasse; red lined
Coris auricularis	wrasse; western king

SITE:	58	WATER DEPTH:	7m	WATER VISIBILITY:	10m
HABITAT TYPE:		Subtidal reef <10m			

ALGAE

Biomass of dominant species [gms (wet wt) / m2]

		QUADRAT 1	2	3	4	5	6	7	8	9	10	SUM	MEAN	SE
Amphiroa	*anceps*				486				758		1			
Curdiea	*obesa*				527									
Ecklonia	*radiata*								3775.2					
Enantiocladia	*axillaris*		253											
Eucheuma	*speciosum*										210.8			
Metamastophora	*flabellata*								111.2					
Pterocladia	*lucida*		199						448					
Total Reds (Non coralline)			523		745		0		615.6		544	2428	485.6	127
Total Reds (coralline)			0		623		0		924.4		359.6	1907	381.4	180
Total Browns			126		0		0		0		0	126.4	25.28	25.3
Total Greens			0		0		0		0		150	150	30	30
Total Algal Biomass			650		1368		0		1540		1054	4611	922.2	276

Complete Presence/Absence data

Amphiroa	*anceps*				1		1		1	1
Curdiea	*obesa*				1				1	1
Dasya	*sp.*				1					
Ecklonia	*radiata*		1						1	
Enantiocladia	*axillaris*		1							
Eucheuma	*speciosum*						1		1	1
Hennedya	*crispa*		1							
Heterosiphonia	*crassipes*						1			
Hypnea	*sp*									1
Hypnea	*sp 2*				1				1	
Laurencia	*brongniartii*				1		1			1
Lobophora	*variegata*						1			
Metagoniolithon	*radiatum*				1					
Metamastophora	*flabellata*		1		1				1	
Pterocladia	*lucida*		1						1	
Rhodymenia	*sonderi*				1					
Sargassum	*sp.*				1					
Sargassum	*linearifolium*									1

SEAGRASS

None present

INVERTEBRATES

Sessile animals (percentage cover)

Calc Sp 1			4	2	4		2			1
Calc Sp 3		1	2	4	1				4	2
Calc Sp 4						2	1	1		1
Calc Sp 6	4			2	1			1		1
Calc Sp 9			2					1		
Calc Sp 18							1			
Calc Sp 19								1		
Spongiidae Sp 1	1	1			1	2	1	1		
Chalinidae Sp 1		1		1						
Spongiidae Sp 4										1
Ancorinidae Sp 3		1						1		1
Chalinidae Sp 2		2	5	2	5		4			7
Irciniidae Sp 2				1		1				1
Axinellidae Sp 3			2							

	QUADRAT									
	1	2	3	4	5	6	7	8	9	10
Geodiidae Sp						2				
Irciniidae Sp 6				1						
Microcionidae Sp 3	1		4	2	2		4	1		2
Oceanapia? Sp 2				1			2	1		1
Myxillidae Sp					2					
Desmacellidae Sp 4		1			1			1		
Axinellidae Sp 7	1				1					
Suberitiidae Sp				4	1		5		1	
Spongiidae Sp 21										1
Spongiidae Sp 22									1	
Ascidian Sp 3	2	7		9	6	2		6	5	7
Ascidian Sp 6					1		1		1	1
Didemnidae Sp 1		1								
Montipora mollis								1		10
Turbinaria bifrons						4				
Herdmania momas		1						1		
Pleisiatrea versipora	1			1	1	4	1		7	5
Pyrene bidentata		1				1				
Pyura Sp 2	2									
Soft Coral Sp 1							1			
Soft Coral Sp 2				1				1	1	1
Zoanthid Sp 5					1		1			

Mobile Animals (number per quadrat)

Barbatia pistachia (or B. helblingii)	1									
Septifer bilocularis	1									
Centrostephanus tenuispinus						3				
Turbo torquatus		1								
Heliocidaris erythrogramma			3							

FISH

Latin name	Common name
Epinephelides armatus	cod; breaksea
Choerodon cyanodus	groper; baldchin
	Sp1
Kyphosus sydneyanus	drummer; silver
Odax cyanomelas	herring cale
Parma mccullochi	scalyfin; mccullochs
Scorpis georgianus	sweep; banded
Austrolabrus maculatus	wrasse; black spotted
Pseudolabrus parilus	wrasse; brown spotted
Halichoeres brownfieldi	wrasse; brownfields
Thalassoma lutescens	wrasse; green moon
Ophthalmolepis lineolatus	wrasse; maori
	wrasse; red banded
Halichoeres biocellatus	wrasse; red lined
	wrasse; senator
Coris auricularis	wrasse; western king

SITE:	60	WATER DEPTH:	8.4m	WATER VISIBILITY:	3m
HABITAT TYPE:	Bare Sand				

ALGAE

None present

SEAGRASS

Biomass of dominant species [gms (wet wt) / m2]

