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Central Waitemata Harbour Ecological Monitoring 2000 - 2010

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1 Executive Summary

This report details the results of a State of the Environment monitoring programme for the Central Waitemata Harbour conducted between October 2000 and February 2010. The focus of the programme is to monitor the ecological status and trends of change in macrobenthic communities in the Central Waitemata. Five intertidal soft-sediment sites were monitored, representing distinct habitats in terms of physical and biological composition. The design of the programme matches those carried out in Mahurangi and Manukau Harbours. The monitoring focuses on 20 taxa which are expected to respond differently to changes in site characteristics such as sediment composition, contamination and other forms of disturbances. This method has proved useful in monitoring Manukau and Mahurangi and has been further validated in work carried out by NIWA and the University of Auckland on ways of defining healthy communities (Anderson et al. 2002).

This report addresses several questions relevant to State of the Environment monitoring:

- Have the sedimentary conditions at each site changed?
- Have any of the sites undergone changes in monitored taxa or in overall community structure?
- If changes have occurred in the ecology, do they reflect changes in habitat conditions e.g., sedimentation, or can they be attributed to other factors such as long-term natural cycles or chemical contamination?

The HBV, Whau and HC sites have shown minimal change in sediment composition over the last few, although site observations at HBV suggest that the shell hash quantity over a section of the site maybe increasing. Both the Reef and ShB sites have shown increasing trends in the sediment mud content. The coverage of seagrass has expanded at Reef and the lower shore at ShB has become muddier.

The general patterns in community composition occurring in the Central Waitemata are: (1) HC and HBV demonstrating relative stability, (2) variability at Whau relating to cyclic patterns in abundances and (3) large changes of concern occurring at ShB and Reef. These latter two sites have had recent change in abundance of several polychaetes species, with *Macroclymenella*, *Prionospio*, *Heteromastus* and *Aricidea* all showing substantial increases. Changes at Reef appear to be naturally driven through the expansion of seagrass coverage which has caused an associated increase in mud content. Changes at ShB look to be anthropogenically mediated, through the increasing mud content associated with higher sedimentation in this embayment.

The locations of the five sentinel monitoring sites in the Central Waitemata provide coverage of physically and biotically distinct sections of the Harbour. However monitoring does not need to be continuous at all sites with temporal nesting possible. In the future it is recommended that:

- ShB and Whau have continual monitoring due to the larger changes occurring at these sites.
- An additional site is established for monitoring in Shoal Bay; as this is an area predicted to change in the future.
- HC has rotational monitoring due to the relative stability at this site.
- HBV has continuous monitoring due to its proximity to Upper Waitemata Harbour.
- Rotational monitoring of the Reef site as changes appear to be driven primarily by the expansion of seagrass patches.

Consideration may need to be given to moving the HBV site due to an expanding channel which will encroach on the monitored area in the future.

2 Introduction

In October 2000, a State of the Environment monitoring programme for the Central Waitemata Harbour was developed for the Auckland Regional Council (ARC). The programme was designed to be scientifically credible, practical, and affordable and to meet the requirements of the Resource Management Act (1991). The focus of the programme was to monitor the ecological status and the trends of change in macrobenthic communities in the Central Waitemata.

Hewitt (2000) suggested that the Central Waitemata would be best represented by 6 intertidal sites; 5 from soft-sediment habitats and 1 rocky habitat. In 2000, NIWA was commissioned to monitor the soft sediments and the University of Auckland was commissioned to monitor the rocky site at Meola Reef. The soft-sediment sites were selected for monitoring in consultation with the ARC, and were chosen to integrate multiple aquatic inputs, but remaining distanced from any industry-specific contaminant sources. A site was placed in each of five sub-regions of the Central Waitemata Harbour, based on hydrodynamics and drainage areas with significant intertidal habitats (Figure 1; Hewitt 2000). Details on site selection are given in the first report (Nicholls et al. 2002).

The monitoring focuses on a selection of 20 species (see Nicholls et al. 2002) that can be expected to respond to changes in their surrounding environments. This method has proved useful in monitoring for both the Manukau and Mahurangi Harbours and has been further validated in work carried out by NIWA and the University of Auckland on ways of defining healthy communities (Anderson et al. 2002).

This report presents the results from monitoring of soft-sediment sites between October 2000 and February 2010 and details the present status of the benthic communities in the Central Waitemata Harbour. In particular the following questions are addressed:

- Have there been any changes in the characteristics of each site or the surrounding areas?
- Have there been any changes in the monitored benthic communities of Central Waitemata Harbour and are these of concern?
- Are changes confined to one site or one area of the harbour or do they reflect a harbour-wide change?

This latter point will be answered by looking at two sub-questions:

- Are species exhibiting temporal variations that appear predictable?
- Are species abundances exhibiting similar patterns at all sites?

The report also discusses a non-native species that has been found in the Central Waitemata Harbour over the last year.

2.1 Functional Indicators & Benthic Health Model

A functional diversity index, NIWACOOBII, was developed to assess changes in functional attributes for intertidal non-vegetated benthic communities in the Auckland Region (van Houte-Howes and Lohrer 2010). This study assessed 29 functional traits from 7 functional groups; with the final index comprising the most reliable and sensitive traits from each of the 7 groups. This index was recently applied to ARC data for the Regional Discharge Project and the Mahurangi time series, to observe how the index responded to gradients in muddiness and heavy metal contamination (van Houte-Howes and Lohrer 2010). The index has been applied to the October data from 2000 and 2009 for the five Central Waitemata sites and the results are discussed.

Data from October 2000 and 2009 has also been analysed using the Benthic Health Model. The BHM is a multivariate model of community structure based on canonical analysis of the principle co-ordinates (Anderson 2002). This has recently been updated to show community changes caused by changing mud content as well as stormwater heavy metal contamination (Hewitt and Ellis 2010).

Figure 1:

Map of the Waitemata Harbour showing the five permanent soft-sediment monitoring sites at Hobsonville (HBV), Henderson Creek (HC), Whau River (Whau), Te Tokoroa Reef (Reef) and Shoal Bay (ShB).

3 Methods

Five soft-sediment sites are sampled representing five different drainage sub-regions of the Central Waitemata: Upper-Waitemata-Hobsonville (HBV), Henderson Creek (HC), Whau River (Whau), Meola and Motions Creek by the Te Tokoroa Reef area (Reef) and Shoal Bay (ShB) (see Figure 1). Sites are located at the mid-tide level and cover an area of 9000 m^2, with the exception of HBV which covers 10,800 m^2. Sites are located in areas that are representative of the general character of the surrounding intertidal environment and are as close to channels as practical (to aid access). Sites are marked by wooden stakes and located by GPS (Table 1).

Table 1:

Dimensions and GPS co-ordinates for the monitored sites in the Central Waitemata. Hobsonville (HBV), Henderson Creek (HC), Whau River (Whau), Te Tokoroa Reef (Reef) and Shoal Bay (ShB). GPS co-ordinates mark the 0,0 point of each site.

Site	Dimensions (m)		GPS coordinates in NZMG	
	X	Y	North	East
HBV	180	60	6487791	2660090
HC	100	90	6486226	2658567
Whau	100	90	6482500	2659244
Reef	180	50	6482597	2663505
ShB	180	50	6485554	2667087

Methods and techniques used for sampling and sample processing are consistent with those used at the established sentinel locations of Mahurangi and Manukau Harbours, and have been detailed in a previous report (Nicholls et al. 2002). Sampling is conducted every two months, and began in October 2000. The methods used are briefly described below.

3.1 Macrofauna

On each sampling occasion, 12 core samples (each 13 cm diameter, 15 cm deep) are collected from each site. To provide an adequate spread of cores over the site, each site is 'divided' into 12 equal sections and one core sample is taken from a random location within each section. To reduce the influence of previous sampling activity and spatial autocorrelation, samples are not placed within a 5 m radius of each other or of any samples collected in the previous 12 months. Core samples are sieved through a 500 µm mesh and the residues stained with rose bengal and preserved in 70 % isopropyl alcohol. Samples are then sorted and stored in 50 % isopropyl alcohol. The 20 selected species (see Table 2) are counted and stored in 50 % isopropyl alcohol. Other macrofauna are not discarded; rather they are kept and processed under other funding when available.

Table 2:

The 20 taxa recommended for long-term monitoring in the Waitemata Harbour monitoring programme. Where genera and species names have changed with taxonomic refinement, the names in brackets indicate alternatives.

Order	Taxa
Bivalvia	*Arthritica bifurca*
	Austrovenus (Chione) stutchburyi
	Macomona (Tellina) liliana
	Nucula hartvigiana
	Paphies australis
Cnidaria	*Anthopleura aureoradiata*
Cumacea	*Colurostylis lemurum*
Gastropoda	*Diloma subrostrata*
	Haminoea zelandiae
	Notoacmea (helmsi) scapha
	Zeacumantus lutulentus
Isopoda	*Exosphaeroma chilensis*
Polychaeta	*Aonides trifida (oxycephala)*
	Prionospio (*Aquilaspio*) *aucklandica*
	Aricidea sp.
	Boccardia syrtis
	Euchone sp.
	Glycera spp.
	Heteromastus filiformis
	Macroclymenella stewartensis

3.2 Bivalve size-class analysis range

After identification, individual *Paphies australis*, *Austrovenus stutchburyi* and *Macomona liliana* are measured and placed into size classes. The size classes for *Austrovenus stutchburyi* and *Macomona liliana* are <1 mm, 1 – 5 mm, 5 – 10 mm and then in 10 mm increments. *Paphies australis* size-classing is the same initially but, after the 10 - 20 mm, changes to 20 mm increments (20 - 40 mm, 40 – 60 mm, >60 mm). Unlike the Manukau and Mahurangi monitoring programmes *Nucula hartvigiana* is not measured, as the high densities found at some sites make this economically unviable. Instead, only those bivalve species which grow to be relatively large and have juveniles which are more sensitive to stress than adults are measured.

3.3 Sub-sampling replicates with high tube-worm densities

For certain months of sampling, the tube-worm density was exceptionally high in all replicates at both the Reef and ShB sites. Complete processing of these samples was unviable due to financial and time constraints. Instead a sub-sampling protocol was adopted: Each sample was divided into two equal halves and separated. For both halves, the monitored and unmonitored non tube-worm taxa were identified as per usual. For one half of the sample, tubes were emptied and the tube dwelling species identified and enumerated. The count for tube-worm species (predominantly *Boccardia syrtis*) was doubled to estimate the total count per sample. The unprocessed replicate halves have been stored so that if time is available in the future these can be fully completed.

3.4 Site characteristics

During each site visit, attention is paid to the appearance of the site and the surrounding sandflat. In particular, surface sediment characteristics and the presence of birds, plants and epifaunal species are noted.

3.5 Sediment characteristics

Sediment characteristics (grain size, organic content and chlorophyll *a*) are assessed at each site on each sampling occasion. At six random locations within the site, two small sediment cores (2 cm deep, 2 cm diameter) are collected, one to determine grain-size and organic content and the other for chlorophyll *a* analysis. Cores from the six locations are pooled, and kept frozen in the dark prior to being analysed as described below.

Grain size: The samples are homogenised and a subsample of approximately 5 g of sediment taken, and digested in ~ 9% hydrogen peroxide until frothing ceases. The sediment sample is then wet sieved through 2000 μm, 500 μm, 250 μm and 63 μm mesh sieves. Pipette analysis is used to separate the <63 μm fraction into >3.9 μm and $\leq$3.9 μm. All fractions are then dried at 60°C until a constant weight is achieved (fractions are weighed at ~ 40 h and then again at 48 h). The results of the analysis are presented as percentage weight of gravel/shell hash (>2000 μm), coarse sand (500 – 2000 μm), medium sand (250 – 500 μm), fine sand (62.5 – 250 μm), silt (3.9 – 62.5 μm) and clay ($\leq$3.9 μm). Mud content is calculated as the sum of the silt and clay content.

Chlorophyll *a*: Within one month of sampling, the full sample is freeze dried, weighed, then homogenised and a subsample (~0.5 g) taken for analysis. Chlorophyll *a* is extracted by boiling the sediment in 90% ethanol, and the extract processed using a spectrophotometer. An acidification step is used to separate degradation products from chlorophyll *a*.

Organic content: Approximately 5 g of sediment is placed in a dry, pre-weighed tray. The sample is then dried at 60°C until a constant weight is achieved (the sample is weighed after ~ 40 h and then again after 48 h). The sample is then ashed for 5.5 h at 400°C (Mook and Hoskin 1982) and then reweighed.

3.6 Statistical analyses

When the State of the Environment monitoring programme was developed for the ARC, the methods to be used in analysing the data were also detailed (Hewitt, 2000). This report recommended that, every 2 years, a graphical analysis of patterns in selected taxa abundances over time at each site should be conducted to identify seasonal patterns, multiyear patterns and trends.

Analyses included:

- Changes in dominant taxa over time to determine whether observed changes in individual monitored taxa led to community changes.
- Multivariate ordination of ecological data collected in October of each year to determine whether community composition at the sites was changing over the monitored period.
    - Ordination of raw data was conducted through non-metric multidimensional scaling based on Bray-Curtis similarities.
    - Canonical analysis of principle co-ordinates (CAP, Anderson and Robinson 2003, Anderson and Willis 2003) to relate Bray-Curtis similarities of raw data to environmental factors.

- Trend analysis- to formally identify any suggested trends in both biotic and abiotic variables, trend analysis was conducted on:
    - Total species abundances – to investigate if there were significant changes in the direction of the populations of the monitored species and if so, whether these changes occurred in the same direction and for the same species across the different sites.
    - Sediment properties - to see if changes in the sediment environment occurred and if so, whether these alterations related to changes in species abundances.
    - Bivalve size classes - to investigate if there were size specific changes occurring and if so, where changes in a size class would underpin changes occurring in the species abundance.

In each trend analysis autocorrelation was investigated using *chi*-square probabilities. Where autocorrelation was indicated, increasing or decreasing trends were investigated by adjusting parameters and significance levels (AUTOREG procedure, SAS). Otherwise ordinary least squares regression was carried out. Only linear trends were investigated as investigation of residual variability suggested no other responses. Analyses were carried out on both the raw and log transformed data. Log transformations removed those trends which were driven by peak values and aided the biological interpretation.

Note that all analyses conducted are performed on the sum of the 12 cores collected at each site.

4 Present status of benthic communities in the Central Waitemata Harbour

This programme was designed to monitor the ecological status and trends of change in macrobenthic communities in the Central Waitemata Harbour. An important process in detecting trends is determining temporal variability, as knowledge of cyclic patterns of recruitment aids in detection of long-term trends (Hewitt et al. 1994). Thus, in this report we ask the following questions:

- Have there been any changes in site characteristics?
- At each site, are species exhibiting temporal variations that appear predictable, i.e., trends, seasonal patterns or multiyear cycles?
- Are species' abundances exhibiting similar patterns at each site?
- Have any changes in species over time led to changes in communities, with sites becoming more or less similar to each other?

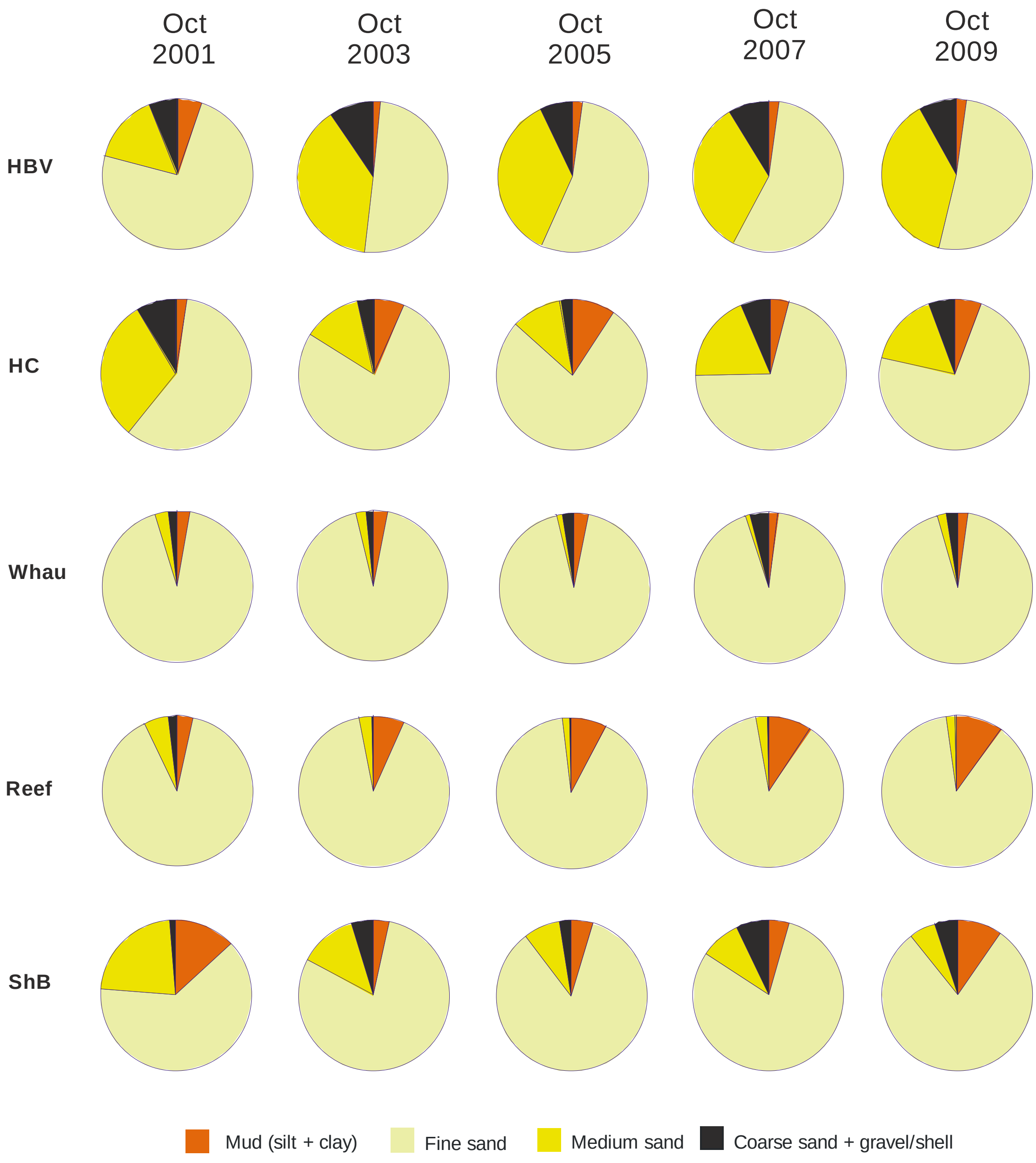
4.1 Have there been any changes in site characteristics?

4.1.1 Hobsonville (HBV)

Site HBV is located on the sandflats near the Hobsonville Air Base, close to the deep channel entering the Upper Waitemata Harbour. The sandflat shows characteristics of high flow with coarse sediment and ripple features on the surface (Plate 1). Large fragments of old logs still persist buried in the sediment and there is still a shell layer approximately 15 cm below the surface. While the site itself has changed little since monitoring began, a channel on the seaward/eastern side has increased in size in recent years (2-3 m wide and approximately 0.5 m deep in 2008, estimated at 3.5 m wide and 0.5 m deep in 2010). The channel's banks have increased in muddiness and these are close to encroaching on the site (at the current rates estimated 2 years before affecting sample area). In 2008 a second smaller channel (<1 m, approx 0.3 m deep) branched from the main Hobsonville channel and approached the site toward its seaward side length. Water drains from the monitored area towards this channel but, it has remained stable in size and does not intrude into the site. Observations from April 2010 indicate that a shell hash ridge in the centre of the monitored area nearest the channel is increasing in shell density, while the far end of the site (with respect to the 0,0 peg) has decreased in shell hash density. Sediment characteristics have shown little change since 2008 and have been relatively stable since October 2002. The sediment is still predominantly fine and medium sand, with small amounts of coarse material (Figure 2). Chlorophyll *a* content of the sediment has ranged between 8.0 and 19.7 µg/g sediment and the organic content has been both low and variable (Average 1.5%, range 5.9).

Figure 2:

Summary of sediment characteristics at Hobsonville (HBV), Henderson Creek (HC), Whau River (Whau), Te Tokoroa Reef (Reef), Shoal Bay (ShB), from October 2001 to October 2009. Coarse sand and gravel (>500µm), medium sand (250 – 500 µm), fine sand (62.5 – 500 µm), mud (< 62.5 µm). Full results are given in Appendix 1.



4.1.2 Henderson Creek (HC)

The HC site is located adjacent to Henderson Creek on a large intertidal flat, which is fringed by mangroves on the upper edge and oyster reef on the western edge. The sediment surface is generally free from features such as ripples and is covered with a substantial layer of shell-hash (Plate 2). The appearance of the HC site has shown little change over the last two years, and still has dense shell hash over two-thirds of the plot, thinning slightly towards the landward side. The sediment is predominantly medium and fine sand (Figure 2). The proportion of fine sand increased at this site rapidly over the first two years of monitoring accompanied by a decrease in medium sand (Appendix 1) but since October 2002 had been stable until December 2008. Since the latter part of 2008 to the present, the fine sand fraction has shown more variability (the standard deviation from December 2008 to the present was 5.0, standard deviation in the 14 months prior to December 2008 was 1.3). The mud content, which showed an upward trend during the first four years of sampling (Halliday and Hewitt, 2006) had stabilised by 2008 (Townsend et al. 2008). Since 2008 the mud content has continued to be highly variable and recent values have approached the high values recorded in 2005-06. Chlorophyll *a* content is high at this site, with a mean value of 24.70 and a range of 9.5 –38 µg/g sediment. There is a cyclic pattern of lowest chlorophyll *a* content in either August or October.

4.1.3 Whau River (Whau)

The Whau site is located on the north-western side of the Whau River (Plate 3). The sand flats here are large, sandy and generally show signs of wind-wave activity (small ripples on the sediment surface). There has been little visual change to this site or the nearby channel over nearly ten years of monitoring. The majority of the sediment size fractions have been consistent over time. The medium sand fraction was variable prior to February 2004, but showed minimal change from then until October 2008. Since October 2008 this fraction has increased in variability and reached a local maximum of 5.6% in April 2009 (Figure 3). The sediment at Whau is predominantly fine sand, with an average chlorophyll *a* content of 10.4 µg/g sediment and a low organic content (generally <1%)(Appendix 1).

4.1.4 Te Tokoroa Reef (Reef)

The intertidal flat on the eastern side of Te Tokoroa Reef is a muddy sandflat located near Meola and Motions Creeks (Plate 4). Of all the study areas, this has the longest uninterrupted fetch and consequently may be affected by both waves and currents. The site itself is situated a few hundred meters west of scattered patches of rock, and at the end of a shallow-sloping channel. Since December 2004 patches of seagrass (*Zostera muelleri*) have established at the site (Plate 4). Seagrass has been increasing in density since 2008, with a greater number of patches and a higher density of shoots within seagrass patches. In 2008, patches varied between 10-50% seagrass coverage but in 2010 this has risen to 30-100%. Patches vary in size from 1-5m^2 on the sparser side of the site to patches greater than 10m^2 on the denser side. The seagrass appears healthy and in good condition with long (15-20cm) green blades. The temporal succession of seagrass has caused raised islands of muddy sediment to occur across the site, increasing the heterogeneity. Associated with the trapping effect of seagrass has been a consistent upward trend in the mud fraction of the sediment (Appendix 1, Figure 4). The site sediment is still dominated by fine sand (76 – 95%) with coarse sand remaining the lowest of al monitored sites (< 1%) (Figure 2). The chlorophyll *a* and organic content of the sediment are both moderate to low.

4.1.5 Shoal Bay (ShB)

The intertidal flat selected for monitoring in Shoal Bay is adjacent to the Auckland Harbour Bridge and offshore from a large rock platform at the side of the motorway (Plate 5). The sediment at this site is coarse with a dense shell hash layer over much of the surface and consequently it has the highest gravel-sized sediment of all monitored sites (Appendix 10.1). The mud content at this site has been increasing but variable since February 2003. Overall, across this site there is large spatial variation. The shell hash on the lower third of the site nearest the water edge is no longer visible as it has been covered by a mud layer (~5-10 cm in depth). The sediment surface on the upper section of the site displays less shell-hash and often shows ripples which are a characteristic of high wave-exposure. A buried pipeline running perpendicular to the shore intersects the site and human debris (plastics, glassware and rubber) is still commonly observed on this sandflat. Outside of the monitored area on the lower shore there is a large tube-worm bed which is approximately 20 m by 200m in extent. The sediment at ShB is mainly fine (mean 74%) and medium sand (mean 14%, Figure 2). ShB sediment has a low mean organic content (0.23 – 1.94%), and the chlorophyll *a* content is also frequently low (< 10 µg/g sediment).

4.1.6 Summary of site characteristics

The Chlorophyll *a* and organic content at each site remain comparable with previous years of the study and show minimal change in the level of variation (Table 3B) (Halliday and Hewitt 2006, Townsend et al. 2008). The highest values of organic material and chlorophyll *a* are both still found at the HC site, and likewise the lowest values at ShB (Appendix 1). The five sites can still be divided into two groups on the basis of within-year variability in sediment characteristics: Whau, Reef and ShB have lower variability than HBV and HC (Table 3A). However, there have been notable shifts in the levels of relative variability. Table 3B demonstrates the relative change in variability over the last two years; comparing the standard deviation of data from October 2000 to February 2008 (shown in the last report) with the data from October 2000 to February 2010. Both HBV and HC have remained relatively stable as indicated by the small deviations from zero in Table 3B i.e., their level of annual variability is high, but no different in comparison with previous years. For HC both the percentages of fine and medium sand have been less variable. However, the percentages of mud and fine sand have become more variable for Whau, Reef and ShB (with the exception of ShB fine sand).

Table 3:

Analysis of temporal variability in sediment characteristics at five sites from October 2000 to February 2010; Hobsonville (HBV), Henderson Creek (HC), Whau River (Whau), Te Tokoroa Reef (Reef) and Shoal Bay (ShB): A) Average annual variability (Standard Deviation) of sediment % by weight, coarse sand (500 – 2000 μm), medium sand (250 – 500 μm), fine sand (62.5 – 250 μm), mud (< 62.5 μm) and Chla = chlorophyll *a*. Note: gravel faction (>2000 μm) not included. B) relative changes in the standard deviations compared with results reported in 2008. Negative values indicate larger variability over the last two years, whereas positive values indicate increased stability.

A)

site	%mud	%fine sand	%medium sand	%coarse sand	%organics	chl*a* μg/g
HBV	1.56	8.81	8.70	2.77	0.88	2.80
HC	2.27	9.03	8.29	1.90	0.69	5.51
Whau	1.42	2.68	1.95	0.24	0.37	2.84
Reef	3.89	4.13	1.63	0.20	0.89	3.07
ShB	2.96	8.34	8.45	1.49	0.32	2.41

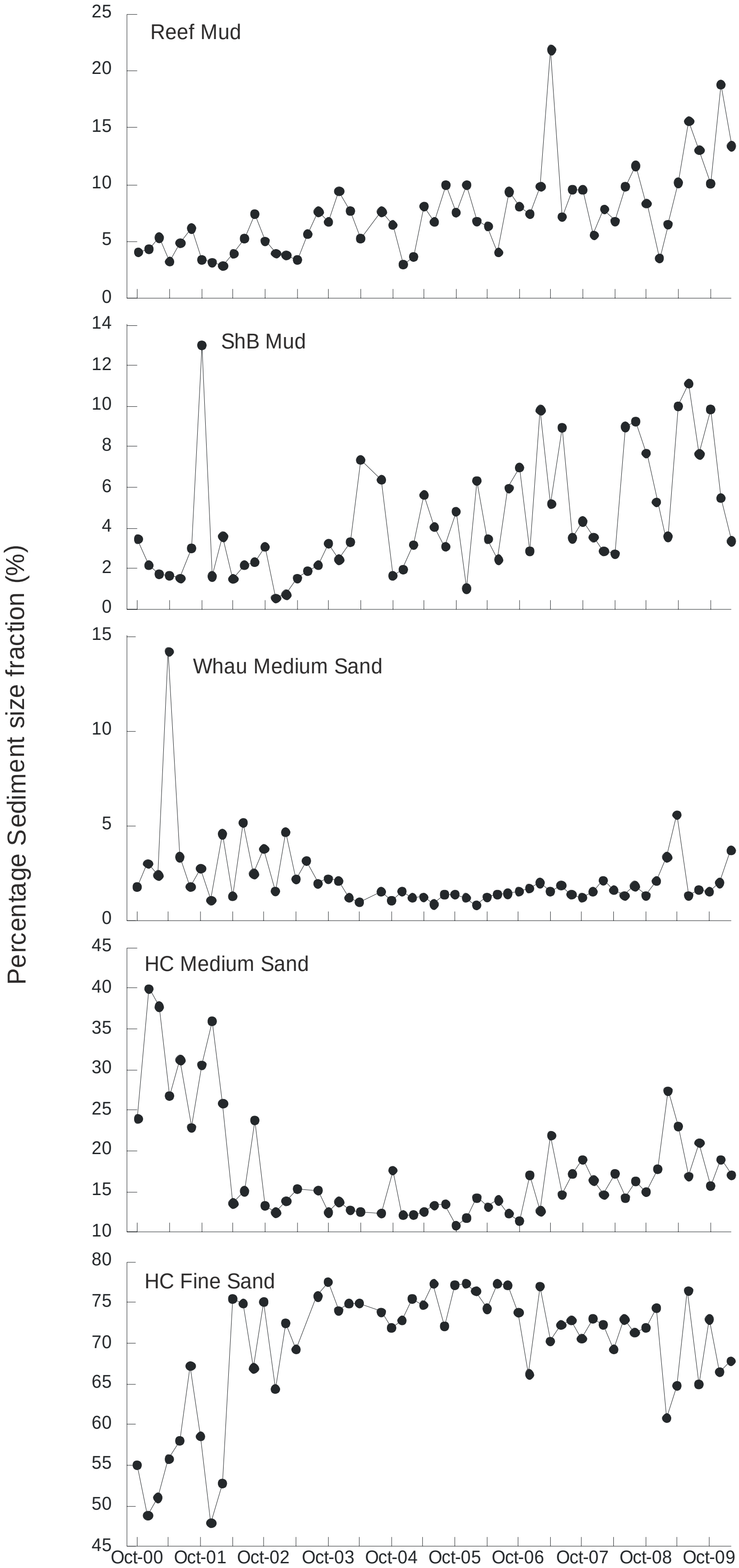
B)

site	%mud	%fine sand	%medium sand	%coarse sand	%organics	chl*a* μg/g
HBV	-0.06	-0.06	-0.49	0.44	-0.10	-0.21
HC	-0.12	-0.94	-0.89	-0.19	-0.08	-0.28
Whau	0.37	0.35	-0.16	0.00	-0.04	-0.02
Reef	0.69	1.02	0.24	0.05	-0.09	-0.15
ShB	0.41	0.18	-0.25	-0.06	0.00	-0.05

The sediment data for HBV and HC have historic trends in several size fractions, but there have been no substantive changes since April 2002. HC now has a marginal increase in the medium sand fraction and a decrease in the fine sand fraction (Figure 3), but the previous trend of increasing mud content (Townsend et al. 2008) is no longer evident. The trends apparent at the Whau site are also driven by the early data, with little change occurring after December 2003. ShB and Reef have shown substantial changes in sediment over time and both have recent increases in the mud fraction (Figure 3). ShB shows an increasing trend in gravel and continues to have a decreasing medium fraction which was noted in the 2008 report (Townsend et al. 2008). The Reef site shows a decreasing trend in the fine fraction.

Figure 3:

Temporal changes in site sediment characteristics. Percentage mud content increasing at the Reef and ShB sites. Recent variability in the medium sand fraction at Whau and relative stability in the medium and fine sand fractions from HC.



5 Are species exhibiting temporal variations?

This section describes patterns observed in species abundances at a site. Three types of patterns are described: trends, seasonal patterns that are similar in timing from year to year; and multiyear patterns. The latter are usually variations in the magnitude of seasonal recruitment, although the description also covers species that have multiyear recruitment patterns.

5.1 Hobsonville (HBV)

The Hobsonville site continues to be dominated by the nut clam *Nucula hartvigiana*, the polychaete *Aonides trifida* and the venerid bivalve *Austrovenus stutchburyi* (Table 4). Prior to December 2006 there had been no change in dominance with *Nucula* consistently the most abundant species. In the last report *Aonides* had exceeded *Nucula* in dominance on two occasions (February and December 2007). Since then, *Aonides* has been the most abundant species on four more occasions including October 2009. The change in dominance is a combination of two factors. Firstly in the last report, *Aonides* was shown to have increasing abundance and abundances are still high although no longer increasing (Table 5, Figure 4). Secondly, abundances of *Nucula* show a multiyear cycle and have decreased to the same level found in the first years of monitoring (Figure 4). On all occasions where *Aonides* was dominant, *Nucula* was the second most abundant species. *Austrovenus* has consistently been the 3rd dominant species at the HBV site. The remaining monitored fauna were usually low in abundance, although *Notoacmea scapha*, *Prionospio aucklandica* and *Paphies australis* were among the abundant taxa on multiple sampling dates (Appendix 10.2).

Table 4:

The three most abundant monitored taxa found over time at HBV.

Date	1st	2nd	3rd
Oct-00	*Nucula*	*Aonides*	*Austrovenus*
Oct-01	*Nucula*	*Aonides*	*Austrovenus*
Oct-02	*Nucula*	*Aonides*	*Austrovenus*
Oct-03	*Nucula*	*Aonides*	*Austrovenus*
Oct-04	*Nucula*	*Aonides*	*Austrovenus*
Oct-05	*Nucula*	*Aonides*	*Notoacmea*
Oct-06	*Nucula*	*Aonides*	*Austrovenus*
Oct-07	*Nucula*	*Aonides*	*Austrovenus*
Oct-08	*Nucula*	*Aonides*	*Austrovenus*
Oct-09	*Aonides*	*Nucula*	*Austrovenus*

Zeacumantus lutulentus show cyclic behaviour (1-2 years) with a series of peak abundances occurring through the time series. These peaks have been increasing in size since August 2004 (Figure 4). *Prionospio aucklandica, Aonides and Nucula* all demonstrate long multi-year cyclic patterns. *Prionospio* has cycles in recruitment which have been seven years apart; with a large recruitment event at the end of summer in 2001 and a more recent event in February 2008 (Figure 4). *Nucula* had an elevation in abundance in 2001, but the cyclic pattern now shows that the population is back to the October 2000 level. *Aonides* also shows behaviour of a long term cycle in abundance (Figure 4). Seasonal patterns with peak abundances during the summer occurred for *Austrovenus* (February), *Exosphaeroma chilensis* (February-April) and *Macroclymenella* (December). Both *Boccardia* and *Colurostylis lemurum* showed cyclic patterns with peak abundances during June-August, and April and August respectively (Figure 4, Table 5). Both of these species show possibilities of an increasing baseline shift occurring from October 2007. *Haminoea zelandiae* used to be rare at HBV prior to December 2005 but is now more frequently seen although in low numbers (Appendix 10.2).

Trends have recently become evident with increases in the populations of several species (Table 5). *Aricidea* sp. shows an upward trend with high numbers since February 2008 with the exception of April 2008 (Figure 4). *Aricidea* also shows seasonal patterns with peak abundances from August to October. *Macroclymenella stewartensis* numbers have increased since August 2007 and remain higher than earlier years in the monitored history with the exception of April-June 2009.

Austrovenus now shows a trend of increasing abundance at HBV (Table 5, Figure 4), however this is mainly driven by the abundance of juveniles <5 mm (Figure 4). The abundance of cockles at this site is high and most similar to the Whau site (Appendix 10.2). *Austrovenus stutchburyi* at the HBV site continues to be dominated by 5-20 mm sized individuals and juveniles are also relatively abundant (<5 mm) (Figures 5 and 6). In the 2006 report, the 5-20 mm size class showed a significant trend of decreased abundance. This trend is no longer apparent due to higher abundances of 5-20 mm sized individuals since February 2009. The rise of intermediate sized Austrovenus may be the result of successful recruitment with high numbers of juveniles recorded between February 2007 and April 2008 (Figure 6).

Macomona liliana at HBV was dominated by adult individuals in similar densities to the Whau and Reef sites (Figure 5 and 6, Appendix 10.2). *Macomona* are less abundant at present relative to before February 2004. There are also cyclic patterns with a high number of larger individuals recorded in October.

The HBV site remains the only monitoring location to consistently support *Paphies australis;* which are predominantly of juvenile and intermediate sizes (Figures 5 and 6). In the 2008 report, the juvenile *Paphies* exhibited a decreasing trend in abundance and the population has remained low since February 2006 (Townsend et al. 2008). A recent increase in juvenile *Paphies* in the past few sampling times (December 2009 and February 2010) may reverse this trend in future years (Figure 5). There is however also an indication of decline in intermediate sized individuals which have been low since April 2008 (Figure 5).

Figure 4:
Temporal patterns in abundances of *Anthopleura aureoradiata*, *Aonides trifida*, *Aricidea sp.*, *Austrovenus stutchburyi*, *Boccardia syrtis*, *Colurostylis lemurum*, *Nucula hartvigiana*, *Paphies australis*, *Prionospio aucklandica* and *Zeacumantus lutulentus* at the HBV site.

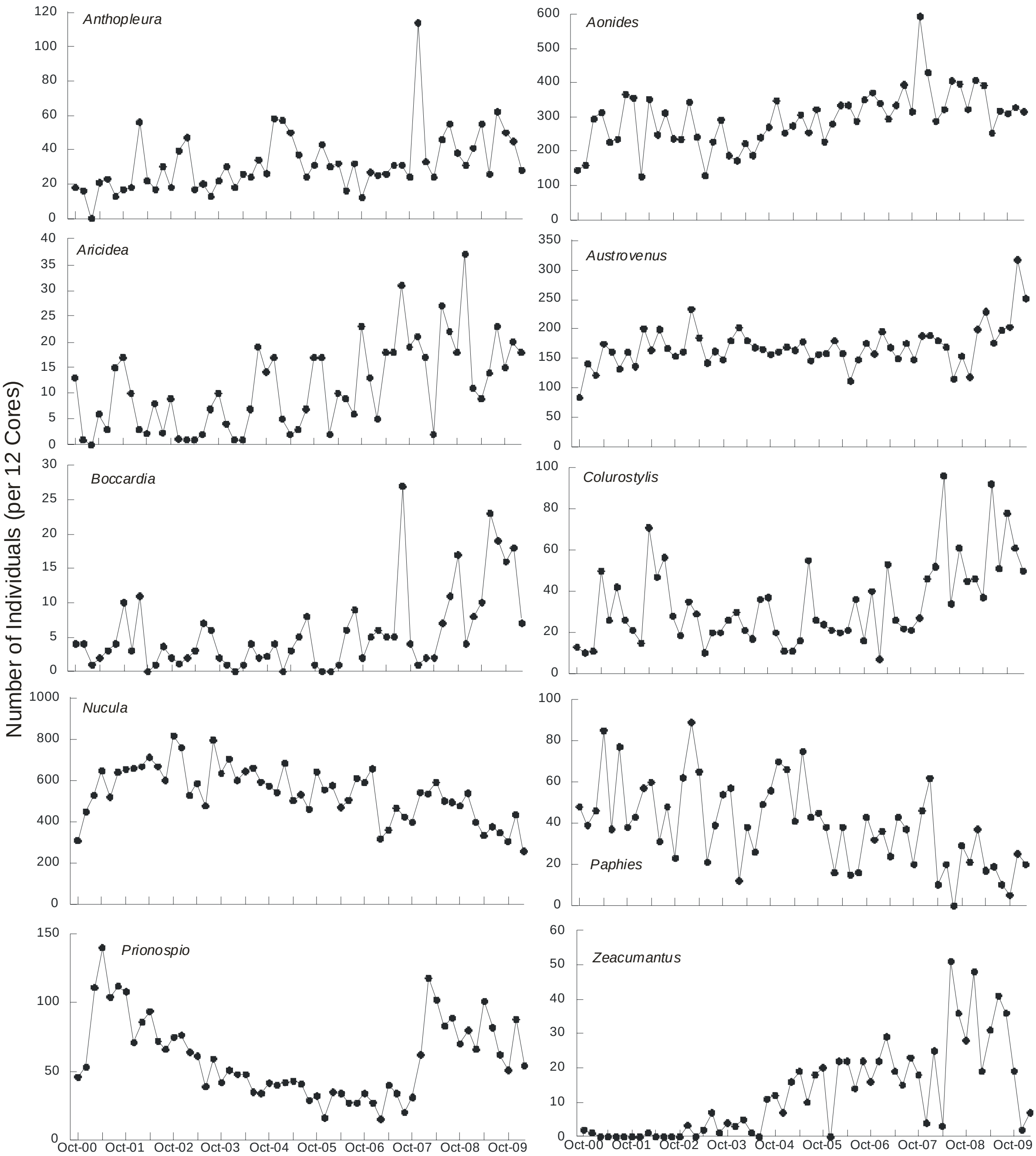


Table 5:

Summary of temporal patterns in abundance of selected taxa observed at each site between October 2000 to February 2010. Hobsonville (HBV), Henderson Creek (HC), Whau River (Whau), Te Tokoroa Reef (Reef) and Shoal Bay (ShB). *temporal pattern suggests trend no longer operating . ** *Boccardia* has a cycle of 5-10 months at Whau.