	QUADRAT 1	2	3	4	5	6	7	8	9	10	SUM	MEAN	SE
Amphibolis antarctica		3796								854			
Amphibolis griffithii		825						3735					
Total Seagrass Biomass		4621		0		0		3735		854	9210	1842	976.4313

Complete Presence/Absence data

Amphibolis antarctica		1								1
Amphibolis griffithii		1						1		

INVERTEBRATES

Sessile animals (percentage cover)

None present

Mobile Animals (number per quadrat)

Cantharidus lehmanni							2	4		2
Cronia avellana									1	
Calcinus ? sp.									1	
Pyrene bidentata								1		
Thalotia chlorostoma										1

FISH

Latin name	Common name
Cnidoglanis macrocephalu	cobbler
Pempheris klunzingeri	bullseye; rough
Apogon rueppellii	gobbleguts
Megalaspis cordyla	scad
Pseudolabrus parilus	wrasse; brown spotted

SITE:	61	WATER DEPTH:	13.7m	WATER VISIBILITY:	4m
HABITAT TYPE:	Subtidal reef >10m				

ALGAE

Biomass of dominant species [gms (wet wt) / m2]

		QUADRAT 1	2	3	4	5	6	7	8	9	10	SUM	MEAN	SE
Cladurus	*elatus*		936											
Curdiea	*obesa*		805											
Dictyopteris	*muelleri*		233											
Total Reds (Non coralline)			4380		0		0		146		0	4526	905.2	869.16
Total Reds (coralline)			33.2		0		0		0		0	33.2	6.64	6.64
Total Browns			306		0		0		124.8		0	430.4	86.08	59.96564
Total Greens			0		0		0		0		150	150	30	30
Total Algal Biomass			4719		0		0		270.8		150	5139.6	1027.92	924.116

Complete Presence/Absence data

Amphiroa	*anceps*		1								
Cladurus	*elatus*		1								
Clavicionium	*ovatum*		1						1		
Curdiea	*obesa*		1								
Dictyopteris	*muelleri*		1						1		
Dictyopteris	*plagiogramma*		1								
Dilophus	*robustus*		1								
Erythroclonium	*sonderi*		1								
Heterosiphonia	*crassipes*		1								
Jeannerettia	*pedicellata*		1								
Kuetzingia	*canaliculata*								1		
Laurencia	*filiformis*		1						1		
Lobophora	*variegata*		1								
Lobospira	*bicuspidata*		1								
Melanamansia	*serrata*								1		
Myriodesma	*quercifolium*								1		
Osmundaria	*prolifera*		1						1		

SEAGRASS

Biomass of dominant species [gms (wet wt) / m2]

												SUM	MEAN	SE
Amphibolis	*antarctica*				400		164		436		287			
Amphibolis	*griffithii*				724		1274		1146		1519			
Total Seagrass Biomass			0		1124		1438		1582		1806	5950	1190	317.4177

Complete Presence/Absence data

Amphibolis	*antarctica*				1		1		1		1
Amphibolis	*griffithii*				1		1		1		1

INVERTEBRATES

Sessile animals (percentage cover)

Calc Sp 1			4							
Calc Sp 4			2			1				
Spongiidae Sp 1			1							
Microcionidae Sp 1		1	1				2			
Axinellidae Sp 1		1	1							
Axinellidae Sp 3							2	1		
Chalinidae Sp 5			2							
Ircinidae Sp 1			1					1		
Ircinidae Sp 8							1			
Niphatidae? Sp4							1			
Ascidian Sp 3			1			2				
Ascidian Sp 8		1						4		
Polyandracarpa nigrans			1							
Polycitor giganteus								1		
Polycitoridae Sp 1								1		

	QUADRAT									
	1	2	3	4	5	6	7	8	9	10
Polycitoridae Sp 2			1							
Zoanthid Sp 3	1	2					5		4	

Mobile Animals (number per quadrat)

Campanile symbolicum			2							
Cronia avellana							2	1		
Scutus antipodes		1								
Shrimp Sp 3	1									
Phasianella ventricosa	1									
Australium sqamifera	1									

FISH

Latin name	Common name
Apogon aureus	cardinalfish; red striped
Penicipelta vittiger	leatherjacket; toothbrush
	Sp1
Paracyllium variolatum	catshark; varied
Halichoeres brownfieldi	wrasse; brownfields
Coris auricularis	wrasse; western king

SITE:	63	WATER DEPTH:	12.5m	WATER VISIBILITY:	2.5m
HABITAT TYPE:		Subtidal reef >10m			

ALGAE

Biomass of dominant species [gms (wet wt) / m2]