Site	Seasonal cycles	Greater than annual patterns	Trends	Trend direction
HBV	*Aricidea* *Austrovenus* *Boccardia* *Colurostylis* *Exosphaeroma* *Macroclymenella*	*Colurostylis* *Notoacmea* *Prionospio* *Zeacumantus* *Nucula* *Aonides* *Boccardia* *Colurostylis*	Aricidea *Austrovenus* *Macroclymenella* *Paphies* *Zeacumantus*	Increase Increase Increase Decrease Increase
HC	*Aricidea* *Exosphaeroma* *Macroclymenella* *Notoacmea*	*Austrovenus* *Colurostylis* *Exosphaeroma* *Notoacmea* *Diloma* *Nucula* *Zeacumantus*	*Anthopleura* *Aricidea* *Macroclymenella* *Colurostylis*	Increase Increase Increase Increase
Whau	*Austrovenus* *Boccardia*** *Colurostylis*	*Macroclymenella* *Notoacmea* *Colurostylis*	*Aricidea* *Euchone* *Nucula* *Prionospio* *Zeacumantus*	Decrease* Increase Decrease* Decrease* Increase
Reef	*Arthritica* *Austrovenus* *Euchone* *Haminoea*	*Austrovenus* *Euchone* *Haminoea* *Macroclymenella* *Aricidea* *Boccardia* *Macroclymenella* *Prionospio*	*Heteromastus* *Nucula* *Aricidea* *Macroclymenella* *Prionospio*	Increase Decrease* Increase Increase Increase
ShB	*Austrovenus* *Colurostylis* *Glycera* *Notoacmea* *Nucula*	*Anthopleura* *Aricidea* *Austrovenus* *Euchone* *Boccardia* *Macroclymenella* *Prionospio* *Aricidea*	*Heteromastus* *Macomona* *Nucula* *Aricidea* *Macroclymenella* *Prionospio*	Increase Decrease Decrease* Increase Increase Increase

Figure 5:

Trends in abundance of different size classes of *Austrovenus stutchburyi, Macomona liliana* and *Paphies australis* found at site HBV.

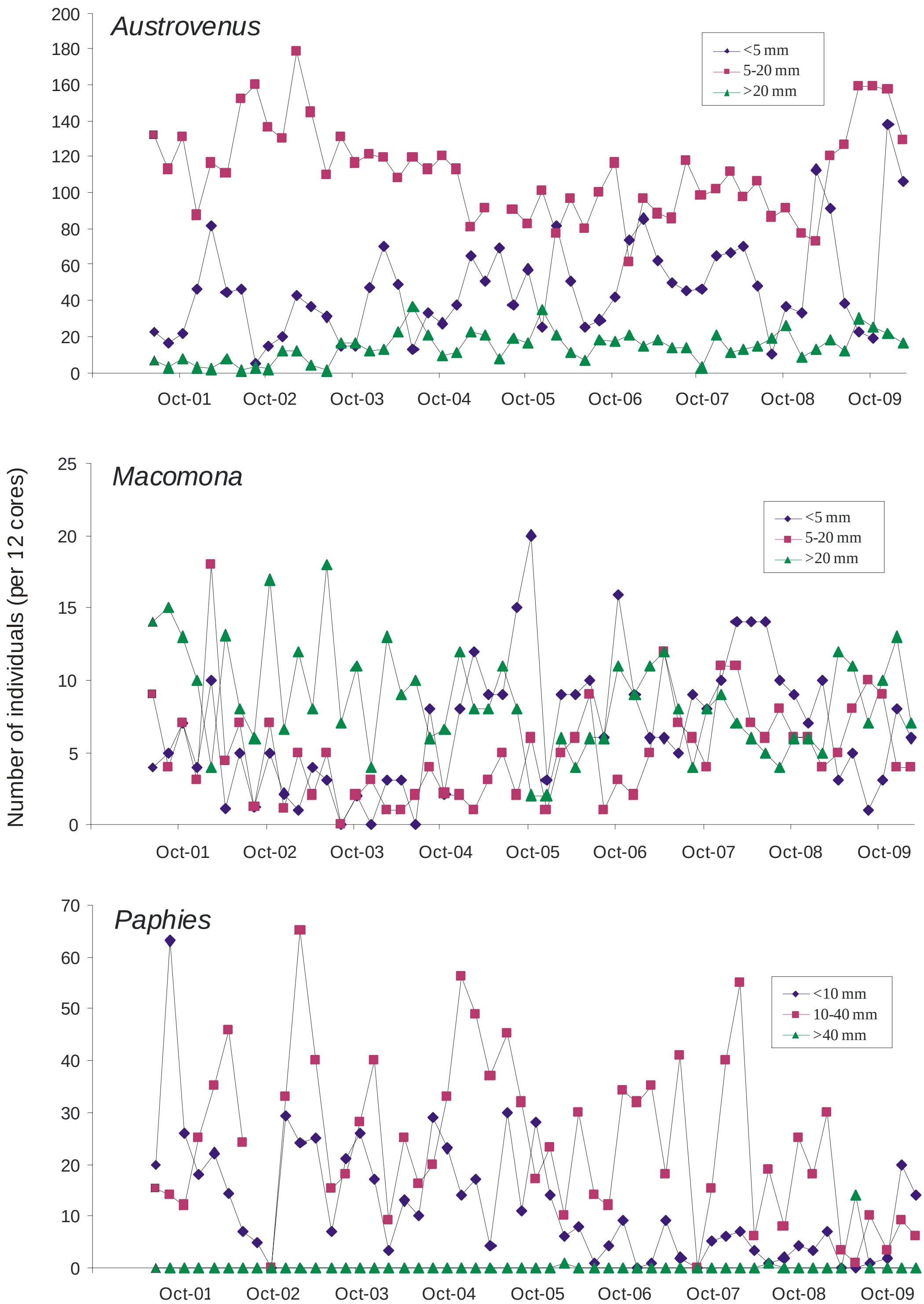


Figure 6:

Size class distributions of *Austrovenus stutchburyi* (red) and wedge shells (*Macomona liliana*) (blue) measured as maximum shell width, at each site in June 2009. Population structures during recruitment periods are generally dominated by juveniles. To give a more general representation of population structure, this graph is based on June, typically a month when juvenile recruitment is low or absent.

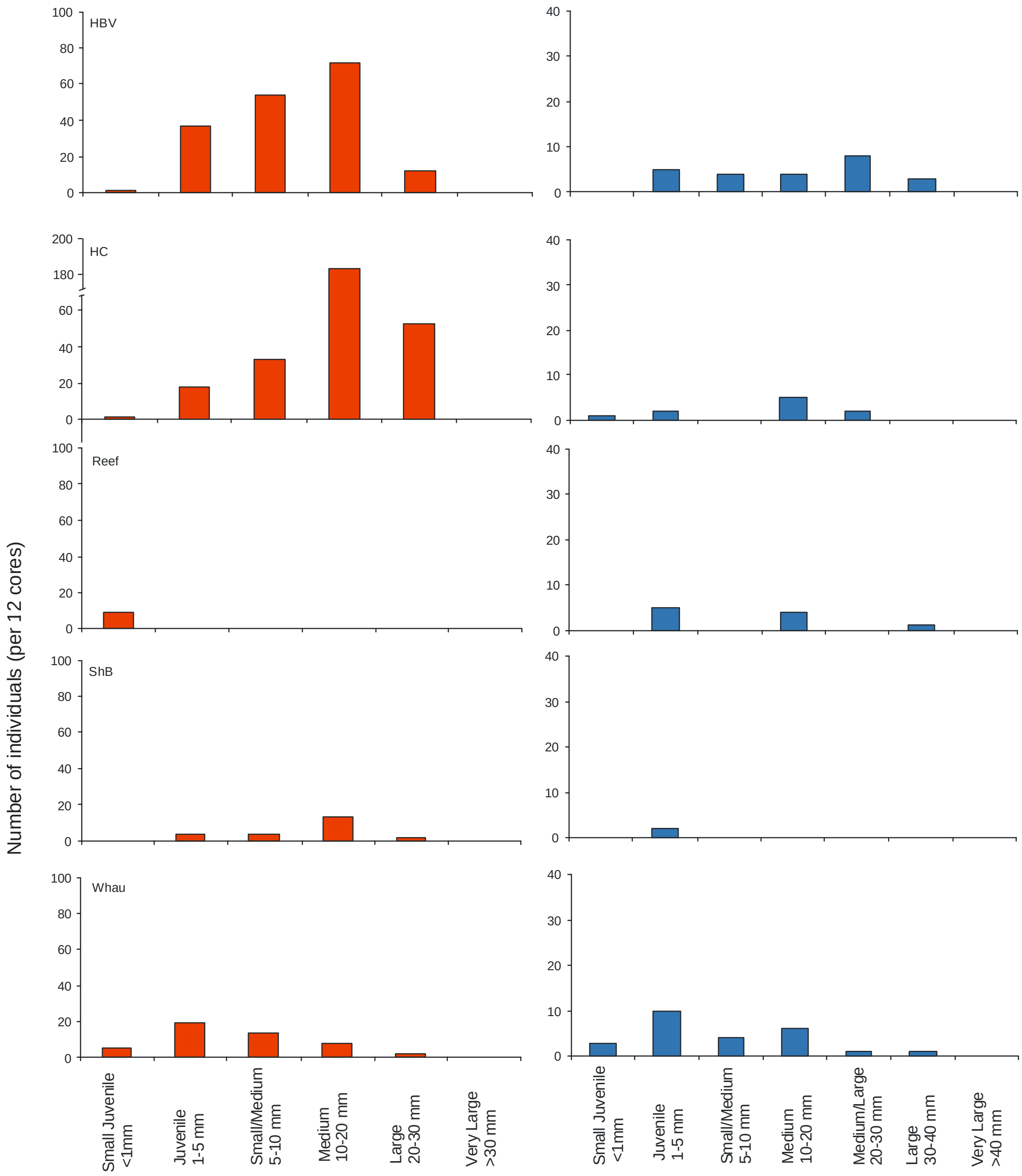
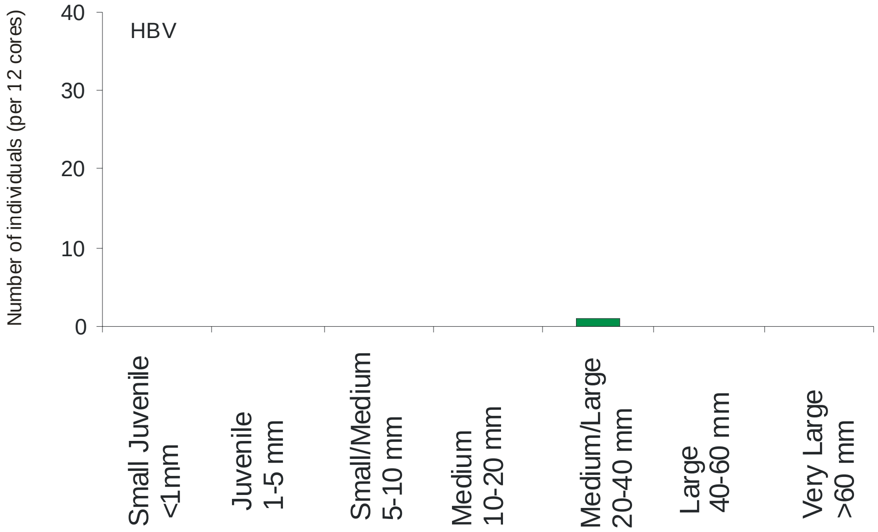


Figure 6 (Cont.)
Size class distributions of *Paphies australis* at Hobsonville measured as maximum shell width. HBV is the only site to consistently support *Paphies*.



5.2 Henderson Creek (HC)

Nucula hartvigiana continues to be the most dominant species at HC (Table 6), attaining high densities (typically >1000 for the sum of 12 cores). *Austrovenus stutchburyi* has been consistently overtaken by *Aricidea* sp. as the second most dominant species since August 2007. This is due to an increasing trend in the population of *Aricidea* and a marginal decrease in the total *Austrovenus* population (although recent October 2009-February 2010 numbers have been high, Figure 7). Other common species included *Notoacmea scapha*, *Prionospio aucklandica*, *Anthopleura aureoradiata* and *Colurostylis lemurum* (Appendix 10.2).

Table 6:
The three most abundant monitored taxa found over time at HC.

Date	1st	2nd	3rd
Oct-00	*Nucula*	*Austrovenus*	*Notoacmea*
Oct-01	*Nucula*	*Austrovenus*	*Aricidea*
Oct-02	*Nucula*	*Austrovenus*	*Aricidea*
Oct-03	*Nucula*	*Austrovenus*	*Notoacmea*
Oct-04	*Nucula*	*Austrovenus*	*Notoacmea*
Oct-05	*Nucula*	*Austrovenus*	*Aricidea*
Oct-06	*Nucula*	*Aricidea*	*Austrovenus*
Oct-07	*Nucula*	*Aricidea*	*Austrovenus*
Oct-08	*Nucula*	*Aricidea*	*Austrovenus*
Oct-09	*Nucula*	*Aricidea*	*Austrovenus*

Seasonal cycles were observed in *Exosphaeroma* and *Macroclymenella* populations which all had peak in abundances during the summer (December-February) (Figure 7, Table 5). *Exosphaeroma* has also shown a multi-year behaviour with abundance patterns showing 3 year cyclic patterns (Figure 7). *Macroclymenella* also has a cyclic pattern with increasing peak sizes and a new maximum abundance reached in December 2008. *Zeacumantus lutulentus* exhibits strong signs of a multi-year cycle in abundance, with alternating periods of low abundance and sharp rises (Figure 7). *Colurostylis lemurum* also has cyclic behaviour and there is the indication of an increasing shift in baseline from 2007 (Figure 7). Greater than annual patterns were seen in *Austrovenus*, *Notoacmea*, *Nucula* and *Diloma subrostrata* which showed variation in peak size and differential recruitment success from year to year (Table 5). Peaks in *Diloma* abundance occurred every 10 to 15 months. In 2008 there was an indication of a marginal increase in *Aricidea*, and this now shows an upward and significant trend (Figure 7). An increasing trend is now apparent for *Anthopleura aureoradiata* (Figure 7).

All size classes of Austrovenus show multi-year cycles in abundance with the peaks in juvenile (<5 mm) abundance being high since December 2005. *Macomona liliana* has lower abundance at the HC site compared to all other monitoring sites. The juvenile size-class (<5 mm) has high variability similar to that observed in the Manukau Harbour, with a recent increasing trend in abundance driven by the higher numbers between October 2007 to 2008. No trends were apparent in the intermediate (5-20 mm) or adult (> 20 mm) size classes.

Figure 7:

Temporal patterns in abundances of *Anthopleura aureoradiata*, *Aricidea* sp., *Colurostylis lemurum, Exosphaeroma chilensis, Macroclymenella stewartensis*, *Zeacumantus lutulentus and Notoacmea scapha* at the HC site.

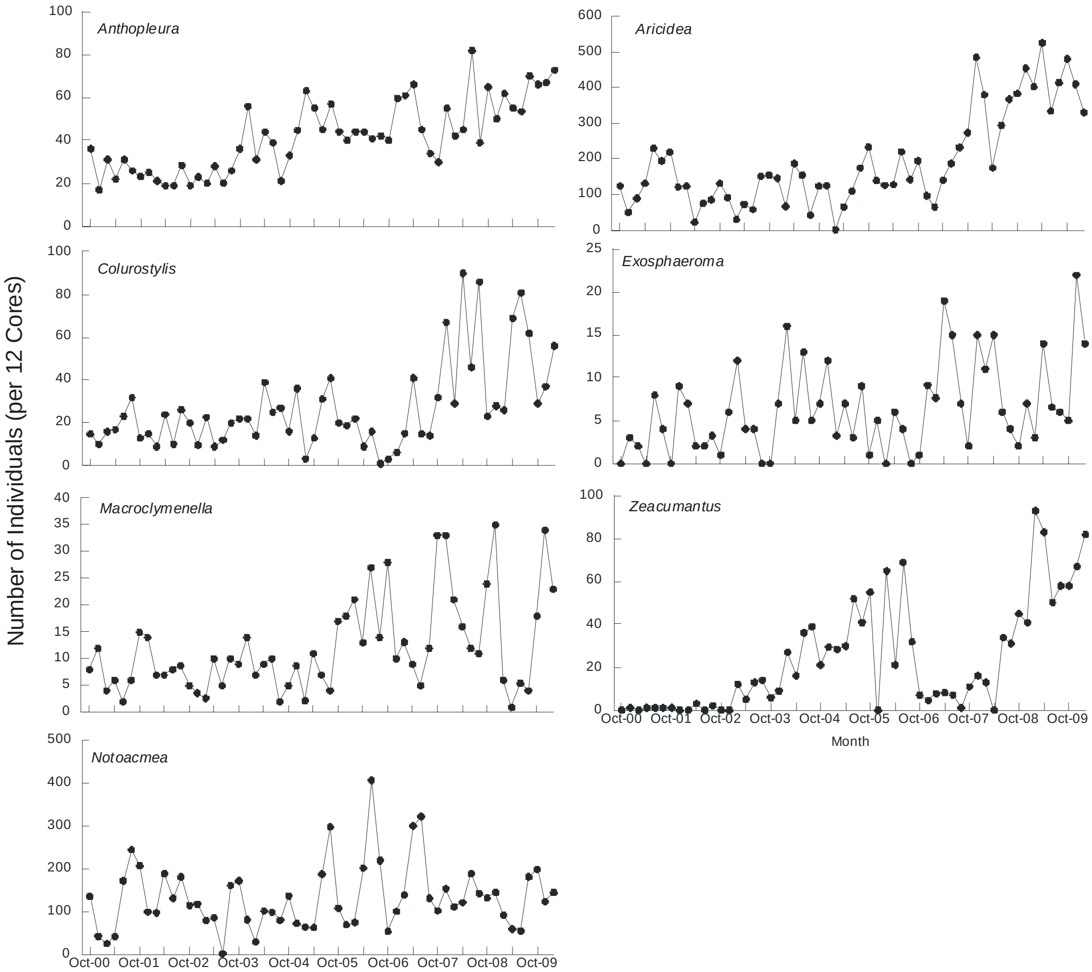
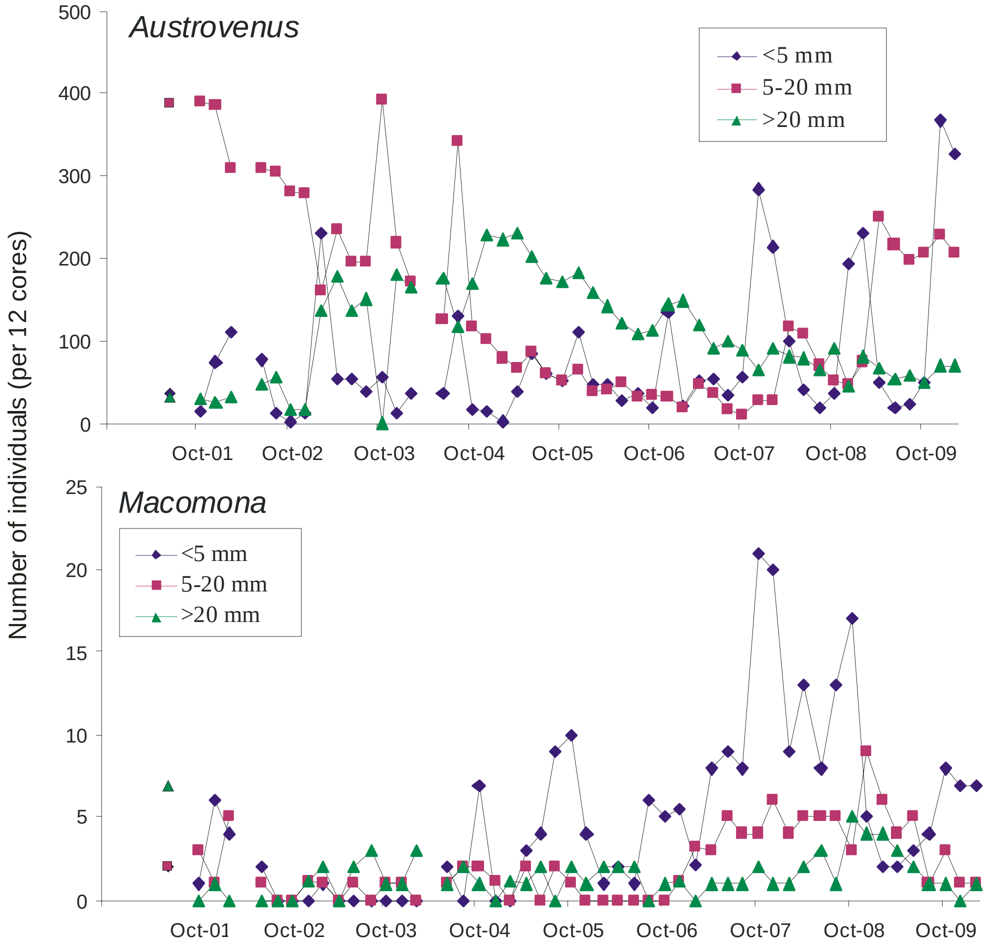


Figure 8:

Trends in abundance of different size classes of *Austrovenus stutchburyi* and *Macomona liliana* found at HC.



5.3 Whau River (Whau)

Nucula hartvigiana continues to be a dominant species at the Whau site, although whether it is the most dominant species varies with year (Table 7) and season (frequently being the dominant from December to August). *Aricidea* sp. has also consistently been in the top few dominant species at this site. Other species of higher abundance at this site include *Austrovenus stutchburyi*, *Colurostylis lemurum*, *Macroclymenella stewartensis, Notoacmea scapha* and *Macomona liliana* (Appendix 10.2).

Table 7:

The three most abundant monitored taxa found over time at Whau.

Date	1st	2nd	3rd
Oct-00	*Nucula*	*Aricidea*	*Austrovenus*
Oct-01	*Nucula*	*Aricidea*	*Austrovenus*
Oct-02	*Nucula*	*Aricidea*	*Austrovenus*
Oct-03	*Nucula*	*Austrovenus*	*Aricidea*
Oct-04	*Aricidea*	*Nucula*	*Macroclymenella*
Oct-05	*Nucula*	*Aricidea*	*Macroclymenella*
Oct-06	*Nucula*	*Aricidea*	*Macroclymenella*
Oct-07	*Nucula*	*Aricidea*	*Austrovenus*
Oct-08	*Austrovenus*	*Nucula*	*Aricidea*
Oct-09	*Austrovenus*	*Nucula*	*Aricidea*

Trends of decreasing abundances were reported for *Anthopleura aureoradiata*, *Aricidea sp.*, *Prionospio aucklandica, Nucula* and *Notoacmea* in 2008 (Townsend et al. 2008). These declines were historic, driven by high values prior to February 2004, with all species remaining relatively unchanged in abundance after this point. Of these species, the temporal pattern in abundance of *Anthopleura* suggests a long multi-year cycle (Figure 9) and *Notoacmea* has shown cyclic behaviour with high abundances and variability recently (peak abundances in December 2006, December 2008). Seasonal patterns can be still be seen for *Colurostylis* which has a peak abundance in June (Figure 9) and *Austrovenus* which peaks between December and February (Figure 9 and 10, Table 5). *Macroclymenella* shows a cyclic pattern of abundance (1-2 year cycle) and an increase trend in abundance peak height. *Boccardia syrtis* shows peaks in recruitment on a multi-year cycle occurring five to ten months apart (Table 5). *Euchone* sp, which was rare at Whau until October 2005, continues to be more abundant and more commonly found. A new trend is the increase in *Zeacumantus lutulentus* at Whau, which has had a higher abundance since February 2008.

Bivalve populations have been variable over time at the Whau site. The total *Austrovenus* population does not show an overall trend in abundance over the monitored time series due to the juvenile size class (<5 mm), which exhibits large and variable annual recruitment. However, both the intermediate (5-20 mm) and adult (>20 mm) size classes showed significant trends of declining abundance in the first 4 years of monitoring and have remained low since this time. *Macomona* exhibits multi-year cycles in the abundance of juveniles (<5 mm), intermediates (5-20 mm) and consistently low adult densities.

Figure 9:

Temporal patterns in abundances of *Anthopleura aureoradiata, Colurostylis lemurum, Heteromastus filiformis, Macroclymenella stewartensis, Notoacmea scapha*, and *Nucula hartvigiana* at the Whau site.

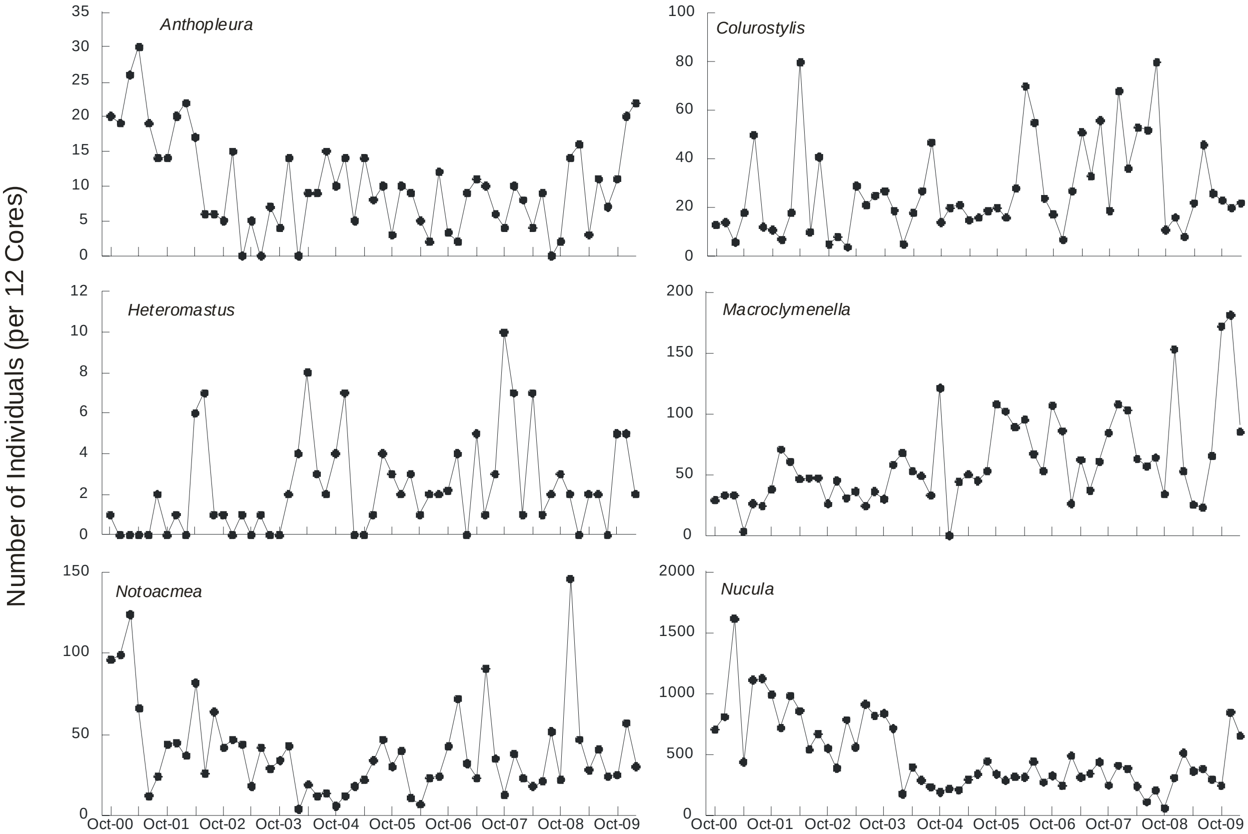
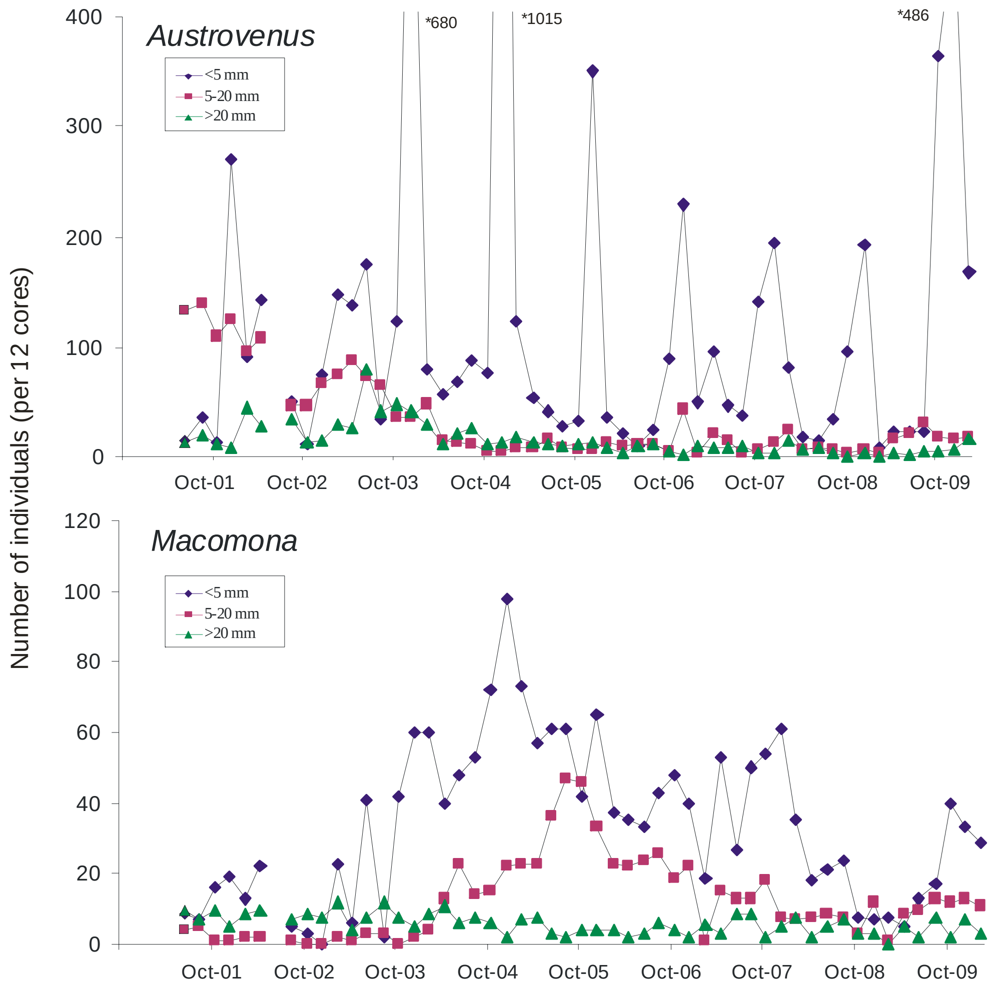


Figure 10.
Trends in abundance of different size classes of *Austrovenus stutchburyi* and *Macomona liliana* found at Whau.



5.4 Te Tokoroa Reef (Reef)

The species dominance at the Reef site has changed multiple times since monitoring began (Table 8). Initially *Nucula hartvigiana* was the dominant species, but its abundance declined dramatically and has remained low since April 2004 (Figure 11). *Heteromastus filiformis* has increased in abundance since February 2003 and has now been the dominant species for the last 5 years (Table 8). *Boccardia syrtis* has also been of importance recently, being the second most abundant species in October 2009 (Table 8) and the most abundant species in June and August 2009. Other dominant species at this site include *Euchone* sp., which dominated from October 2003-04, *Prionospio aucklandica* which has been the second most dominant species on multiple occasions (although not in October) and *Aricidea* sp. which has consistently been either the third or fourth dominant species. *Austrovenus stutchburyi, Macomona liliana* and *Zeacumantus lutulentus* have all been relatively common. However other monitored species, *Anthopleura aureoradiata*, *Aonides trifida, Diloma subrostrata*, *Exosphaeroma chilensis*, *Notoacmea scapha* and *Paphies australis* are rarely found at the Reef site (Appendix 10.2).

Table 8:

The three most abundant monitored taxa found over time at Reef.

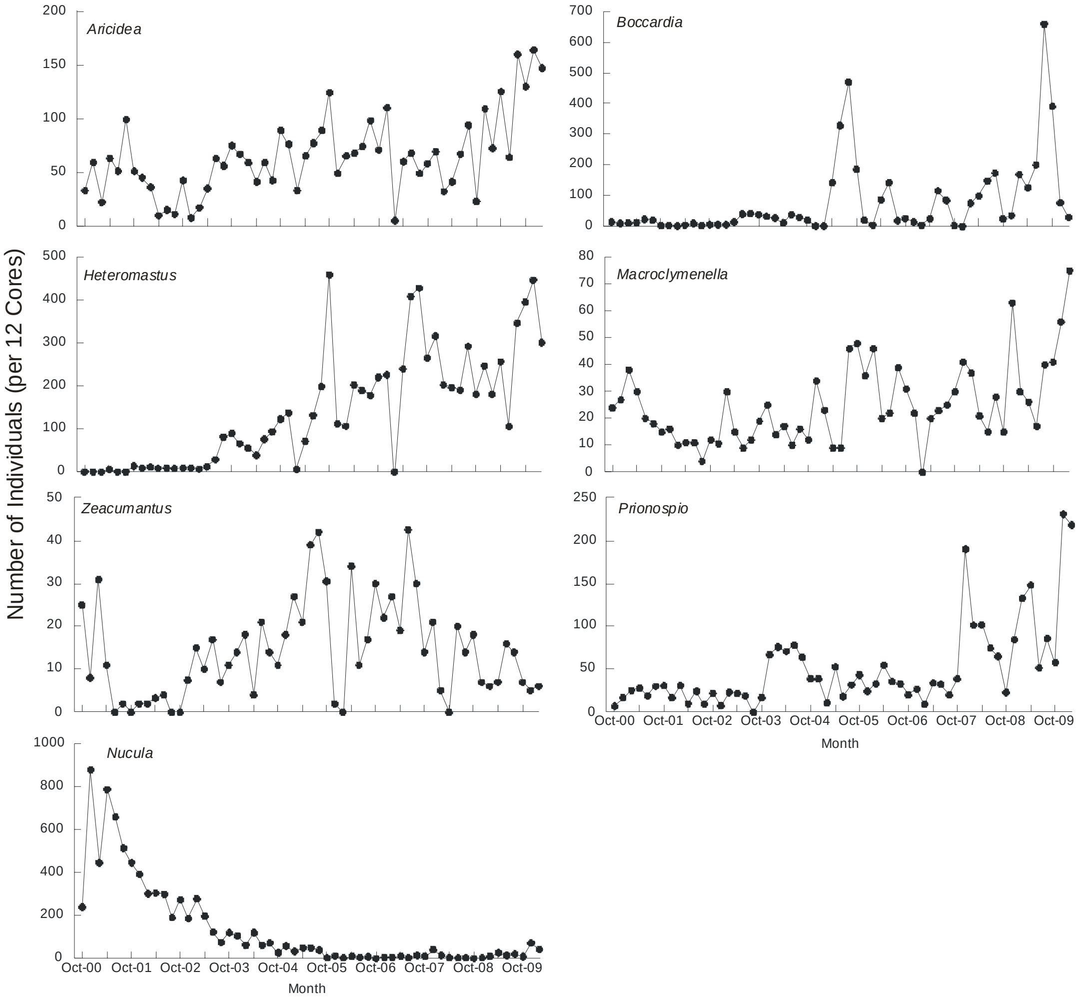
Date	1st	2nd	3rd
Oct-00	*Nucula*	*Euchone*	*Aricidea*
Oct-01	*Nucula*	*Euchone*	*Aricidea*
Oct-02	*Nucula*	*Euchone*	*Aricidea*
Oct-03	*Euchone*	*Austrovenus*	*Nucula*
Oct-04	*Euchone*	*Heteromastus*	*Aricidea*
Oct-05	*Heteromastus*	*Euchone*	*Boccardia*
Oct-06	*Heteromastus*	*Euchone*	*Aricidea*
Oct-07	*Heteromastus*	*Euchone*	*Aricidea*
Oct-08	*Heteromastus*	*Euchone*	*Boccardia*
Oct-09	*Heteromastus*	*Boccardia*	*Aricidea*

Zeacumantus, Aricidea, *Boccardia*, *Macroclymenella, Heteromastus* and *Prionospio* all show abundance patterns of cyclic behaviour (Figure 11, Appendix 10.2). All species have shown recently high peaks with higher abundances after February 2008 (Figure 11, Table 5). Seasonal cycles in abundance are evident for *Austrovenus, Haminoea,* and *Arthritica bifurca*; which all peaked during the summer months, usually between December and February (Figure 11, Table 5). *Euchone* also demonstrated a seasonal pattern with peak abundance between June and August. Greater than seasonal cycles were also seen for *Austrovenus, Haminoea* and *Euchone* which differed in recruitment success from year to year (Table 5). Across the time series *Heteromastus* shows an increasing trend starting from 2003, with cyclic peaks (every 2 years) in abundance.

Some trends are also apparent, with the polychaetes (*Aricidea, Boccardia Macroclymenella* and *Prionospio*) all showing increases. These have been increasing in peal abundance or both peak abundance and base line shifts since around 2004.

Figure 11:

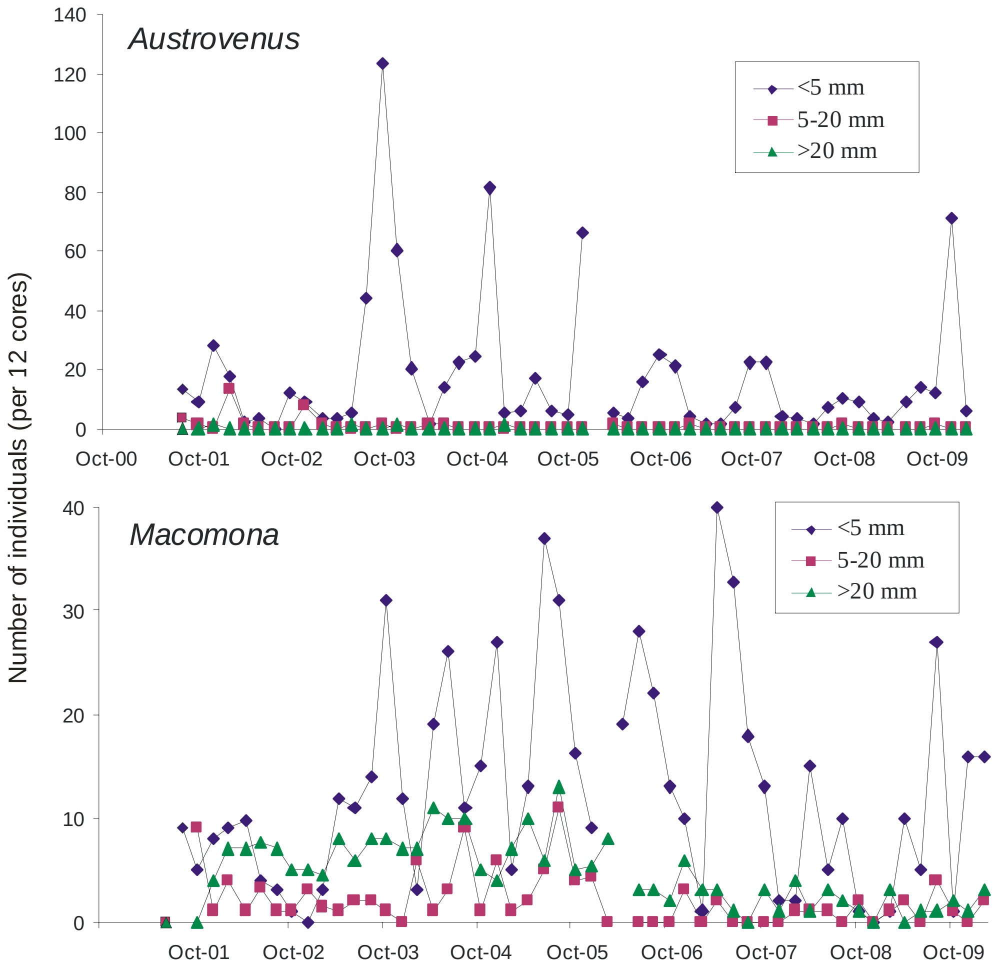
Temporal patterns in abundance of *Aricidea* sp., *Boccardia syrtis, Heteromastus filiformis, Macroclymenella stewartensis, Nucula hartvigiana Prionospio aucklandica*, and *Zeacumantus lutulentus* at the Reef site.



Austrovenus abundances at Reef are the lowest of all the Central Waitemata Harbour monitoring sites. Abundances are predominantly comprised of juveniles which exhibit cyclic patterns in recruitment, with adults absent and intermediate individuals rare across the whole time series (Figure 12). All *Macomona* size-classes are found at the Reef and densities are typical of those of the other monitoring sites (Figure 6). The population is dominated by the juvenile size-class (< 5 mm) which displays large recruitment peaks (Figure 12). However, both intermediate (5 – 20 mm) and adult (>20 mm) size classes show notable shifts to lower abundances around April 2005 (Figure 12).

Figure 12:

Trends in abundance of different size classes of *Austrovenus stutchburyi* and *Macomona liliana* found at Reef.



5.5 Shoal Bay (ShB)

Since October 2005 the species dominance at the Shoal Bay site has been variable (Table 9). Prior to this, the site was dominated by *Nucula hartvigiana*, but this species has declined in numbers and now remains low. Recently *Boccardia syrtis* has been an abundant species and was the highest ranked species on every sampling occasion from February 2009 to 2010. Other species have been variable in abundance, with five different species ranking second in dominance in the past year (*Prionospio aucklandica, Nucula, Aricidea sp., Austrovenus stutchburyi* and *Heteromastus filiformis*)(Appendix 10.2). Both *Aricidea* and *Notoacmea scapha* have been abundant and important species throughout the monitoring period. Other common species include *Aonides trifida*, *Colurostylis lemurum* and Euchone sp. at this site (Appendix 10.2).

Table 9:

The three most abundant monitored taxa found over time at ShB.

Date	1st	2nd	3rd
Oct-00	*Nucula*	*Notoacmea*	*Boccardia*
Oct-01	*Nucula*	*Notoacmea*	*Aricidea*
Oct-02	*Nucula*	*Notoacmea*	*Aricidea*
Oct-03	*Nucula*	*Notoacmea*	*Aricidea*
Oct-04	*Nucula*	*Notoacmea*	*Euchone*
Oct-05	*Notoacmea*	*Boccardia*	*Euchone*
Oct-06	*Nucula*	*Notoacmea*	*Boccardia*
Oct-07	*Notoacmea*	*Boccardia*	*Euchone*
Oct-08	*Aricidea*	*Boccardia*	*Heteromastus*
Oct-09	*Boccardia*	*Aricidea*	*Heteromastus*

Notoacmea, *Nucula*, *Colurostylis*, *Glycera* spp. and *Austrovenus* all continue to show seasonal patterns in abundances at ShB (Figure 13, Table 5). The peak abundances in *Notoacmea* occurred in winter (August) and of *Nucula* in April. *Glycera, Colurostylis*, *Austrovenus* have all had peak abundances in summer. Greater than annual cycles were seen in *Aricidea*, *Anthopleura*, *Euchone* and *Austrovenus* primarily reflecting variation in recruitment success from year to year or less frequent recruitment (Table 5). *Macroclymenella stewartensis, Prionospio, Boccardia* and *Aricidea* all show cyclic peaks in abundance but with peaks in the last two years being extremely high (Figure 13). Increased abundances of *Macroclymenella* and *Boccardia* support observations of increased tube worms (see section 4.1.5). The increase in the population of *Heteromastus* is still apparent at the ShB site (Townsend et al. 2008). The decreasing trend in *Nucula* is also still noticeable with this species found in lower densities since around October 2004. However, the *abundance of Nucula* has been relatively stable over the last three years (Figure 13). The density of *Austrovenus* is relatively low at ShB site (Figure 14) and adults are rare. The juvenile size-class (<5 mm) displays the characteristic pattern of large annual peak in recruitment, but no overall trend. There are signs of a multi-year cycle in the intermediate size-class. Adult *Macomona* continue to show a decreasing trend in abundance at ShB, due to higher abundance prior to June 06 and rarity since. A similar pattern is seen for the intermediate size category although this is less pronounced. Overall *Macomona* has a decreasing trend in total abundance.

Figure 13:

Trends in abundance of *Aricidea* sp., *Boccardia syrtis*, *Heteromastus filiformis*, *Macomona liliana*, *Macroclymenella stewartensis*, *Notoacmea scapha*, *Nucula hartvigiana*, *Prionospio aucklandica*, and *Zeacumantus lutulentus* at the ShB site.

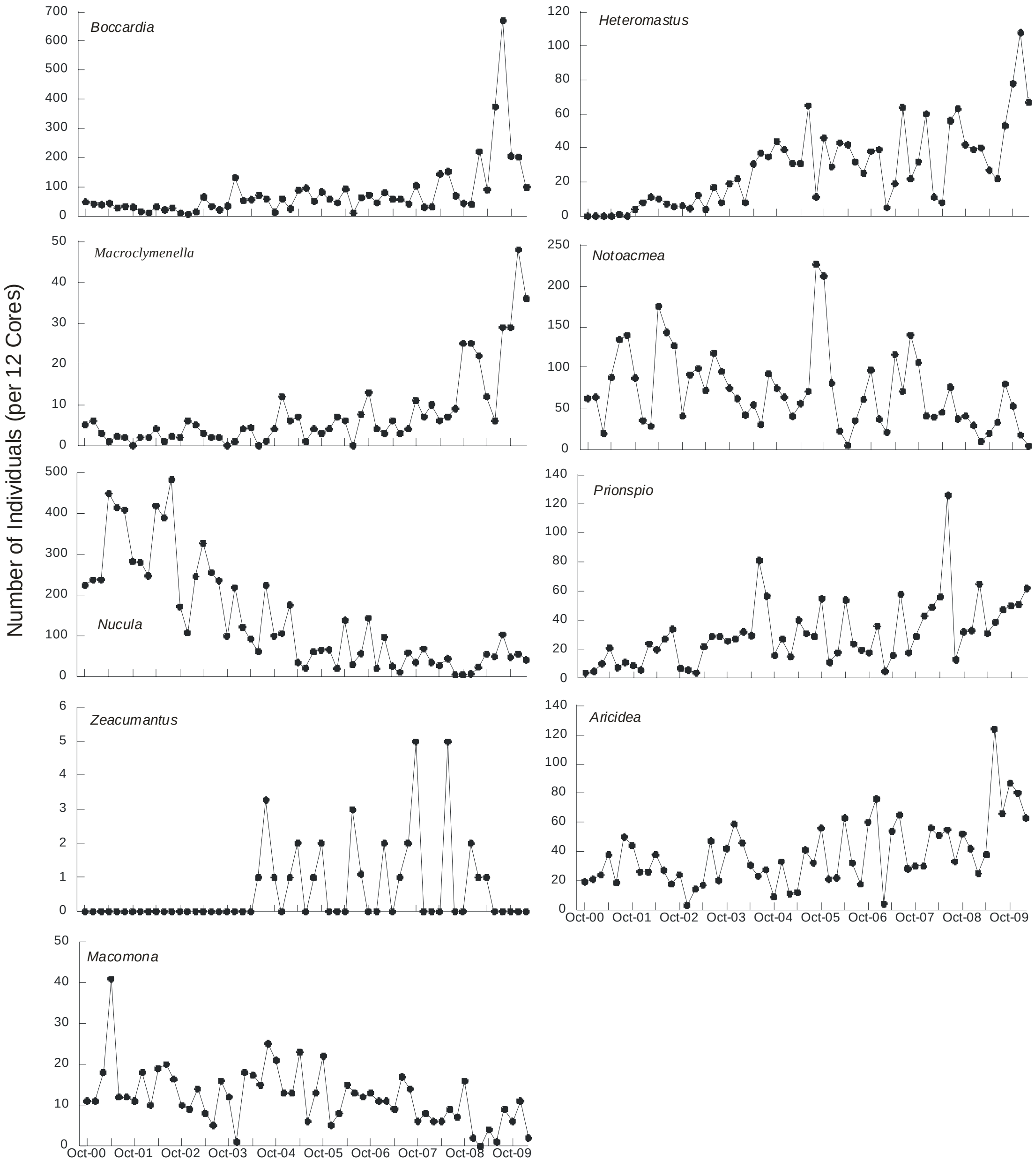
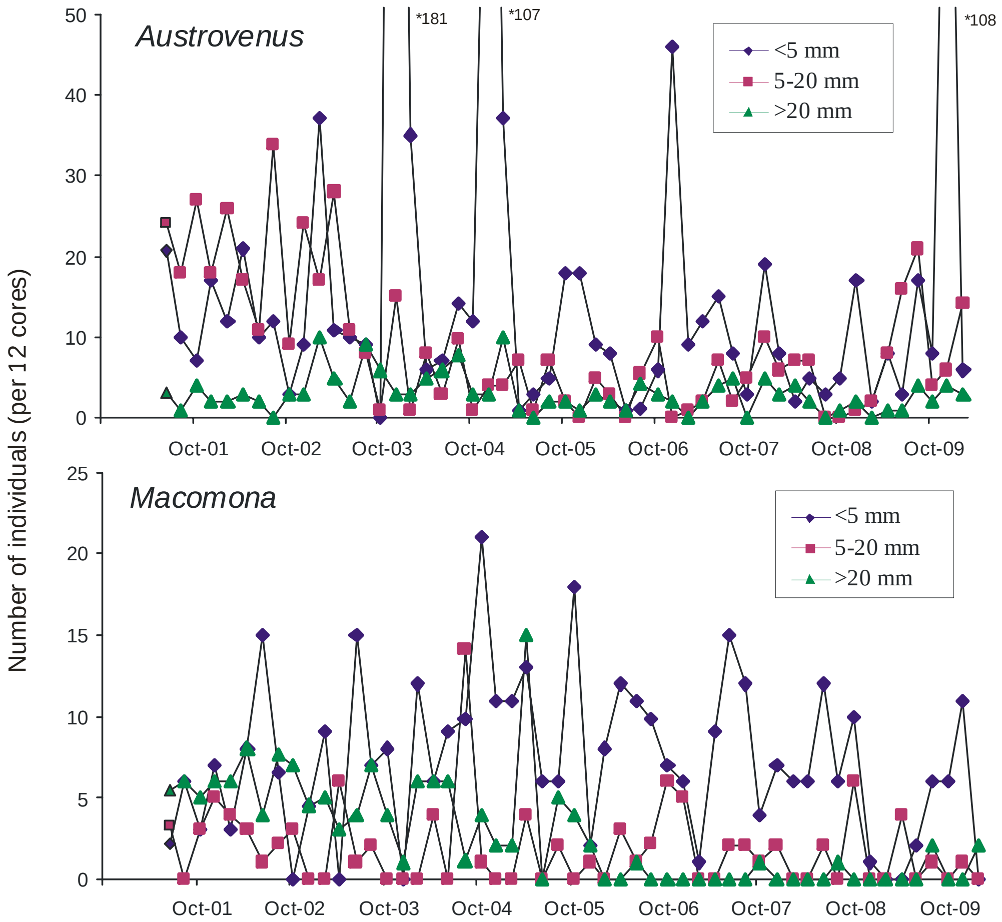


Figure 14:

Trends in abundance of different size classes of *Austrovenus stutchburyi* and *Macomona liliana* found over time at ShB.



5.6 Are species abundances exhibiting similar patterns at all sites?

There were some consistent trends in the abundance of species, and types of species, across multiple sites in the Waitemata Harbour. There was a noticeable decline in bivalve populations with *Nucula hartvigiana* decreasing at Reef and ShB (and historically at Whau), *Paphies australis* decreasing at HBV and *Macomona liliana* decreasing at ShB. The exception to this was the increase in *Austrovenus stutchburyi* at HBV due to successful recruitment. There was also an increase in silt-tolerant polychaetes which was most noticeable at the ShB and Reef sites which are showing increases in mud content. At these sites *Heteromastus filiformis*, *Macroclymenella stewartensis*, *Boccardia syrtis, Prionospio aucklandica* and *Aricidea* sp. all had recently high abundances. In terms of sensitivity to sedimentation, these species have all been ranked as having a preference for silty sediment with a tolerance for higher suspended sediment concentration (Gibbs and Hewitt 2004). *Aricidea* was found to be increasing in abundance at all sites and *Macroclymenella* at all except Whau. This suggests that for these species the recruitment across the harbour as a whole has been successful and that conditions are favourable. The increase in the populations of polychaetes, particularly at ShB and Reef, may have been facilitated by the low number of bivalves. For example, Whitlatch et al. (1997) experimentally demonstrated that *Austrovenus* density negatively affects a polychaete species (*Microspio maori*) although simultaneously promoting other species. Also *Macomona* has been shown to have a negative impact on community members (Thrush 1994, 2000). Gadd et al. (in draft) found that both *Aricidea* and *Heteromastus* were common species in non-cockle communities. Lower *Nucula* and *Macomona* populations and reduction in adult *Austrovenus* may reduce the level of sediment disturbance and thus facilitate these polychaetes. *Anthopleura aureoradiata* abundances have increased at HC with recent high abundances at HBV. Both these sites have large quantities of attachment substrate: HBV has had an increase in intermediate sized *Austrovenus* since early 2009 and the shell hash ridge has been increasing in size (*pers. obs.*). Additionally, the declining adult and intermediate *Paphies* population may actually facilitate *Anthopleura*, if the decline results in more *Paphies* shell hash to attach to. HC has the largest *Austrovenus* population of the monitoring sites and area is covered with shell hash, suggesting that *Anthopleura* is not space limited and that favourable conditions may allow this species to increase.

5.7 Have any changes over time led to communities, or sites becoming more or less similar to each other?

5.7.1 Changes in communities

The changes in multiple species at some sites since October 2006 (Figures 5, 7, 9, 11 and 13) are reflected in the community multivariate ordination which indicates changes in the community structure in the last three years. Despite this, all sites remain distinct from one another. HC and HBV have shown the lowest variability. Variability in composition was higher at Whau (Figure 15), primarily driven by cyclic patterns in *Boccardia* abundance, but no long term change in composition occurred. The Benthic

Health Model found the community change at these three sites, associated with the changing mud content, to be small between the months of October 2000 and 2009 and below the detection limits of the model (<1%, 1.7% and 2.8% for Whau, HC and HBV respectively) (Figure 16). However, long-term changes were apparent for Reef and ShB, with the ordination showing directional shifts; moving away from the other three sites. A 4th root ordination reduced some changes driven by variable abundances, however Reef and ShB still obviously track away from the other sites (Figure 17). The changes in community composition at ShB and Reef over the last few years relate well to changes in sediment mud content and rank cover of Zostera (Cap analysis, Figure 18). CAP analysis found a correlation of 0.89 and 0.38 respectively (m=8) for eigen values 1 and 2. This was also demonstrated by the BHM (Figure 16) which showed substantial changes in the community associate with increasing mud content (19% and 26% for ShB and Reef respectively).

Other community changes, although not of the monitored species, have seen a new invasive species arriving in the Central Waitemata Harbour and New Zealand (Townsend et al. accepted). In April 2009 two empty shells of the Australian dog whelk, *Nassarius* (*Plicarcularia*) *burchardi* (Dunker in Philippi, 1849) were found in the Central Waitemata Harbour. In June 2009 the first confirmed specimen was found at the HC site, and then found at other monitoring sites during the year: Whau (August), Reef (December) and ShB (December). Future sampling will indicate whether this species establishes in the harbour or if the current records represent a recruitment event with a sink population. This species is of interest as it is functionally similar to the commonly occurring *Cominella glandiformis*; which it may compete with for resources. The additional concern is that it may increase the predation pressure and have negative impacts on bivalve species such as *Austrovenus stutchburyi* and *Paphies australis* which it has been observed feeding on (M. Morley *pers. com.*). As there is no common nassariid counterpart in New Zealand the impact of *N. burchardi* remains to be determined, but continued monitoring will observe many of the species it may affect.

Figure 15.

MDS ordination using Bray-Curtis similarity on the raw data of the monitored species from October data 2000-2009 of the five sites (HBV, HC, Reef, Whau and ShB). MDS stress value 0.11.

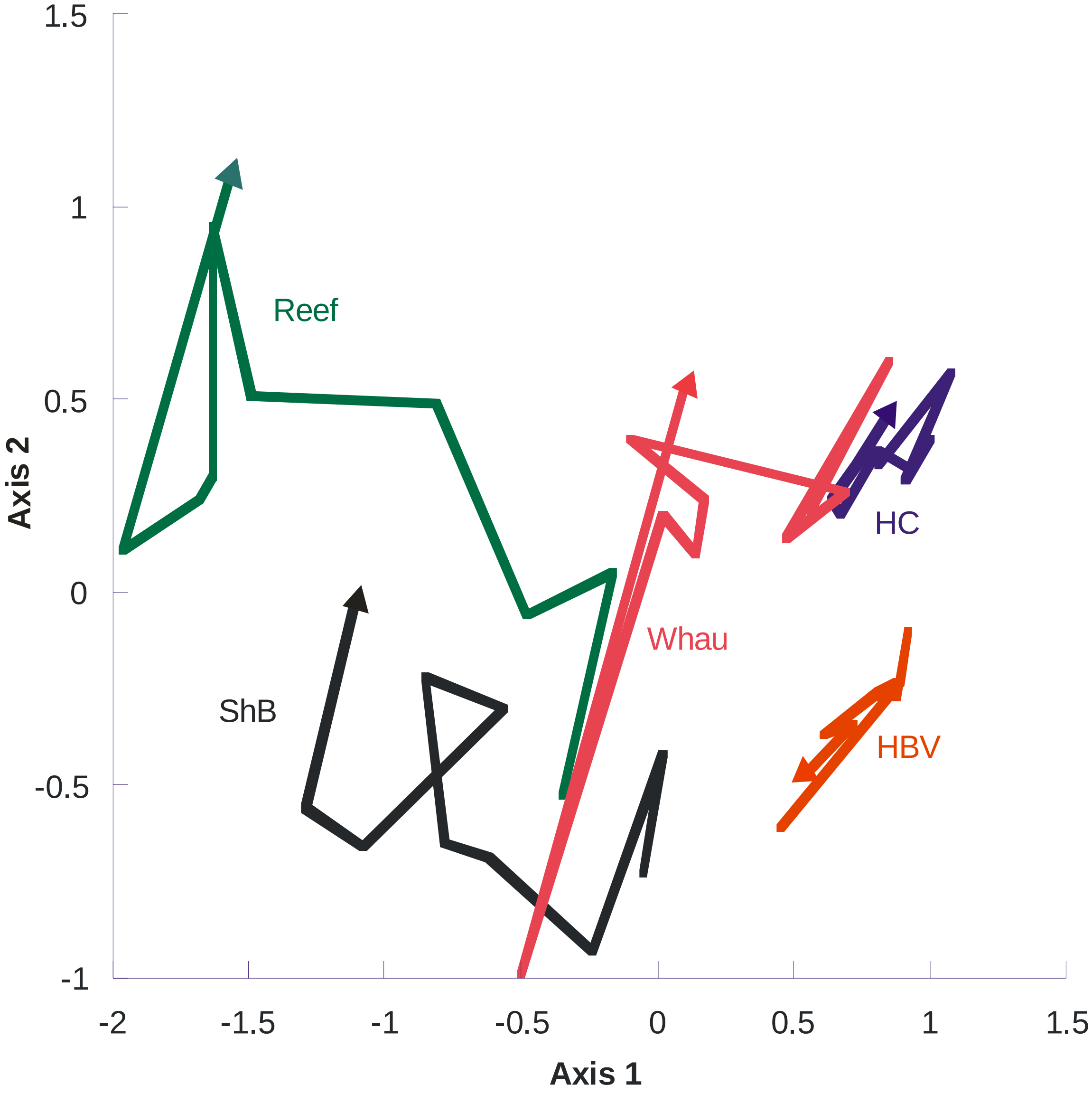


Figure 16

From the benthic health model (Hewitt and Ellis 2010), showing the percentage mud content (x-axis) against the community change associated with mud content change (CAPmud, y-axis) between the months of October 2000 and 2009.

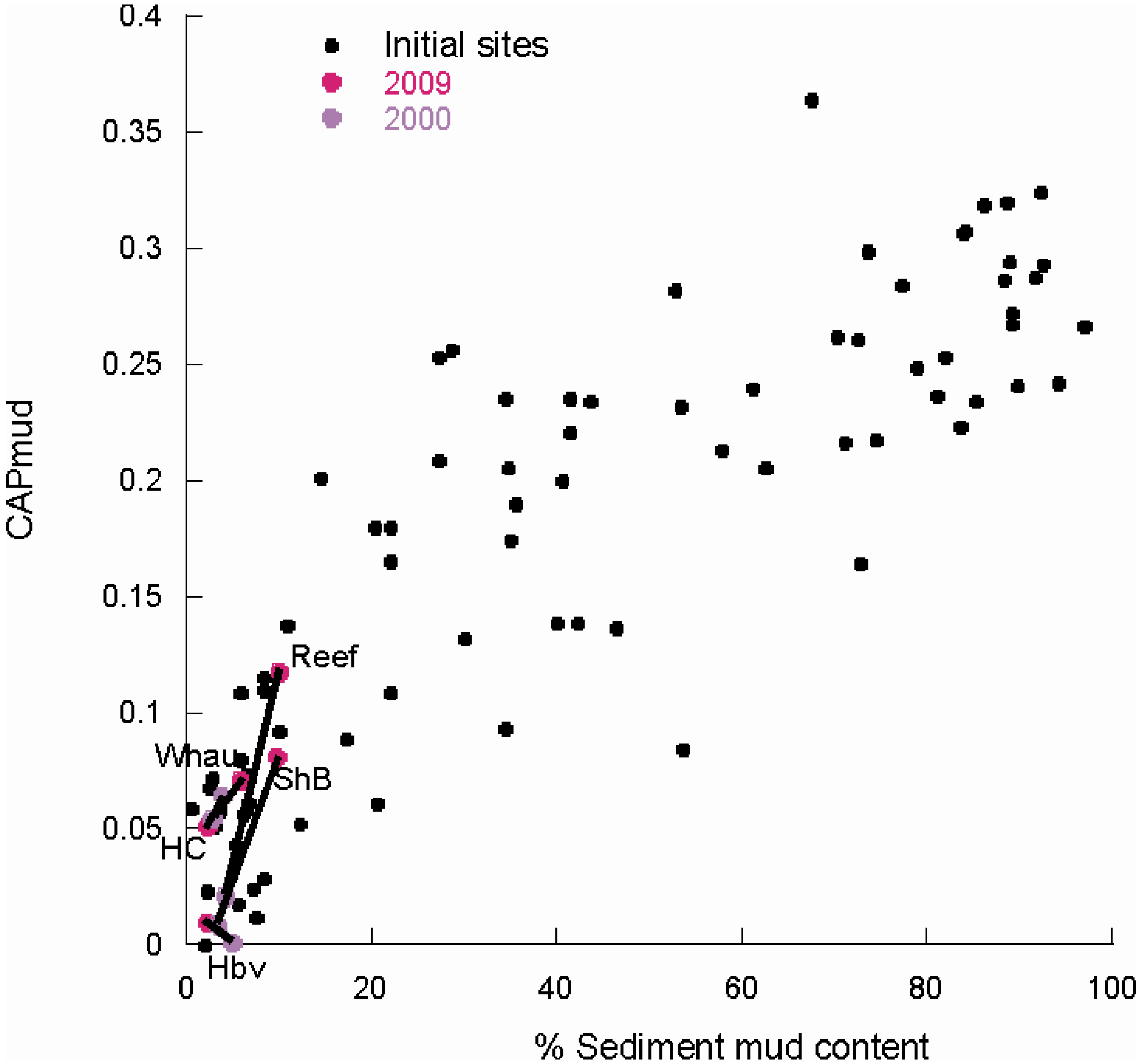


Figure 17.
MDS ordination using Bray-Curtis similarity on the 4th root transformed data of the monitored species from October data 2000-2009 of the five sites (HBV, HC, Reef, Whau and ShB). MDS stress value 0.13

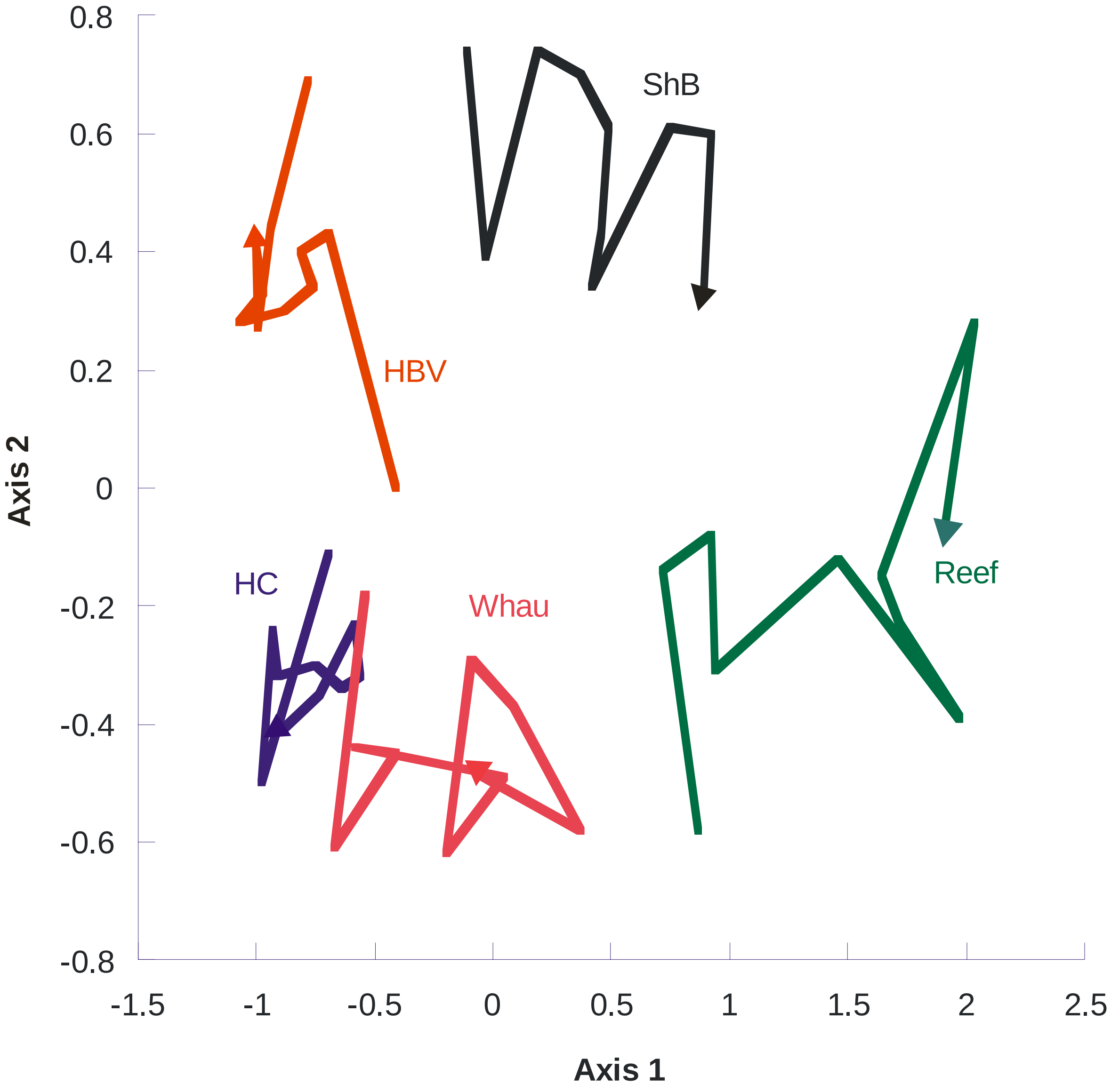
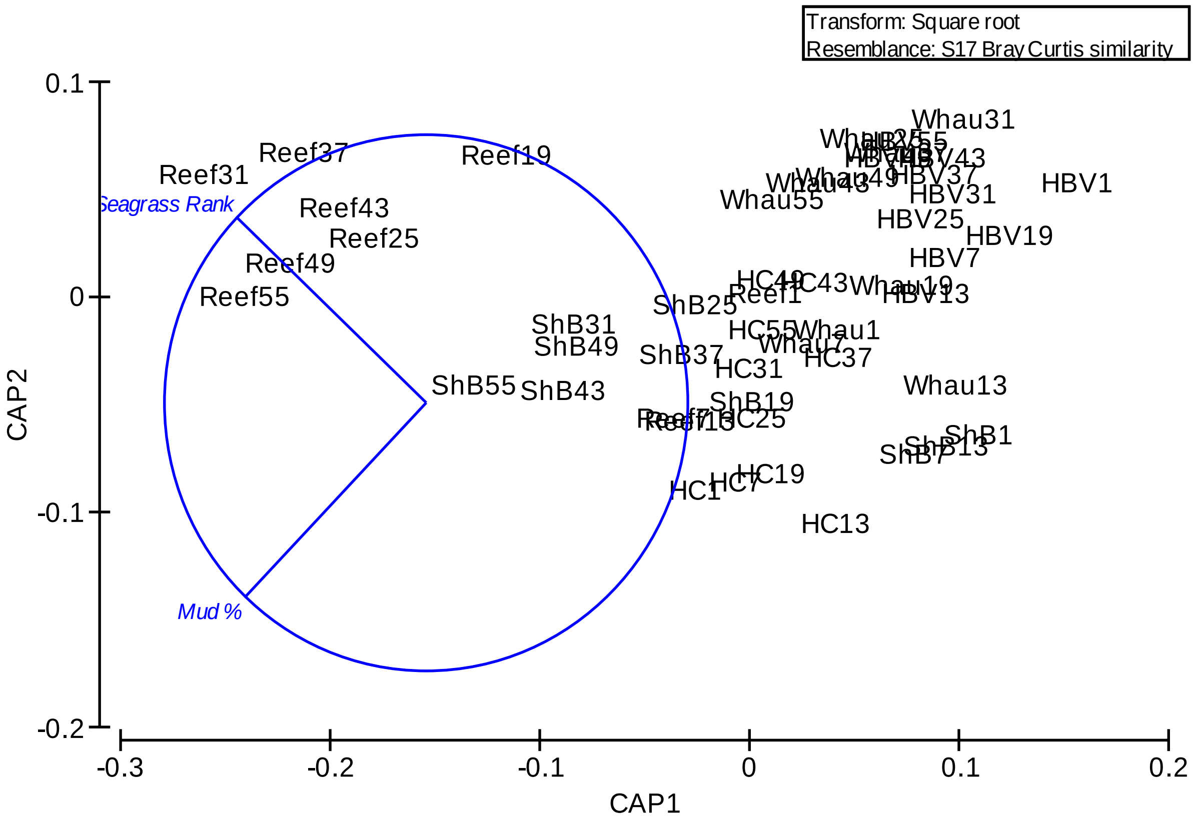

0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
Axis 2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Axis 1
ShB
HBV
HC
Whau
Reef

Figure 18

Canonical analysis of principle co-ordinates for the monitored species, percentage mud and a Seagrass cover for each site-time from October data 2000-2009



5.7.2 Changes in site characteristics

Recently there have been noticeable trends of increasing mud content at both the Reef and ShB sites (Figure 3). These increases are likely to influence the biotic component, but may also have been simultaneously mediated by them.

The increase in coverage of seagrass at Reef is a likely a strong determining factor in the change of percentage mud content. Seagrass is well known to influence hydrodynamics (Jones et al. 1997), reducing the flow conditions and dissipating the energy of currents and waves (Gambi et al. 1990). These actions subsequently increase the rate of sediment accumulation (Gacia et al. 1999), and by trapping fine material change the sediment grain-size structure. These affects are not limited to subtidal seagrass as intertidal seagrass beds have been found to have higher silt fractions (Heiss et al. 2000, Granata et al. 2001). The study of Bos et al. (2007) also demonstrated causality; that intertidal seagrass caused rather than responded to increasing silt fractions.

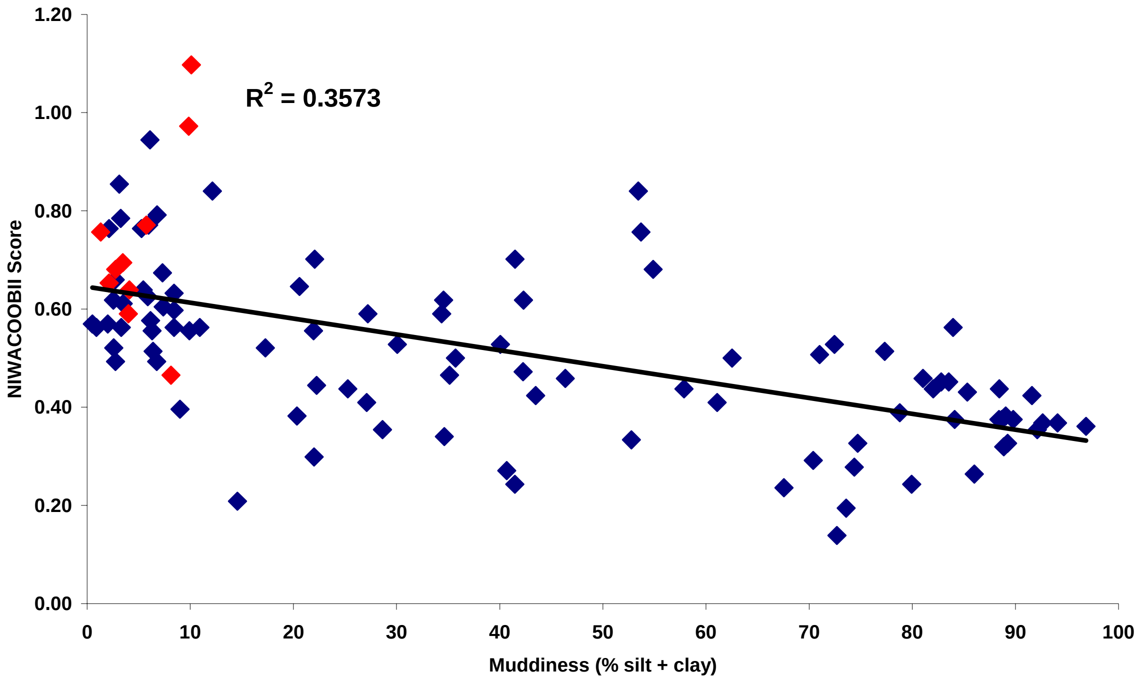
Shoal Bay is a region predicted to have high sedimentation in the future (green 2008). This is due to the tidal flow dynamics which mean that Shoal Bay receives a higher proportion of sediment emerging from Henderson Creek than other intertidal areas. A possible secondary factor involved could be the recent increases in tube-forming polychaetes. The impacts of worm tubes are complex as they can have both stabilizing and destabilizing effects on the sediment environment (Rhoads and Young 1971). Tube-worms have been observed to increase the accumulation of fine material (Mills 1967) and there has been a recent proliferation in tube building species such as *Boccardia syrtis* and *Macroclymenella stewartensis* at the ShB site.

5.8 Functional Indicators

The functional formulae of the NIWACOOBII was designed using the Mahurangi and RDP community data so that index values fell between 0 and 1; with values near to 0 indicating low functionality (and possible a indication of degradation) and values near 1 would indicating the opposite. Index values from the five Waitemata sites for October 2000 and 2009 ranged between 0.47 (HBV October 2000) and 1.10 (Reef October 2009). The Reef 2009 score was greater than 1 as it exceeded the maximum expected value calculated from the Mahurangi and RDP data sets. This high score is likely a reflection of the relatively heterogeneous and partially vegetated habitat (seagrass patches and sandier patches) which supports high species and functional diversity. As the index was developed using community data from non-vegetated intertidal sites only, the index may not apply to this site without refinement. The high scores and high functionality of communities, observed across the Waitemata sites are likely supported by the relatively low mud content (Figure 19). NIWACOOBII scores were on average marginally higher in 2009 than in 2000. Analysis of data from other months and years found some variability in scores; indicating year to year variation rather than any directional change.

Figure 19

NIWACOOBII scores for the 5 Central Waitemata sites (red) and Mahurangi and RDP sites (blue) plotted against percentage mud. The addition of the extra data of the 5 Central Waitemata for October 2000 and 2009 marginally improves the R^2 value reported in van Houte-Howes and Lohrer (2010) and shows a negative relationship between the mud fraction and the index.



6 Conclusions and recommendations

The general patterns in community composition occurring in the Central Waitemata are: (1) No substantive changes occurring at HC and HBV, (2) moderate change occurring at Whau relating to variability and cyclic patterns in abundances and (3) large changes of concern occurring at ShB and Reef. These latter two sites have had recent increases in abundance of several polychaetes species, with *Macroclymenella*, *Prionospio*, *Heteromastus* and *Aricidea* all showing substantial increases. Changes at Reef appear to be in part natural, through the expansion of seagrass coverage which has an associated increase in mud content. Changes at ShB look to be anthropogenically mediated through the increasing mud content associated with higher sedimentation in this embayment. Future monitoring is necessary to determine whether these changes continue and if future community changes relate to environmental parameters. REC

The locations of the five sentinel monitoring sites in the Central Waitemata provide coverage of physically and biotically distinct sections of the Harbour. The Whau, HC and Hobsonville sites are all situated near the outflow of tidal creeks, areas that could be susceptible to changes in the future, and so continued monitoring is paramount. All monitored sites complement ongoing ARC research in other areas and may prove useful in future multi-disciplinary studies. However such monitoring does not need to be continuous at all sites. Temporally nested monitoring (some sites continually monitored while others have monitored/unmonitored periods) has been shown to be highly successful in monitoring of the Manukau Harbour (Hewitt and Hailes 2007, Hewitt and Thrush 2007). If this was to occur in the Central Waitemata the following is suggested:

- Continuous monitoring of the ShB and Whau sites - Both these site have shown high variability in species composition with community change at ShB appearing to be anthropogenically driven. Both require continuous monitoring to determine the rate and extend of further changes.
- Rotational monitoring of the HC site – The HC site has shown only small changes in sediment granulometry and few changes in species abundances recently. Seasonal and cyclic behaviour of species have been established and the community composition has been relatively stable over time at HC (Figure 17) making it suitable for temporal nesting.
- Preferentially continuous monitoring of the HBV site. HBV has been relatively stable over the monitoring period with minimal changes in granulometry occurring since June 2002 and a consistent community structure. However, changes have been occurring around this site (expansion of nearby channel, increased thickness of shell hash ridge). The location of this site is near to the outflow of the upper harbour and it is in a good position to capture future changes in sedimentation and community composition that may occur. Information from this site is also utilised in the Upper Waitemata monitoring program.

- Rotational monitoring of the Reef site - Ecological changes that are occurring at this site appear to be driven primarily by the expansion of seagrass patches (*Zostera muelleri*). Separating out elevation in anthropogenic induced sedimentation from that occurring due to the seagrass would be fundamentally problematic, if at all possible. Overall seagrass is increasing the level of heterogeneity at this site. On each sampling occasion faunal and sedimentary patterns may be strongly influenced by the proportion of the random sampling locations which fall within or outside of these patches and currently no records are kept. Continual bi-monthly monitoring of this site may not best achieve ARC's primary aims: to monitor habitats affected by the ARC's priority issues of sedimentation (if relating specifically to anthropogenic sedimentation) and pollution (Nicholls et al. 2002). When the Reef site is sampled in the future it is recommend that:
    - A description indicating the presence, absence or degree of seagrass coverage and/or photo of each of the 12 sampled locations are recorded.
    - Sediment properties (grain-size, organics and chlorophyll) are separated into distinct samples for the site i.e., within seagrass and outside of seagrass, following a similar strategy to the MainO site in the Upper Waitemata Monitoring (Miller et al. 2008).
    - On each sampling occasion, a rudimentary seagrass patch map is drawn for the monitored area and the percentage coverage across the entire site is estimated.
    - All information is incorporated into the site notes and passed onto NIWA.

Further consideration should be given by ARC into establishing a new monitoring site on the eastern or north-eastern shore of Shoal Bay. Modelling has predicted change to this area, with elevated sedimentation and metal contamination probable (Green 2008). Establishing baseline data would help determine the magnitude of degradation in this bay in the future.

In the 2008 report it was highlighted that the ShB site needed to be surveyed on a low tides of 0.7 m or lower and that consideration should be given to moving the SHB site 50m further up the shore due to frequent sampling of this site whilst underwater. Sampling has been conducted consistently on spring low waters and the approach of using two ARC field teams, with the land-based team sampling ShB at exactly low tide, has alleviated this problem. This also allows observations of lower down the shore and monitoring the dynamics of the large tube-worm bed outside of the site. It is recommended this strategy is continued in the future which will negate the need to move the site higher up the shore. On the seaward/eastern side of the HBV site the expanding channel should be monitored by field staff to assess if it continues to widen and increase in muddiness. If the channel maintains its current rate of growth then consideration should be given in one year to moving the site 10 m further along the shore.