		QUADRAT 1	2	3	4	5	6	7	8	9	10	SUM	MEAN	SE
Amphiroa	*anceps*		193				8							
Caulerpa	*cactoides*						279							
Chauviniella	*coriifolia*						126							
Dasyclonium	*incisum*						128							
Dictyomenia	*sonderi*		206											
Dilophus	*robustus*						190							
Laurencia	*elata*		246											
Laurencia	*filiformis*		395				348		597		1233.2			
Osmundaria	*prolifera*		116											
Osmundaria	*spiralis*										387.2			
Total Reds (Non coralline)			1199		0		594		0		153.2	1946	389.2	229.7873
Total Reds (coralline)			376		0		206		0		0	582.4	116.48	76.24795
Total Browns			186		0		0		0		0	186.4	37.28	37.28
Total Greens			265		0		472		0		0	737.2	147.44	96.06977
Total Algal Biomass			2026		0		1272		0		153.2	3452	690.4	410.2139

Complete Presence/Absence data

Amphiroa	anceps		1				1				1
Amphiroa	gracilis										1
Botryocladia	sonderi						1				1
Caulerpa	cactoides						1				
Chauviniella	coriifolia						1		1		
Cliftonaea	pectinata		1						1		
Craspedocarpu	biepharicarpus						1				1
Dasyclonium	incisum						1				
Dictyomenia	sonderi		1				1				
Dictyopteris	muelleri		1								
Dictyopteris	plagiogramma		1								1
Dictyota	sp. 1		1								
Dictyota	sp. 2		1								
Dilophus	robustus		1				1		1		
Hennedya	crispa		1								
Jeannerettia	pedicellata						1		1		1
Kuetzingia	canaliculata		1				1				1
Laurencia	clavata								1		1
Laurencia	elata		1				1				
Laurencia	filiformis		1				1		1		1
Lobophora	variegata						1		1		
Lobospira	bicuspidata		1								1
Melanamansia	serrata								1		
Metagoniolitho	radiatum								1		
Metamastopho	flabellata						1				
Neurymenia	fraxinifolia										1
Osmundaria	prolifera		1								1
Osmundaria	spiralis										1
Peyssonnelia	novae-hollandiae		1								
Polysiphonia	decipiens		1								
Pterocladia	lucida						1		1		
Rhodymenia	sonderi		1								

SEAGRASS

Biomass of dominant species [gms (wet wt) / m2]

												SUM	MEAN	SE
Amphibolis	*antarctica*				481									
Total Seagrass Biomass			0		481		0		0		0	481	96.2	96.2

Complete Presence/Absence data

Amphibolis	*antarctica*				1						

INVERTEBRATES

Sessile animals (percentage cover)

	QUADRAT									
	1	2	3	4	5	6	7	8	9	10
Calc Sp 1	4				6			1		11
Calc Sp 6					1					
Spongiidae Sp 1		1								
Spongiidae Sp 2			1		1	1	1			
Microcionidae Sp 1		2								
Spongiidae Sp 4						4		2	20	6
Spongiidae Sp 7		2				2				1
Spongiidae Sp 8					1					
Ancorinidae Sp 3					2					
Chalinidae Sp 2					2					
Chalinidae Sp 3		1								
Irciniidae Sp 1	1									
Irciniidae Sp 2		2					1			
Chalinidae Sp 4							1			
Microcionidae Sp 2										1
Axinellidae Sp 1						1				
Niphatidae? Sp 2						1				
Spongiidae Sp 9			1		2		1			
Irciniidae Sp 3										1
Irciniidae Sp 1	1				1	1	1	1		1
Ascidian Sp 3		1								1
Zoanthus prolongus		35	4	1		4		1		5
Plesiastrea versipora						2	2			1
Isaurus cliftoni			4							
Pyura Sp 1						1		1		

Mobile Animals (number per quadrat)

Australium sqamifera	1									
Australium tentorium		1				1				
Dromidiopsis? sp.					1					
Sticopus mollis						1				
Turbo torquatus			1							

FISH

Latin name	Common name
Choerodon cyanodus	groper; baldchin
Apogon aureus	cardinalfish; red striped
Parapriacanthus elongatus	bullseye; slender
Upeneichthys vlamingii	goatfish; blue spotted
Apogon rueppellii	gobbleguts
Neatypus obliquus	sweep; footballer
Pelates sexlineatus	trumpeter; striped
Halichoeres brownfieldi	wrasse; brownfields
Pictilabrus laticlavius	wrasse; senator
Coris auricularis	wrasse; western king

SITE:	65	WATER DEPTH:	12m	WATER VISIBILITY:	15m
HABITAT TYPE:		Subtidal reef >10m			

ALGAE

Biomass of dominant species [gms (wet wt) / m2]

		QUADRAT 1	2	3	4	5	6	7	8	9	10	SUM	MEAN	SE
Amphiroa	*anceps*		1813											
Chauviniella	*coriifolia*								136					
Curdiea	*irviniae*				236									
Curdiea	*obesa*		841.6											
Dilophus	*robustus*				?				134					
Ecklonia	*radiata*						1821		652		2109			
Hennedya	*crispa*								466					
Kuetzingia	*canaliculata*						143.6		293					
Metamastophora	*flabellata*		232											
Scytothalia	*doryocarpa*						2147		1088		1966			
Tylotus	*obtusatus*						122.8		461					
Total Reds (Non coralline)			1054		738		697.2		1505		0	3994	798.8	247
Total Reds (coralline)			2054		0		0		0		0	2054	410.7	411
Total Browns			0		0		4054		2083		4075	10212	2042	909
Total Greens			0		164		0		0		0	164.4	32.88	32.9
Total Algal Biomass			3108		902		4751		3588		4075	16424	3285	655