The arrival of an invasive dog whelk *Nassarius burchardi* may be of concern to the native community if it should become established. The Waitemata Harbour has a history of invasive species on the intertidal area such as the Asian date mussel, *Musculista senhousia*, the oyster *Crassotrea gigas*, the file shell *Limaria orientalis* and *Theora lubrica* (Hayward et al. 1997, Hayward 1997). *Nassarius* has the potential for impact, as it has already been observed feeding on bivalve species which are largely in decline. It may also compete with the native whelk, *Cominella glandiformis*. For this reason, it is recommended that *Cominella glandiformis* is added to the monitored species list so that its abundance and future trend can be recorded.

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9 Appendices

9.1 Appendix 1: Sediment characteristics October 2000 – February 2008

Sediment characteristics including particle size as gravimetric %, % organics calculated from loss on ignition, and chlorophyll *a* (chla). June 2004 samples were lost prior to analysis.

site	date	%clay	%silt	%mud	%fine sand	% medium	%coarse sand	%gravel	%organics	chla υg/g
HBV	Oct-00	0.48	7.65	8.13	74.16	12.20	4.01	1.50	0.95	10.26
	Dec-00	0.05	5.17	5.22	78.45	10.74	2.33	3.26	1.05	13.36
	Feb-01	1.08	4.41	5.49	75.11	14.43	2.88	2.09	1.16	13.62
	Apr-01	1.80	4.84	6.64	66.93	18.26	4.97	3.20	1.29	17.77
	Jun-01	1.38	2.59	3.97	67.83	18.27	5.19	4.75	1.18	18.79
	Aug-01	1.20	4.46	5.66	77.59	12.67	2.66	1.43	1.15	17.51
	Oct-01	1.49	3.83	5.32	73.67	14.90	4.02	2.09	0.81	16.50
	Dec-01	1.60	4.42	6.02	71.49	15.98	2.73	3.78	0.80	12.38
	Feb-02	1.80	3.24	5.03	71.49	13.79	4.96	4.72	1.67	11.21
	Apr-02	0.85	1.02	1.88	46.32	45.28	5.92	0.60	1.14	17.18
	Jun-02	0.69	0.69	1.38	48.61	42.09	5.58	2.34	1.17	18.09
	Aug-02	0.32	0.49	0.81	46.19	40.48	9.45	3.07	2.43	15.80
	Oct-02	0.50	1.49	1.99	54.79	31.31	8.15	3.75	3.73	13.98
	Dec-02	1.60	0.27	1.86	58.28	32.23	4.65	2.97	1.25	12.58
	Feb-03	1.70	1.06	2.76	53.54	31.54	8.33	3.82	1.12	12.20
	Apr-03	0.00	2.05	2.05	55.95	33.42	7.65	0.92	1.39	17.75
	Jun-03	1.05	1.05	2.10	56.44	24.44	13.32	3.69	1.17	10.76
	Aug-03	0.00	1.29	1.29	60.15	31.61	6.09	0.86	0.78	11.24
	Oct-03	0.78	0.78	1.55	50.07	39.00	7.84	1.53	0.78	7.97
	Dec-03	0.00	1.50	1.50	47.68	43.56	7.09	0.17	0.83	14.11
	Feb-04	0.00	1.85	1.85	59.54	31.24	5.70	1.67	1.11	12.83
	Apr-04	0.00	2.67	2.67	49.60	32.00	5.75	9.98	3.38	11.23
	Jun-04									7.98
	Aug-04	2.32	1.55	3.87	56.69	33.33	6.10	0.00	0.52	18.04
	Oct-04	1.97	0.98	2.95	52.05	25.78	5.87	13.36	1.75	10.78
	Dec-04	2.40	0.00	2.40	48.99	39.52	8.70	0.38	2.19	15.36
	Feb-05	2.55	1.28	3.83	56.71	32.41	6.53	0.52	6.40	10.39
	Apr-05	1.30	2.59	3.89	49.48	33.58	7.08	5.97	1.07	12.66
	Jun-05	2.25	2.25	4.50	54.52	33.01	7.30	0.67	1.29	16.24
	Aug-05	2.46	0.99	3.45	56.32	34.15	5.67	0.41	1.12	15.32
	Oct-05	1.65	0.47	2.12	54.51	36.31	6.86	0.20	1.53	17.55
	Dec-05	0.98	0.00	0.98	44.21	42.33	10.71	1.76	1.75	10.68
	Feb-06	1.61	1.61	3.22	63.63	36.18	6.78	0.18	1.87	11.00
	Apr-06	1.67	2.01	3.68	57.92	30.86	6.47	1.07	0.78	10.99
	Jun-06	0.96	1.43	2.39	57.51	32.08	6.94	1.09	1.48	9.51
	Aug-06	2.85	0.36	3.21	56.96	32.09	5.10	2.64	1.46	19.72
	Oct-06	1.20	0.60	1.80	52.08	36.62	7.92	1.58	1.39	15.81
	Dec-06	2.29	0.76	3.05	58.52	32.22	4.77	1.44	1.21	11.70
	Feb-07	1.66	2.07	3.72	55.41	34.87	4.95	1.04	2.22	14.55
	Apr-07	3.23	0.40	3.63	50.80	36.13	7.76	1.68	1.43	13.87
	Jun-07	2.06	1.85	3.91	65.45	24.73	4.25	1.66	1.40	16.27
	Aug-07	0.00	3.87	3.87	58.35	23.11	12.43	2.25	1.92	16.39
	Oct-07	1.86	0.27	2.13	55.62	33.52	7.67	1.07	1.13	12.15
	Dec-07	1.50	3.00	4.51	58.93	25.96	8.82	1.79	1.89	12.50
	Feb-08	2.46	0.82	3.28	56.54	32.59	7.19	0.40	1.54	13.64

HC	Oct-00	0.43	3.57	4.00	55.08	23.92	9.36	7.64	1.61	9.53
	Dec-00	0.50	1.31	1.81	48.81	40.02	7.77	1.59	1.89	19.89
	Feb-01	0.45	1.92	2.37	50.99	37.74	8.05	0.85	1.75	17.99
	Apr-01	0.17	1.26	1.43	55.75	26.83	5.08	10.90	2.66	26.12
	Jun-01	0.57	1.47	2.04	58.03	31.22	7.96	0.74	2.65	29.61
	Aug-01	0.49	2.97	3.46	67.19	22.95	5.19	1.20	1.50	18.89
	Oct-01	0.53	1.76	2.30	58.56	30.63	7.43	1.08	1.46	21.67
	Dec-01	0.37	1.80	2.17	47.88	35.95	7.65	6.34	1.10	23.60
	Feb-02	0.13	3.53	3.66	52.76	25.84	11.42	6.33	2.55	16.58
	Apr-02	0.00	4.40	4.40	75.51	13.56	5.00	1.53	2.11	29.57
	Jun-02	3.15	0.00	3.15	74.86	15.05	3.82	3.12	2.08	26.77
	Aug-02	0.48	2.09	2.57	66.94	23.80	4.61	2.09	2.32	22.11
	Oct-02	3.73	2.66	6.39	75.07	13.30	3.24	2.00	2.04	22.49
	Dec-02	3.25	3.25	6.49	64.35	12.43	2.39	14.33	1.80	26.04
	Feb-03	2.51	3.35	5.86	72.52	13.85	4.06	3.70	1.77	29.99
	Apr-03	4.23	2.82	7.05	69.26	15.36	3.74	4.58	0.85	23.38
	Jun-03	3.78	1.89	5.67	35.11	52.55	3.16	3.50	1.19	31.70
	Aug-03	2.85	0.95	3.81	75.80	15.16	4.10	1.13	1.47	27.98
	Oct-03	0.83	5.42	6.26	77.57	12.42	2.70	1.05	1.90	20.34
	Dec-03	4.62	3.85	8.47	74.10	13.75	2.24	1.44	1.81	16.53
	Feb-04	3.13	4.70	7.83	74.91	12.75	3.05	1.46	1.92	23.81
	Apr-04	3.67	5.50	9.17	74.96	12.51	1.97	1.39	0.89	27.98
	Jun-04									18.80
	Aug-04	5.11	1.28	6.38	73.89	12.39	5.31	2.02	0.34	24.09
	Oct-04	4.62	2.77	7.39	71.92	17.67	3.03	0.00	2.85	19.92
	Dec-04	8.98	1.28	10.26	72.81	12.12	3.44	1.38	3.62	38.62
	Feb-05	2.67	4.46	7.13	75.56	12.19	2.51	2.60	4.74	37.79
	Apr-05	3.96	5.28	9.23	74.70	12.55	2.84	0.67	3.00	31.27
	Jun-05	3.93	1.57	5.50	77.36	13.39	3.25	0.50	2.37	25.63
	Aug-05	5.65	1.13	6.78	72.12	13.48	5.20	2.42	2.21	32.94
	Oct-05	5.21	4.26	9.47	77.16	10.86	2.01	0.49	2.24	18.41
	Dec-05	4.46	0.74	5.20	77.40	11.77	3.55	2.07	3.34	27.47
	Feb-06	0.47	5.64	6.11	76.45	14.29	2.44	0.72	2.18	16.28
	Apr-06	3.72	1.86	5.58	74.30	13.14	4.83	2.16	1.35	21.76
	Jun-06	1.98	2.47	4.45	77.34	13.99	3.63	0.59	2.36	23.40
	Aug-06	4.07	2.59	6.66	77.15	12.27	2.95	0.97	2.72	14.55
	Oct-06	6.29	2.52	8.81	73.85	11.48	2.52	3.34	2.51	25.22
	Dec-06	7.84	3.02	10.86	66.22	17.04	4.28	1.61	2.27	28.22
	Feb-07	1.01	3.30	4.31	77.09	12.63	3.65	2.32	1.41	28.20
	Apr-07	4.84	0.00	4.84	70.34	21.99	2.83	0.00	2.13	24.76
	Jun-07	2.58	2.32	4.90	72.27	14.71	4.75	3.37	2.27	27.50
	Aug-07	1.71	2.28	4.00	72.83	17.16	3.97	2.04	2.45	20.86
	Oct-07	1.89	2.27	4.16	70.60	18.99	4.89	1.36	1.77	23.60
	Dec-07	3.73	1.24	4.98	73.02	16.42	4.35	1.24	2.68	22.23
	Feb-08	3.74	3.20	6.94	72.28	14.68	3.87	2.23	2.28	22.93
REEF	Oct-00	0.59	3.50	4.09	91.80	3.77	0.28	0.06	0.90	7.28
	Dec-00	1.12	3.25	4.37	93.12	1.79	0.29	0.43	0.92	11.12
	Feb-01	1.17	4.22	5.39	90.81	2.78	0.18	0.85	1.09	10.51
	Apr-01	0.24	3.02	3.26	92.07	3.24	0.23	1.20	1.13	12.74
	Jun-01	1.04	3.87	4.91	91.43	2.78	0.19	0.68	1.26	15.02
	Aug-01	0.91	5.28	6.19	87.22	5.02	0.14	1.43	1.16	10.94
	Oct-01	0.67	2.76	3.43	89.44	5.21	0.26	1.67	0.74	10.54
	Dec-01	1.39	1.81	3.20	93.76	2.87	0.11	0.06	1.35	6.29
	Feb-02	0.32	2.58	2.90	87.20	8.37	0.92	0.62	1.02	19.31
	Apr-02	2.13	1.83	3.96	92.37	3.25	0.17	0.25	1.52	17.64
	Jun-02	1.98	3.30	5.27	91.51	3.11	0.10	0.00	1.14	12.65
	Aug-02	3.11	4.36	7.47	89.26	3.00	0.23	0.04	1.62	15.64
	Oct-02	3.63	1.45	5.08	92.25	1.67	0.11	0.89	1.04	10.46
	Dec-02	1.85	2.16	4.01	93.73	1.27	0.24	0.75	2.01	10.03
	Feb-03	1.91	1.91	3.82	93.32	2.56	0.19	0.12	1.13	7.24
	Apr-03	1.86	1.60	3.46	91.96	3.72	0.36	0.50	1.00	9.60
	Jun-03	0.94	4.72	5.67	87.22	7.11	0.00	0.00	2.00	11.92
	Aug-03	7.65	0.00	7.65	89.41	2.59	0.27	0.07	0.99	8.47
	Oct-03	2.70	4.04	6.74	90.29	2.59	0.27	0.12	1.08	6.42
	Dec-03	0.79	8.65	9.44	88.41	2.08	0.07	0.00	1.09	6.52

	Feb-04	1.55	6.19	7.74	89.12	2.97	0.11	0.06	1.24	6.74
	Apr-04	2.12	3.18	5.30	90.98	3.36	0.19	0.16	7.22	7.37
	Jun-04									8.69
	Aug-04	6.12	1.53	7.65	86.56	2.84	0.55	2.40	0.50	9.90
	Oct-04	4.85	1.62	6.47	91.82	1.67	0.04	0.00	1.20	5.36
	Dec-04	2.59	0.43	3.02	94.55	2.26	0.06	0.12	2.16	10.99
	Feb-05	3.67	0.00	3.67	94.85	1.15	0.29	0.04	1.78	7.91
	Apr-05	3.56	4.57	8.13	89.85	1.90	0.00	0.13	1.68	7.83
	Jun-05	4.04	2.69	6.74	87.26	3.93	0.27	1.81	1.28	6.76
	Aug-05	4.45	5.56	10.01	87.09	2.53	0.28	0.10	1.48	10.39
	Oct-05	2.65	4.97	7.61	90.31	1.90	0.11	0.07	1.64	18.45
	Dec-05	3.60	6.40	10.00	87.81	2.03	0.11	0.06	1.93	6.40
	Feb-06	3.00	3.85	6.85	91.58	1.32	0.23	0.02	1.43	7.93
	Apr-06	1.82	4.54	6.35	90.92	2.59	0.12	0.02	0.76	8.83
	Jun-06	2.70	1.35	4.04	93.16	2.24	0.19	0.36	1.86	10.43
	Aug-06	3.92	5.49	9.42	87.42	2.85	0.20	0.11	1.51	7.80
	Oct-06	3.83	4.22	8.05	88.68	3.05	0.22	0.00	1.73	7.80
	Dec-06	4.79	2.66	7.45	90.52	1.94	0.09	0.00	0.65	11.92
	Feb-07	3.63	6.22	9.85	88.31	1.74	0.09	0.00	1.78	12.49
	Apr-07	10.66	11.19	21.85	76.06	1.97	0.12	0.00	1.47	9.63
	Jun-07	3.21	4.01	7.22	89.86	2.60	0.13	0.19	1.47	8.94
	Aug-07	3.19	6.38	9.57	88.26	1.98	0.12	0.07	1.87	10.54
	Oct-07	4.46	5.09	9.55	87.57	2.52	0.30	0.06	1.41	11.92
	Dec-07	4.10	1.54	5.64	91.56	2.50	0.18	0.13	2.60	9.97
	Feb-08	4.24	3.63	7.87	90.18	1.76	0.18	0.01	1.65	10.78
SHB	Oct-00	0.13	3.33	3.46	78.71	14.11	2.46	1.26	0.63	5.23
	Dec-00	0.42	1.74	2.16	68.32	24.91	1.96	2.65	0.64	8.78
	Feb-01	0.46	1.27	1.73	67.55	28.84	0.87	1.01	0.27	4.87
	Apr-01	0.09	1.59	1.68	74.45	21.83	0.64	1.41	0.91	7.04
	Jun-01	0.37	1.17	1.54	72.98	22.83	1.31	1.35	0.49	10.29
	Aug-01	0.77	2.24	3.00	71.78	20.01	1.57	3.64	0.54	7.03
	Oct-01	12.36	0.65	13.01	63.30	22.43	0.70	0.56	0.48	10.72
	Dec-01	0.96	0.67	1.63	62.87	20.93	0.55	14.01	1.05	11.10
	Feb-02	0.68	2.91	3.59	78.72	15.86	1.08	0.76	0.76	10.53
	Apr-02	0.19	1.31	1.49	77.08	17.17	1.90	2.36	0.62	10.03
	Jun-02	0.50	1.66	2.15	67.64	25.86	2.01	2.34	0.73	8.19
	Aug-02	2.34	0.00	2.34	67.51	25.94	2.72	1.50	0.69	10.67
	Oct-02	2.80	0.25	3.06	80.84	11.70	3.33	1.07	0.81	7.79
	Dec-02	0.47	0.10	0.58	60.27	25.83	8.71	4.61	0.84	8.48
	Feb-03	0.18	0.55	0.74	53.62	37.54	5.03	3.07	0.23	6.45
	Apr-03	0.00	1.56	1.56	69.27	23.72	2.63	2.82	0.51	6.63
	Jun-03	0.00	1.89	1.89	48.92	41.65	1.68	5.86	0.70	8.38
	Aug-03	1.36	0.82	2.18	76.41	9.37	1.37	10.68	0.59	6.37
	Oct-03	0.36	2.89	3.25	79.66	12.31	2.13	2.65	0.70	6.87
	Dec-03	0.00	2.44	2.44	75.61	14.59	1.76	5.59	0.57	5.62
	Feb-04	0.00	3.33	3.33	69.35	14.13	3.97	9.21	0.91	5.05
	Apr-04	0.00	7.35	7.35	83.55	8.02	0.41	0.66	0.42	2.77
	Jun-04									13.56
	Aug-04	3.18	3.18	6.37	73.68	9.39	4.58	5.98	0.54	8.08
	Oct-04	0.83	0.83	1.67	72.67	24.18	0.77	0.71	0.87	8.37
	Dec-04	1.98	0.00	1.98	77.59	10.56	2.69	7.19	1.36	6.53
	Feb-05	0.00	3.20	3.20	85.28	10.82	0.59	0.12	1.94	7.99
	Apr-05	3.08	2.55	5.63	87.08	4.75	0.66	1.88	1.23	6.75
	Jun-05	2.69	1.35	4.04	75.08	7.57	2.87	10.44	0.96	5.04
	Aug-05	2.65	0.44	3.09	74.20	11.95	4.48	6.28	0.78	6.81
	Oct-05	2.23	2.60	4.83	84.69	8.11	0.87	1.50	1.01	14.32
	Dec-05	1.02	0.00	1.02	85.13	12.27	0.80	0.78	0.68	6.64
	Feb-06	5.85	0.49	6.33	86.11	3.79	0.53	3.23	0.71	4.23
	Apr-06	0.86	2.59	3.45	73.95	13.06	3.12	6.42	0.54	6.53
	Jun-06	0.96	1.50	2.46	78.57	10.29	3.51	5.17	1.48	8.36
	Aug-06	2.60	3.38	5.99	76.75	9.94	1.33	5.99	0.87	7.68
	Oct-06	3.84	3.14	6.98	74.17	10.81	1.84	6.19	0.88	9.40
	Dec-06	2.16	0.72	2.88	77.40	7.04	2.19	10.49	0.76	4.36
	Feb-07	3.56	6.24	9.80	78.43	5.36	1.57	4.84	0.70	7.11
	Apr-07	3.29	1.92	5.22	82.41	9.51	1.54	1.33	0.91	6.76
	Jun-07	3.39	5.57	8.96	71.75	7.67	3.39	8.23	1.15	2.75

	Aug-07	0.50	3.00	3.50	83.17	11.42	1.28	0.62	0.91	10.66
	Oct-07	2.70	1.62	4.33	80.22	8.47	2.61	4.37	1.23	6.88
	Dec-07	1.49	2.09	3.58	72.77	7.07	1.97	14.62	1.11	6.54
	Feb-08	1.31	1.58	2.89	72.32	7.57	1.88	15.34	1.02	5.62
WHAU	Oct-00	0.02	2.75	2.77	93.64	1.79	0.80	1.00	0.76	5.23
	Dec-00	0.26	1.96	2.22	92.38	3.04	0.82	1.53	0.77	8.78
	Feb-01	0.70	2.11	2.81	91.90	2.40	0.69	2.19	0.86	4.87
	Apr-01	0.02	3.17	3.19	82.15	14.23	0.26	0.16	1.42	7.04
	Jun-01	0.57	1.67	2.24	88.91	3.37	0.64	4.84	1.02	10.29
	Aug-01	0.85	1.84	2.69	94.48	1.81	0.65	0.36	0.90	7.03
	Oct-01	0.85	1.90	2.75	92.42	2.78	0.47	1.59	0.86	10.72
	Dec-01	0.53	1.38	1.91	91.65	1.10	0.34	5.00	2.86	11.10
	Feb-02	0.41	2.00	2.41	90.94	4.59	0.81	1.24	1.03	10.53
	Apr-02	1.06	1.06	2.12	95.48	1.29	0.43	0.68	0.93	10.03
	Jun-02	0.00	1.81	1.81	91.37	5.18	0.75	0.89	1.09	8.19
	Aug-02	0.00	1.81	1.81	92.44	2.49	0.54	2.72	1.07	10.67
	Oct-02	0.99	2.31	3.30	91.71	3.79	0.56	0.64	0.75	7.79
	Dec-02	1.70	0.57	2.26	94.94	1.57	0.49	0.73	0.58	8.48
	Feb-03	2.50	1.59	4.10	88.20	4.67	0.91	2.12	0.76	6.45
	Apr-03	0.80	2.41	3.21	92.25	2.19	0.52	1.83	0.80	6.63
	Jun-03	1.76	1.76	3.52	92.20	3.16	0.65	0.47	0.85	8.38
	Aug-03	1.91	0.00	1.91	95.10	1.98	0.59	0.42	0.80	6.37
	Oct-03	1.46	1.46	2.92	93.55	2.24	0.66	0.64	0.92	6.87
	Dec-03	0.80	4.01	4.81	91.87	2.09	0.35	0.89	0.87	5.62
	Feb-04	0.86	4.30	5.16	92.29	1.20	0.50	0.85	0.84	5.05
	Apr-04	0.00	5.10	5.10	93.48	0.97	0.45	0.00	0.58	8.72
	Jun-04									10.02
	Aug-04	2.00	1.33	3.33	94.22	1.51	0.88	0.05	0.16	13.28
	Oct-04	1.47	0.59	2.06	93.08	1.07	0.39	3.40	1.17	11.22
	Dec-04	1.33	2.65	3.98	93.68	1.55	0.80	0.00	2.03	11.79
	Feb-05	0.00	1.62	1.62	93.95	1.22	0.73	2.48	1.58	10.13
	Apr-05	1.94	3.23	5.16	88.73	1.26	0.60	4.24	1.28	7.36
	Jun-05	3.52	0.59	4.10	93.07	0.89	0.58	1.35	1.02	9.77
	Aug-05	2.74	2.19	4.93	91.40	1.37	0.71	1.59	0.63	12.94
	Oct-05	1.05	2.10	3.15	92.89	1.40	0.90	1.67	1.01	12.41
	Dec-05	1.54	0.00	1.54	96.07	1.22	0.42	0.75	1.19	7.19
	Feb-06	1.10	0.74	1.84	95.69	0.83	0.54	1.09	0.84	10.60
	Apr-06	1.96	1.96	3.92	92.11	1.29	0.76	1.93	0.48	11.44
	Jun-06	2.39	0.95	3.34	92.73	1.43	0.65	1.85	1.28	12.37
	Aug-06	1.46	2.29	3.75	93.08	1.45	0.68	1.04	1.25	14.44
	Oct-06	1.00	1.75	2.75	93.43	1.55	1.50	0.77	0.84	16.74
	Dec-06	2.32	0.58	2.90	93.74	1.72	0.96	0.68	0.98	13.87
	Feb-07	2.83	0.00	2.83	93.19	2.00	0.57	1.40	1.12	13.29
	Apr-07	2.09	1.77	3.86	91.61	1.56	0.80	2.17	0.85	11.47
	Jun-07	1.78	1.60	3.38	92.71	1.86	1.00	1.04	1.16	11.93
	Aug-07	0.27	1.09	1.37	94.93	1.41	0.56	1.74	0.99	14.67
	Oct-07	0.78	1.05	1.83	92.89	1.23	0.83	3.22	0.85	12.39
	Dec-07	2.03	0.00	2.03	91.51	1.53	0.86	4.06	1.02	12.73
	Feb-08	1.63	0.65	2.29	90.91	2.15	1.26	3.39	1.14	10.20

9.2 Appendix 2: Benthic Invertebrate data collected between October 2000 and February 2008.

Total, median, mean number of individuals found in 12 cores. Range= 90th percentile – 5th percentile.

Species: *Anthopleura aureoradiata*

Site	Series	Total	Median	Range	Mean
HBV	1	18	1	5	1.5
HBV	2	16	1	4	1.3
HBV	3	0	0	0	0.0
HBV	4	21	2	4	1.8
HBV	5	23	1.5	3	1.9
HBV	6	13	1	3	1.1
HBV	7	17	1	3	1.4
HBV	8	18	1	4	1.5
HBV	9	56	3	11	4.7
HBV	10	22	1	4	1.8
HBV	11	17	1	3	1.4
HBV	12	30	3	4	2.5
HBV	13	18	1	3	1.5
HBV	14	39	3	4	3.3
HBV	15	47	3	7	3.9
HBV	16	17	1.5	3	1.4
HBV	17	20	1	5	1.7
HBV	18	13	1	3	1.1
HBV	19	22	1.5	4	1.8
HBV	20	30	3	2	2.5
HBV	21	18	1	4	1.5
HBV	22	26	2	5	2.2
HBV	23	24	1.5	5	2.0
HBV	24	34	2	5	2.8
HBV	25	26	2	3	2.2
HBV	26	58	5	8	4.8
HBV	27	57	3.5	10	4.8
HBV	28	50	4	7	4.2
HBV	29	37	3	4	3.1
HBV	30	24	1.5	3	2.0
HBV	31	31	2	7	2.6
HBV	32	43	3	8	3.6
HBV	33	30	2.5	5	2.5
HBV	34	32	2.5	5	2.7
HBV	35	16	1	3	1.3
HBV	36	32	2	3	2.7
HBV	37	12	1	2	1.0
HBV	38	27	1.5	5	2.3
HBV	39	25	1	2	2.1
HBV	40	26	1.5	6	2.2
HBV	41	31	2	3	2.6
HBV	42	31	2	4	2.6
HBV	43	24	1	3	2.0
HBV	44	114	8.5	10	9.5
HBV	45	33	2.5	5	2.8
HC	1	36	3	3	3.0
HC	2	17	1	3	1.4
HC	3	31	2	5	2.6
HC	4	22	1.5	4	1.8
HC	5	31	2.5	5	2.6
HC	6	26	2	4	2.2
HC	7	23	2	3	1.9
HC	8	25	1.5	3	2.1
HC	9	21	1	5	1.8

Site	Series	Total	Median	Range	Mean
HC	10	19	1	3	1.6
HC	11	19	1.5	3	1.6
HC	12	28	2	4	2.4
HC	13	19	1.5	4	1.6
HC	14	23	1.5	2	1.9
HC	15	20	1	4	1.7
HC	16	28	2.5	4	2.3
HC	17	20	1.5	3	1.7
HC	18	26	2	3	2.2
HC	19	36	3	4	3.0
HC	20	56	4.5	7	4.7
HC	21	31	2	6	2.6
HC	22	44	3.5	6	3.7
HC	23	39	2	8	3.3
HC	24	21	1	5	1.8
HC	25	33	2.5	4	2.8
HC	26	45	3	7	3.7
HC	27	63	5	6	5.3
HC	28	55	4	7	4.6
HC	29	45	3	4	3.8
HC	30	57	4	6	4.8
HC	31	44	3	8	3.7
HC	32	40	2.5	7	3.3
HC	33	44	4	5	3.7
HC	34	44	3.5	5	3.7
HC	35	41	3	5	3.4
HC	36	42	2.5	6	3.5
HC	37	40	3.5	5	3.3
HC	38	60	6	10	5.0
HC	39	61	5	8	5.1
HC	40	66	5.5	6	5.5
HC	41	45	3	5	3.8
HC	42	34	2	4	2.8
HC	43	30	2	5	2.5
HC	44	55	5	6	4.6
HC	45	42	2	7	3.5
Reef	1	0	0	0	0.0
Reef	2	1	0	0	0.1
Reef	3	0	0	0	0.0
Reef	4	1	0	0	0.1
Reef	5	0	0	0	0.0
Reef	6	1	0	0	0.1
Reef	7	0	0	0	0.0
Reef	8	2	0	1	0.2
Reef	9	2	0	1	0.2
Reef	10	0	0	0	0.0
Reef	11	1	0	0	0.1
Reef	12	0	0	0	0.0
Reef	13	0	0	0	0.0
Reef	14	0	0	0	0.0
Reef	15	0	0	0	0.0
Reef	16	0	0	0	0.0
Reef	17	2	0	0	0.2
Reef	18	0	0	0	0.0
Reef	19	1	0	0	0.1

Site	Series	Total	Median	Range	Mean
Reef	20	0	0	0	0.0
Reef	21	0	0	0	0.0
Reef	22	0	0	0	0.0
Reef	23	0	0	0	0.0
Reef	24	0	0	0	0.0
Reef	25	0	0	0	0.0
Reef	26	0	0	0	0.0
Reef	27	0	0	0	0.0
Reef	28	0	0	0	0.0
Reef	29	0	0	0	0.0
Reef	30	2	0	0	0.2
Reef	31	0	0	0	0.0
Reef	32	0	0	0	0.0
Reef	33	0	0	0	0.0
Reef	34	1	0	0	0.1
Reef	35	0	0	0	0.0
Reef	36	2	0	1	0.2
Reef	37	1	0	0	0.1
Reef	38	0	0	0	0.0
Reef	39	1	0	0	0.1
Reef	40	1	0	0	0.1
Reef	41	2	0	1	0.2
Reef	42	0	0	0	0.0
Reef	43	0	0	0	0.0
Reef	44	3	0	1	0.3
Reef	45	0	0	0	0.0
ShB	1	9	0	2	0.8
ShB	2	10	0	2	0.8
ShB	3	9	0	2	0.8
ShB	4	15	1	3	1.3
ShB	5	7	0	2	0.5
ShB	6	5	0	1	0.4
ShB	7	10	1	2	0.8
ShB	8	8	0	2	0.7
ShB	9	5	0	1	0.4
ShB	10	6	0	2	0.5
ShB	11	7	0.5	1	0.6
ShB	12	4	0	1	0.4
ShB	13	5	0	1	0.4
ShB	14	9	0	2	0.8
ShB	15	14	0.5	2	1.2
ShB	16	11	0	3	0.9
ShB	17	12	0.5	3	1.0
ShB	18	15	1	3	1.3
ShB	19	11	0	3	0.9
ShB	20	13	0.5	3	1.1
ShB	21	9	0	3	0.8
ShB	22	14	1	3	1.2
ShB	23	4	0	1	0.3
ShB	24	5	0	1	0.5
ShB	25	4	0	1	0.3
ShB	26	4	0	1	0.3
ShB	27	6	0	2	0.5
ShB	28	8	0	2	0.7
ShB	29	9	0	3	0.8

Site	Series	Total	Median	Range	Mean
ShB	30	13	0.5	3	1.1
ShB	31	14	0	4	1.2
ShB	32	3	0	1	0.3
ShB	33	13	1	3	1.1
ShB	34	2	0	1	0.2
ShB	35	5	0	1	0.4
ShB	36	2	0	1	0.2
ShB	37	2	0	1	0.2
ShB	38	8	0	1	0.7
ShB	39	4	0	1	0.3
ShB	40	22	1	4	1.8
ShB	41	6	0	1	0.5
ShB	42	5	0	2	0.4
ShB	43	7	0	2	0.6
ShB	44	12	0	2	1.0
ShB	45	12	0.5	3	1.0
Whau	1	20	0	5	1.7
Whau	2	19	1	3	1.6
Whau	3	26	1	4	2.2
Whau	4	30	2	4	2.5
Whau	5	19	2	4	1.6
Whau	6	14	1	3	1.2
Whau	7	14	1	2	1.2
Whau	8	20	1.5	3	1.7
Whau	9	22	2	4	1.8
Whau	10	17	1	4	1.4
Whau	11	6	0	1	0.5
Whau	12	6	0	1	0.5
Whau	13	5	0	1	0.4
Whau	14	15	1	3	1.3
Whau	15	0	0	0	0.0
Whau	16	5	0	1	0.4
Whau	17	0	0	0	0.0
Whau	18	7	0	2	0.6
Whau	19	4	0	1	0.3
Whau	20	14	1	3	1.2
Whau	21	0	0	0	0.0
Whau	22	9	1	2	0.8
Whau	23	9	0	2	0.8
Whau	24	15	1.5	3	1.3
Whau	25	10	0.5	3	0.8
Whau	26	14	0.5	3	1.2
Whau	27	5	0	1	0.4
Whau	28	14	1	2	1.2
Whau	29	8	0.5	2	0.7
Whau	30	10	1	2	0.8
Whau	31	3	0	1	0.3
Whau	32	10	1	2	0.8
Whau	33	9	1	2	0.8
Whau	34	5	0	1	0.4
Whau	35	2	0	1	0.2
Whau	36	12	0.5	2	1.0
Whau	37	3	0	1	0.3
Whau	38	2	0	1	0.2
Whau	39	9	0	2	0.8

Site	Series	Total	Median	Range	Mean
Whau	40	11	0.5	2	0.9
Whau	41	10	1	2	0.8
Whau	42	6	0	1	0.5
Whau	43	4	0	1	0.3
Whau	44	10	0.5	2	0.8
Whau	45	8	0	2	0.7

Species: ***Aonides trifida***

Site	Series	Total	Median	Range	Mean
HBV	1	145	10	18	12.1
HBV	2	160	12.5	20	13.3
HBV	3	294	22.5	26	24.5
HBV	4	313	24	13	26.1
HBV	5	227	19.5	28	18.9
HBV	6	235	16	24	19.6
HBV	7	366	31	17	30.5
HBV	8	356	29	27	29.7
HBV	9	126	9.5	13	10.5
HBV	10	351	31	43	29.3
HBV	11	248	19	16	20.7
HBV	12	312	27	33	26.0
HBV	13	236	20.5	16	19.7
HBV	14	236	17	10	19.6
HBV	15	343	26.5	30	28.6
HBV	16	242	21	17	20.2
HBV	17	130	11.5	11	10.8
HBV	18	228	17.5	21	19.0
HBV	19	292	24.5	24	24.3
HBV	20	188	16.5	16	15.7
HBV	21	173	14.5	16	14.4
HBV	22	223	16.5	14	18.6
HBV	23	188	15.5	19	15.7
HBV	24	241	19	23	20.1
HBV	25	271	22	23	22.5
HBV	26	348	24.5	25	29.0
HBV	27	254	22.5	24	21.2
HBV	28	275	21.5	32	22.9
HBV	29	307	25	15	25.6
HBV	30	255	22	14	21.3
HBV	31	323	22	36	26.9
HBV	32	228	21.5	25	19.0
HBV	33	280	19.5	29	23.3
HBV	34	335	29	16	27.9
HBV	35	335	27	32	27.9
HBV	36	288	24.5	28	24.0
HBV	37	350	20.5	42	29.2
HBV	38	372	31	15	31.0
HBV	39	340	27	30	28.3
HBV	40	295	24.5	16	24.6
HBV	41	335	28	22	27.9
HBV	42	394	33	21	32.8
HBV	43	316	23.5	39	26.3
HBV	44	593	46	41	49.4
HBV	45	429	39.5	30	35.8
HC	1	2	0	1	0.2
HC	2	2	0	1	0.2
HC	3	4	0	1	0.3
HC	4	0	0	0	0.0
HC	5	2	0	1	0.2
HC	6	11	0	3	0.9
HC	7	0	0	0	0.0
HC	8	3	0	1	0.3
HC	9	0	0	0	0.0

Site	Series	Total	Median	Range	Mean
HC	10	10	0	2	0.8
HC	11	1	0	0	0.1
HC	12	3	0	1	0.3
HC	13	0	0	0	0.0
HC	14	2	0	1	0.2
HC	15	0	0	0	0.0
HC	16	1	0	0	0.1
HC	17	0	0	0	0.0
HC	18	5	0	2	0.4
HC	19	0	0	0	0.0
HC	20	1	0	0	0.1
HC	21	1	0	0	0.1
HC	22	1	0	0	0.1
HC	23	0	0	0	0.0
HC	24	3	0	1	0.3
HC	25	1	0	0	0.1
HC	26	5	0	1	0.5
HC	27	2	0	1	0.2
HC	28	0	0	0	0.0
HC	29	1	0	0	0.1
HC	30	0	0	0	0.0
HC	31	0	0	0	0.0
HC	32	3	0	1	0.3
HC	33	0	0	0	0.0
HC	34	5	0	2	0.4
HC	35	0	0	0	0.0
HC	36	1	0	0	0.1
HC	37	3	0	1	0.3
HC	38	0	0	0	0.0
HC	39	0	0	0	0.0
HC	40	6	0	1	0.5
HC	41	1	0	0	0.1
HC	42	4	0	1	0.3
HC	43	1	0	0	0.1
HC	44	3	0	1	0.3
HC	45	2	0	0	0.2
Reef	1	1	0	0	0.1
Reef	2	3	0	1	0.3
Reef	3	2	0	1	0.2
Reef	4	1	0	0	0.1
Reef	5	0	0	0	0.0
Reef	6	0	0	0	0.0
Reef	7	1	0	0	0.1
Reef	8	2	0	1	0.2
Reef	9	0	0	0	0.0
Reef	10	0	0	0	0.0
Reef	11	0	0	0	0.0
Reef	12	1	0	0	0.1
Reef	13	0	0	0	0.0
Reef	14	0	0	0	0.0
Reef	15	0	0	0	0.0
Reef	16	0	0	0	0.0
Reef	17	2	0	1	0.2
Reef	18	4	0	1	0.3
Reef	19	1	0	0	0.1

Site	Series	Total	Median	Range	Mean
Reef	20	0	0	0	0.0
Reef	21	0	0	0	0.0
Reef	22	1	0	0	0.1
Reef	23	0	0	0	0.0
Reef	24	8	0	2	0.7
Reef	25	1	0	0	0.1
Reef	26	1	0	0	0.1
Reef	27	2	0	1	0.2
Reef	28	5	0	2	0.4
Reef	29	3	0	1	0.3
Reef	30	1	0	0	0.1
Reef	31	0	0	0	0.0
Reef	32	1	0	0	0.1
Reef	33	1	0	0	0.1
Reef	34	0	0	0	0.0
Reef	35	0	0	0	0.0
Reef	36	3	0	0	0.3
Reef	37	0	0	0	0.0
Reef	38	4	0	1	0.3
Reef	39	0	0	0	0.0
Reef	40	0	0	0	0.0
Reef	41	2	0	1	0.2
Reef	42	0	0	0	0.0
Reef	43	0	0	0	0.0
Reef	44	3	0	1	0.3
Reef	45	2	0	0	0.2
ShB	1	6	0	1	0.5
ShB	2	6	0	1	0.5
ShB	3	7	0	2	0.6
ShB	4	27	0	12	2.3
ShB	5	24	0	2	2.0
ShB	6	21	0	4	1.8
ShB	7	0	0	0	0.0
ShB	8	5	0	2	0.4
ShB	9	1	0	0	0.1
ShB	10	28	0	2	2.3
ShB	11	2	0	0	0.2
ShB	12	26	0	6	2.2
ShB	13	2	0	1	0.2
ShB	14	59	1	11	4.9
ShB	15	56	0	22	4.7
ShB	16	11	0	3	0.9
ShB	17	6	0	2	0.5
ShB	18	1	0	0	0.1
ShB	19	9	0.5	2	0.8
ShB	20	24	0	1	2.0
ShB	21	15	0	2	1.3
ShB	22	4	0	1	0.4
ShB	23	9	0	1	0.8
ShB	24	20	1	3	1.6
ShB	25	9	0	3	0.8
ShB	26	13	0	6	1.1
ShB	27	14	0	0	1.2
ShB	28	12	1	2	1.0
ShB	29	11	0	2	0.9

Site	Series	Total	Median	Range	Mean
ShB	30	8	0	2	0.7
ShB	31	22	0	3	1.8
ShB	32	6	0	1	0.5
ShB	33	12	0	2	1.0
ShB	34	3	0	1	0.3
ShB	35	3	0	1	0.3
ShB	36	47	1	13	3.9
ShB	37	36	0	10	3.0
ShB	38	4	0	1	0.3
ShB	39	2	0	1	0.2
ShB	40	2	0	1	0.2
ShB	41	40	0.5	14	3.3
ShB	42	4	0	0	0.3
ShB	43	14	0	5	1.2
ShB	44	36	0	5	3.0
ShB	45	9	0	3	0.8
Whau	1	2	0	1	0.2
Whau	2	1	0	0	0.1
Whau	3	1	0	0	0.1
Whau	4	71	6	8	5.9
Whau	5	7	0	1	0.6
Whau	6	1	0	0	0.1
Whau	7	0	0	0	0.0
Whau	8	2	0	1	0.2
Whau	9	2	0	0	0.2
Whau	10	6	0	2	0.5
Whau	11	1	0	0	0.1
Whau	12	0	0	0	0.0
Whau	13	7	1	1	0.6
Whau	14	2	0	1	0.2
Whau	15	3	0	1	0.3
Whau	16	2	0	1	0.2
Whau	17	0	0	0	0.0
Whau	18	6	0	2	0.5
Whau	19	0	0	0	0.0
Whau	20	0	0	0	0.0
Whau	21	13	0.5	2	1.1
Whau	22	9	0	3	0.8
Whau	23	6	0	1	0.5
Whau	24	13	1	2	1.1
Whau	25	11	0.5	2	0.9
Whau	26	19	1	6	1.6
Whau	27	20	0.5	5	1.7
Whau	28	17	0	5	1.4
Whau	29	5	0	1	0.4
Whau	30	21	0	5	1.8
Whau	31	21	1	4	1.8
Whau	32	6	0	2	0.5
Whau	33	4	0	1	0.3
Whau	34	0	0	0	0.0
Whau	35	3	0	1	0.3
Whau	36	10	0	3	0.8
Whau	37	21	0	5	1.7
Whau	38	14	1	2	1.2
Whau	39	0	0	0	0.0

Site	Series	Total	Median	Range	Mean
Whau	40	10	0	3	0.8
Whau	41	3	0	1	0.3
Whau	42	4	0	1	0.3
Whau	43	1	0	0	0.1
Whau	44	6	0	1	0.5
Whau	45	13	0.5	4	1.1

Species: *Aricidea* sp.

Site	Series	Total	Median	Range	Mean
HBV	1	13	1	3	1.1
HBV	2	1	0	0	0.1
HBV	3	0	0	0	0.0
HBV	4	6	0	1	0.5
HBV	5	3	0	1	0.3
HBV	6	15	0	2	1.3
HBV	7	17	1	3	1.4
HBV	8	10	0	3	0.8
HBV	9	3	0	1	0.3
HBV	10	2	0	1	0.2
HBV	11	8	1	1	0.7
HBV	12	2.4	0	1	0.2
HBV	13	9	0	3	0.8
HBV	14	1	0	0	0.1
HBV	15	1	0	0	0.1
HBV	16	1	0	0	0.1
HBV	17	2	0	0	0.2
HBV	18	7	0	3	0.6
HBV	19	10	0.5	2	0.8
HBV	20	4	0	1	0.3
HBV	21	1	0	0	0.1
HBV	22	1	0	0	0.1
HBV	23	7	0	1	0.6
HBV	24	19	0	6	1.6
HBV	25	14	0	4	1.2
HBV	26	17	1	4	1.4
HBV	27	5	0	1	0.4
HBV	28	2	0	0	0.2
HBV	29	3	0	1	0.3
HBV	30	7	0	3	0.6
HBV	31	17	1	3	1.4
HBV	32	17	1	3	1.4
HBV	33	2	0	1	0.2
HBV	34	10	0.5	3	0.8
HBV	35	9	0	2	0.8
HBV	36	6	0	1	0.5
HBV	37	23	2	4	1.9
HBV	38	13	1	3	1.1
HBV	39	5	0	1	0.4
HBV	40	18	0	5	1.5
HBV	41	18	1	4	1.5
HBV	42	31	2	6	2.6
HBV	43	19	1	4	1.6
HBV	44	21	1.5	3	1.8
HBV	45	17	1	2	1.4
HC	1	124	5.5	21	10.3
HC	2	52	2	11	4.3
HC	3	90	3.5	15	7.5
HC	4	132	7.5	16	11.0
HC	5	230	14	43	19.2
HC	6	196	17	24	16.3
HC	7	219	12	33	18.3
HC	8	121	7	20	10.1
HC	9	124	8	17	10.3

Site	Series	Total	Median	Range	Mean
HC	10	23	1	4	1.9
HC	11	76	4	15	6.3
HC	12	86	5	11	7.2
HC	13	132	4	22	11.0
HC	14	92	8	8	7.7
HC	15	32	1	7	2.7
HC	16	74	5	9	6.2
HC	17	59	2.5	9	4.9
HC	18	152	10	20	12.7
HC	19	154	7	24	12.8
HC	20	147	10	17	12.3
HC	21	67	3.5	7	5.6
HC	22	187	14	18	15.6
HC	23	155	8.5	25	12.9
HC	24	43	3	8	3.6
HC	25	124	9	16	10.3
HC	26	125	11	17	10.5
HC	27	2	0	1	0.2
HC	28	66	4	12	5.5
HC	29	109	10	15	9.1
HC	30	175	14.5	18	14.6
HC	31	234	14.5	20	19.5
HC	32	140	12	19	11.7
HC	33	127	9.5	16	10.6
HC	34	128	10.5	14	10.7
HC	35	221	18	28	18.4
HC	36	142	11.5	18	11.8
HC	37	195	15	16	16.3
HC	38	98	7	18	8.2
HC	39	67	5	9	5.5
HC	40	141	12.5	18	11.8
HC	41	187	13.5	23	15.6
HC	42	233	17	25	19.4
HC	43	273	25	17	22.8
HC	44	485	39	21	40.4
HC	45	379	30.5	37	31.6
Reef	1	33	2.5	6	2.8
Reef	2	59	4	9	4.9
Reef	3	22	2	2	1.8
Reef	4	63	3	10	5.3
Reef	5	51	3	8	4.3
Reef	6	99	8	13	8.3
Reef	7	51	4.5	6	4.3
Reef	8	45	3.5	7	3.8
Reef	9	36	2	5	3.0
Reef	10	10	1	2	0.8
Reef	11	15	1	2	1.3
Reef	12	11	1	0	0.9
Reef	13	42	4	7	3.5
Reef	14	8	0.5	1	0.6
Reef	15	17	1.5	3	1.4
Reef	16	35	2.5	7	2.9
Reef	17	63	4	9	5.3
Reef	18	56	4	9	4.7
Reef	19	75	5.5	8	6.3

Site	Series	Total	Median	Range	Mean
Reef	20	67	3.5	9	5.6
Reef	21	59	3	13	4.9
Reef	22	41	2.5	8	3.4
Reef	23	59	3.5	10	4.9
Reef	24	42	2.5	6	3.5
Reef	25	89	5.5	7	7.4
Reef	26	76	5	9	6.3
Reef	27	33	1.5	6	2.8
Reef	28	65	4	8	5.4
Reef	29	77	7	10	6.4
Reef	30	89	7	11	7.4
Reef	31	124	11	12	10.4
Reef	32	49	3	10	4.1
Reef	33	65	4.5	10	5.4
Reef	34	68	5	11	5.7
Reef	35	74	6	11	6.2
Reef	36	98	7.5	15	8.2
Reef	37	71	6.5	8	5.9
Reef	38	110	8	15	9.2
Reef	39	5	0	1	0.4
Reef	40	60	6	8	5.0
Reef	41	68	4	9	5.6
Reef	42	49	2.5	9	4.1
Reef	43	58	4.5	9	4.8
Reef	44	69	5	10	5.8
Reef	45	32	2	4	2.7
ShB	1	19	0.5	5	1.6
ShB	2	21	1	5	1.8
ShB	3	24	0	7	2.0
ShB	4	38	3.5	7	3.2
ShB	5	19	0	5	1.5
ShB	6	50	2.5	8	4.2
ShB	7	44	3.5	5	3.7
ShB	8	26	1.5	5	2.2
ShB	9	26	1	5	2.2
ShB	10	38	3	6	3.2
ShB	11	27	2.5	4	2.3
ShB	12	17	1	3	1.5
ShB	13	24	1.5	4	2.0
ShB	14	3	0	1	0.3
ShB	15	14	0	4	1.2
ShB	16	17	1	2	1.4
ShB	17	47	3	9	3.9
ShB	18	20	1	4	1.7
ShB	19	42	1	7	3.5
ShB	20	59	1	14	4.9
ShB	21	46	2	6	3.8
ShB	22	31	1	4	2.5
ShB	23	23	1.5	5	1.9
ShB	24	27	2	5	2.3
ShB	25	9	1	1	0.8
ShB	26	33	2	5	2.8
ShB	27	11	0.5	2	0.9
ShB	28	12	1	2	1.0
ShB	29	41	2.5	6	3.4

Site	Series	Total	Median	Range	Mean
ShB	30	32	2.5	6	2.7
ShB	31	56	3.5	6	4.7
ShB	32	21	1	4	1.8
ShB	33	22	1	2	1.8
ShB	34	63	3.5	13	5.3
ShB	35	32	1	7	2.7
ShB	36	17	1	3	1.5
ShB	37	60	5	9	5.0
ShB	38	76	3.5	16	6.3
ShB	39	4	0	1	0.3
ShB	40	54	2	9	4.5
ShB	41	65	3.5	11	5.4
ShB	42	28	0.5	4	2.3
ShB	43	30	2.5	5	2.5
ShB	44	30	2.5	4	2.5
ShB	45	56	2	10	4.7
Whau	1	344	25.5	58	28.7
Whau	2	482	36	56	40.2
Whau	3	458	36.5	40	38.2
Whau	4	9	0.5	2	0.8
Whau	5	598	52	78	49.8
Whau	6	567	47	40	47.3
Whau	7	746	57	99	62.2
Whau	8	523	37	54	43.6
Whau	9	432	30	56	36.0
Whau	10	332	16.5	54	27.7
Whau	11	193	11.5	25	16.1
Whau	12	399	18	84	33.3
Whau	13	325	22	40	27.1
Whau	14	68	4.5	10	5.7
Whau	15	113	5.5	28	9.4
Whau	16	212	10.5	41	17.7
Whau	17	130	7.5	21	10.8
Whau	18	145	10	24	12.1
Whau	19	175	8	31	14.6
Whau	20	179	8.5	28	14.9
Whau	21	168	8.5	35	14.0
Whau	22	165	11.5	18	13.8
Whau	23	269	22.5	37	22.4
Whau	24	123	10	21	10.3
Whau	25	207	16	22	17.3
Whau	26	267	16.5	45	22.3
Whau	27	34	2.5	5	2.8
Whau	28	62	5.5	10	5.2
Whau	29	69	4.5	13	5.8
Whau	30	145	9	16	12.1
Whau	31	276	17.5	42	23.0
Whau	32	197	15.5	26	16.4
Whau	33	99	8	16	8.3
Whau	34	117	8	20	9.8
Whau	35	210	14.5	38	17.5
Whau	36	75	6.5	5	6.3
Whau	37	225	15	37	18.7
Whau	38	237	11.5	49	19.8
Whau	39	35	2	6	2.9

Site	Series	Total	Median	Range	Mean
Whau	40	187	9.5	38	15.6
Whau	41	119	7	23	9.9
Whau	42	223	18.5	31	18.6
Whau	43	193	10.5	26	16.1
Whau	44	165	15.5	24	13.8
Whau	45	261	21.5	29	21.8

Species: *Arthritica bifurca*

Site	Series	Total	Median	Range	Mean
HBV	1	0	0	0	0.0
HBV	2	1	0	0	0.1
HBV	3	1	0	0	0.1
HBV	4	2	0	1	0.2
HBV	5	3	0	1	0.3
HBV	6	1	0	0	0.1
HBV	7	0	0	0	0.0
HBV	8	3	0	1	0.3
HBV	9	4	0	1	0.3
HBV	10	4	0	1	0.4
HBV	11	6	0	1	0.5
HBV	12	1.2	0	0	0.1
HBV	13	7	0	0	0.6
HBV	14	0	0	0	0.0
HBV	15	0	0	0	0.0
HBV	16	0	0	0	0.0
HBV	17	3	0	1	0.3
HBV	18	2	0	1	0.2
HBV	19	0	0	0	0.0
HBV	20	3	0	1	0.3
HBV	21	1	0	0	0.1
HBV	22	7	0	2	0.6
HBV	23	0	0	0	0.0
HBV	24	9	0.5	2	0.8
HBV	25	10	0	1	0.8
HBV	26	10	0	3	0.8
HBV	27	5	0	1	0.4
HBV	28	1	0	0	0.1
HBV	29	0	0	0	0.0
HBV	30	1	0	0	0.1
HBV	31	0	0	0	0.0
HBV	32	2	0	0	0.2
HBV	33	6	0	1	0.5
HBV	34	0	0	0	0.0
HBV	35	4	0	1	0.3
HBV	36	6	0	1	0.5
HBV	37	10	0	2	0.8
HBV	38	9	0	2	0.8
HBV	39	6	0	1	0.5
HBV	40	2	0	1	0.2
HBV	41	5	0	1	0.4
HBV	42	2	0	1	0.2
HBV	43	2	0	1	0.2
HBV	44	5	0	1	0.4
HBV	45	1	0	0	0.1
HC	1	10	0	2	0.8
HC	2	0	0	0	0.0
HC	3	0	0	0	0.0
HC	4	8	0	2	0.7
HC	5	26	1.5	4	2.2
HC	6	15	1	3	1.3
HC	7	6	0	2	0.5
HC	8	10	0	3	0.8
HC	9	3	0	1	0.3

Site	Series	Total	Median	Range	Mean
HC	10	19	0	6	1.6
HC	11	21	1	6	1.8
HC	12	2	0	1	0.2
HC	13	0	0	0	0.0
HC	14	0	0	0	0.0
HC	15	13	0	3	1.1
HC	16	2	0	1	0.2
HC	17	1	0	0	0.1
HC	18	0	0	0	0.0
HC	19	0	0	0	0.0
HC	20	0	0	0	0.0
HC	21	3	0	1	0.3
HC	22	49	0.5	18	4.1
HC	23	41	2.5	8	3.4
HC	24	0	0	0	0.0
HC	25	31	1	6	2.6
HC	26	3	0	0	0.3
HC	27	0	0	0	0.0
HC	28	2	0	1	0.2
HC	29	17	0.5	4	1.4
HC	30	17	1	3	1.4
HC	31	9	0	2	0.8
HC	32	16	0	6	1.3
HC	33	16	0	2	1.3
HC	34	18	0.5	5	1.5
HC	35	0	0	0	0.0
HC	36	25	1	6	2.1
HC	37	10	0	2	0.8
HC	38	19	1	4	1.6
HC	39	13	0	3	1.1
HC	40	37	1.5	7	3.1
HC	41	9	0.5	1	0.8
HC	42	33	1	7	2.8
HC	43	5	0	2	0.4
HC	44	6	0	2	0.5
HC	45	3	0	1	0.3
Reef	1	0	0	0	0.0
Reef	2	2	0	0	0.2
Reef	3	3	0	1	0.3
Reef	4	15	0.5	2	1.3
Reef	5	11	0.5	3	0.9
Reef	6	3	0	1	0.3
Reef	7	0	0	0	0.0
Reef	8	0	0	0	0.0
Reef	9	7	0	2	0.6
Reef	10	1	0	0	0.1
Reef	11	6	0	1	0.5
Reef	12	0	0	0	0.0
Reef	13	2	0	1	0.2
Reef	14	2	0	0	0.1
Reef	15	13	0	4	1.1
Reef	16	9	0	3	0.8
Reef	17	2	0	1	0.2
Reef	18	3	0	1	0.3
Reef	19	9	0	2	0.8

Site	Series	Total	Median	Range	Mean
Reef	20	11	0.5	1	0.9
Reef	21	25	0.5	9	2.1
Reef	22	15	0.5	5	1.3
Reef	23	17	1	4	1.4
Reef	24	9	0	3	0.8
Reef	25	9	0	1	0.8
Reef	26	25	0.5	5	2.1
Reef	27	0	0	0	0.0
Reef	28	0	0	0	0.0
Reef	29	13	0	2	1.1
Reef	30	1	0	0	0.1
Reef	31	1	0	0	0.1
Reef	32	6	0	1	0.5
Reef	33	5	0	2	0.4
Reef	34	10	0	3	0.8
Reef	35	18	1.5	3	1.5
Reef	36	0	0	0	0.0
Reef	37	10	0	3	0.8
Reef	38	16	0	4	1.3
Reef	39	7	0	1	0.6
Reef	40	10	0	2	0.8
Reef	41	2	0	1	0.2
Reef	42	6	0	1	0.5
Reef	43	7	0	2	0.6
Reef	44	0	0	0	0.0
Reef	45	5	0	2	0.4
ShB	1	0	0	0	0.0
ShB	2	0	0	0	0.0
ShB	3	0	0	0	0.0
ShB	4	1	0	0	0.1
ShB	5	1	0	0	0.1
ShB	6	3	0	0	0.3
ShB	7	0	0	0	0.0
ShB	8	0	0	0	0.0
ShB	9	1	0	0	0.1
ShB	10	1	0	0	0.1
ShB	11	0	0	0	0.0
ShB	12	0	0	0	0.0
ShB	13	0	0	0	0.0
ShB	14	0	0	0	0.0
ShB	15	0	0	0	0.0
ShB	16	0	0	0	0.0
ShB	17	0	0	0	0.0
ShB	18	0	0	0	0.0
ShB	19	1	0	0	0.1
ShB	20	0	0	0	0.0
ShB	21	11	0	1	0.9
ShB	22	0	0	0	0.0
ShB	23	0	0	0	0.0
ShB	24	7	0	2	0.5
ShB	25	9	0	3	0.8
ShB	26	1	0	0	0.1
ShB	27	0	0	0	0.0
ShB	28	1	0	0	0.1
ShB	29	2	0	1	0.2

Site	Series	Total	Median	Range	Mean
ShB	30	0	0	0	0.0
ShB	31	4	0	0	0.3
ShB	32	0	0	0	0.0
ShB	33	0	0	0	0.0
ShB	34	3	0	1	0.3
ShB	35	7	0	1	0.6
ShB	36	4	0	1	0.4
ShB	37	0	0	0	0.0
ShB	38	1	0	0	0.1
ShB	39	2	0	1	0.2
ShB	40	2	0	1	0.2
ShB	41	24	0	0	2.0
ShB	42	10	0	0	0.8
ShB	43	0	0	0	0.0
ShB	44	0	0	0	0.0
ShB	45	1	0	0	0.1
Whau	1	0	0	0	0.0
Whau	2	3	0	1	0.3
Whau	3	10	0	2	0.8
Whau	4	14	0	4	1.1
Whau	5	3	0	1	0.3
Whau	6	12	0	3	1.0
Whau	7	3	0	1	0.3
Whau	8	5	0	1	0.4
Whau	9	15	0	3	1.3
Whau	10	4	0	1	0.3
Whau	11	1	0	0	0.1
Whau	12	0	0	0	0.0
Whau	13	0	0	0	0.0
Whau	14	0	0	0	0.0
Whau	15	3	0	1	0.3
Whau	16	1	0	0	0.1
Whau	17	3	0	1	0.3
Whau	18	2	0	0	0.2
Whau	19	4	0	1	0.3
Whau	20	14	1	3	1.2
Whau	21	18	0.5	3	1.5
Whau	22	10	0.5	2	0.8
Whau	23	11	1	2	0.9
Whau	24	7	0	2	0.6
Whau	25	4	0	1	0.3
Whau	26	4	0	1	0.3
Whau	27	2	0	1	0.2
Whau	28	3	0	1	0.3
Whau	29	13	0.5	3	1.1
Whau	30	11	0	4	0.9
Whau	31	1	0	0	0.1
Whau	32	3	0	1	0.3
Whau	33	3	0	1	0.3
Whau	34	2	0	1	0.2
Whau	35	6	0	1	0.5
Whau	36	3	0	1	0.3
Whau	37	1	0	0	0.1
Whau	38	6	0	1	0.5
Whau	39	5	0	1	0.4

Site	Series	Total	Median	Range	Mean
Whau	40	1	0	0	0.1
Whau	41	0	0	0	0.0
Whau	42	7	0.5	1	0.6
Whau	43	1	0	0	0.1
Whau	44	0	0	0	0.0
Whau	45	3	0	0	0.3

Species: ***Austrovenus stutchburyi***

Site	Series	Total	Median	Range	Mean
HBV	1	83	7	6	6.9
HBV	2	140	13	16	11.7
HBV	3	121	10	12	10.1
HBV	4	174	13	13	14.5
HBV	5	161	12	8	13.4
HBV	6	132	12	12	11.0
HBV	7	160	13	11	13.3
HBV	8	136	10	12	11.3
HBV	9	200	15.5	11	16.7
HBV	10	164	13	15	13.6
HBV	11	199	14.5	9	16.6
HBV	12	167	13.5	7	13.9
HBV	13	153	12	13	12.8
HBV	14	161	13	12	13.5
HBV	15	233	18.5	15	19.4
HBV	16	185	14	21	15.4
HBV	17	142	10.5	14	11.8
HBV	18	162	9	26	13.5
HBV	19	147	11	9	12.3
HBV	20	180	15	17	15.0
HBV	21	202	17	13	16.8
HBV	22	180	14	16	15.0
HBV	23	168	13.5	14	14.0
HBV	24	165	12	12	13.8
HBV	25	156	13	11	13.0
HBV	26	161	12.5	19	13.4
HBV	27	169	13	16	14.1
HBV	28	163	13	11	13.6
HBV	29	178	15.5	19	14.8
HBV	30	146	12	11	12.2
HBV	31	156	13	12	13.0
HBV	32	158	11	16	13.2
HBV	33	180	14	9	15.0
HBV	34	158	12.5	5	13.2
HBV	35	111	8.5	7	9.3
HBV	36	147	12.5	15	12.3
HBV	37	175	14.5	12	14.6
HBV	38	157	12	18	13.1
HBV	39	195	14.5	20	16.3
HBV	40	168	15	13	14.0
HBV	41	149	12	9	12.4
HBV	42	175	15.5	11	14.6
HBV	43	147	10.5	9	12.3
HBV	44	188	14	15	15.7
HBV	45	189	16.5	18	15.8
HC	1	210	14.5	24	17.5
HC	2	242	21.5	22	20.2
HC	3	358	32.5	26	29.8
HC	4	428	34.5	31	35.7
HC	5	454	38.5	40	37.8
HC	6	426	33	22	35.5
HC	7	433	31.5	36	36.1
HC	8	485	39	28	40.4
HC	9	450	36.5	25	37.5

Site	Series	Total	Median	Range	Mean
HC	10	456	38.5	24	38.0
HC	11	424	34	21	35.3
HC	12	372	31	32	31.0
HC	13	299	26.5	16	24.9
HC	14	336	30	20	28.0
HC	15	500	41	34	41.7
HC	16	466	38	26	38.8
HC	17	386	32.5	19	32.2
HC	18	384	33	20	32.0
HC	19	447	39.5	21	37.3
HC	20	410	34	32	34.2
HC	21	376	32.5	20	31.3
HC	22	318	23	20	26.5
HC	23	337	26.5	22	28.1
HC	24	590	28.5	102	49.2
HC	25	257	23	33	21.4
HC	26	344	30	17	28.6
HC	27	305	27	25	25.5
HC	28	335	26.5	21	27.9
HC	29	371	33	25	30.9
HC	30	297	23.5	16	24.8
HC	31	273	25	29	22.8
HC	32	349	29.5	16	29.1
HC	33	243	19.5	21	20.3
HC	34	230	18.5	16	19.2
HC	35	198	14	16	16.5
HC	36	176	14.5	13	14.7
HC	37	166	14	14	13.8
HC	38	261	27	25	21.8
HC	39	188	13	21	15.6
HC	40	218	17.5	17	18.2
HC	41	181	14	6	15.1
HC	42	172	14.5	12	14.3
HC	43	153	13	10	12.8
HC	44	375	31	15	31.3
HC	45	330	26	28	27.5
Reef	1	3	0	0	0.3
Reef	2	173	14	16	14.4
Reef	3	53	3.5	9	4.4
Reef	4	49	2.5	10	4.1
Reef	5	24	1	3	2.0
Reef	6	16	1.5	3	1.3
Reef	7	10	0.5	2	0.8
Reef	8	29	1.5	6	2.4
Reef	9	31	1	8	2.6
Reef	10	3	0	1	0.3
Reef	11	3	0	1	0.3
Reef	12	0	0	0	0.0
Reef	13	13	1	2	1.1
Reef	14	18	1	3	1.5
Reef	15	4	0	1	0.3
Reef	16	3	0	1	0.3
Reef	17	6	0	2	0.5
Reef	18	45	2	12	3.8
Reef	19	124	6.5	17	10.3

Site	Series	Total	Median	Range	Mean
Reef	20	61	3.5	10	5.1
Reef	21	22	1.5	4	1.8
Reef	22	2	0	1	0.2
Reef	23	15	1	3	1.3
Reef	24	22	0.5	4	1.8
Reef	25	24	1	5	2.0
Reef	26	81	5	10	6.8
Reef	27	6	0	1	0.5
Reef	28	6	0	2	0.5
Reef	29	17	0	1	1.4
Reef	30	6	0	2	0.5
Reef	31	4	0	1	0.4
Reef	32	66	4.5	10	5.5
Reef	33	7	0.5	1	0.6
Reef	34	4	0	1	0.3
Reef	35	3	0	1	0.3
Reef	36	16	1	4	1.3
Reef	37	24	2	3	2.0
Reef	38	21	1.5	4	1.8
Reef	39	5	0	1	0.4
Reef	40	2	0	1	0.2
Reef	41	1	0	0	0.1
Reef	42	7	0	2	0.6
Reef	43	23	2	4	1.9
Reef	44	22	1	4	1.8
Reef	45	4	0	1	0.3
ShB	1	21	1.5	4	1.8
ShB	2	23	2	4	1.9
ShB	3	55	2	12	4.6
ShB	4	63	5	8	5.3
ShB	5	48	3	8	4.0
ShB	6	29	3	4	2.4
ShB	7	38	3	7	3.2
ShB	8	37	2.5	8	3.1
ShB	9	38	2.5	7	3.2
ShB	10	41	2	7	3.4
ShB	11	23	1.5	4	1.9
ShB	12	46	3	8	3.8
ShB	13	15	0.5	4	1.3
ShB	14	36	3	4	3.0
ShB	15	64	5	10	5.3
ShB	16	44	2.5	9	3.7
ShB	17	24	0.5	6	2.0
ShB	18	26	2	4	2.2
ShB	19	7	0	1	0.6
ShB	20	199	6	53	16.6
ShB	21	39	1.5	6	3.3
ShB	22	21	0	6	1.7
ShB	23	16	0	4	1.3
ShB	24	32	1	8	2.6
ShB	25	14	1	2	1.2
ShB	26	114	4.5	11	9.5
ShB	27	51	3	9	4.3
ShB	28	11	0	3	0.9
ShB	29	4	0	1	0.3

Site	Series	Total	Median	Range	Mean
ShB	30	14	0.5	2	1.2
ShB	31	22	1	4	1.8
ShB	32	19	1.5	4	1.6
ShB	33	17	0	6	1.4
ShB	34	13	0	2	1.1
ShB	35	2	0	1	0.2
ShB	36	11	0	2	0.9
ShB	37	19	0	4	1.6
ShB	38	38	2	7	3.2
ShB	39	0	0	0	0.0
ShB	40	16	0	4	1.3
ShB	41	26	0	8	2.2
ShB	42	15	1	3	1.3
ShB	43	8	0	3	0.7
ShB	44	33	2	8	2.8
ShB	45	17	1	4	1.4
Whau	1	149	11.5	16	12.4
Whau	2	322	22.5	45	26.8
Whau	3	513	41.5	35	42.8
Whau	4	96	8.5	7	8.0
Whau	5	210	16.5	20	17.5
Whau	6	197	16.5	17	16.4
Whau	7	135	10	13	11.3
Whau	8	404	34.5	25	33.7
Whau	9	233	16.5	24	19.4
Whau	10	0	0	0	0.0
Whau	11	119	9.5	13	9.9
Whau	12	125	9	13	10.4
Whau	13	71	6.5	8	5.9
Whau	14	157	12.5	17	13.1
Whau	15	253	17.5	21	21.1
Whau	16	252	14.5	29	21.0
Whau	17	328	26	19	27.3
Whau	18	141	10	12	11.8
Whau	19	206	18	19	17.2
Whau	20	759	68.5	56	63.3
Whau	21	157	8.5	25	13.1
Whau	22	84	6.5	9	7.0
Whau	23	103	9	11	8.6
Whau	24	127	9	11	10.6
Whau	25	92	7	8	7.7
Whau	26	1034	90	123	86.2
Whau	27	149	12	12	12.4
Whau	28	74	6	7	6.2
Whau	29	0	0	0	0.0
Whau	30	46	4	3	3.8
Whau	31	52	3.5	5	4.3
Whau	32	370	30.5	37	30.8
Whau	33	58	5.5	5	4.8
Whau	34	36	3	4	3.0
Whau	35	32	2	4	2.7
Whau	36	48	4	5	4.0
Whau	37	98	6	18	8.2
Whau	38	273	21	22	22.8
Whau	39	61	4.5	4	5.1

Site	Series	Total	Median	Range	Mean
Whau	40	113	8	14	9.4
Whau	41	71	3.5	11	5.9
Whau	42	52	2	8	4.3
Whau	43	152	12	13	12.7
Whau	44	212	17.5	14	17.7
Whau	45	121	7.5	18	10.1

Species: *Boccardia syrtis*

Site	Series	Total	Median	Range	Mean
HBV	1	4	0	1	0.3
HBV	2	4	0	1	0.3
HBV	3	1	0	0	0.1
HBV	4	2	0	1	0.2
HBV	5	3	0	1	0.3
HBV	6	4	0	1	0.3
HBV	7	10	1	2	0.8
HBV	8	3	0	1	0.3
HBV	9	11	0.5	3	0.9
HBV	10	0	0	0	0.0
HBV	11	1	0	0	0.1
HBV	12	4	0	1	0.3
HBV	13	2	0	1	0.2
HBV	14	1	0	0	0.1
HBV	15	2	0	1	0.2
HBV	16	3	0	1	0.3
HBV	17	7	0.5	1	0.6
HBV	18	6	0	1	0.5
HBV	19	2	0	1	0.2
HBV	20	1	0	0	0.1
HBV	21	0	0	0	0.0
HBV	22	1	0	0	0.1
HBV	23	4	0	1	0.3
HBV	24	2	0	1	0.2
HBV	25	2	0	1	0.2
HBV	26	4	0	1	0.3
HBV	27	0	0	0	0.0
HBV	28	3	0	1	0.3
HBV	29	5	0	1	0.4
HBV	30	8	1	1	0.7
HBV	31	1	0	0	0.1
HBV	32	0	0	0	0.0
HBV	33	0	0	0	0.0
HBV	34	1	0	0	0.1
HBV	35	6	0	1	0.5
HBV	36	9	1	1	0.8
HBV	37	2	0	1	0.2
HBV	38	5	0	1	0.4
HBV	39	6	0	1	0.5
HBV	40	5	0	1	0.4
HBV	41	5	0	1	0.4
HBV	42	27	1.5	5	2.3
HBV	43	4	0	1	0.3
HBV	44	1	0	0	0.1
HBV	45	2	0	1	0.2
HC	1	98	5	19	8.2
HC	2	12	0.5	2	1.0
HC	3	19	1	4	1.6
HC	4	33	3	4	2.8
HC	5	40	2	8	3.3
HC	6	31	2.5	5	2.6
HC	7	15	0	1	1.3
HC	8	16	1	4	1.3
HC	9	5	0	1	0.4
HC	10	2	0	0	0.2
HC	11	2	0	1	0.2
HC	12	3	0	1	0.3
HC	13	7	0	2	0.6
HC	14	0	0	0	0.0
HC	15	3	0	1	0.2
HC	16	2	0	1	0.2
HC	17	1	0	0	0.1
HC	18	5	0	2	0.4
HC	19	7	0.5	1	0.6
HC	20	7	0	2	0.6
HC	21	3	0	1	0.3
HC	22	13	1	2	1.1
HC	23	2	0	1	0.2
HC	24	0	0	0	0.0
HC	25	5	0	1	0.4
HC	26	1	0	0	0.1
HC	27	2	0	0	0.2
HC	28	2	0	1	0.2
HC	29	3	0	1	0.3
HC	30	4	0	1	0.3
HC	31	6	0	1	0.5
HC	32	0	0	0	0.0
HC	33	3	0	1	0.3
HC	34	3	0	1	0.3
HC	35	2	0	1	0.2
HC	36	0	0	0	0.0
HC	37	6	0	2	0.5
HC	38	5	0	1	0.4
HC	39	4	0	1	0.4
HC	40	6	0	2	0.5
HC	41	4	0	1	0.3
HC	42	4	0	1	0.3
HC	43	4	0	1	0.3
HC	44	0	0	0	0.0
HC	45	2	0	1	0.2
Reef	1	14	0.5	3	1.2
Reef	2	9	0	1	0.8
Reef	3	11	0	1	0.9
Reef	4	12	1	2	1.0
Reef	5	23	2	3	1.9
Reef	6	19	1	4	1.6
Reef	7	3	0	1	0.3
Reef	8	3	0	1	0.3
Reef	9	2	0	1	0.2
Reef	10	4	0	1	0.4
Reef	11	9	0.5	1	0.8
Reef	12	3	0	1	0.3
Reef	13	6	0	1	0.5
Reef	14	6	0	1	0.5
Reef	15	6	0	2	0.5
Reef	16	13	0.5	2	1.1
Reef	17	40	2	7	3.3
Reef	18	42	1.5	10	3.5
Reef	19	39	2.5	6	3.3

Site	Series	Total	Median	Range	Mean
Reef	20	32	1.5	7	2.7
Reef	21	27	1.5	6	2.3
Reef	22	10	0	1	0.8
Reef	23	38	2.5	7	3.2
Reef	24	30	2	4	2.5
Reef	25	19	1	3	1.6
Reef	26	1	0	0	0.1
Reef	27	2	0	0	0.2
Reef	28	142	9	20	11.8
Reef	29	328	25	45	27.3
Reef	30	470	33.5	67	39.2
Reef	31	187	17	21	15.5
Reef	32	19	1	4	1.6
Reef	33	5	0	2	0.4
Reef	34	86	2	8	7.2
Reef	35	142	2	27	11.8
Reef	36	18	1	3	1.5
Reef	37	26	2	5	2.2
Reef	38	14	1	2	1.2
Reef	39	4	0	0	0.3
Reef	40	24	0.5	5	2.0
Reef	41	116	8	12	9.6
Reef	42	85	2	16	7.1
Reef	43	3	0	1	0.3
Reef	44	0	0	0	0.0
Reef	45	75	1.5	14	6.3
ShB	1	47	3.5	10	3.9
ShB	2	42	2	10	3.5
ShB	3	38	2.5	5	3.2
ShB	4	43	2	11	3.6
ShB	5	27	0	4	2.3
ShB	6	32	2	5	2.7
ShB	7	30	2.5	4	2.5
ShB	8	16	1	3	1.3
ShB	9	10	0.5	1	0.8
ShB	10	31	1.5	6	2.6
ShB	11	21	1	6	1.8
ShB	12	28	2	7	2.4
ShB	13	9	0	3	0.8
ShB	14	6	0	2	0.5
ShB	15	13	0	3	1.1
ShB	16	64	1	19	5.3
ShB	17	32	1	6	2.7
ShB	18	21	0.5	5	1.8
ShB	19	34	1	9	2.8
ShB	20	131	2	29	10.9
ShB	21	52	1.5	8	4.3
ShB	22	56	4	7	4.6
ShB	23	71	5	14	5.9
ShB	24	58	2	11	4.8
ShB	25	12	1	2	1.0
ShB	26	59	2.5	8	4.9
ShB	27	25	1.5	4	2.1
ShB	28	87	5.5	15	7.3
ShB	29	96	4.5	21	8.0

Site	Series	Total	Median	Range	Mean
ShB	30	51	2.5	9	4.3
ShB	31	82	4	20	6.8
ShB	32	56	2	12	4.7
ShB	33	44	2.5	5	3.7
ShB	34	92	5	22	7.7
ShB	35	10	0	3	0.8
ShB	36	62	4	9	5.2
ShB	37	72	4	15	6.0
ShB	38	45	1	10	3.8
ShB	39	80	2	8	6.7
ShB	40	56	2.5	10	4.7
ShB	41	56	1	15	4.7
ShB	42	41	1.5	8	3.4
ShB	43	103	3.5	28	8.6
ShB	44	29	1.5	4	2.4
ShB	45	31	1.5	4	2.6
Whau	1	24	1	4	2.0
Whau	2	17	1	4	1.4
Whau	3	9	0	1	0.8
Whau	4	20	0.5	4	1.6
Whau	5	27	0.5	8	2.3
Whau	6	17	1	4	1.4
Whau	7	8	0	2	0.7
Whau	8	17	1	3	1.4
Whau	9	8	0	3	0.7
Whau	10	6	0	2	0.5
Whau	11	3	0	1	0.3
Whau	12	9	0.5	2	0.8
Whau	13	4	0	1	0.3
Whau	14	8	0	2	0.7
Whau	15	21	1	2	1.8
Whau	16	27	1	7	2.3
Whau	17	16	1	3	1.3
Whau	18	16	0	5	1.3
Whau	19	4	0	1	0.3
Whau	20	26	1	5	2.2
Whau	21	61	3	12	5.1
Whau	22	32	1	7	2.7
Whau	23	41	2	8	3.4
Whau	24	26	1	5	2.2
Whau	25	30	2	5	2.5
Whau	26	27	2	5	2.3
Whau	27	5	0	1	0.4
Whau	28	34	1.5	8	2.8
Whau	29	15	1	4	1.3
Whau	30	12	0.5	2	1.0
Whau	31	9	0	2	0.8
Whau	32	13	1	2	1.1
Whau	33	5	0	1	0.4
Whau	34	6	0	1	0.5
Whau	35	9	0	2	0.8
Whau	36	42	3	7	3.5
Whau	37	20	2	2	1.6
Whau	38	11	1	2	0.9
Whau	39	6	0	2	0.5

Site	Series	Total	Median	Range	Mean
Whau	40	8	0	3	0.7
Whau	41	4	0	1	0.3
Whau	42	16	1	1	1.3
Whau	43	2	0	1	0.2
Whau	44	0	0	0	0.0
Whau	45	7	0	1	0.6

Species: *Colurostylis lemurum*

Site	Series	Total	Median	Range	Mean
HBV	1	13	1	3	1.1
HBV	2	10	0.5	2	0.8
HBV	3	11	1	1	0.9
HBV	4	50	3.5	9	4.2
HBV	5	26	2	3	2.2
HBV	6	42	3	6	3.5
HBV	7	26	2	4	2.2
HBV	8	21	1	4	1.8
HBV	9	15	1	2	1.3
HBV	10	71	4	10	5.9
HBV	11	47	3.5	7	3.9
HBV	12	56	4	10	4.7
HBV	13	28	2	5	2.3
HBV	14	19	0	5	1.5
HBV	15	35	1.5	8	2.9
HBV	16	29	1.5	5	2.4
HBV	17	10	1	2	0.8
HBV	18	20	1	6	1.7
HBV	19	20	1	4	1.7
HBV	20	26	1.5	5	2.2
HBV	21	30	1.5	5	2.5
HBV	22	21	1	4	1.8
HBV	23	17	1.5	3	1.4
HBV	24	36	2.5	6	3.0
HBV	25	37	3	5	3.1
HBV	26	20	1	4	1.7
HBV	27	11	1	2	0.9
HBV	28	11	1	2	0.9
HBV	29	16	1	4	1.3
HBV	30	55	4.5	5	4.6
HBV	31	26	2	4	2.2
HBV	32	24	2	3	2.0
HBV	33	21	1.5	4	1.8
HBV	34	20	1.5	3	1.7
HBV	35	21	1.5	5	1.8
HBV	36	36	2	5	3.0
HBV	37	16	1	3	1.3
HBV	38	40	2	6	3.3
HBV	39	7	0	2	0.6
HBV	40	53	3	9	4.4
HBV	41	26	1	6	2.2
HBV	42	22	1.5	4	1.8
HBV	43	21	2	4	1.8
HBV	44	27	2	5	2.3
HBV	45	46	3.5	4	3.8
HC	1	15	1	3	1.3
HC	2	10	1	2	0.8
HC	3	16	1	5	1.3
HC	4	17	0	4	1.4
HC	5	23	1.5	2	1.9
HC	6	32	2.5	4	2.7
HC	7	13	0.5	3	1.1
HC	8	15	0	5	1.3
HC	9	9	0	3	0.8