Complete Presence/Absence data

Amphiroa	*anceps*		1		1		1		1		
Amphiroa	*gracilis*				1						
Areschougia	*sp.*								1		
Calliblepharis									1		
Callophycus	*oppositifolius*										1
Callophyllis	*rangiferina*								1		
Chauviniella	*coriifolia*								1		
Claviclonium	*ovatum*						1				
Craspedocarpus	*blepharicarpus*								1		
Curdiea	*irviniae*				1		1				1
Curdiea	*obesa*		1		1		1				
Dictyomenia	*sonderi*		1						1		
Dictyomenia	*tridens*				1						
Dictyopteris	*muelleri*				1						
Dilophus	*robustus*								1		
Ecklonia	*radiata*				1		1		1		1
Erythroclonium	*sp.*						1				
Galaxaura	*obtusata*				1						
Haloplegma	*preissii*						1		1		
Hennedya	*crispa*		1						1		
Heterodoxia	*denticulata*				1		1				
Kuetzingia	*canaliculata*		1		1		1		1		
Laurencia	*filiformis*		1		1		1				
Lobophora	*variegata*				1						
Lobospira	*bicuspidata*				1						
Metamastophora	*flabellata*		1		1		1				
Myriodesma	*quercifolium*				1		1				
Phacelocarpus	*peperocarpos*								1		
Platythalia	*angustifolia*				1						
Plocamium	*mertensii*		1								
Polysiphonia	*decipiens*		1								
Ptilophora	*prolifera*				1						
Rhodopeltis	*australis*										1
Rhodymenia	*sonderi*						1				
Sarconema	*filiforme*		1								
Sargassum	*sp.*						1				

		QUADRAT									
		1	2	3	4	5	6	7	8	9	10
Scytothalia	*doryocarpa*						1		1		1
Trigenea	*australis*								1		
Tylotus	*obtusatus*						1		1		
Zonaria	*turneriana*						1		1		

SEAGRASS

Biomass of dominant species [gms (wet wt) / m2]
None recorded

Complete Presence/Absence data

Amphibolis	*antarctica*				1						

INVERTEBRATES

Sessile animals (percentage cover)

Calc Sp 1	2	2		5	4	6	15	4	10	12
Calc Sp 2	2			2		1				1
Calc Sp 3		4			1				1	1
Calc Sp 4				1	1					
Spongiidae Sp 1								1		
Microcionidae Sp 1						1	1			1
Spongiidae Sp 7							9	1		
Spongiidae Sp 9		2						1		
Geodiidae Sp			2							
Irciniidae Sp 6		1								1
Microcionidae Sp 3				1			1	1		1
Microcionidae Sp 6				4	7	5		5	2	2
Ascidian Sp 3	2	2	7		5	5	2	1		5
Ascidian Sp 59	1						1			
Ascidian Sp 6										1
Zoanthid Sp 4	1									2
Didemnidae Sp 2							1		1	1
Montipora mollis			28							
Herdmania momas									1	
Isaurus cliftoni				2		2			1	2
Pleisiatrea versipora			1							
Polycitoridae Sp 4							4			
Sabellid Sp 1				1		1				
Sycozoa ceribriformis								1		

Mobile Animals (number per quadrat)

Aplysia Sp 1				1						
Heliocidaris erythrogramma				1	1					
Thais orbita								1		
Ranella australasia								1		
Australium sqamifera			1	1	1					
Campanile symbolicum	3				4	1	1	1		
Turbo torquatus						1				
Pyrene bidentata						1				

FISH

Latin name	Common name
Chaetodon assarius	butterflyfish; western
Chelmonops truncatus	coralfish; truncate
Parapriacanthus elongatus	old wife
Pempheris klunzingeri	bullseye; rough
Kyphosus sydneyanus	drummer; silver
Apogon rueppellii	gobbleguts

Latin name	Common name
Odax cyanomelas	herring cale
Meuschenia hippocrepis	leatherjacket; horseshoe
Cheilodactylus rubrolabiatus	morwong; red-lipped
Schuettea woodwardi	pomfret; woodwards
Parma mccullochi	scalyfin; mccullochs
Scorpis georgianus	sweep; banded
Neatypus obliquus	sweep; footballer
Austrolabrus maculatus	wrasse; black spotted
Pseudolabrus parilus	wrasse; brown spotted
Halichoeres brownfieldi	wrasse; brownfields
Ophthalmolepis lineolatus	wrasse; maori
Pseudolabrus biserialis	wrasse; red banded
Halichoeres biocellatus	wrasse; red lined
Coris auricularis	wrasse; western king

SITE:	67	WATER DEPTH:	8.3m	WATER VISIBILITY:	15m
HABITAT TYPE:		Subtidal reef <10m			

ALGAE

Biomass of dominant species [gms (wet wt) / m2]

		QUADRAT 1	2	3	4	5	6	7	8	9	10	SUM	MEAN	SE
Amphiroa	*gracilis*				225									
Dictyomenia	*tridens*				184									
Ecklonia	*radiata*						6171		1646					
Enantiocladia	*axillaris*		485.2											
Laurencia	*filiformis*										211.2			
Melanamansia	*serrata*		120											
Metamastophora	*flabellata*								631.2					
Myriodesma	*quercifolium*		232.4											
Myriodesma	*serrulata*		498		200									
Nizymenia	*sp.*								191.2					
Osmundaria	*prolifera*										211.2			
Sargassum	*sp.*		185.6											
Scytothalia	*doryocarpa*								3874					
Total Reds (Non coralline)			1438		662		324		366.4		1029.6	3820.4	764.08	210.47
Total Reds (coralline)			0		388		0		668.8		173.2	1230.4	246.08	127.55
Total Browns			466.4		0		0		5600		0	6066.4	1213.28	1100.4
Total Greens			0		0		0		0		0	0	0	0
Total Algal Biomass			1904		1051		324		6635		1202.8	11117.2	2223.44	1131.1

Complete Presence/Absence data

			1		1		1		1		1
Amphiroa	*anceps*										
Amphiroa	*gracilis*				1						
Botryocladia	*sonderi*				1						1
Callophycus	*oppositifolius*						1				
Coeloclonium					1						
Craspedocarpus	*blepharicarpus*				1						
Curdiea	*obesa*						1				
Dicranema	*revolutum*		1								
Dictyomenia	*tridens*				1						
Dictyopteris	*plagiogramma*		1								1
Dilophus	*fastigiatus*										1
Ecklonia	*radiata*						1		1		
Enantiocladia	*axillaris*		1								
Euptilota	*articulata*										1
Galaxaura	*obtusata*										1
Haloplegma	*preissii*				1				1		
Hennedya	*crispa*										1
Hypnea	*sp*				1						
Jeannerettia	*pedicellata*				1						
Kuetzingia	*canaliculata*		1		1						1
Laurencia	*filiformis*		1								1
Lobophora	*variegata*										1
Melanamansia	*serrata*		1								
Metagoniolithon	*chara*		1								
Metamastophora	*flabellata*				1				1		1
Myriodesma	*quercifolium*		1								
Myriodesma	*serrulata*		1		1						
Nizymenia	*conferta*						1				1
Nizymenia	*sp.*								1		
Osmundaria	*prolifera*		1								1
Osmundaria	*spiralis*		1						1		1
Platythalia	*angustifolia*								1		1
Polysiphonia	*decipiens*		1								
Pterocladia	*lucida*						1				
Rhodopeltis	*australis*								1		
Rhodopeltis	*borealis*										1
Rhodymenia	*sonderi*						1		1		
Sargassum	*sp.*		1				1				1
Scytothalia	*doryocarpa*								1		
Tylotus	*obtusatus*						1				

SEAGRASS

	QUADRAT									
	1	2	3	4	5	6	7	8	9	10

Biomass of dominant species [gms (wet wt) / m2]

											SUM	MEAN	SE
Amphibolis antarctica		1441											
Total Seagrass Biomass		1441		0		0		0		0	1441	288.2	288.2

Complete Presence/Absence data

Amphibolis antarctica		1								

INVERTEBRATES

Sessile animals (percentage cover)

Calc Sp 1			2		17	6	1	2	1	
Calc Sp 3				2		4		2	2	6
Calc Sp 4			5				1		1	
Calc Sp 6			1	5		4		1	1	
Calc Sp 7									2	
Spongiidae Sp 1	1		2		2			1	1	2
Microcionidae Sp 1			1	1		1				
Chondrillidae Sp1								2		
Ancorinidae Sp 3						1				
Spongiidae Sp 9								1	2	
Irciniidae Sp 6						2				
Microcionidae Sp 3	1		2	2	2	5		2	1	
Microcionidae Sp 5	1							1		
Irciniidae Sp 7							1			
Microcionidae Sp 6	1					5		2	1	
Microcionidae Sp 7			1							
Chalinidae? Sp 7				5						
Dysideidae Sp 5								1		
Microcionidae Sp 14			5							
Irciniidae Sp 14									1	
Ascidian Sp 3	1	1	2	5	5	7	5	5	11	
Ascidian Sp 6								1		
Ascidian Sp 8						1		1		
Centrostephanus tenuispinus				1						
Glossodoris atromarginata			1							
Herdmania momas			1	1	1	1	1			2
Pleisiatrea versipora				2		1				
Polycitor giganteus				1						
Polycitoridae Sp 1	1		1	4		4	2		2	
Sycozoa ceribriformis						1				
Thais orbita					1					
Zoanthid Sp 3	1		1		1				1	2