Site	Series	Total	Median	Range	Mean
HC	10	24	1.5	6	2.0
HC	11	10	1	2	0.8
HC	12	26	2	5	2.2
HC	13	20	1.5	3	1.7
HC	14	10	0	3	0.8
HC	15	23	1	5	1.9
HC	16	9	0.5	2	0.8
HC	17	12	1	3	1.0
HC	18	20	1	5	1.7
HC	19	22	1	4	1.8
HC	20	22	1	4	1.8
HC	21	14	1	1	1.2
HC	22	39	2	6	3.3
HC	23	25	2	4	2.1
HC	24	27	1.5	5	2.3
HC	25	16	1	2	1.3
HC	26	36	3	4	3.0
HC	27	3	0	0	0.3
HC	28	13	0.5	2	1.1
HC	29	31	1	7	2.6
HC	30	41	2	7	3.4
HC	31	20	2	3	1.7
HC	32	19	1	4	1.6
HC	33	22	1	5	1.8
HC	34	9	0	3	0.8
HC	35	16	1	3	1.3
HC	36	1	0	0	0.1
HC	37	3	0	1	0.3
HC	38	6	0	1	0.5
HC	39	15	1	3	1.3
HC	40	41	3	8	3.4
HC	41	15	1	3	1.3
HC	42	14	0.5	3	1.2
HC	43	32	2.5	3	2.7
HC	44	67	5	10	5.6
HC	45	29	2	6	2.4
Reef	1	4	0	2	0.3
Reef	2	19	1	5	1.6
Reef	3	9	0	2	0.8
Reef	4	94	4.5	17	7.8
Reef	5	218	9.5	44	18.2
Reef	6	11	0.5	1	0.9
Reef	7	8	0	2	0.7
Reef	8	2	0	0	0.2
Reef	9	9	0	2	0.8
Reef	10	55	4	8	4.5
Reef	11	22	2	3	1.8
Reef	12	2	0	1	0.2
Reef	13	6	0	1	0.5
Reef	14	5	0	1	0.4
Reef	15	9	0	3	0.8
Reef	16	48	1.5	8	4.0
Reef	17	44	1	10	3.7
Reef	18	7	1	1	0.6
Reef	19	72	6.5	10	6.0

Site	Series	Total	Median	Range	Mean
Reef	20	22	1	5	1.8
Reef	21	4	0	1	0.3
Reef	22	31	2	6	2.6
Reef	23	23	1	4	1.9
Reef	24	35	1.5	8	2.9
Reef	25	6	0	1	0.5
Reef	26	29	2	4	2.4
Reef	27	11	0.5	2	0.9
Reef	28	12	0.5	2	1.0
Reef	29	11	0	2	0.9
Reef	30	8	0	2	0.7
Reef	31	15	0	3	1.3
Reef	32	3	0	1	0.3
Reef	33	2	0	1	0.2
Reef	34	16	1	3	1.3
Reef	35	45	1	12	3.8
Reef	36	32	1	3	2.7
Reef	37	30	2	5	2.5
Reef	38	11	1	2	0.9
Reef	39	7	0	2	0.6
Reef	40	18	1.5	3	1.5
Reef	41	60	5	11	5.0
Reef	42	88	6.5	9	7.3
Reef	43	13	0	3	1.1
Reef	44	14	0	3	1.2
Reef	45	3	0	1	0.3
ShB	1	9	0	2	0.8
ShB	2	9	0	2	0.8
ShB	3	16	0	4	1.3
ShB	4	26	0.5	4	2.2
ShB	5	38	1	11	3.2
ShB	6	19	0	3	1.6
ShB	7	17	1	4	1.4
ShB	8	22	1	4	1.8
ShB	9	31	0.5	8	2.6
ShB	10	113	8	17	9.4
ShB	11	7	0	2	0.6
ShB	12	13	0	3	1.1
ShB	13	6	0	2	0.5
ShB	14	17	1	3	1.4
ShB	15	61	4.5	8	5.1
ShB	16	34	1.5	5	2.8
ShB	17	22	1	6	1.8
ShB	18	18	1.5	3	1.5
ShB	19	41	2.5	8	3.4
ShB	20	45	3.5	10	3.8
ShB	21	6	0	1	0.5
ShB	22	19	1	3	1.5
ShB	23	3	0	1	0.3
ShB	24	10	0	3	0.8
ShB	25	18	1	4	1.5
ShB	26	26	0	2	2.2
ShB	27	29	2	5	2.4
ShB	28	6	0	1	0.5
ShB	29	9	0	1	0.8

Site	Series	Total	Median	Range	Mean
ShB	30	14	1	3	1.2
ShB	31	15	0	3	1.3
ShB	32	4	0	1	0.3
ShB	33	7	0	2	0.6
ShB	34	15	0.5	3	1.3
ShB	35	9	0	2	0.8
ShB	36	14	0	3	1.2
ShB	37	20	0.5	6	1.7
ShB	38	33	1.5	8	2.8
ShB	39	2	0	1	0.2
ShB	40	4	0	1	0.3
ShB	41	11	0	1	0.9
ShB	42	14	0	3	1.2
ShB	43	11	0	4	0.9
ShB	44	27	1.5	5	2.3
ShB	45	18	0	4	1.5
Whau	1	13	1	2	1.1
Whau	2	14	1	3	1.2
Whau	3	6	0	1	0.5
Whau	4	18	2	2	1.5
Whau	5	50	3	7	4.2
Whau	6	12	0	4	1.0
Whau	7	11	1	2	0.9
Whau	8	7	0.5	1	0.6
Whau	9	18	2	2	1.5
Whau	10	80	5.5	12	6.7
Whau	11	10	0.5	2	0.8
Whau	12	41	3	6	3.4
Whau	13	5	0	1	0.4
Whau	14	8	0.5	2	0.7
Whau	15	4	0	1	0.3
Whau	16	29	1.5	4	2.4
Whau	17	21	1	4	1.8
Whau	18	25	1.5	3	2.1
Whau	19	27	2	5	2.3
Whau	20	19	1.5	3	1.6
Whau	21	5	0	2	0.4
Whau	22	18	1	3	1.5
Whau	23	27	1	1	2.3
Whau	24	47	4.5	5	3.9
Whau	25	14	1	3	1.2
Whau	26	20	1.5	3	1.7
Whau	27	21	2	2	1.8
Whau	28	15	1	4	1.3
Whau	29	16	1	3	1.3
Whau	30	19	1	4	1.6
Whau	31	20	2	3	1.7
Whau	32	16	1	3	1.3
Whau	33	28	2	3	2.3
Whau	34	70	5	10	5.8
Whau	35	55	5	7	4.6
Whau	36	24	1.5	4	2.0
Whau	37	17	1	3	1.5
Whau	38	7	0.5	1	0.6
Whau	39	27	3	4	2.3

Site	Series	Total	Median	Range	Mean
Whau	40	51	3.5	9	4.3
Whau	41	33	2	4	2.8
Whau	42	56	5	8	4.7
Whau	43	19	1.5	3	1.6
Whau	44	68	5	10	5.7
Whau	45	36	3	4	3.0

Species: *Diloma subrostrata*

Site	Series	Total	Median	Range	Mean
HBV	1	6	0	2	0.5
HBV	2	3	0	1	0.3
HBV	3	0	0	0	0.0
HBV	4	5	0	1	0.4
HBV	5	10	1	2	0.8
HBV	6	1	0	0	0.1
HBV	7	0	0	0	0.0
HBV	8	0	0	0	0.0
HBV	9	2	0	1	0.2
HBV	10	11	1	2	0.9
HBV	11	10	0.5	2	0.8
HBV	12	5	0	1	0.4
HBV	13	2	0	1	0.2
HBV	14	9	1	2	0.7
HBV	15	1	0	0	0.1
HBV	16	19	2	3	1.6
HBV	17	8	0.5	1	0.7
HBV	18	3	0	1	0.3
HBV	19	6	0	1	0.5
HBV	20	7	0.5	1	0.6
HBV	21	2	0	1	0.2
HBV	22	2	0	1	0.2
HBV	23	2	0	1	0.2
HBV	24	12	0.5	3	1.0
HBV	25	14	1	4	1.2
HBV	26	6	0	2	0.5
HBV	27	11	1	2	0.9
HBV	28	3	0	1	0.3
HBV	29	8	0	2	0.7
HBV	30	2	0	1	0.2
HBV	31	15	0	4	1.3
HBV	32	12	0.5	3	1.0
HBV	33	1	0	0	0.1
HBV	34	13	1	2	1.1
HBV	35	5	0	1	0.4
HBV	36	9	0.5	2	0.8
HBV	37	6	0	1	0.5
HBV	38	5	0	1	0.4
HBV	39	4	0	0	0.3
HBV	40	11	0	3	0.9
HBV	41	10	0.5	2	0.8
HBV	42	19	1	3	1.6
HBV	43	12	0.5	2	1.0
HBV	44	0	0	0	0.0
HBV	45	12	0.5	3	1.0
HC	1	16	2	2	1.3
HC	2	14	1	2	1.2
HC	3	2	0	1	0.2
HC	4	8	0	2	0.7
HC	5	8	0.5	1	0.7
HC	6	5	0	1	0.4
HC	7	43	3.5	7	3.6
HC	8	4	0	1	0.3
HC	9	14	1	2	1.2

Site	Series	Total	Median	Range	Mean
HC	10	26	1.5	6	2.2
HC	11	18	1	4	1.5
HC	12	8	1	1	0.6
HC	13	2	0	1	0.2
HC	14	1	0	0	0.1
HC	15	5	0	1	0.4
HC	16	10	1	2	0.8
HC	17	8	0	2	0.7
HC	18	10	1	2	0.8
HC	19	5	0	2	0.4
HC	20	5	0	1	0.4
HC	21	4	0	1	0.3
HC	22	8	1	1	0.7
HC	23	5	0	1	0.4
HC	24	20	0	3	1.7
HC	25	12	1	3	1.0
HC	26	4	0	1	0.4
HC	27	8	0	2	0.6
HC	28	6	0	2	0.5
HC	29	6	0	1	0.5
HC	30	9	0.5	1	0.8
HC	31	4	0	1	0.3
HC	32	15	1	4	1.3
HC	33	2	0	0	0.2
HC	34	19	1	3	1.6
HC	35	40	2	10	3.3
HC	36	20	1	3	1.7
HC	37	7	0	1	0.6
HC	38	3	0	1	0.2
HC	39	7	0	1	0.5
HC	40	7	0.5	1	0.6
HC	41	29	2	5	2.4
HC	42	29	1.5	5	2.4
HC	43	23	1	6	1.9
HC	44	13	0.5	3	1.1
HC	45	13	1	2	1.1
Reef	1	2	0	0	0.2
Reef	2	3	0	1	0.3
Reef	3	1	0	0	0.1
Reef	4	0	0	0	0.0
Reef	5	0	0	0	0.0
Reef	6	1	0	0	0.1
Reef	7	0	0	0	0.0
Reef	8	0	0	0	0.0
Reef	9	0	0	0	0.0
Reef	10	2	0	1	0.2
Reef	11	0	0	0	0.0
Reef	12	0	0	0	0.0
Reef	13	0	0	0	0.0
Reef	14	0	0	0	0.0
Reef	15	0	0	0	0.0
Reef	16	0	0	0	0.0
Reef	17	0	0	0	0.0
Reef	18	0	0	0	0.0
Reef	19	0	0	0	0.0

Site	Series	Total	Median	Range	Mean
Reef	20	0	0	0	0.0
Reef	21	0	0	0	0.0
Reef	22	0	0	0	0.0
Reef	23	0	0	0	0.0
Reef	24	0	0	0	0.0
Reef	25	1	0	0	0.1
Reef	26	0	0	0	0.0
Reef	27	0	0	0	0.0
Reef	28	0	0	0	0.0
Reef	29	0	0	0	0.0
Reef	30	0	0	0	0.0
Reef	31	0	0	0	0.0
Reef	32	0	0	0	0.0
Reef	33	0	0	0	0.0
Reef	34	0	0	0	0.0
Reef	35	0	0	0	0.0
Reef	36	2	0	0	0.2
Reef	37	0	0	0	0.0
Reef	38	0	0	0	0.0
Reef	39	0	0	0	0.0
Reef	40	2	0	1	0.2
Reef	41	0	0	0	0.0
Reef	42	0	0	0	0.0
Reef	43	0	0	0	0.0
Reef	44	0	0	0	0.0
Reef	45	1	0	0	0.1
ShB	1	6	0	2	0.5
ShB	2	5	0	1	0.4
ShB	3	2	0	1	0.2
ShB	4	9	0	2	0.8
ShB	5	3	0	0	0.3
ShB	6	0	0	0	0.0
ShB	7	2	0	0	0.2
ShB	8	1	0	0	0.1
ShB	9	0	0	0	0.0
ShB	10	9	0.5	2	0.8
ShB	11	5	0	1	0.4
ShB	12	3	0	1	0.3
ShB	13	1	0	0	0.1
ShB	14	0	0	0	0.0
ShB	15	2	0	1	0.2
ShB	16	1	0	0	0.1
ShB	17	8	0	2	0.7
ShB	18	1	0	0	0.1
ShB	19	0	0	0	0.0
ShB	20	3	0	1	0.3
ShB	21	1	0	0	0.1
ShB	22	2	0	0	0.2
ShB	23	4	0	2	0.3
ShB	24	14	1	3	1.2
ShB	25	8	1	1	0.7
ShB	26	4	0	1	0.3
ShB	27	4	0	1	0.3
ShB	28	2	0	1	0.2
ShB	29	4	0	1	0.3

Site	Series	Total	Median	Range	Mean
ShB	30	10	0	2	0.8
ShB	31	6	0	2	0.5
ShB	32	8	0	2	0.7
ShB	33	0	0	0	0.0
ShB	34	0	0	0	0.0
ShB	35	1	0	0	0.1
ShB	36	1	0	0	0.1
ShB	37	7	0	1	0.6
ShB	38	1	0	0	0.1
ShB	39	5	0	1	0.4
ShB	40	1	0	0	0.1
ShB	41	3	0	1	0.3
ShB	42	5	0	2	0.4
ShB	43	1	0	0	0.1
ShB	44	0	0	0	0.0
ShB	45	2	0	0	0.2
Whau	1	0	0	0	0.0
Whau	2	8	0.5	1	0.7
Whau	3	5	0	1	0.4
Whau	4	3	0	1	0.3
Whau	5	1	0	0	0.1
Whau	6	3	0	1	0.3
Whau	7	0	0	0	0.0
Whau	8	0	0	0	0.0
Whau	9	2	0	1	0.2
Whau	10	0	0	0	0.0
Whau	11	2	0	1	0.2
Whau	12	0	0	0	0.0
Whau	13	0	0	0	0.0
Whau	14	0	0	0	0.0
Whau	15	3	0	1	0.3
Whau	16	2	0	1	0.2
Whau	17	0	0	0	0.0
Whau	18	1	0	0	0.1
Whau	19	3	0	1	0.3
Whau	20	1	0	0	0.1
Whau	21	2	0	1	0.2
Whau	22	1	0	0	0.1
Whau	23	1	0	0	0.1
Whau	24	1	0	0	0.1
Whau	25	2	0	1	0.2
Whau	26	1	0	0	0.1
Whau	27	1	0	0	0.1
Whau	28	1	0	0	0.1
Whau	29	2	0	0	0.2
Whau	30	4	0	1	0.3
Whau	31	0	0	0	0.0
Whau	32	1	0	0	0.1
Whau	33	1	0	0	0.1
Whau	34	2	0	1	0.2
Whau	35	1	0	0	0.1
Whau	36	0	0	0	0.0
Whau	37	4	0	1	0.4
Whau	38	1	0	0	0.1
Whau	39	0	0	0	0.0

Site	Series	Total	Median	Range	Mean
Whau	40	1	0	0	0.1
Whau	41	1	0	0	0.1
Whau	42	3	0	1	0.3
Whau	43	1	0	0	0.1
Whau	44	0	0	0	0.0
Whau	45	2	0	1	0.2

Species: *Euchone* sp.

Site	Series	Total	Median	Range	Mean
HBV	1	0	0	0	0.0
HBV	2	0	0	0	0.0
HBV	3	0	0	0	0.0
HBV	4	0	0	0	0.0
HBV	5	0	0	0	0.0
HBV	6	0	0	0	0.0
HBV	7	0	0	0	0.0
HBV	8	0	0	0	0.0
HBV	9	0	0	0	0.0
HBV	10	0	0	0	0.0
HBV	11	0	0	0	0.0
HBV	12	0	0	0	0.0
HBV	13	0	0	0	0.0
HBV	14	0	0	0	0.0
HBV	15	0	0	0	0.0
HBV	16	0	0	0	0.0
HBV	17	0	0	0	0.0
HBV	18	0	0	0	0.0
HBV	19	0	0	0	0.0
HBV	20	0	0	0	0.0
HBV	21	0	0	0	0.0
HBV	22	0	0	0	0.0
HBV	23	0	0	0	0.0
HBV	24	0	0	0	0.0
HBV	25	0	0	0	0.0
HBV	26	0	0	0	0.0
HBV	27	0	0	0	0.0
HBV	28	0	0	0	0.0
HBV	29	0	0	0	0.0
HBV	30	0	0	0	0.0
HBV	31	0	0	0	0.0
HBV	32	0	0	0	0.0
HBV	33	0	0	0	0.0
HBV	34	0	0	0	0.0
HBV	35	0	0	0	0.0
HBV	36	17	0	4	1.4
HBV	37	0	0	0	0.0
HBV	38	3	0	1	0.3
HBV	39	0	0	0	0.0
HBV	40	0	0	0	0.0
HBV	41	0	0	0	0.0
HBV	42	0	0	0	0.0
HBV	43	0	0	0	0.0
HBV	44	0	0	0	0.0
HBV	45	0	0	0	0.0
HC	1	0	0	0	0.0
HC	2	0	0	0	0.0
HC	3	0	0	0	0.0
HC	4	0	0	0	0.0
HC	5	1	0	0	0.1
HC	6	0	0	0	0.0
HC	7	0	0	0	0.0
HC	8	0	0	0	0.0
HC	9	0	0	0	0.0

Site	Series	Total	Median	Range	Mean
HC	10	1	0	0	0.1
HC	11	0	0	0	0.0
HC	12	0	0	0	0.0
HC	13	0	0	0	0.0
HC	14	0	0	0	0.0
HC	15	0	0	0	0.0
HC	16	0	0	0	0.0
HC	17	0	0	0	0.0
HC	18	0	0	0	0.0
HC	19	0	0	0	0.0
HC	20	0	0	0	0.0
HC	21	0	0	0	0.0
HC	22	0	0	0	0.0
HC	23	0	0	0	0.0
HC	24	0	0	0	0.0
HC	25	8	0	2	0.7
HC	26	0	0	0	0.0
HC	27	0	0	0	0.0
HC	28	0	0	0	0.0
HC	29	1	0	0	0.1
HC	30	0	0	0	0.0
HC	31	1	0	0	0.1
HC	32	0	0	0	0.0
HC	33	0	0	0	0.0
HC	34	0	0	0	0.0
HC	35	0	0	0	0.0
HC	36	7	0	2	0.6
HC	37	0	0	0	0.0
HC	38	0	0	0	0.0
HC	39	0	0	0	0.0
HC	40	0	0	0	0.0
HC	41	0	0	0	0.0
HC	42	0	0	0	0.0
HC	43	0	0	0	0.0
HC	44	0	0	0	0.0
HC	45	0	0	0	0.0
Reef	1	55	3	8	4.6
Reef	2	139	8	18	11.6
Reef	3	57	3.5	9	4.8
Reef	4	97	6.5	20	8.1
Reef	5	452	35	71	37.7
Reef	6	648	37	87	54.0
Reef	7	251	22.5	18	20.9
Reef	8	59	4.5	7	4.9
Reef	9	43	2.5	8	3.6
Reef	10	44	2	8	3.6
Reef	11	107	4	24	8.9
Reef	12	24	1.5	5	2.0
Reef	13	177	10	24	14.8
Reef	14	35	1	7	2.9
Reef	15	24	1	6	2.0
Reef	16	80	4	14	6.7
Reef	17	790	58.5	124	65.8
Reef	18	525	27	88	43.8
Reef	19	482	33.5	50	40.2

Site	Series	Total	Median	Range	Mean
Reef	20	333	30.5	40	27.8
Reef	21	301	21.5	41	25.1
Reef	22	305	24.5	34	25.4
Reef	23	604	36.5	88	50.3
Reef	24	909	73	86	75.8
Reef	25	377	29.5	36	31.4
Reef	26	191	14	21	15.9
Reef	27	43	1	10	3.6
Reef	28	118	7	16	9.8
Reef	29	330	23.5	47	27.5
Reef	30	611	54	58	50.9
Reef	31	432	40	36	36.0
Reef	32	129	8.5	16	10.8
Reef	33	58	3.5	9	4.8
Reef	34	141	10.5	16	11.8
Reef	35	183	13.5	23	15.3
Reef	36	311	19	50	25.9
Reef	37	158	11.5	19	13.2
Reef	38	178	11	32	14.8
Reef	39	5	0	1	0.4
Reef	40	326	15.5	69	27.2
Reef	41	439	37	33	36.5
Reef	42	462	35	62	38.5
Reef	43	115	9	19	9.6
Reef	44	75	6.5	11	6.3
Reef	45	62	2.5	14	5.2
ShB	1	0	0	0	0.0
ShB	2	0	0	0	0.0
ShB	3	10	0	3	0.8
ShB	4	1	0	0	0.1
ShB	5	7	0	2	0.5
ShB	6	3	0	0	0.3
ShB	7	12	0.5	2	1.0
ShB	8	10	0	2	0.8
ShB	9	19	1	4	1.6
ShB	10	48	0	5	4.0
ShB	11	27	0	8	2.3
ShB	12	11	0	4	0.9
ShB	13	13	0	5	1.1
ShB	14	0	0	0	0.0
ShB	15	0	0	0	0.0
ShB	16	13	1	2	1.1
ShB	17	23	0	7	1.9
ShB	18	14	0.5	4	1.2
ShB	19	17	1	3	1.4
ShB	20	59	1.5	11	4.9
ShB	21	35	0.5	5	2.9
ShB	22	184	14	26	15.4
ShB	23	156	5.5	37	13.0
ShB	24	239	6	78	19.9
ShB	25	52	1.5	11	4.3
ShB	26	44	2	8	3.7
ShB	27	79	3.5	15	6.6
ShB	28	78	3	15	6.5
ShB	29	150	6	30	12.5

Site	Series	Total	Median	Range	Mean
ShB	30	52	1	11	4.3
ShB	31	76	1	18	6.3
ShB	32	37	1.5	5	3.1
ShB	33	19	1.5	3	1.6
ShB	34	100	2.5	19	8.3
ShB	35	189	4	49	15.8
ShB	36	216	11	27	18.0
ShB	37	67	3.5	11	5.6
ShB	38	47	2	7	3.9
ShB	39	11	0	3	0.9
ShB	40	98	1	24	8.2
ShB	41	48	1.5	10	4.0
ShB	42	45	1.5	6	3.8
ShB	43	39	0	6	3.3
ShB	44	10	0	4	0.8
ShB	45	19	1	4	1.6
Whau	1	0	0	0	0.0
Whau	2	0	0	0	0.0
Whau	3	0	0	0	0.0
Whau	4	0	0	0	0.0
Whau	5	1	0	0	0.1
Whau	6	0	0	0	0.0
Whau	7	0	0	0	0.0
Whau	8	0	0	0	0.0
Whau	9	0	0	0	0.0
Whau	10	0	0	0	0.0
Whau	11	0	0	0	0.0
Whau	12	0	0	0	0.0
Whau	13	0	0	0	0.0
Whau	14	0	0	0	0.0
Whau	15	1	0	0	0.1
Whau	16	0	0	0	0.0
Whau	17	0	0	0	0.0
Whau	18	0	0	0	0.0
Whau	19	0	0	0	0.0
Whau	20	10	0	2	0.8
Whau	21	2	0	1	0.2
Whau	22	0	0	0	0.0
Whau	23	2	0	0	0.2
Whau	24	3	0	0	0.3
Whau	25	2	0	1	0.2
Whau	26	2	0	1	0.2
Whau	27	0	0	0	0.0
Whau	28	0	0	0	0.0
Whau	29	0	0	0	0.0
Whau	30	2	0	0	0.2
Whau	31	0	0	0	0.0
Whau	32	13	0	2	1.1
Whau	33	1	0	0	0.1
Whau	34	7	0.5	1	0.6
Whau	35	9	0	2	0.8
Whau	36	73	2.5	15	6.1
Whau	37	14	0	3	1.2
Whau	38	8	0.5	2	0.7
Whau	39	0	0	0	0.0

Site	Series	Total	Median	Range	Mean
Whau	40	5	0	2	0.4
Whau	41	16	0	3	1.3
Whau	42	53	3	12	4.4
Whau	43	40	2.5	7	3.3
Whau	44	26	1	6	2.2
Whau	45	14	1	3	1.2

Species: *Exosphaeroma chilensis*

Site	Series	Total	Median	Range	Mean
HBV	1	1	0	0	0.1
HBV	2	1	0	0	0.1
HBV	3	12	1	2	1.0
HBV	4	17	1	3	1.4
HBV	5	6	0	2	0.5
HBV	6	0	0	0	0.0
HBV	7	0	0	0	0.0
HBV	8	0	0	0	0.0
HBV	9	14	1	3	1.2
HBV	10	67	5	8	5.5
HBV	11	36	2.5	6	3.0
HBV	12	4	0	1	0.3
HBV	13	0	0	0	0.0
HBV	14	0	0	0	0.0
HBV	15	3	0	1	0.3
HBV	16	1	0	0	0.1
HBV	17	8	0	2	0.7
HBV	18	2	0	0	0.2
HBV	19	0	0	0	0.0
HBV	20	1	0	0	0.1
HBV	21	14	1	3	1.2
HBV	22	0	0	0	0.0
HBV	23	6	0	1	0.5
HBV	24	7	0	2	0.6
HBV	25	4	0	1	0.4
HBV	26	5	0	1	0.4
HBV	27	9	1	2	0.8
HBV	28	3	0	1	0.3
HBV	29	7	0	1	0.6
HBV	30	4	0	1	0.3
HBV	31	6	0	1	0.5
HBV	32	11	0.5	2	0.9
HBV	33	1	0	0	0.1
HBV	34	0	0	0	0.0
HBV	35	0	0	0	0.0
HBV	36	4	0	1	0.3
HBV	37	3	0	1	0.3
HBV	38	3	0	1	0.3
HBV	39	6	0	2	0.5
HBV	40	10	0	3	0.8
HBV	41	6	0	2	0.5
HBV	42	10	0.5	2	0.8
HBV	43	5	0	1	0.4
HBV	44	0	0	0	0.0
HBV	45	14	0	3	1.2
HC	1	0	0	0	0.0
HC	2	3	0	1	0.3
HC	3	2	0	1	0.2
HC	4	0	0	0	0.0
HC	5	8	0	2	0.7
HC	6	4	0	1	0.3
HC	7	0	0	0	0.0
HC	8	9	0	2	0.8
HC	9	7	0	1	0.6

Site	Series	Total	Median	Range	Mean
HC	10	2	0	0	0.2
HC	11	2	0	1	0.2
HC	12	3	0	0	0.3
HC	13	1	0	0	0.1
HC	14	6	0	1	0.5
HC	15	12	1	2	1.0
HC	16	4	0	1	0.3
HC	17	4	0	1	0.3
HC	18	0	0	0	0.0
HC	19	0	0	0	0.0
HC	20	7	0	2	0.6
HC	21	16	1	2	1.3
HC	22	5	0	2	0.4
HC	23	13	0	3	1.1
HC	24	5	0	1	0.4
HC	25	7	0.5	1	0.6
HC	26	12	1	2	1.0
HC	27	3	0	1	0.3
HC	28	7	1	1	0.6
HC	29	3	0	1	0.3
HC	30	9	0.5	2	0.8
HC	31	1	0	0	0.1
HC	32	5	0	1	0.4
HC	33	0	0	0	0.0
HC	34	6	0	2	0.5
HC	35	4	0	1	0.3
HC	36	0	0	0	0.0
HC	37	1	0	0	0.1
HC	38	9	1	2	0.8
HC	39	8	0	2	0.6
HC	40	19	1	3	1.6
HC	41	15	1	3	1.3
HC	42	7	0	2	0.6
HC	43	2	0	1	0.2
HC	44	15	0.5	5	1.3
HC	45	11	1	2	0.9
Reef	1	0	0	0	0.0
Reef	2	0	0	0	0.0
Reef	3	0	0	0	0.0
Reef	4	0	0	0	0.0
Reef	5	1	0	0	0.1
Reef	6	4	0	1	0.3
Reef	7	0	0	0	0.0
Reef	8	0	0	0	0.0
Reef	9	0	0	0	0.0
Reef	10	0	0	0	0.0
Reef	11	0	0	0	0.0
Reef	12	0	0	0	0.0
Reef	13	0	0	0	0.0
Reef	14	0	0	0	0.0
Reef	15	1	0	0	0.1
Reef	16	0	0	0	0.0
Reef	17	0	0	0	0.0
Reef	18	0	0	0	0.0
Reef	19	0	0	0	0.0

Site	Series	Total	Median	Range	Mean
Reef	20	0	0	0	0.0
Reef	21	0	0	0	0.0
Reef	22	0	0	0	0.0
Reef	23	0	0	0	0.0
Reef	24	1	0	0	0.1
Reef	25	0	0	0	0.0
Reef	26	0	0	0	0.0
Reef	27	0	0	0	0.0
Reef	28	0	0	0	0.0
Reef	29	0	0	0	0.0
Reef	30	0	0	0	0.0
Reef	31	0	0	0	0.0
Reef	32	0	0	0	0.0
Reef	33	0	0	0	0.0
Reef	34	0	0	0	0.0
Reef	35	0	0	0	0.0
Reef	36	0	0	0	0.0
Reef	37	0	0	0	0.0
Reef	38	0	0	0	0.0
Reef	39	0	0	0	0.0
Reef	40	0	0	0	0.0
Reef	41	0	0	0	0.0
Reef	42	0	0	0	0.0
Reef	43	0	0	0	0.0
Reef	44	0	0	0	0.0
Reef	45	0	0	0	0.0
ShB	1	0	0	0	0.0
ShB	2	0	0	0	0.0
ShB	3	1	0	0	0.1
ShB	4	2	0	1	0.2
ShB	5	0	0	0	0.0
ShB	6	0	0	0	0.0
ShB	7	0	0	0	0.0
ShB	8	1	0	0	0.1
ShB	9	0	0	0	0.0
ShB	10	1	0	0	0.1
ShB	11	1	0	0	0.1
ShB	12	0	0	0	0.0
ShB	13	0	0	0	0.0
ShB	14	3	0	1	0.3
ShB	15	0	0	0	0.0
ShB	16	2	0	1	0.2
ShB	17	1	0	0	0.1
ShB	18	0	0	0	0.0
ShB	19	0	0	0	0.0
ShB	20	0	0	0	0.0
ShB	21	0	0	0	0.0
ShB	22	2	0	1	0.2
ShB	23	0	0	0	0.0
ShB	24	2	0	1	0.2
ShB	25	1	0	0	0.1
ShB	26	4	0	1	0.3
ShB	27	0	0	0	0.0
ShB	28	0	0	0	0.0
ShB	29	1	0	0	0.1

Site	Series	Total	Median	Range	Mean
ShB	30	2	0	1	0.2
ShB	31	1	0	0	0.1
ShB	32	0	0	0	0.0
ShB	33	0	0	0	0.0
ShB	34	0	0	0	0.0
ShB	35	0	0	0	0.0
ShB	36	0	0	0	0.0
ShB	37	2	0	0	0.2
ShB	38	0	0	0	0.0
ShB	39	0	0	0	0.0
ShB	40	0	0	0	0.0
ShB	41	0	0	0	0.0
ShB	42	2	0	1	0.2
ShB	43	0	0	0	0.0
ShB	44	0	0	0	0.0
ShB	45	1	0	0	0.1
Whau	1	0	0	0	0.0
Whau	2	1	0	0	0.1
Whau	3	5	0	1	0.4
Whau	4	5	0	1	0.4
Whau	5	1	0	0	0.1
Whau	6	0	0	0	0.0
Whau	7	0	0	0	0.0
Whau	8	0	0	0	0.0
Whau	9	0	0	0	0.0
Whau	10	4	0	1	0.3
Whau	11	0	0	0	0.0
Whau	12	0	0	0	0.0
Whau	13	2	0	1	0.2
Whau	14	3	0	1	0.3
Whau	15	0	0	0	0.0
Whau	16	1	0	0	0.1
Whau	17	1	0	0	0.1
Whau	18	0	0	0	0.0
Whau	19	2	0	1	0.2
Whau	20	2	0	1	0.2
Whau	21	0	0	0	0.0
Whau	22	4	0	1	0.3
Whau	23	1	0	0	0.1
Whau	24	4	0	1	0.3
Whau	25	0	0	0	0.0
Whau	26	0	0	0	0.0
Whau	27	0	0	0	0.0
Whau	28	4	0	1	0.3
Whau	29	2	0	1	0.2
Whau	30	5	0	2	0.4
Whau	31	1	0	0	0.1
Whau	32	0	0	0	0.0
Whau	33	1	0	0	0.1
Whau	34	0	0	0	0.0
Whau	35	0	0	0	0.0
Whau	36	0	0	0	0.0
Whau	37	0	0	0	0.0
Whau	38	3	0	0	0.3
Whau	39	0	0	0	0.0

Site	Series	Total	Median	Range	Mean
Whau	40	4	0	1	0.3
Whau	41	4	0	1	0.3
Whau	42	2	0	1	0.2
Whau	43	0	0	0	0.0
Whau	44	0	0	0	0.0
Whau	45	0	0	0	0.0

Species: *Glycera* sp.

Site	Series	Total	Median	Range	Mean
HBV	1	0	0	0	0.0
HBV	2	1	0	0	0.1
HBV	3	3	0	1	0.3
HBV	4	4	0	1	0.3
HBV	5	1	0	0	0.1
HBV	6	5	0	1	0.4
HBV	7	5	0	1	0.4
HBV	8	2	0	1	0.2
HBV	9	0	0	0	0.0
HBV	10	2	0	1	0.2
HBV	11	3	0	1	0.3
HBV	12	4	0	1	0.3
HBV	13	1	0	0	0.1
HBV	14	4	0	1	0.4
HBV	15	0	0	0	0.0
HBV	16	5	0	1	0.4
HBV	17	2	0	1	0.2
HBV	18	2	0	1	0.2
HBV	19	1	0	0	0.1
HBV	20	2	0	0	0.2
HBV	21	1	0	0	0.1
HBV	22	5	0	1	0.4
HBV	23	5	0	2	0.4
HBV	24	1	0	0	0.1
HBV	25	4	0	1	0.4
HBV	26	4	0	1	0.3
HBV	27	5	0	1	0.4
HBV	28	0	0	0	0.0
HBV	29	1	0	0	0.1
HBV	30	0	0	0	0.0
HBV	31	1	0	0	0.1
HBV	32	1	0	0	0.1
HBV	33	2	0	1	0.2
HBV	34	2	0	1	0.2
HBV	35	2	0	1	0.2
HBV	36	4	0	1	0.3
HBV	37	3	0	1	0.3
HBV	38	2	0	1	0.2
HBV	39	1	0	0	0.1
HBV	40	4	0	1	0.3
HBV	41	3	0	1	0.3
HBV	42	4	0	1	0.3
HBV	43	6	0	1	0.5
HBV	44	11	1	2	0.9
HBV	45	16	1.5	2	1.3
HC	1	3	0	1	0.3
HC	2	3	0	1	0.3
HC	3	6	0	1	0.5
HC	4	6	0.5	1	0.5
HC	5	4	0	1	0.3
HC	6	13	1	2	1.1
HC	7	1	0	0	0.1
HC	8	11	1	1	0.9
HC	9	5	0	1	0.4
HC	10	5	0	1	0.4
HC	11	4	0	1	0.3
HC	12	1	0	0	0.1
HC	13	1	0	0	0.1
HC	14	1	0	0	0.1
HC	15	4	0	1	0.3
HC	16	1	0	0	0.1
HC	17	2	0	1	0.2
HC	18	1	0	0	0.1
HC	19	2	0	1	0.2
HC	20	2	0	1	0.2
HC	21	0	0	0	0.0
HC	22	0	0	0	0.0
HC	23	0	0	0	0.0
HC	24	0	0	0	0.0
HC	25	0	0	0	0.0
HC	26	0	0	0	0.0
HC	27	1	0	0	0.1
HC	28	5	0	1	0.4
HC	29	2	0	1	0.2
HC	30	4	0	1	0.3
HC	31	3	0	1	0.3
HC	32	2	0	1	0.2
HC	33	2	0	1	0.2
HC	34	4	0	1	0.3
HC	35	3	0	1	0.3
HC	36	4	0	1	0.3
HC	37	0	0	0	0.0
HC	38	5	0	1	0.4
HC	39	1	0	0	0.1
HC	40	1	0	0	0.1
HC	41	3	0	1	0.3
HC	42	2	0	1	0.2
HC	43	3	0	1	0.3
HC	44	4	0	1	0.3
HC	45	6	0	1	0.5
Reef	1	9	0	2	0.8
Reef	2	12	1	2	1.0
Reef	3	3	0	1	0.3
Reef	4	1	0	0	0.1
Reef	5	7	0	2	0.6
Reef	6	2	0	1	0.2
Reef	7	3	0	1	0.3
Reef	8	2	0	1	0.2
Reef	9	0	0	0	0.0
Reef	10	0	0	0	0.0
Reef	11	1	0	0	0.1
Reef	12	0	0	0	0.0
Reef	13	6	0.5	1	0.5
Reef	14	3	0	1	0.3
Reef	15	1	0	0	0.1
Reef	16	2	0	1	0.2
Reef	17	2	0	1	0.2
Reef	18	2	0	1	0.2
Reef	19	4	0	1	0.3

Site	Series	Total	Median	Range	Mean
Reef	20	24	1.5	4	2.0
Reef	21	20	1	2	1.7
Reef	22	8	0	2	0.7
Reef	23	8	0	2	0.7
Reef	24	12	1	3	1.0
Reef	25	14	1	3	1.2
Reef	26	4	0	1	0.3
Reef	27	7	0	2	0.6
Reef	28	6	0.5	1	0.5
Reef	29	5	0	1	0.4
Reef	30	6	0	1	0.5
Reef	31	11	1	2	0.9
Reef	32	16	1	3	1.3
Reef	33	14	1	2	1.2
Reef	34	2	0	1	0.2
Reef	35	5	0	1	0.4
Reef	36	1	0	0	0.1
Reef	37	0	0	0	0.0
Reef	38	2	0	1	0.2
Reef	39	0	0	0	0.0
Reef	40	6	0	1	0.5
Reef	41	3	0	1	0.3
Reef	42	4	0	1	0.3
Reef	43	14	1	3	1.2
Reef	44	17	1	2	1.4
Reef	45	12	1	2	1.0
ShB	1	5	0	1	0.4
ShB	2	8	0	3	0.7
ShB	3	7	0	2	0.6
ShB	4	2	0	1	0.2
ShB	5	1	0	0	0.1
ShB	6	2	0	1	0.2
ShB	7	3	0	1	0.3
ShB	8	3	0	1	0.3
ShB	9	5	0	1	0.4
ShB	10	2	0	1	0.2
ShB	11	1	0	0	0.1
ShB	12	1	0	0	0.1
ShB	13	2	0	1	0.2
ShB	14	3	0	1	0.3
ShB	15	0	0	0	0.0
ShB	16	0	0	0	0.0
ShB	17	0	0	0	0.0
ShB	18	2	0	1	0.2
ShB	19	2	0	0	0.2
ShB	20	1	0	0	0.1
ShB	21	9	0	2	0.8
ShB	22	8	1	1	0.6
ShB	23	8	0	0	0.7
ShB	24	3	0	1	0.3
ShB	25	0	0	0	0.0
ShB	26	2	0	1	0.2
ShB	27	7	0	2	0.6
ShB	28	6	0	1	0.5
ShB	29	3	0	1	0.3

Site	Series	Total	Median	Range	Mean
ShB	30	3	0	1	0.3
ShB	31	6	0	1	0.5
ShB	32	4	0	1	0.3
ShB	33	5	0	1	0.4
ShB	34	1	0	0	0.1
ShB	35	0	0	0	0.0
ShB	36	1	0	0	0.1
ShB	37	3	0	1	0.3
ShB	38	2	0	1	0.2
ShB	39	1	0	0	0.1
ShB	40	1	0	0	0.1
ShB	41	1	0	0	0.1
ShB	42	1	0	0	0.1
ShB	43	3	0	1	0.3
ShB	44	7	0	1	0.6
ShB	45	5	0	2	0.4
Whau	1	0	0	0	0.0
Whau	2	6	0.5	1	0.5
Whau	3	6	0	2	0.5
Whau	4	8	0	2	0.6
Whau	5	5	0	1	0.4
Whau	6	5	0	1	0.4
Whau	7	3	0	1	0.3
Whau	8	5	0	1	0.4
Whau	9	5	0	1	0.4
Whau	10	0	0	0	0.0
Whau	11	5	0	1	0.4
Whau	12	3	0	1	0.3
Whau	13	3	0	1	0.3
Whau	14	3	0	1	0.3
Whau	15	4	0	1	0.3
Whau	16	2	0	1	0.2
Whau	17	3	0	1	0.3
Whau	18	1	0	0	0.1
Whau	19	2	0	0	0.2
Whau	20	6	0.5	1	0.5
Whau	21	10	1	2	0.8
Whau	22	4	0	1	0.3
Whau	23	10	1	1	0.8
Whau	24	5	0	1	0.4
Whau	25	2	0	1	0.2
Whau	26	3	0	1	0.3
Whau	27	0	0	0	0.0
Whau	28	1	0	0	0.1
Whau	29	1	0	0	0.1
Whau	30	2	0	1	0.2
Whau	31	0	0	0	0.0
Whau	32	2	0	1	0.2
Whau	33	7	0.5	1	0.6
Whau	34	0	0	0	0.0
Whau	35	5	0	2	0.4
Whau	36	2	0	1	0.2
Whau	37	0	0	0	0.0
Whau	38	5	0	1	0.4
Whau	39	0	0	0	0.0