Mobile Animals (number per quadrat)

Comatula purpurea						1	2			
Rhinoclavis bituberculatum								1		
Calcinus ? sp.	1									
Pyrene bidentata			1							

FISH

Latin name	Common name
Othos dentex	harlequin fish
Seriola hippos	samson fish
Pseudocaranx dentex	trevally; silver
	Sp1
Kyphosus sydneyanus	drummer; silver
Kyphosus cornelii	drummer; western
Parupeneus bifasciatus	goatfish; blackspotted
Odax cyanomelas	herring cale
Meuschenia hippocrepis	leatherjacket; horseshoe
Chromis klunzingeri	puller; black headed
Parma mccullochi	scalyfin; mccullochs
Scorpis georgianus	sweep; banded

Latin name	Common name
Neatypus obliquus	sweep; footballer
Tetractenos hamiltoni	toadfish;common
Austrolabrus maculatus	wrasse; black spotted
Pseudolabrus parilus	wrasse; brown spotted
Halichoeres brownfieldi	wrasse; brownfields
Thalassoma lutescens	wrasse; green moon
Ophthalmolepis lineolatus	wrasse; maori
Pseudolabrus biserialis	wrasse; red banded
Halichoeres biocellatus	wrasse; red lined
Pictilabrus laticlavius	wrasse; senator
Coris auricularis	wrasse; western king

APPENDIX VIII

Summary of transect water depth measurements

Distance	Sites																																							
along transect (m)	1	2	7	8	9	10	14	15	18	19	21	22	23	24	27	28	29	30	31	32	34	35	37	38	40	43	45	47	48	49	51	53	54	58	60	61	63	65	67
0		5.0	4.6	8.6	2.4	10.4	7.5	9.3	15.9	14.7	8.5	12.5	11.5	7.0	9.6	13.3	6.5	9.9	7.6	13.0	3.5	8.6	7.8	6.4	10.5	10.8	5.9	5.5	9.0	7.2	2.7	2.5	9.4	4.6	7	11.6	10.5	8.8	8.5
10	3.3	5.2	4.7	8.6	2.4	10.5	7.0	10.1	15.9	14.5	8.4	12.4	11.4	6.6	9.7	13.2	6.2	9.2	7.2	12.8	3.4	8.4	7.7	6.5	10.5	11.5	6.2	5.9	9.0	7.1	2.7	2.8	10.1	4.4	7	11.6	10.3	10.1	8.5
20	3.2	5.7	4.9	8.7	2.2	10.2	7.8	10.2	16.1	14.6	8.6	12.5	11.4	6.2	9.5	13.4	6.5	9.1	7.0	13.1	3.4	8.5	8.0	6.4	10.3	11.6	6.0	6.4	8.8	7.4	2.8	1.9	10.3	5.1	7.5	11.7	10.4	10.0	8.2
30	3.5	5.9	5.0	8.6	3.0	10.3	8.0	10.0	16.0	14.2	8.5	12.6	11.5	6.3	9.8	13.8	6.4	8.6	7.0	13.0	5.3	8.6	7.7	6.2	10.4	11.6	6.0	6.8	9.6	7.3	2.8	2.4	10.4	5.7	7.5	12.0	10.9	9.8	7.2
40	3.9	7.0	5.1	8.6	2.9	10.4	7.9	10.9	16.1	14.5	8.4	12.3	11.5	6.8	9.4	13.8	6.1	11.2	6.7	13.1	4.4	8.3	2.7	6.4	10.3	12.6	6.2	7.2	9.6	7.4	2.0	2.5	11.0	5.6	7.6	11.8	11.3	10.1	7.2
50	3.8	7.6	5.2	8.2	3.1	9.9	7.8	11.7	16.0	14.0	8.5	12.5	11.5	6.9	9.8	14.2	6.3	10.8	6.5	13.0	4.4	8.3	3.8	6.3	10.3	12.1	6.2	7.2	10.4	7.4	2.5	2.7	10.8	6.1	7.5	12.0	11.0	10.2	6.2
60	3.8	7.8	5.2	8.4	3.0	10.3	7.8	11.1	15.9	14.6	8.5	12.6	11.4	6.9	9.6	13.8	5.9	10.4	5.9	13.1	6.1	8.2	6.0	6.3	10.2	12.7	6.3	7.3	9.7	7.4	2.4	2.9	10.6	6.2	7.7	12.3	11.9	11.5	7.1
70	4.4	8.4	5.4	8.3	2.7	10.6	7.5	11.3	16.0	14.9	8.7	12.3	11.5	7.3	9.3	13.8	5.7	10.8	5.8	13.2	5.9	8.4	7.9	6.5	10.3	12.4	7.6	7.2	11.0	7.3	2.5	3.2	10.0	6.3	8.1	12.5	11.6	11.8	5.6
80	4.5	8.5	5.4	8.2	2.6	9.9	7.7	12.1	16.1	15.0	8.6	12.5	11.5	7.1	9.8	13.4	5.9	10.0	5.7	13.2	5.7	8.4	8.1	6.4	9.9	12.7	7.1	7.6	11.1	7.4	2.7	3.2	10.0	6.7	8	12.5	12.1	12.9	5.6
90	4.7	8.7	5.4	7.9	2.7	9.9	7.2	12.4	15.9	14.6	8.6	12.3	11.3	7.2	9.8	13.5	5.7	9.6	5.8	13.1	5.1	8.7	8.0	6.8	9.8	12.1	7.1	7.5	10.9	7.4	2.7	3	9.7	6.6	8.4	13.0	12.5	10.9	5.4
100	5.1	8.8	5.2	8.0	2.2	10.4	7.5	13.1	15.9	14.5	8.6	12.5	11.4	7.5	9.3	12.9	5.6	10.2	5.9	13.2	4.6	8.7	4.8	6.7	9.7	12.0	7.3	7.3	11.1	7.3	2.6	2.9	10.0	7.4	8.2	13.2	12.1	10.6	7.0
110	5.4	9.0	5.1	7.5	2.2	10.4	7.0	14.3	16.2	13.5	8.8	12.3	11.4	7.3	9.6	12.4	5.6	11.3	5.8	13.1	4.6	8.6	5.1	6.7	9.9	12.1	7.6	7.3	10.4	7.5	2.6	2.6	10.0	7.8	8.1	13.4	11.0	10.6	7.4
120	5.7	9.0	5.1	8.2	2.5	9.8	6.7	14.5	16.0	14.0	8.6	12.4	11.5	7.5	9.8	12.0	5.4	12.4	5.9	13.1	5.0	8.7	7.1	6.7	9.7	10.8	7.2	7.2	10.7	7.5	2.5	2.4	9.9	7.5	8.2	13.1	11.6	10.6	8.1
130	5.7	9.2	5.2	7.9	2.7	10.1	7.1	15.0	16.1	13.4	8.5	12.4	11.5	7.4	9.6	11.7	5.4	12.5	6.0	13.6	3.7	8.5	5.1	6.8	9.5	11.2	7.6	7.6	10.4	7.7	2.3	2.3	10.3	7.1	8	13.4	12.0	10.4	7.5
140	5.7	9.2	5.3	7.7	2.6	10.3	6.8	15.2	15.8	12.5	8.4	12.6	11.3	7.7	9.7	11.5	5.0	12.1	5.9	13.3	4.6	8.6	7.3	6.9	9.2	10.8	7.2	7.5	10.7	7.6	2.2	2.2	10.9	6.4	7.9	13.1	11.7	10.6	8.2
150	5.4	9.5	5.3	7.6	2.0	10.1	6.1	15.5	15.8	11.6	8.7	12.4	11.4	7.7	9.7	11.2	5.5	11.7	5.8	13.3	5.6	8.4	8.8	6.8	8.5	11.0	7.0	7.2	10.4	7.5	2.0	2.3	10.4	6.0	7.2	13.3	12.0	10.8	8.6
160	5.2	9.5	5.4	7.6	2.0	10.2	7.0	16.4	15.4	11.6	8.8	12.6	11.3	8.2	9.7	11.1	4.3	NR	5.7	13.5	6.2	8.4	8.5	6.8	8.8	11.0	7.2	7.3	10.3	7.7	2.0	2.7	10.7	7.5	7.4	13.5	12.1	10.4	11.1
170	5.1	9.4	5.5	7.7	2.1	10.0	7.5	16.2	15.4	11.6	8.7	12.5	11.3	7.7	9.8	11.2	4.9	NR	5.6	13.7	7.0	8.4	8.8	6.7	8.1	11.9	7.2	7.4	10.5	7.6	2.1	3	10.1	8.0	6.6	13.2	12.5	10.1	11.3
180	4.9	9.6	5.5	7.7	2.1	10.1	7.3	16.5	15.4	10.6	8.5	12.7	11.3	7.9	9.8	11.5	4.0	NR	5.7	13.7	7.3	8.6	9.0	6.8	7.5	10.5	7.2	7.2	10.3	7.7	2.1	2.4	10.3	8.2	6.8	13.5	12.0	10.2	11.2
190	5.4	9.8	5.5	7.6	2.5	10.0	8.3	17.1	15.1	11.0	8.6	12.6	11.2	7.8	9.6	11.2	3.8	NR	5.7	13.9	7.0	8.8	9.0	6.9	7.3	10.8	7.2	7.2	10.6	7.7	2.1	3.6	9.8	8.1	6.8	13.7	11.2	9.8	12.2
200	5.0	9.7	5.4	7.5	2.6	10.0	8.5	17.1	15.2	10.1	8.5	12.6	11.2	7.8	9.8	11.3	4.0	NR	5.8	13.8	7.7	8.7	9.0	6.6	6.4	11.3	7.1	7.3	10.5	7.6	2.4	2.6	9.7	9.0	6.8	13.6	10.9	9.9	11.9
Average depth	4.7	8.2	5.2	8.1	2.5	10.2	7.4	13.3	15.8	13.3	8.6	12.5	11.4	7.3	9.7	12.6	5.5	10.6	6.1	13.3	5.3	8.5	7.2	6.6	9.4	11.6	6.9	7.1	10.2	7.5	2.4	2.7	10.2	6.7	7.5	12.8	11.5	10.5	8.3
SD	0.83	1.55	0.25	0.42	0.34	0.22	0.56	2.62	0.32	1.59	0.12	0.12	0.10	0.53	0.16	1.11	0.84	1.20	0.59	0.30	1.30	0.16	1.84	0.22	1.18	0.70	0.58	0.54	0.69	0.17	0.28	0.40	0.42	1.23	0.55	0.73	0.67	0.83	2.10
SE	0.046	0.059	0.024	0.031	0.028	0.023	0.036	0.077	0.027	0.060	0.016	0.017	0.015	0.035	0.019	0.050	0.044	0.068	0.037	0.026	0.054	0.019	0.065	0.022	0.052	0.040	0.036	0.035	0.040	0.020	0.025	0.030	0.031	0.053	0.035	0.041	0.039	0.043	0.069