Site	Series	Total	Median	Range	Mean
Whau	40	2	0	1	0.2
Whau	41	1	0	0	0.1
Whau	42	2	0	1	0.2
Whau	43	3	0	1	0.3
Whau	44	4	0	1	0.3
Whau	45	4	0	1	0.3

Species: *Haminoea zelandiae*

Site	Series	Total	Median	Range	Mean
HBV	1	0	0	0	0.0
HBV	2	0	0	0	0.0
HBV	3	0	0	0	0.0
HBV	4	0	0	0	0.0
HBV	5	0	0	0	0.0
HBV	6	0	0	0	0.0
HBV	7	0	0	0	0.0
HBV	8	0	0	0	0.0
HBV	9	0	0	0	0.0
HBV	10	1	0	0	0.1
HBV	11	0	0	0	0.0
HBV	12	0	0	0	0.0
HBV	13	0	0	0	0.0
HBV	14	0	0	0	0.0
HBV	15	0	0	0	0.0
HBV	16	0	0	0	0.0
HBV	17	1	0	0	0.1
HBV	18	0	0	0	0.0
HBV	19	0	0	0	0.0
HBV	20	0	0	0	0.0
HBV	21	0	0	0	0.0
HBV	22	0	0	0	0.0
HBV	23	0	0	0	0.0
HBV	24	0	0	0	0.0
HBV	25	0	0	0	0.0
HBV	26	1	0	0	0.1
HBV	27	1	0	0	0.1
HBV	28	1	0	0	0.1
HBV	29	0	0	0	0.0
HBV	30	0	0	0	0.0
HBV	31	0	0	0	0.0
HBV	32	0	0	0	0.0
HBV	33	2	0	1	0.2
HBV	34	0	0	0	0.0
HBV	35	0	0	0	0.0
HBV	36	1	0	0	0.1
HBV	37	0	0	0	0.0
HBV	38	1	0	0	0.1
HBV	39	1	0	0	0.1
HBV	40	0	0	0	0.0
HBV	41	2	0	0	0.2
HBV	42	0	0	0	0.0
HBV	43	0	0	0	0.0
HBV	44	6	0	1	0.5
HBV	45	6	0	2	0.5
HC	1	2	0	0	0.2
HC	2	0	0	0	0.0
HC	3	1	0	0	0.1
HC	4	5	0	1	0.4
HC	5	0	0	0	0.0
HC	6	0	0	0	0.0
HC	7	0	0	0	0.0
HC	8	3	0	1	0.3
HC	9	0	0	0	0.0

Site	Series	Total	Median	Range	Mean
HC	10	1	0	0	0.1
HC	11	2	0	1	0.2
HC	12	0	0	0	0.0
HC	13	0	0	0	0.0
HC	14	0	0	0	0.0
HC	15	0	0	0	0.0
HC	16	0	0	0	0.0
HC	17	3	0	1	0.3
HC	18	0	0	0	0.0
HC	19	0	0	0	0.0
HC	20	4	0	1	0.3
HC	21	7	0	2	0.6
HC	22	0	0	0	0.0
HC	23	1	0	0	0.1
HC	24	0	0	0	0.0
HC	25	2	0	1	0.2
HC	26	1	0	0	0.1
HC	27	5	0	1	0.5
HC	28	6	0	1	0.5
HC	29	5	0	1	0.4
HC	30	0	0	0	0.0
HC	31	1	0	0	0.1
HC	32	0	0	0	0.0
HC	33	1	0	0	0.1
HC	34	1	0	0	0.1
HC	35	2	0	1	0.2
HC	36	0	0	0	0.0
HC	37	0	0	0	0.0
HC	38	8	0	2	0.7
HC	39	4	0	1	0.4
HC	40	7	0	2	0.6
HC	41	5	0	1	0.4
HC	42	0	0	0	0.0
HC	43	0	0	0	0.0
HC	44	16	1	2	1.3
HC	45	2	0	1	0.2
Reef	1	10	0.5	2	0.8
Reef	2	20	1.5	4	1.7
Reef	3	3	0	1	0.3
Reef	4	4	0	1	0.3
Reef	5	2	0	1	0.2
Reef	6	4	0	1	0.3
Reef	7	1	0	0	0.1
Reef	8	8	0.5	2	0.7
Reef	9	10	1	2	0.8
Reef	10	3	0	1	0.3
Reef	11	1	0	0	0.1
Reef	12	0	0	0	0.0
Reef	13	0	0	0	0.0
Reef	14	1	0	0	0.1
Reef	15	33	2.5	3	2.8
Reef	16	2	0	1	0.2
Reef	17	5	0	2	0.4
Reef	18	6	0	1	0.5
Reef	19	8	0.5	2	0.7

Site	Series	Total	Median	Range	Mean
Reef	20	29	2	6	2.4
Reef	21	46	1	11	3.8
Reef	22	24	0.5	6	2.0
Reef	23	18	1	4	1.5
Reef	24	14	1	4	1.2
Reef	25	1	0	0	0.1
Reef	26	9	0	2	0.8
Reef	27	11	1	2	0.9
Reef	28	0	0	0	0.0
Reef	29	17	1	3	1.4
Reef	30	17	1.5	3	1.4
Reef	31	4	0	1	0.4
Reef	32	0	0	0	0.0
Reef	33	0	0	0	0.0
Reef	34	1	0	0	0.1
Reef	35	2	0	1	0.2
Reef	36	1	0	0	0.1
Reef	37	5	0	2	0.4
Reef	38	11	0.5	3	0.9
Reef	39	3	0	1	0.3
Reef	40	11	0.5	2	0.9
Reef	41	24	1	3	2.0
Reef	42	24	1.5	3	2.0
Reef	43	25	1	5	2.1
Reef	44	14	1	3	1.2
Reef	45	0	0	0	0.0
ShB	1	0	0	0	0.0
ShB	2	0	0	0	0.0
ShB	3	1	0	0	0.1
ShB	4	0	0	0	0.0
ShB	5	0	0	0	0.0
ShB	6	0	0	0	0.0
ShB	7	0	0	0	0.0
ShB	8	2	0	1	0.2
ShB	9	1	0	0	0.1
ShB	10	0	0	0	0.0
ShB	11	0	0	0	0.0
ShB	12	0	0	0	0.0
ShB	13	0	0	0	0.0
ShB	14	5	0	1	0.4
ShB	15	6	0	1	0.5
ShB	16	2	0	1	0.2
ShB	17	1	0	0	0.1
ShB	18	0	0	0	0.0
ShB	19	0	0	0	0.0
ShB	20	14	0	2	1.2
ShB	21	5	0	1	0.4
ShB	22	8	0	2	0.6
ShB	23	0	0	0	0.0
ShB	24	0	0	0	0.0
ShB	25	3	0	1	0.3
ShB	26	3	0	1	0.3
ShB	27	2	0	0	0.2
ShB	28	0	0	0	0.0
ShB	29	0	0	0	0.0

Site	Series	Total	Median	Range	Mean
ShB	30	0	0	0	0.0
ShB	31	0	0	0	0.0
ShB	32	0	0	0	0.0
ShB	33	5	0	1	0.4
ShB	34	1	0	0	0.1
ShB	35	1	0	0	0.1
ShB	36	0	0	0	0.0
ShB	37	0	0	0	0.0
ShB	38	2	0	1	0.2
ShB	39	0	0	0	0.0
ShB	40	2	0	1	0.2
ShB	41	2	0	0	0.2
ShB	42	19	0	1	1.6
ShB	43	3	0	1	0.3
ShB	44	3	0	1	0.3
ShB	45	5	0	1	0.4
Whau	1	0	0	0	0.0
Whau	2	1	0	0	0.1
Whau	3	7	0.5	1	0.6
Whau	4	0	0	0	0.0
Whau	5	0	0	0	0.0
Whau	6	1	0	0	0.1
Whau	7	1	0	0	0.1
Whau	8	2	0	1	0.2
Whau	9	7	0.5	1	0.6
Whau	10	0	0	0	0.0
Whau	11	0	0	0	0.0
Whau	12	0	0	0	0.0
Whau	13	0	0	0	0.0
Whau	14	0	0	0	0.0
Whau	15	9	0.5	2	0.8
Whau	16	2	0	1	0.2
Whau	17	2	0	1	0.2
Whau	18	0	0	0	0.0
Whau	19	0	0	0	0.0
Whau	20	43	3	5	3.6
Whau	21	32	3	4	2.7
Whau	22	0	0	0	0.0
Whau	23	3	0	1	0.3
Whau	24	2	0	1	0.2
Whau	25	0	0	0	0.0
Whau	26	8	0.5	1	0.7
Whau	27	15	1	3	1.3
Whau	28	4	0	1	0.3
Whau	29	0	0	0	0.0
Whau	30	0	0	0	0.0
Whau	31	0	0	0	0.0
Whau	32	5	0	1	0.4
Whau	33	4	0	1	0.3
Whau	34	2	0	0	0.2
Whau	35	0	0	0	0.0
Whau	36	0	0	0	0.0
Whau	37	0	0	0	0.0
Whau	38	5	0	1	0.4
Whau	39	19	1	4	1.6

Site	Series	Total	Median	Range	Mean
Whau	40	7	0	2	0.6
Whau	41	5	0	1	0.4
Whau	42	3	0	1	0.3
Whau	43	0	0	0	0.0
Whau	44	17	1.5	3	1.4
Whau	45	7	0.5	1	0.6

Species: ***Heteromastus filiformis***

Site	Series	Total	Median	Range	Mean
HBV	1	0	0	0	0.0
HBV	2	1	0	0	0.1
HBV	3	0	0	0	0.0
HBV	4	0	0	0	0.0
HBV	5	3	0	1	0.3
HBV	6	4	0	1	0.3
HBV	7	3	0	1	0.3
HBV	8	11	1	2	0.9
HBV	9	3	0	1	0.3
HBV	10	4	0	2	0.4
HBV	11	10	1	2	0.8
HBV	12	2	0	0	0.2
HBV	13	7	0	1	0.6
HBV	14	1	0	0	0.1
HBV	15	2	0	1	0.2
HBV	16	3	0	1	0.3
HBV	17	0	0	0	0.0
HBV	18	3	0	1	0.3
HBV	19	1	0	0	0.1
HBV	20	0	0	0	0.0
HBV	21	0	0	0	0.0
HBV	22	7	0	2	0.6
HBV	23	1	0	0	0.1
HBV	24	3	0	1	0.3
HBV	25	2	0	1	0.2
HBV	26	5	0	2	0.4
HBV	27	0	0	0	0.0
HBV	28	2	0	0	0.2
HBV	29	4	0	1	0.3
HBV	30	5	0	1	0.4
HBV	31	2	0	1	0.2
HBV	32	6	0	2	0.5
HBV	33	3	0	1	0.3
HBV	34	5	0	1	0.4
HBV	35	1	0	0	0.1
HBV	36	6	0	1	0.5
HBV	37	1	0	0	0.1
HBV	38	2	0	1	0.2
HBV	39	0	0	0	0.0
HBV	40	3	0	1	0.3
HBV	41	5	0	1	0.4
HBV	42	3	0	1	0.3
HBV	43	0	0	0	0.0
HBV	44	9	0	2	0.8
HBV	45	0	0	0	0.0
HC	1	4	0	1	0.3
HC	2	1	0	0	0.1
HC	3	3	0	1	0.3
HC	4	0	0	0	0.0
HC	5	13	1	2	1.1
HC	6	13	1	3	1.1
HC	7	6	0	1	0.5
HC	8	5	0	1	0.4
HC	9	13	0.5	3	1.1

Site	Series	Total	Median	Range	Mean
HC	10	4	0	1	0.3
HC	11	6	0	1	0.5
HC	12	4	0	1	0.4
HC	13	3	0	1	0.3
HC	14	6	0.5	1	0.5
HC	15	5	0	1	0.4
HC	16	6	0	1	0.5
HC	17	3	0	1	0.3
HC	18	5	0	1	0.4
HC	19	8	0.5	2	0.7
HC	20	6	0	1	0.5
HC	21	1	0	0	0.1
HC	22	10	0.5	2	0.8
HC	23	6	0	1	0.5
HC	24	7	0	1	0.6
HC	25	10	1	2	0.8
HC	26	4	0	1	0.4
HC	27	0	0	0	0.0
HC	28	0	0	0	0.0
HC	29	4	0	1	0.3
HC	30	6	0	1	0.5
HC	31	13	1	2	1.1
HC	32	4	0	1	0.3
HC	33	12	1	2	1.0
HC	34	4	0	1	0.3
HC	35	7	0	2	0.6
HC	36	7	0	2	0.6
HC	37	15	1	3	1.3
HC	38	6	0	1	0.5
HC	39	2	0	1	0.2
HC	40	9	1	2	0.8
HC	41	5	0	1	0.4
HC	42	8	0.5	2	0.7
HC	43	2	0	0	0.2
HC	44	7	0	2	0.6
HC	45	2	0	0	0.2
Reef	1	0	0	0	0.0
Reef	2	0	0	0	0.0
Reef	3	0	0	0	0.0
Reef	4	5	0	1	0.4
Reef	5	0	0	0	0.0
Reef	6	0	0	0	0.0
Reef	7	13	1	3	1.1
Reef	8	9	0	2	0.8
Reef	9	11	0	2	0.9
Reef	10	8	0	2	0.6
Reef	11	9	0.5	1	0.8
Reef	12	8	1	1	0.7
Reef	13	9	0	2	0.8
Reef	14	9	1	1	0.8
Reef	15	7	0	1	0.6
Reef	16	12	0.5	3	1.0
Reef	17	28	1.5	6	2.3
Reef	18	81	4.5	14	6.8
Reef	19	89	5.5	17	7.4

Site	Series	Total	Median	Range	Mean
Reef	20	66	2.5	15	5.5
Reef	21	55	4.5	11	4.6
Reef	22	39	1	11	3.3
Reef	23	76	5	8	6.3
Reef	24	93	7	11	7.8
Reef	25	123	11	17	10.3
Reef	26	137	12	17	11.4
Reef	27	5	0	2	0.4
Reef	28	72	4	11	6.0
Reef	29	131	10	11	10.9
Reef	30	198	18.5	14	16.5
Reef	31	459	21	21	38.3
Reef	32	112	9.5	9	9.3
Reef	33	107	9	14	8.9
Reef	34	203	15.5	21	16.9
Reef	35	189	17	16	15.8
Reef	36	179	14.5	21	14.9
Reef	37	220	18	20	18.3
Reef	38	226	19.5	12	18.8
Reef	39	0	0	0	0.0
Reef	40	240	15	29	20.0
Reef	41	408	37	29	34.0
Reef	42	428	36	23	35.7
Reef	43	266	19	28	22.2
Reef	44	316	25.5	35	26.3
Reef	45	203	17.5	20	16.9
ShB	1	0	0	0	0.0
ShB	2	0	0	0	0.0
ShB	3	0	0	0	0.0
ShB	4	0	0	0	0.0
ShB	5	1	0	0	0.1
ShB	6	0	0	0	0.0
ShB	7	4	0	1	0.3
ShB	8	8	1	1	0.7
ShB	9	11	0.5	2	0.9
ShB	10	10	0.5	2	0.8
ShB	11	7	0	2	0.6
ShB	12	5	0	1	0.5
ShB	13	6	0.5	1	0.5
ShB	14	5	0	1	0.4
ShB	15	12	1	2	1.0
ShB	16	4	0	1	0.3
ShB	17	17	1	3	1.4
ShB	18	8	0	2	0.7
ShB	19	19	1	5	1.6
ShB	20	22	1	2	1.8
ShB	21	8	0	1	0.7
ShB	22	31	2	4	2.5
ShB	23	37	2	5	3.1
ShB	24	35	1	4	2.9
ShB	25	44	4	7	3.7
ShB	26	39	2.5	8	3.3
ShB	27	31	1	7	2.6
ShB	28	31	2	7	2.6
ShB	29	65	4	8	5.4

Site	Series	Total	Median	Range	Mean
ShB	30	11	0.5	2	0.9
ShB	31	46	4	6	3.8
ShB	32	29	2	4	2.4
ShB	33	43	3	5	3.6
ShB	34	42	2	9	3.5
ShB	35	32	1	7	2.7
ShB	36	25	1	6	2.1
ShB	37	38	2.5	7	3.2
ShB	38	39	2	5	3.3
ShB	39	5	0	2	0.4
ShB	40	19	1	4	1.6
ShB	41	64	4.5	12	5.3
ShB	42	22	1	4	1.8
ShB	43	32	1	8	2.7
ShB	44	60	3	9	5.0
ShB	45	11	1	1	0.9
Whau	1	1	0	0	0.1
Whau	2	0	0	0	0.0
Whau	3	0	0	0	0.0
Whau	4	0	0	0	0.0
Whau	5	0	0	0	0.0
Whau	6	2	0	1	0.2
Whau	7	0	0	0	0.0
Whau	8	1	0	0	0.1
Whau	9	0	0	0	0.0
Whau	10	6	0	1	0.5
Whau	11	7	0	2	0.6
Whau	12	1	0	0	0.1
Whau	13	1	0	0	0.1
Whau	14	0	0	0	0.0
Whau	15	1	0	0	0.1
Whau	16	0	0	0	0.0
Whau	17	1	0	0	0.1
Whau	18	0	0	0	0.0
Whau	19	0	0	0	0.0
Whau	20	2	0	0	0.2
Whau	21	4	0	1	0.3
Whau	22	8	0.5	2	0.7
Whau	23	3	0	1	0.3
Whau	24	2	0	1	0.2
Whau	25	4	0	1	0.3
Whau	26	7	0	2	0.6
Whau	27	0	0	0	0.0
Whau	28	0	0	0	0.0
Whau	29	1	0	0	0.1
Whau	30	4	0	1	0.3
Whau	31	3	0	1	0.3
Whau	32	2	0	1	0.2
Whau	33	3	0	1	0.3
Whau	34	1	0	0	0.1
Whau	35	2	0	1	0.2
Whau	36	2	0	0	0.2
Whau	37	2	0	1	0.2
Whau	38	4	0	1	0.3
Whau	39	0	0	0	0.0

Site	Series	Total	Median	Range	Mean
Whau	40	5	0	2	0.4
Whau	41	1	0	0	0.1
Whau	42	3	0	1	0.3
Whau	43	10	0.5	1	0.8
Whau	44	7	0	2	0.6
Whau	45	1	0	0	0.1

Species: *Macomona liliana*

Site	Series	Total	Median	Range	Mean
HBV	1	12	1	2	1.0
HBV	2	28	2	3	2.3
HBV	3	23	1.5	2	1.9
HBV	4	14	1	2	1.2
HBV	5	29	2	3	2.4
HBV	6	24	2	2	2.0
HBV	7	27	2	3	2.3
HBV	8	17	1	3	1.4
HBV	9	32	3	3	2.7
HBV	10	19	2	2	1.5
HBV	11	20	1.5	3	1.7
HBV	12	8	0	2	0.7
HBV	13	29	2	3	2.4
HBV	14	10	1	2	0.8
HBV	15	18	1	3	1.5
HBV	16	14	1	2	1.2
HBV	17	24	2	3	2.0
HBV	18	7	0.5	1	0.6
HBV	19	15	1	2	1.3
HBV	20	7	0.5	1	0.6
HBV	21	17	2	2	1.4
HBV	22	13	1	3	1.1
HBV	23	12	1	2	1.0
HBV	24	18	1	3	1.5
HBV	25	11	1	2	0.9
HBV	26	22	1.5	4	1.8
HBV	27	21	1	2	1.8
HBV	28	20	2	3	1.7
HBV	29	25	2	3	2.1
HBV	30	25	2	4	2.1
HBV	31	28	2	4	2.3
HBV	32	7	0	2	0.6
HBV	33	20	1	3	1.7
HBV	34	19	1	3	1.6
HBV	35	25	2	4	2.1
HBV	36	13	1	2	1.1
HBV	37	30	2	3	2.5
HBV	38	20	1.5	3	1.7
HBV	39	22	1.5	2	1.8
HBV	40	30	2	4	2.5
HBV	41	20	1	2	1.7
HBV	42	19	1.5	3	1.6
HBV	43	20	2	4	1.7
HBV	44	30	2	4	2.5
HBV	45	35	3	4	2.9
HC	1	6	0.5	1	0.5
HC	2	8	1	1	0.7
HC	3	4	0	1	0.3
HC	4	2	0	1	0.2
HC	5	11	1	2	0.9
HC	6	7	0	1	0.6
HC	7	4	0	1	0.3
HC	8	8	0	1	0.7
HC	9	9	0	2	0.8

Site	Series	Total	Median	Range	Mean
HC	10	5	0	1	0.4
HC	11	3	0	1	0.3
HC	12	0	0	0	0.0
HC	13	0	0	0	0.0
HC	14	2	0	1	0.2
HC	15	5	0	1	0.4
HC	16	0	0	0	0.0
HC	17	3	0	1	0.3
HC	18	4	0	1	0.3
HC	19	2	0	0	0.2
HC	20	2	0	1	0.2
HC	21	3	0	1	0.3
HC	22	8	0.5	2	0.7
HC	23	4	0	1	0.3
HC	24	4	0	1	0.3
HC	25	7	0.5	1	0.6
HC	26	1	0	0	0.1
HC	27	2	0	1	0.2
HC	28	6	0	1	0.5
HC	29	6	0	2	0.5
HC	30	11	0.5	3	0.9
HC	31	13	0	3	1.1
HC	32	5	0	1	0.4
HC	33	3	0	1	0.3
HC	34	4	0	1	0.3
HC	35	3	0	1	0.3
HC	36	6	0.5	1	0.5
HC	37	6	0	1	0.5
HC	38	6	0	1	0.5
HC	39	5	0	1	0.5
HC	40	12	0	3	1.0
HC	41	15	1	2	1.3
HC	42	9	0	2	0.8
HC	43	28	2	3	2.3
HC	44	26	2	3	2.2
HC	45	14	1	1	1.2
Reef	1	10	1	2	0.8
Reef	2	11	1	2	0.9
Reef	3	6	0	1	0.5
Reef	4	12	1	2	1.0
Reef	5	13	1	3	1.1
Reef	6	18	1	3	1.5
Reef	7	10	1	2	0.8
Reef	8	19	2	2	1.6
Reef	9	18	1	1	1.5
Reef	10	21	2	2	1.7
Reef	11	12	1	2	1.0
Reef	12	8	1	1	0.7
Reef	13	9	0.5	2	0.8
Reef	14	8	1	1	0.6
Reef	15	12	1	2	1.0
Reef	16	20	1	4	1.7
Reef	17	21	1	3	1.8
Reef	18	23	2	2	1.9
Reef	19	38	3	4	3.2

Site	Series	Total	Median	Range	Mean
Reef	20	25	2	2	2.1
Reef	21	15	1	1	1.3
Reef	22	32	2.5	3	2.7
Reef	23	45	3.5	6	3.8
Reef	24	17	2	2	1.4
Reef	25	30	2.5	4	2.5
Reef	26	35	3	4	2.9
Reef	27	17	1.5	3	1.4
Reef	28	24	1	6	2.0
Reef	29	61	3	5	5.1
Reef	30	40	4	3	3.3
Reef	31	26	2	3	2.2
Reef	32	17	1	1	1.4
Reef	33	8	0.5	2	0.7
Reef	34	22	1	5	1.8
Reef	35	31	3	3	2.6
Reef	36	24	2	4	2.0
Reef	37	22	2	4	1.8
Reef	38	13	1	1	1.1
Reef	39	6	0	1	0.5
Reef	40	42	3.5	5	3.5
Reef	41	33	2	6	2.7
Reef	42	21	1.5	2	1.8
Reef	43	14	1	2	1.2
Reef	44	7	0.5	1	0.6
Reef	45	4	0	1	0.3
ShB	1	11	1	1	0.9
ShB	2	11	1	1	0.9
ShB	3	18	1	3	1.5
ShB	4	41	3	7	3.4
ShB	5	12	1	3	1.0
ShB	6	12	1	2	1.0
ShB	7	11	1	2	0.9
ShB	8	18	1	3	1.5
ShB	9	10	1	2	0.8
ShB	10	19	1	4	1.6
ShB	11	20	1.5	2	1.7
ShB	12	16	2	2	1.4
ShB	13	10	1	1	0.8
ShB	14	9	1	1	0.8
ShB	15	14	1	2	1.2
ShB	16	8	0.5	1	0.7
ShB	17	5	0	1	0.4
ShB	18	16	1	3	1.3
ShB	19	12	1	2	1.0
ShB	20	1	0	0	0.1
ShB	21	18	1	3	1.5
ShB	22	17	1	3	1.5
ShB	23	15	1	3	1.3
ShB	24	25	2	2	2.1
ShB	25	21	1.5	3	1.8
ShB	26	13	1	2	1.1
ShB	27	13	1	2	1.1
ShB	28	23	1	3	1.9
ShB	29	6	0	1	0.5

Site	Series	Total	Median	Range	Mean
ShB	30	13	1	2	1.1
ShB	31	22	1	3	1.8
ShB	32	5	0	1	0.4
ShB	33	8	0	1	0.7
ShB	34	15	1	2	1.3
ShB	35	13	0	3	1.1
ShB	36	12	1	3	1.0
ShB	37	13	1	2	1.1
ShB	38	11	0	3	0.9
ShB	39	11	0.5	2	0.9
ShB	40	9	0	1	0.8
ShB	41	17	1	3	1.4
ShB	42	14	1	3	1.2
ShB	43	6	0.5	1	0.5
ShB	44	8	0	1	0.7
ShB	45	6	0	1	0.5
Whau	1	33	3	3	2.8
Whau	2	33	2.5	3	2.8
Whau	3	25	2	2	2.1
Whau	4	68	5	4	5.6
Whau	5	21	2	3	1.8
Whau	6	19	1	2	1.6
Whau	7	27	2	3	2.3
Whau	8	25	1.5	5	2.1
Whau	9	24	2	4	2.0
Whau	10	0	0	0	0.0
Whau	11	23	2	3	1.9
Whau	12	12	1	0	1.0
Whau	13	12	1	2	1.0
Whau	14	8	1	1	0.7
Whau	15	37	3	4	3.1
Whau	16	11	1	3	0.9
Whau	17	52	4	7	4.3
Whau	18	17	1	1	1.4
Whau	19	50	3	7	4.2
Whau	20	67	6	4	5.6
Whau	21	73	5	9	6.1
Whau	22	64	5	6	5.3
Whau	23	77	5	10	6.4
Whau	24	75	4.5	11	6.3
Whau	25	93	6.5	11	7.8
Whau	26	122	9.5	14	10.2
Whau	27	103	6.5	13	8.6
Whau	28	88	6	10	7.3
Whau	29	100	6.5	10	8.3
Whau	30	111	10	11	9.3
Whau	31	92	6	10	7.7
Whau	32	102	8.5	8	8.5
Whau	33	64	5	7	5.3
Whau	34	59	5	4	4.9
Whau	35	60	6	9	5.0
Whau	36	75	7	8	6.3
Whau	37	70	5	9	5.8
Whau	38	64	5.5	7	5.3
Whau	39	23	1	4	1.9

Site	Series	Total	Median	Range	Mean
Whau	40	72	6	5	6.0
Whau	41	49	3.5	7	4.1
Whau	42	72	6	7	6.0
Whau	43	74	6	10	6.2
Whau	44	95	7	9	7.9
Whau	45	50	3.5	5	4.2

Species: ***Macroclymenella stewartensis***

Site	Series	Total	Median	Range	Mean
HBV	1	1	0	0	0.1
HBV	2	4	0	1	0.3
HBV	3	3	0	1	0.3
HBV	4	2	0	1	0.2
HBV	5	2	0	1	0.2
HBV	6	0	0	0	0.0
HBV	7	5	0	1	0.4
HBV	8	7	0	2	0.6
HBV	9	0	0	0	0.0
HBV	10	2	0	1	0.2
HBV	11	2	0	1	0.2
HBV	12	0	0	0	0.0
HBV	13	2	0	1	0.2
HBV	14	4	0	1	0.4
HBV	15	2	0	1	0.2
HBV	16	0	0	0	0.0
HBV	17	0	0	0	0.0
HBV	18	0	0	0	0.0
HBV	19	1	0	0	0.1
HBV	20	5	0	1	0.4
HBV	21	2	0	1	0.2
HBV	22	1	0	0	0.1
HBV	23	0	0	0	0.0
HBV	24	3	0	1	0.3
HBV	25	1	0	0	0.1
HBV	26	3	0	1	0.3
HBV	27	1	0	0	0.1
HBV	28	0	0	0	0.0
HBV	29	3	0	1	0.3
HBV	30	0	0	0	0.0
HBV	31	3	0	1	0.3
HBV	32	3	0	1	0.3
HBV	33	6	0	1	0.5
HBV	34	4	0	1	0.3
HBV	35	3	0	1	0.3
HBV	36	3	0	1	0.3
HBV	37	4	0	1	0.3
HBV	38	3	0	1	0.3
HBV	39	1	0	0	0.1
HBV	40	1	0	0	0.1
HBV	41	4	0	1	0.3
HBV	42	5	0	1	0.4
HBV	43	12	1	2	1.0
HBV	44	10	1	2	0.8
HBV	45	10	0.5	2	0.8
HC	1	8	0.5	1	0.7
HC	2	12	1	2	1.0
HC	3	4	0	1	0.3
HC	4	6	0.5	1	0.5
HC	5	2	0	1	0.2
HC	6	6	0	1	0.5
HC	7	15	1	3	1.3
HC	8	14	1	2	1.2
HC	9	7	0.5	1	0.6
HC	10	7	0	3	0.6
HC	11	8	0.5	1	0.7
HC	12	9	0	2	0.7
HC	13	5	0	1	0.4
HC	14	4	0	1	0.3
HC	15	3	0	0	0.2
HC	16	10	0.5	2	0.8
HC	17	5	0	1	0.4
HC	18	10	1	2	0.8
HC	19	9	0.5	2	0.8
HC	20	14	1	2	1.2
HC	21	7	0	2	0.6
HC	22	9	1	2	0.8
HC	23	10	1	1	0.8
HC	24	2	0	1	0.2
HC	25	5	0	1	0.4
HC	26	9	0	1	0.7
HC	27	2	0	1	0.2
HC	28	11	1	2	0.9
HC	29	7	0.5	1	0.6
HC	30	4	0	1	0.3
HC	31	17	1	3	1.4
HC	32	18	1.5	3	1.5
HC	33	21	1	4	1.8
HC	34	13	1	2	1.1
HC	35	27	2	3	2.3
HC	36	14	1	3	1.2
HC	37	28	2	3	2.3
HC	38	10	0	3	0.8
HC	39	13	1	2	1.1
HC	40	9	1	1	0.8
HC	41	5	0	1	0.4
HC	42	12	1	2	1.0
HC	43	33	2.5	4	2.8
HC	44	33	2.5	5	2.8
HC	45	21	2	3	1.8
Reef	1	24	2	4	2.0
Reef	2	27	2	3	2.3
Reef	3	38	2.5	5	3.2
Reef	4	30	2	5	2.5
Reef	5	20	2	3	1.7
Reef	6	18	1	3	1.5
Reef	7	15	1	3	1.3
Reef	8	16	1	3	1.3
Reef	9	10	0.5	2	0.8
Reef	10	11	1	2	0.9
Reef	11	11	1	2	0.9
Reef	12	4	0	1	0.3
Reef	13	12	0.5	3	1.0
Reef	14	11	1	2	0.9
Reef	15	30	2.5	3	2.5
Reef	16	15	1	3	1.3
Reef	17	9	0.5	2	0.8
Reef	18	12	1	2	1.0
Reef	19	19	1.5	3	1.6

Site	Series	Total	Median	Range	Mean
Reef	20	25	2	5	2.1
Reef	21	14	1	2	1.2
Reef	22	17	1.5	2	1.4
Reef	23	10	1	2	0.8
Reef	24	16	1.5	2	1.3
Reef	25	12	1	2	1.0
Reef	26	34	2.5	4	2.8
Reef	27	23	1	5	1.9
Reef	28	9	0.5	1	0.8
Reef	29	9	0.5	2	0.8
Reef	30	46	3	7	3.8
Reef	31	48	3	4	4.0
Reef	32	36	3	4	3.0
Reef	33	46	3	6	3.8
Reef	34	20	2	4	1.7
Reef	35	22	2	3	1.8
Reef	36	39	2	4	3.3
Reef	37	31	2	5	2.6
Reef	38	22	1.5	4	1.8
Reef	39	0	0	0	0.0
Reef	40	20	1.5	4	1.7
Reef	41	23	2	3	1.9
Reef	42	25	1.5	4	2.1
Reef	43	30	2	5	2.5
Reef	44	41	4	4	3.4
Reef	45	37	3.5	5	3.1
ShB	1	5	0	1	0.4
ShB	2	6	0	1	0.5
ShB	3	3	0	1	0.3
ShB	4	1	0	0	0.1
ShB	5	2	0	1	0.2
ShB	6	2	0	1	0.2
ShB	7	0	0	0	0.0
ShB	8	2	0	1	0.2
ShB	9	2	0	0	0.2
ShB	10	4	0	1	0.3
ShB	11	1	0	0	0.1
ShB	12	2	0	1	0.2
ShB	13	2	0	1	0.2
ShB	14	6	0	1	0.5
ShB	15	5	0	1	0.4
ShB	16	3	0	1	0.3
ShB	17	2	0	1	0.2
ShB	18	2	0	1	0.2
ShB	19	0	0	0	0.0
ShB	20	1	0	0	0.1
ShB	21	4	0	1	0.3
ShB	22	4	0	1	0.4
ShB	23	0	0	0	0.0
ShB	24	1	0	0	0.1
ShB	25	4	0	1	0.3
ShB	26	12	1	3	1.0
ShB	27	6	0	2	0.5
ShB	28	7	0	1	0.6
ShB	29	1	0	0	0.1

Site	Series	Total	Median	Range	Mean
ShB	30	4	0	2	0.3
ShB	31	3	0	1	0.3
ShB	32	4	0	1	0.3
ShB	33	7	0	1	0.6
ShB	34	6	0.5	1	0.5
ShB	35	0	0	0	0.0
ShB	36	8	1	1	0.6
ShB	37	13	1	2	1.1
ShB	38	4	0	1	0.3
ShB	39	3	0	1	0.3
ShB	40	6	0	1	0.5
ShB	41	3	0	1	0.3
ShB	42	4	0	1	0.3
ShB	43	11	1	2	0.9
ShB	44	7	0	2	0.6
ShB	45	10	1	2	0.8
Whau	1	29	2	3	2.4
Whau	2	33	2.5	4	2.8
Whau	3	33	2.5	3	2.8
Whau	4	3	0	1	0.3
Whau	5	26	2	2	2.2
Whau	6	24	2	2	2.0
Whau	7	38	3	4	3.2
Whau	8	71	6	5	5.9
Whau	9	61	3.5	10	5.1
Whau	10	46	2	8	3.8
Whau	11	47	4	3	3.9
Whau	12	47	3	7	3.9
Whau	13	26	2	3	2.2
Whau	14	45	3.5	6	3.8
Whau	15	31	2	4	2.6
Whau	16	36	3	5	3.0
Whau	17	24	1.5	3	2.0
Whau	18	36	3	4	3.0
Whau	19	30	2.5	4	2.5
Whau	20	58	4	6	4.8
Whau	21	68	6.5	5	5.7
Whau	22	53	4.5	5	4.4
Whau	23	49	5	4	4.1
Whau	24	33	2.5	4	2.8
Whau	25	121	8	9	10.1
Whau	26	0	0	0	0.0
Whau	27	44	3.5	6	3.7
Whau	28	50	4.5	6	4.2
Whau	29	45	4	4	3.8
Whau	30	53	4.5	6	4.4
Whau	31	108	10	7	9.0
Whau	32	102	8	8	8.5
Whau	33	89	6.5	10	7.4
Whau	34	95	7.5	9	7.9
Whau	35	67	5.5	7	5.6
Whau	36	53	5	6	4.4
Whau	37	107	8	8	8.9
Whau	38	86	7.5	7	7.2
Whau	39	26	2	4	2.2

Site	Series	Total	Median	Range	Mean
Whau	40	62	5.5	7	5.2
Whau	41	37	3.5	5	3.1
Whau	42	61	4.5	6	5.1
Whau	43	84	7	10	7.0
Whau	44	108	8	11	9.0
Whau	45	103	8	11	8.6

Species: *Notoacmea helmsi*

Site	Series	Total	Median	Range	Mean
HBV	1	32	2	6	2.7
HBV	2	39	2	9	3.3
HBV	3	20	1	4	1.7
HBV	4	143	9.5	25	11.9
HBV	5	150	9	22	12.5
HBV	6	133	10.5	13	11.1
HBV	7	86	6.5	11	7.2
HBV	8	83	6.5	8	6.9
HBV	9	58	4	10	4.8
HBV	10	93	6	12	7.7
HBV	11	122	9.5	16	10.2
HBV	12	107	8.5	13	8.9
HBV	13	95	9	9	7.9
HBV	14	110	9	14	9.2
HBV	15	60	5	7	5.0
HBV	16	95	6	18	7.9
HBV	17	69	4	9	5.8
HBV	18	90	7	10	7.5
HBV	19	63	4	8	5.3
HBV	20	44	4	7	3.7
HBV	21	68	4.5	9	5.7
HBV	22	53	4.5	5	4.4
HBV	23	56	4	8	4.7
HBV	24	161	12.5	18	13.4
HBV	25	123	10	11	10.3
HBV	26	118	8.5	12	9.8
HBV	27	107	8.5	15	8.9
HBV	28	104	8.5	12	8.7
HBV	29	148	13	11	12.3
HBV	30	170	11	19	14.2
HBV	31	168	13	13	14.0
HBV	32	71	3.5	13	5.9
HBV	33	31	2	4	2.6
HBV	34	67	4.5	8	5.6
HBV	35	163	11.5	14	13.6
HBV	36	163	12	10	13.6
HBV	37	111	8.5	14	9.3
HBV	38	125	10	10	10.4
HBV	39	80	5.5	12	6.7
HBV	40	99	9.5	9	8.3
HBV	41	202	16	15	16.8
HBV	42	205	13.5	24	17.1
HBV	43	110	10	13	9.2
HBV	44	117	9.5	14	9.8
HBV	45	113	9	12	9.4
HC	1	136	11.5	15	11.3
HC	2	44	3.5	6	3.7
HC	3	26	2	4	2.2
HC	4	43	3.5	6	3.6
HC	5	173	13	21	14.4
HC	6	245	16.5	25	20.4
HC	7	208	16.5	13	17.3
HC	8	100	7	12	8.3
HC	9	98	7	11	8.2

Site	Series	Total	Median	Range	Mean
HC	10	189	13.5	21	15.8
HC	11	132	9	21	11.0
HC	12	182	17	17	15.2
HC	13	116	10.5	8	9.7
HC	14	119	8.5	13	9.9
HC	15	80	4	11	6.7
HC	16	87	6.5	10	7.3
HC	17	3	0	1	0.3
HC	18	162	13.5	14	13.5
HC	19	173	14	16	14.4
HC	20	83	4	12	6.9
HC	21	31	2	6	2.6
HC	22	102	7	14	8.5
HC	23	99	8	8	8.3
HC	24	81	5.5	14	6.8
HC	25	137	12.5	11	11.4
HC	26	74	5	10	6.2
HC	27	65	5	9	5.5
HC	28	64	6	7	5.3
HC	29	188	15.5	21	15.7
HC	30	298	28.5	31	24.8
HC	31	109	8.5	13	9.1
HC	32	70	5.5	10	5.8
HC	33	76	6	6	6.3
HC	34	202	17	19	16.8
HC	35	407	35.5	22	33.9
HC	36	220	17.5	14	18.3
HC	37	55	3	7	4.6
HC	38	101	8	19	8.4
HC	39	140	11	15	11.6
HC	40	301	21.5	30	25.1
HC	41	323	22.5	32	26.9
HC	42	132	11.5	10	11.0
HC	43	104	8	11	8.7
HC	44	154	10.5	13	12.8
HC	45	112	9	13	9.3
Reef	1	5	0	1	0.4
Reef	2	2	0	1	0.2
Reef	3	10	0	2	0.8
Reef	4	6	0	2	0.5
Reef	5	2	0	1	0.2
Reef	6	9	0	2	0.8
Reef	7	5	0	1	0.4
Reef	8	4	0	1	0.3
Reef	9	13	0.5	3	1.1
Reef	10	2	0	1	0.2
Reef	11	4	0	1	0.3
Reef	12	2	0	1	0.2
Reef	13	1	0	0	0.1
Reef	14	5	0	1	0.4
Reef	15	3	0	1	0.3
Reef	16	0	0	0	0.0
Reef	17	2	0	1	0.2
Reef	18	2	0	1	0.2
Reef	19	4	0	1	0.3