APPENDIX IX

Proportion of bare sand habitat at each site using the quadrat and line intersect methods

Sheet1

Distance along transect (m)	Quadrate No.	Site 1	2	7	8	9	10	14	15	18	19	21	22	23	24	27	28	29	30	31
0																			20*	
20	1	0	0	0	0	0	25	5	10	0	5	0	80	NR	NR	5	0	NR	0	0
40	2	0	30	0	0	0	15	10	10	0	5	0	75	NR	NR	5	0	NR	30	0
60	3	0	0	0	0	0	10	0	40	0	20	0	70	NR	NR	5	0	NR	10	0
80	4	0	0	0	0	0	10	0	10	0	40	5	60	NR	NR	10	0	NR	NR	0
100	5	5	0	0	0	0	20	5	5	0	10	0	65	NR	NR	15	0	NR	30	0
120	6	0	0	0	5	0	5	0	5	0	50	0	75	NR	NR	10	0	NR	NR	0
140	7	0	0	0	0	0	5	5	60	0	20	5	75	NR	NR	30	0	NR	NR	0
160	8	0	0	0	0	0	5	5	60	0	10	5	85	NR	NR	5	0	NR	NR	0
180	9	0	5	0	0	0	5	5	100	0	10	5	70	NR	NR	30	0	NR	NR	0
200	10	5	0	0	0	5	5	5	100	5	50	0	60	NR	NR	60	0	NR	NR	0
Average (%)		1	4	0	1	1	11	4	40	1	22	2	72	NR	NR	18	0	NR	18	0
Total transect																				
Bare sand (m)		26	12	0	14	0	0	5	126	0	2	NR	161	150	82*	0	0	9	NR	0
Cover (%)		13	6	0	7	0	0	3	63	0	1	NR	80	75	40	0	0	4	NR	0

Distance along transect (m)	Quadrate No.	Site 32	34	35	37	38	40	43	45	47	48	49	51	53	54	58	60	61	63	65	67
0																					
20	1	40	0	70	0	0	10	0	0	10	10	0	0	0	5	0	100	40	10	0	10
40	2	10	0	98	0	0	5	5	0	10	0	0	0	0	20	0	0	0	5	0	20
60	3	25	*	90	0	0	5	0	0	0	5	0	0	0	20	0	100	5	60	0	0
80	4	15	10	98	0	0	5	10	0	0	40	5	0	0	5	0	100	5	30	10	0
100	5	5	0	95	0	5	5	10	0	5	20	5	0	0	10	0	100	30	0	0	0
120	6	5	0	95	0	20	0	5	0	0	30	5	0	0	0	0	100	15	5	0	0
140	7	NR	0	85	0	5	0	0	0	0	50	0	0	0	20	0	100	20	0	0	0
160	8	NR	0	85	0	0	5	5	0	5	10	0	0	0	10	0	0	20	5	0	0
180	9	NR	5	90	0	0	0	10	0	30	0	5	0	0	50	0	0	30	5	0	0
200	10	NR	20	95	0	0	30	0	0	10	70	10	0	0	10	0	0	30	15	0	0
Average (%)		17	4	90	0	3	7	5	0	7	24	3	0	0	15	0	60	20	14	1	3
Total transect																					
Bare sand (m)		14	16	46	3	14	2	0	22	36	18	2	0	0	4	0	*153	0	31	20	0
Cover (%)		7	8	23	2	7	1	0	11	18	9	1	0	0	2	0	76	0	15	10	0

*Refer to Fish Data Sheet.

NR = Not recorded