Site	Series	Total	Median	Range	Mean
Reef	20	1	0	0	0.1
Reef	21	0	0	0	0.0
Reef	22	1	0	0	0.1
Reef	23	2	0	1	0.2
Reef	24	3	0	1	0.3
Reef	25	1	0	0	0.1
Reef	26	1	0	0	0.1
Reef	27	0	0	0	0.0
Reef	28	1	0	0	0.1
Reef	29	3	0	0	0.3
Reef	30	1	0	0	0.1
Reef	31	3	0	1	0.3
Reef	32	0	0	0	0.0
Reef	33	0	0	0	0.0
Reef	34	0	0	0	0.0
Reef	35	1	0	0	0.1
Reef	36	3	0	0	0.3
Reef	37	0	0	0	0.0
Reef	38	6	0	2	0.5
Reef	39	1	0	0	0.1
Reef	40	27	0	5	2.3
Reef	41	2	0	1	0.2
Reef	42	2	0	1	0.2
Reef	43	6	0	2	0.5
Reef	44	10	0	2	0.8
Reef	45	8	0	0	0.7
ShB	1	62	3.5	10	5.2
ShB	2	64	3.5	10	5.3
ShB	3	19	0.5	5	1.6
ShB	4	88	7	14	7.3
ShB	5	134	5	33	11.2
ShB	6	140	12.5	17	11.7
ShB	7	87	7	14	7.3
ShB	8	35	2	7	2.9
ShB	9	28	2	5	2.3
ShB	10	175	13	23	14.6
ShB	11	143	12.5	10	11.9
ShB	12	127	10	8	10.5
ShB	13	41	3	3	3.4
ShB	14	92	6.5	11	7.6
ShB	15	99	7	14	8.3
ShB	16	72	5	11	6.0
ShB	17	118	11	16	9.8
ShB	18	95	6.5	14	7.9
ShB	19	75	5	17	6.3
ShB	20	62	4	8	5.2
ShB	21	42	2.5	9	3.5
ShB	22	55	4	12	4.5
ShB	23	30	0.5	9	2.5
ShB	24	93	5	19	7.7
ShB	25	75	5.5	10	6.3
ShB	26	64	3.5	12	5.3
ShB	27	40	1.5	10	3.3
ShB	28	56	3.5	11	4.7
ShB	29	71	5	11	5.9

Site	Series	Total	Median	Range	Mean
ShB	30	227	14	37	18.9
ShB	31	212	13	31	17.7
ShB	32	81	6.5	8	6.8
ShB	33	22	0.5	6	1.8
ShB	34	5	0	1	0.4
ShB	35	35	0	3	2.9
ShB	36	61	2	15	5.1
ShB	37	97	1.5	14	8.1
ShB	38	37	3	3	3.1
ShB	39	21	1.5	4	1.8
ShB	40	116	9.5	20	9.7
ShB	41	71	3.5	12	5.9
ShB	42	140	12	24	11.7
ShB	43	106	7.5	17	8.8
ShB	44	41	3.5	6	3.4
ShB	45	39	2	7	3.3
Whau	1	96	5	18	8.0
Whau	2	99	8	8	8.3
Whau	3	124	8.5	10	10.3
Whau	4	66	3.5	12	5.5
Whau	5	12	1	2	1.0
Whau	6	24	1	5	2.0
Whau	7	44	4	5	3.7
Whau	8	45	3	7	3.8
Whau	9	37	3.5	5	3.1
Whau	10	82	6	4	6.8
Whau	11	26	2	4	2.2
Whau	12	64	6	10	5.3
Whau	13	42	3	6	3.5
Whau	14	47	3.5	6	3.9
Whau	15	44	3.5	6	3.7
Whau	16	18	2	2	1.5
Whau	17	42	2	11	3.5
Whau	18	29	1	8	2.4
Whau	19	34	3	3	2.8
Whau	20	43	2.5	8	3.6
Whau	21	4	0	2	0.3
Whau	22	19	1	5	1.6
Whau	23	12	1	2	1.0
Whau	24	14	0	5	1.2
Whau	25	6	0	2	0.5
Whau	26	12	0.5	2	1.0
Whau	27	18	1	4	1.5
Whau	28	22	1.5	3	1.8
Whau	29	34	2	7	2.8
Whau	30	47	1	15	3.9
Whau	31	30	3	4	2.5
Whau	32	40	2	5	3.3
Whau	33	11	0	4	0.9
Whau	34	7	0	1	0.6
Whau	35	23	1	4	1.9
Whau	36	24	1	5	2.0
Whau	37	43	2	8	3.5
Whau	38	72	1.5	14	6.0
Whau	39	32	0	8	2.7

Site	Series	Total	Median	Range	Mean
Whau	40	23	1	5	1.9
Whau	41	91	1	18	7.6
Whau	42	35	2.5	6	2.9
Whau	43	13	1	3	1.1
Whau	44	38	2	8	3.2
Whau	45	23	1	6	1.9

Species: *Nucula hartvigiana*

Site	Series	Total	Median	Range	Mean
HBV	1	308	21	39	25.7
HBV	2	447	30.5	46	37.3
HBV	3	527	36	63	43.9
HBV	4	646	55	45	53.8
HBV	5	520	38.5	48	43.3
HBV	6	639	59	54	53.3
HBV	7	654	55	34	54.5
HBV	8	659	61	54	54.9
HBV	9	667	56.5	50	55.6
HBV	10	712	54	43	59.4
HBV	11	667	55	53	55.6
HBV	12	600	48.5	33	50.0
HBV	13	817	72	56	68.1
HBV	14	760	60	54	63.4
HBV	15	526	46	36	43.8
HBV	16	586	50	37	48.8
HBV	17	476	38.5	38	39.7
HBV	18	796	73	52	66.3
HBV	19	635	50.5	49	52.9
HBV	20	704	56	30	58.7
HBV	21	600	43	61	50.0
HBV	22	643	50.5	43	53.6
HBV	23	661	49.5	56	55.1
HBV	24	592	55.5	59	49.3
HBV	25	573	52	53	47.7
HBV	26	541	44.5	37	45.1
HBV	27	683	59.5	41	56.9
HBV	28	503	40.5	53	41.9
HBV	29	532	40	51	44.3
HBV	30	461	35	43	38.4
HBV	31	640	53.5	40	53.3
HBV	32	554	41.5	58	46.2
HBV	33	574	47.5	32	47.8
HBV	34	468	32	38	39.0
HBV	35	504	41.5	26	42.0
HBV	36	610	48.5	38	50.8
HBV	37	591	47	36	49.3
HBV	38	656	50.5	49	54.7
HBV	39	317	26.5	53	26.4
HBV	40	359	30	46	29.9
HBV	41	465	37.5	36	38.8
HBV	42	423	38	38	35.3
HBV	43	396	35	25	33.0
HBV	44	541	43.5	25	45.1
HBV	45	534	46.5	45	44.5
HC	1	1150	86.5	98	95.8
HC	2	1059	84	55	88.3
HC	3	967	80	42	80.6
HC	4	1432	118.5	96	119.3
HC	5	1512	127	43	126.0
HC	6	1487	124.5	74	123.9
HC	7	1521	131	78	126.8
HC	8	1502	120	34	125.2
HC	9	1394	115	61	116.2

Site	Series	Total	Median	Range	Mean
HC	10	1508	131	63	125.7
HC	11	1446	119	53	120.5
HC	12	1130	97	69	94.2
HC	13	1064	86.5	51	88.7
HC	14	1262	101.5	34	105.2
HC	15	1548	131	31	129.0
HC	16	1151	90	44	95.9
HC	17	1383	125	69	115.3
HC	18	1327	116	59	110.6
HC	19	1242	106	103	103.5
HC	20	1178	92.5	47	98.2
HC	21	1249	101.5	40	104.1
HC	22	1181	103	34	98.4
HC	23	1179	98	1	98.3
HC	24	1064	92.5	66	88.7
HC	25	1193	100.5	45	99.4
HC	26	1046	82	39	87.2
HC	27	1061	88	24	88.5
HC	28	1014	82.5	73	84.5
HC	29	1317	109	69	109.8
HC	30	1165	94.5	35	97.1
HC	31	1061	91	37	88.4
HC	32	1168	100.5	36	97.3
HC	33	1011	80	49	84.3
HC	34	1022	85	69	85.2
HC	35	1044	85.5	54	87.0
HC	36	908	77	25	75.7
HC	37	815	68	30	67.9
HC	38	950	89	53	79.1
HC	39	968	76	59	80.6
HC	40	979	82	21	81.6
HC	41	1021	81	58	85.1
HC	42	952	79.5	35	79.3
HC	43	845	69.5	41	70.4
HC	44	1248	110	35	104.0
HC	45	859	57.5	118	71.6
Reef	1	240	18	24	20.0
Reef	2	880	82.5	97	73.3
Reef	3	447	33	66	37.3
Reef	4	789	74.5	63	65.8
Reef	5	661	50.5	61	55.1
Reef	6	516	41.5	86	43.0
Reef	7	447	32.5	55	37.3
Reef	8	394	37	61	32.8
Reef	9	303	30	41	25.3
Reef	10	307	29	53	25.5
Reef	11	302	23.5	44	25.2
Reef	12	191	16.5	31	15.9
Reef	13	275	24.5	53	22.9
Reef	14	188	13	33	15.6
Reef	15	280	23.5	32	23.3
Reef	16	199	12	34	16.6
Reef	17	124	4.5	22	10.3
Reef	18	78	4.5	14	6.5
Reef	19	122	4.5	26	10.2

Site	Series	Total	Median	Range	Mean
Reef	20	108	6.5	19	9.0
Reef	21	64	2.5	15	5.3
Reef	22	121	6.5	24	10.1
Reef	23	63	3	13	5.3
Reef	24	73	1.5	14	6.1
Reef	25	28	0	5	2.3
Reef	26	59	1	14	4.9
Reef	27	35	0.5	10	2.9
Reef	28	51	0	13	4.3
Reef	29	51	2	11	4.3
Reef	30	40	1	9	3.3
Reef	31	3	0	1	0.3
Reef	32	14	1	2	1.2
Reef	33	3	0	1	0.3
Reef	34	11	1	2	0.9
Reef	35	7	0	2	0.6
Reef	36	8	0.5	1	0.7
Reef	37	2	0	1	0.2
Reef	38	6	0	2	0.5
Reef	39	7	0	2	0.6
Reef	40	10	0	3	0.8
Reef	41	4	0	1	0.4
Reef	42	16	1	4	1.3
Reef	43	11	0	3	0.9
Reef	44	42	2.5	5	3.5
Reef	45	16	1	3	1.3
ShB	1	223	18.5	34	18.6
ShB	2	237	22	34	19.8
ShB	3	237	12	14	19.8
ShB	4	448	31.5	38	37.3
ShB	5	415	36	31	34.5
ShB	6	408	30	30	34.0
ShB	7	282	25.5	27	23.5
ShB	8	280	21.5	19	23.3
ShB	9	247	13.5	35	20.6
ShB	10	418	31	31	34.8
ShB	11	389	21	43	32.4
ShB	12	482	39	58	40.2
ShB	13	171	16	16	14.3
ShB	14	107	9.5	16	8.9
ShB	15	245	15.5	38	20.4
ShB	16	327	24.5	47	27.3
ShB	17	256	17	47	21.3
ShB	18	234	20	31	19.5
ShB	19	99	4.5	20	8.3
ShB	20	218	10	41	18.2
ShB	21	121	8	22	10.1
ShB	22	92	2	22	7.6
ShB	23	62	4	12	5.2
ShB	24	224	4	58	18.6
ShB	25	99	1	9	8.3
ShB	26	105	2	27	8.8
ShB	27	175	3.5	57	14.6
ShB	28	34	1	8	2.8
ShB	29	21	0	6	1.8

Site	Series	Total	Median	Range	Mean
ShB	30	60	2	10	5.0
ShB	31	65	3.5	12	5.4
ShB	32	66	2	22	5.5
ShB	33	20	1	5	1.7
ShB	34	137	3	10	11.4
ShB	35	30	1	3	2.5
ShB	36	56	1	7	4.6
ShB	37	143	1	41	11.9
ShB	38	20	1	5	1.7
ShB	39	96	4	18	8.0
ShB	40	25	0.5	6	2.1
ShB	41	10	0	3	0.8
ShB	42	58	1	16	4.8
ShB	43	34	0	6	2.8
ShB	44	68	0.5	10	5.7
ShB	45	34	0.5	3	2.8
Whau	1	703	54.5	74	58.6
Whau	2	811	55.5	74	67.6
Whau	3	1616	136	123	134.7
Whau	4	435	28.5	49	36.3
Whau	5	1110	94.5	75	92.5
Whau	6	1124	94	98	93.7
Whau	7	993	93	87	82.8
Whau	8	717	62.5	29	59.8
Whau	9	982	81.5	74	81.8
Whau	10	858	71.5	39	71.5
Whau	11	542	45	34	45.2
Whau	12	671	58	32	55.9
Whau	13	551	47.5	27	45.9
Whau	14	385	34	41	32.1
Whau	15	786	74	75	65.5
Whau	16	558	49.5	42	46.5
Whau	17	910	76	77	75.8
Whau	18	819	69.5	57	68.3
Whau	19	837	75.5	63	69.8
Whau	20	716	58.5	53	59.7
Whau	21	177	13	20	14.8
Whau	22	397	24	64	33.1
Whau	23	286	14	61	23.8
Whau	24	231	23	43	19.3
Whau	25	190	9	35	15.8
Whau	26	216	10.5	41	18.0
Whau	27	206	10	34	17.2
Whau	28	296	12.5	43	24.7
Whau	29	339	14	62	28.3
Whau	30	444	25	78	37.0
Whau	31	337	21	67	28.1
Whau	32	286	13	68	23.8
Whau	33	317	15.5	65	26.4
Whau	34	314	7.5	78	26.2
Whau	35	442	31.5	74	36.8
Whau	36	274	19.5	50	22.8
Whau	37	326	38	48	27.2
Whau	38	241	13	44	20.1
Whau	39	487	45.5	89	40.6

Site	Series	Total	Median	Range	Mean
Whau	40	313	19	58	26.1
Whau	41	345	17	56	28.8
Whau	42	434	34.5	65	36.2
Whau	43	246	20.5	38	20.5
Whau	44	407	20.5	88	33.9
Whau	45	381	21	73	31.8

Species: ***Paphies australis***

Site	Series	Total	Median	Range	Mean
HBV	1	48	4	8	4.0
HBV	2	39	1.5	9	3.3
HBV	3	46	3.5	7	3.8
HBV	4	85	5.5	16	7.1
HBV	5	37	4.5	5	3.1
HBV	6	77	4	12	6.4
HBV	7	38	2.5	5	3.2
HBV	8	43	2	8	3.6
HBV	9	57	0.5	22	4.8
HBV	10	60	2	18	5.0
HBV	11	31	1	8	2.6
HBV	12	48	3.5	7	4.0
HBV	13	23	1.5	5	1.9
HBV	14	62	2	7	5.2
HBV	15	89	4	20	7.4
HBV	16	65	4	13	5.4
HBV	17	21	1.5	3	1.8
HBV	18	39	2	9	3.3
HBV	19	54	3	7	4.5
HBV	20	57	1	17	4.8
HBV	21	12	0.5	3	1.0
HBV	22	38	3	6	3.2
HBV	23	26	1	4	2.2
HBV	24	49	1.5	11	4.1
HBV	25	56	3	10	4.6
HBV	26	70	3	8	5.8
HBV	27	66	3.5	12	5.5
HBV	28	41	2	9	3.4
HBV	29	75	3	12	6.3
HBV	30	43	1.5	10	3.6
HBV	31	45	1	11	3.8
HBV	32	38	1	3	3.2
HBV	33	16	0	3	1.3
HBV	34	38	0	12	3.2
HBV	35	15	0	3	1.3
HBV	36	16	1	3	1.3
HBV	37	43	0.5	8	3.6
HBV	38	32	0	1	2.7
HBV	39	36	0	1	3.0
HBV	40	24	0.5	6	2.0
HBV	41	43	0	11	3.6
HBV	42	37	1	4	3.1
HBV	43	20	1.5	3	1.7
HBV	44	46	0	4	3.8
HBV	45	62	0	19	5.2
HC	1	0	0	0	0.0
HC	2	0	0	0	0.0
HC	3	0	0	0	0.0
HC	4	0	0	0	0.0
HC	5	0	0	0	0.0
HC	6	1	0	0	0.1
HC	7	0	0	0	0.0
HC	8	0	0	0	0.0
HC	9	0	0	0	0.0

Site	Series	Total	Median	Range	Mean
HC	10	0	0	0	0.0
HC	11	0	0	0	0.0
HC	12	0	0	0	0.0
HC	13	0	0	0	0.0
HC	14	0	0	0	0.0
HC	15	0	0	0	0.0
HC	16	0	0	0	0.0
HC	17	1	0	0	0.1
HC	18	0	0	0	0.0
HC	19	0	0	0	0.0
HC	20	0	0	0	0.0
HC	21	0	0	0	0.0
HC	22	0	0	0	0.0
HC	23	0	0	0	0.0
HC	24	0	0	0	0.0
HC	25	0	0	0	0.0
HC	26	0	0	0	0.0
HC	27	0	0	0	0.0
HC	28	3	0	1	0.3
HC	29	0	0	0	0.0
HC	30	3	0	1	0.3
HC	31	0	0	0	0.0
HC	32	0	0	0	0.0
HC	33	0	0	0	0.0
HC	34	0	0	0	0.0
HC	35	0	0	0	0.0
HC	36	0	0	0	0.0
HC	37	0	0	0	0.0
HC	38	0	0	0	0.0
HC	39	0	0	0	0.0
HC	40	0	0	0	0.0
HC	41	0	0	0	0.0
HC	42	6	0	2	0.5
HC	43	0	0	0	0.0
HC	44	1	0	0	0.1
HC	45	0	0	0	0.0
Reef	1	0	0	0	0.0
Reef	2	0	0	0	0.0
Reef	3	0	0	0	0.0
Reef	4	0	0	0	0.0
Reef	5	1	0	0	0.1
Reef	6	1	0	0	0.1
Reef	7	3	0	1	0.3
Reef	8	0	0	0	0.0
Reef	9	0	0	0	0.0
Reef	10	0	0	0	0.0
Reef	11	0	0	0	0.0
Reef	12	2	0	1	0.2
Reef	13	1	0	0	0.1
Reef	14	0	0	0	0.0
Reef	15	0	0	0	0.0
Reef	16	0	0	0	0.0
Reef	17	0	0	0	0.0
Reef	18	0	0	0	0.0
Reef	19	0	0	0	0.0

Site	Series	Total	Median	Range	Mean
Reef	20	0	0	0	0.0
Reef	21	0	0	0	0.0
Reef	22	0	0	0	0.0
Reef	23	0	0	0	0.0
Reef	24	5	0	2	0.4
Reef	25	0	0	0	0.0
Reef	26	0	0	0	0.0
Reef	27	0	0	0	0.0
Reef	28	31	2	4	2.6
Reef	29	0	0	0	0.0
Reef	30	0	0	0	0.0
Reef	31	0	0	0	0.0
Reef	32	2	0	1	0.2
Reef	33	3	0	1	0.3
Reef	34	0	0	0	0.0
Reef	35	0	0	0	0.0
Reef	36	0	0	0	0.0
Reef	37	0	0	0	0.0
Reef	38	0	0	0	0.0
Reef	39	0	0	0	0.0
Reef	40	0	0	0	0.0
Reef	41	0	0	0	0.0
Reef	42	0	0	0	0.0
Reef	43	0	0	0	0.0
Reef	44	0	0	0	0.0
Reef	45	0	0	0	0.0
ShB	1	0	0	0	0.0
ShB	2	0	0	0	0.0
ShB	3	0	0	0	0.0
ShB	4	0	0	0	0.0
ShB	5	1	0	0	0.1
ShB	6	1	0	0	0.1
ShB	7	2	0	1	0.2
ShB	8	1	0	0	0.1
ShB	9	0	0	0	0.0
ShB	10	0	0	0	0.0
ShB	11	0	0	0	0.0
ShB	12	2	0	0	0.2
ShB	13	3	0	1	0.3
ShB	14	0	0	0	0.0
ShB	15	0	0	0	0.0
ShB	16	1	0	0	0.1
ShB	17	7	0	1	0.6
ShB	18	0	0	0	0.0
ShB	19	2	0	1	0.2
ShB	20	2	0	1	0.2
ShB	21	0	0	0	0.0
ShB	22	0	0	0	0.0
ShB	23	7	0	0	0.6
ShB	24	1	0	0	0.1
ShB	25	1	0	0	0.1
ShB	26	0	0	0	0.0
ShB	27	1	0	0	0.1
ShB	28	5	0	1	0.4
ShB	29	0	0	0	0.0

Site	Series	Total	Median	Range	Mean
ShB	30	1	0	0	0.1
ShB	31	1	0	0	0.1
ShB	32	1	0	0	0.1
ShB	33	6	0	1	0.5
ShB	34	1	0	0	0.1
ShB	35	0	0	0	0.0
ShB	36	0	0	0	0.0
ShB	37	0	0	0	0.0
ShB	38	0	0	0	0.0
ShB	39	0	0	0	0.0
ShB	40	0	0	0	0.0
ShB	41	0	0	0	0.0
ShB	42	1	0	0	0.1
ShB	43	0	0	0	0.0
ShB	44	1	0	0	0.1
ShB	45	0	0	0	0.0
Whau	1	0	0	0	0.0
Whau	2	0	0	0	0.0
Whau	3	0	0	0	0.0
Whau	4	3	0	1	0.3
Whau	5	0	0	0	0.0
Whau	6	0	0	0	0.0
Whau	7	0	0	0	0.0
Whau	8	23	1.5	3	1.9
Whau	9	0	0	0	0.0
Whau	10	0	0	0	0.0
Whau	11	0	0	0	0.0
Whau	12	0	0	0	0.0
Whau	13	0	0	0	0.0
Whau	14	0	0	0	0.0
Whau	15	0	0	0	0.0
Whau	16	0	0	0	0.0
Whau	17	0	0	0	0.0
Whau	18	0	0	0	0.0
Whau	19	1	0	0	0.1
Whau	20	0	0	0	0.0
Whau	21	0	0	0	0.0
Whau	22	0	0	0	0.0
Whau	23	0	0	0	0.0
Whau	24	0	0	0	0.0
Whau	25	2	0	1	0.2
Whau	26	0	0	0	0.0
Whau	27	0	0	0	0.0
Whau	28	0	0	0	0.0
Whau	29	0	0	0	0.0
Whau	30	5	0	1	0.4
Whau	31	4	0	1	0.3
Whau	32	0	0	0	0.0
Whau	33	0	0	0	0.0
Whau	34	4	0	1	0.3
Whau	35	0	0	0	0.0
Whau	36	0	0	0	0.0
Whau	37	0	0	0	0.0
Whau	38	0	0	0	0.0
Whau	39	1	0	0	0.1

Site	Series	Total	Median	Range	Mean
Whau	40	1	0	0	0.1
Whau	41	0	0	0	0.0
Whau	42	0	0	0	0.0
Whau	43	1	0	0	0.1
Whau	44	0	0	0	0.0
Whau	45	0	0	0	0.0

Species: *Prionospio aucklandica*

Site	Series	Total	Median	Range	Mean
HBV	1	46	3	9	3.8
HBV	2	53	2.5	9	4.4
HBV	3	111	8	11	9.3
HBV	4	140	11.5	17	11.7
HBV	5	104	7.5	16	8.7
HBV	6	112	6.5	24	9.3
HBV	7	108	7	15	9.0
HBV	8	71	5	7	5.9
HBV	9	86	7.5	12	7.2
HBV	10	94	7	9	7.8
HBV	11	72	6	8	6.0
HBV	12	66	4.5	8	5.5
HBV	13	75	5.5	9	6.3
HBV	14	76	6	10	6.4
HBV	15	64	5	10	5.3
HBV	16	61	4.5	6	5.1
HBV	17	39	2.5	5	3.3
HBV	18	59	5	6	4.9
HBV	19	42	3	7	3.5
HBV	20	51	3.5	5	4.3
HBV	21	48	2.5	10	4.0
HBV	22	48	4.5	5	4.0
HBV	23	35	2.5	5	2.9
HBV	24	34	1.5	6	2.8
HBV	25	41	4	7	3.5
HBV	26	40	3	5	3.3
HBV	27	42	2.5	7	3.5
HBV	28	43	3	5	3.6
HBV	29	41	2	6	3.4
HBV	30	29	2	3	2.4
HBV	31	32	2.5	3	2.7
HBV	32	16	1	3	1.3
HBV	33	35	3.5	5	2.9
HBV	34	34	2.5	4	2.8
HBV	35	27	2	2	2.3
HBV	36	27	2	5	2.3
HBV	37	34	2.5	4	2.8
HBV	38	27	1.5	4	2.3
HBV	39	15	1	3	1.3
HBV	40	40	3	8	3.3
HBV	41	34	2	7	2.8
HBV	42	20	2	3	1.7
HBV	43	31	2	5	2.6
HBV	44	62	5.5	8	5.2
HBV	45	118	8	12	9.8
HC	1	64	4.5	10	5.3
HC	2	36	1.5	7	3.0
HC	3	71	5.5	12	5.9
HC	4	111	7	8	9.3
HC	5	69	5.5	7	5.8
HC	6	142	9.5	22	11.8
HC	7	74	4	12	6.2
HC	8	45	3	5	3.8
HC	9	72	4.5	12	6.0

Site	Series	Total	Median	Range	Mean
HC	10	36	1.5	9	3.0
HC	11	53	4	9	4.4
HC	12	47	4	6	3.9
HC	13	41	2	5	3.4
HC	14	49	4.5	4	4.1
HC	15	45	4	7	3.8
HC	16	36	2.5	5	3.0
HC	17	20	1.5	3	1.7
HC	18	40	3	6	3.3
HC	19	34	3.5	3	2.8
HC	20	37	3	4	3.1
HC	21	22	1	5	1.8
HC	22	37	4	4	3.1
HC	23	27	1.5	5	2.3
HC	24	30	2	4	2.5
HC	25	10	1	2	0.8
HC	26	14	1	3	1.2
HC	27	8	0	2	0.6
HC	28	14	1	3	1.2
HC	29	8	1	1	0.7
HC	30	10	0.5	2	0.8
HC	31	14	1	3	1.2
HC	32	9	0	2	0.8
HC	33	17	2	3	1.4
HC	34	21	1.5	4	1.8
HC	35	19	1	3	1.6
HC	36	5	0	1	0.4
HC	37	7	0	2	0.6
HC	38	4	0	1	0.3
HC	39	15	1	3	1.3
HC	40	15	1	3	1.3
HC	41	15	0.5	4	1.3
HC	42	28	2	5	2.3
HC	43	26	2	5	2.2
HC	44	44	3.5	5	3.7
HC	45	68	5	8	5.7
Reef	1	7	0.5	1	0.6
Reef	2	17	1	3	1.4
Reef	3	25	2	4	2.1
Reef	4	28	2	5	2.3
Reef	5	19	1	3	1.6
Reef	6	30	3	6	2.5
Reef	7	31	3	3	2.6
Reef	8	17	1	5	1.4
Reef	9	31	3	3	2.6
Reef	10	10	1	2	0.8
Reef	11	24	2	4	2.0
Reef	12	9	1	2	0.8
Reef	13	22	2	3	1.8
Reef	14	8	0	2	0.6
Reef	15	23	1	6	1.9
Reef	16	22	1	5	1.8
Reef	17	19	2	3	1.6
Reef	18	0	0	0	0.0
Reef	19	17	1	2	1.4

Site	Series	Total	Median	Range	Mean
Reef	20	67	5	9	5.6
Reef	21	76	7.5	6	6.3
Reef	22	71	4.5	12	5.9
Reef	23	78	6	9	6.5
Reef	24	64	4.5	9	5.3
Reef	25	39	2.5	5	3.3
Reef	26	39	3	5	3.3
Reef	27	11	0.5	2	0.9
Reef	28	53	4	7	4.4
Reef	29	18	1	3	1.5
Reef	30	32	2.5	4	2.7
Reef	31	44	3	4	3.6
Reef	32	24	2	2	2.0
Reef	33	33	3	3	2.8
Reef	34	55	4	6	4.6
Reef	35	36	3	5	3.0
Reef	36	33	2.5	3	2.8
Reef	37	20	1	2	1.7
Reef	38	27	2	3	2.3
Reef	39	9	1	2	0.8
Reef	40	34	3	3	2.8
Reef	41	33	3	5	2.7
Reef	42	20	1.5	4	1.7
Reef	43	39	2	4	3.3
Reef	44	190	10.5	19	15.8
Reef	45	101	9.5	11	8.4
ShB	1	4	0	1	0.3
ShB	2	5	0	1	0.4
ShB	3	10	0	3	0.8
ShB	4	21	0	6	1.8
ShB	5	8	0	1	0.6
ShB	6	11	0	2	0.9
ShB	7	9	0	3	0.8
ShB	8	6	0	1	0.5
ShB	9	24	1	4	2.0
ShB	10	20	1	3	1.7
ShB	11	27	2	3	2.3
ShB	12	34	1	7	2.8
ShB	13	7	0	2	0.6
ShB	14	6	0	2	0.5
ShB	15	4	0	1	0.3
ShB	16	22	1.5	4	1.8
ShB	17	29	2	4	2.4
ShB	18	29	2	5	2.4
ShB	19	26	1	6	2.2
ShB	20	27	0.5	6	2.3
ShB	21	32	2	5	2.7
ShB	22	29	3	5	2.5
ShB	23	81	4.5	15	6.8
ShB	24	57	3	13	4.7
ShB	25	16	1	4	1.3
ShB	26	27	1.5	5	2.3
ShB	27	15	1	3	1.3
ShB	28	40	2	6	3.3
ShB	29	31	2.5	5	2.6

Site	Series	Total	Median	Range	Mean
ShB	30	29	1	5	2.4
ShB	31	55	3	12	4.6
ShB	32	11	0	3	0.9
ShB	33	18	1.5	3	1.5
ShB	34	54	2.5	10	4.5
ShB	35	24	0	4	2.0
ShB	36	20	1	5	1.6
ShB	37	18	1	4	1.5
ShB	38	36	1	9	3.0
ShB	39	5	0	1	0.4
ShB	40	16	1	3	1.3
ShB	41	58	3	14	4.8
ShB	42	18	1.5	4	1.5
ShB	43	29	1	6	2.4
ShB	44	43	3.5	5	3.6
ShB	45	49	2	5	4.1
Whau	1	46	2	7	3.8
Whau	2	41	3	7	3.4
Whau	3	39	3	7	3.3
Whau	4	77	6	7	6.4
Whau	5	60	5	8	5.0
Whau	6	35	3	4	2.9
Whau	7	42	2.5	7	3.5
Whau	8	16	1	3	1.3
Whau	9	54	4	9	4.5
Whau	10	19	1	3	1.6
Whau	11	20	0.5	6	1.7
Whau	12	25	1	6	2.1
Whau	13	10	0.5	2	0.8
Whau	14	12	0	4	1.0
Whau	15	19	1	3	1.6
Whau	16	15	1	2	1.3
Whau	17	11	1	2	0.9
Whau	18	19	1	4	1.6
Whau	19	8	0	2	0.7
Whau	20	19	1.5	4	1.6
Whau	21	0	0	0	0.0
Whau	22	6	0	2	0.5
Whau	23	1	0	0	0.1
Whau	24	5	0	1	0.4
Whau	25	4	0	1	0.3
Whau	26	3	0	1	0.3
Whau	27	0	0	0	0.0
Whau	28	17	1	3	1.4
Whau	29	6	0	1	0.5
Whau	30	8	0	2	0.7
Whau	31	4	0	1	0.3
Whau	32	4	0	1	0.3
Whau	33	6	0	2	0.5
Whau	34	8	0.5	2	0.7
Whau	35	16	1	4	1.3
Whau	36	1	0	0	0.1
Whau	37	3	0	1	0.3
Whau	38	5	0	1	0.4
Whau	39	0	0	0	0.0

Site	Series	Total	Median	Range	Mean
Whau	40	11	0	3	0.9
Whau	41	11	1	2	0.9
Whau	42	6	0	2	0.5
Whau	43	9	0	1	0.8
Whau	44	5	0	1	0.4
Whau	45	9	1	2	0.8

Species: *Zeacumantus lutulentus*

Site	Series	Total	Median	Range	Mean
HBV	1	2	0	0	0.2
HBV	2	1	0	0	0.1
HBV	3	0	0	0	0.0
HBV	4	0	0	0	0.0
HBV	5	0	0	0	0.0
HBV	6	0	0	0	0.0
HBV	7	0	0	0	0.0
HBV	8	0	0	0	0.0
HBV	9	1	0	0	0.1
HBV	10	0	0	0	0.0
HBV	11	0	0	0	0.0
HBV	12	0	0	0	0.0
HBV	13	0	0	0	0.0
HBV	14	3	0	1	0.3
HBV	15	0	0	0	0.0
HBV	16	2	0	1	0.2
HBV	17	7	0.5	1	0.6
HBV	18	1	0	0	0.1
HBV	19	4	0	2	0.3
HBV	20	3	0	1	0.3
HBV	21	5	0	1	0.4
HBV	22	1	0	0	0.1
HBV	23	0	0	0	0.0
HBV	24	11	0.5	3	0.9
HBV	25	12	0	3	1.0
HBV	26	7	0	2	0.6
HBV	27	16	1	5	1.3
HBV	28	19	1	3	1.6
HBV	29	10	1	2	0.8
HBV	30	18	2	2	1.5
HBV	31	20	1	4	1.7
HBV	32	0	0	0	0.0
HBV	33	22	0.5	5	1.8
HBV	34	22	2	4	1.8
HBV	35	14	1	2	1.2
HBV	36	22	1.5	2	1.8
HBV	37	16	1	4	1.3
HBV	38	22	1.5	4	1.8
HBV	39	29	1.5	7	2.4
HBV	40	19	1	3	1.6
HBV	41	15	1	3	1.3
HBV	42	23	2	4	1.9
HBV	43	18	1	5	1.5
HBV	44	4	0	1	0.3
HBV	45	25	1.5	6	2.1
HC	1	0	0	0	0.0
HC	2	1	0	0	0.1
HC	3	0	0	0	0.0
HC	4	1	0	0	0.1
HC	5	1	0	0	0.1
HC	6	1	0	0	0.1
HC	7	1	0	0	0.1
HC	8	0	0	0	0.0
HC	9	0	0	0	0.0

Site	Series	Total	Median	Range	Mean
HC	10	3	0	1	0.3
HC	11	0	0	0	0.0
HC	12	2	0	0	0.2
HC	13	0	0	0	0.0
HC	14	0	0	0	0.0
HC	15	12	1	2	1.0
HC	16	5	0	1	0.4
HC	17	13	1	2	1.1
HC	18	14	1	2	1.2
HC	19	6	0	1	0.5
HC	20	9	0	2	0.8
HC	21	27	1.5	5	2.3
HC	22	16	1.5	3	1.3
HC	23	36	2.5	6	3.0
HC	24	39	3	7	3.3
HC	25	21	1.5	3	1.8
HC	26	29	2	4	2.5
HC	27	28	2	4	2.4
HC	28	30	1	5	2.5
HC	29	52	4	5	4.3
HC	30	41	2	7	3.4
HC	31	55	3.5	7	4.6
HC	32	0	0	0	0.0
HC	33	65	5	6	5.4
HC	34	21	1.5	4	1.8
HC	35	69	5	13	5.8
HC	36	32	2	6	2.7
HC	37	7	0.5	1	0.6
HC	38	5	0	1	0.4
HC	39	8	1	1	0.6
HC	40	8	0	2	0.7
HC	41	7	0	2	0.6
HC	42	1	0	0	0.1
HC	43	11	0	3	0.9
HC	44	16	1	3	1.3
HC	45	13	0	3	1.1
Reef	1	25	2	3	2.1
Reef	2	8	0	2	0.7
Reef	3	31	2	4	2.6
Reef	4	11	0	2	0.9
Reef	5	0	0	0	0.0
Reef	6	2	0	1	0.2
Reef	7	0	0	0	0.0
Reef	8	2	0	1	0.2
Reef	9	2	0	1	0.2
Reef	10	3	0	1	0.3
Reef	11	4	0	1	0.3
Reef	12	0	0	0	0.0
Reef	13	0	0	0	0.0
Reef	14	8	0	2	0.6
Reef	15	15	1	3	1.3
Reef	16	10	1	1	0.8
Reef	17	17	1	4	1.4
Reef	18	7	0	2	0.6
Reef	19	11	1	2	0.9

Site	Series	Total	Median	Range	Mean
Reef	20	14	0.5	3	1.2
Reef	21	18	1	4	1.5
Reef	22	4	0	1	0.3
Reef	23	21	2	3	1.8
Reef	24	14	1	4	1.2
Reef	25	11	0.5	2	0.9
Reef	26	18	1	3	1.5
Reef	27	27	2	3	2.3
Reef	28	21	0.5	4	1.8
Reef	29	39	3.5	4	3.3
Reef	30	42	3	7	3.5
Reef	31	31	2	4	2.5
Reef	32	2	0	1	0.2
Reef	33	0	0	0	0.0
Reef	34	34	2.5	6	2.8
Reef	35	11	0.5	3	0.9
Reef	36	17	1.5	3	1.4
Reef	37	30	2	3	2.5
Reef	38	22	2	4	1.8
Reef	39	27	2.5	3	2.3
Reef	40	19	1	4	1.6
Reef	41	43	2	8	3.5
Reef	42	30	2	6	2.5
Reef	43	14	0	4	1.2
Reef	44	21	1	3	1.8
Reef	45	5	0	1	0.4
ShB	1	0	0	0	0.0
ShB	2	0	0	0	0.0
ShB	3	0	0	0	0.0
ShB	4	0	0	0	0.0
ShB	5	0	0	0	0.0
ShB	6	0	0	0	0.0
ShB	7	0	0	0	0.0
ShB	8	0	0	0	0.0
ShB	9	0	0	0	0.0
ShB	10	0	0	0	0.0
ShB	11	0	0	0	0.0
ShB	12	0	0	0	0.0
ShB	13	0	0	0	0.0
ShB	14	0	0	0	0.0
ShB	15	0	0	0	0.0
ShB	16	0	0	0	0.0
ShB	17	0	0	0	0.0
ShB	18	0	0	0	0.0
ShB	19	0	0	0	0.0
ShB	20	0	0	0	0.0
ShB	21	0	0	0	0.0
ShB	22	0	0	0	0.0
ShB	23	1	0	0	0.1
ShB	24	3	0	1	0.3
ShB	25	1	0	0	0.1
ShB	26	0	0	0	0.0
ShB	27	1	0	0	0.1
ShB	28	2	0	0	0.2
ShB	29	0	0	0	0.0

Site	Series	Total	Median	Range	Mean
ShB	30	1	0	0	0.1
ShB	31	2	0	1	0.2
ShB	32	0	0	0	0.0
ShB	33	0	0	0	0.0
ShB	34	0	0	0	0.0
ShB	35	3	0	1	0.3
ShB	36	1	0	0	0.1
ShB	37	0	0	0	0.0
ShB	38	0	0	0	0.0
ShB	39	2	0	0	0.2
ShB	40	0	0	0	0.0
ShB	41	1	0	0	0.1
ShB	42	2	0	1	0.2
ShB	43	5	0	1	0.4
ShB	44	0	0	0	0.0
ShB	45	0	0	0	0.0
Whau	1	1	0	0	0.1
Whau	2	9	0.5	1	0.8
Whau	3	1	0	0	0.1
Whau	4	14	1	2	1.1
Whau	5	0	0	0	0.0
Whau	6	1	0	0	0.1
Whau	7	3	0	1	0.3
Whau	8	1	0	0	0.1
Whau	9	4	0	1	0.3
Whau	10	0	0	0	0.0
Whau	11	0	0	0	0.0
Whau	12	0	0	0	0.0
Whau	13	0	0	0	0.0
Whau	14	0	0	0	0.0
Whau	15	4	0	1	0.3
Whau	16	1	0	0	0.1
Whau	17	0	0	0	0.0
Whau	18	0	0	0	0.0
Whau	19	3	0	1	0.3
Whau	20	2	0	1	0.2
Whau	21	5	0	1	0.4
Whau	22	0	0	0	0.0
Whau	23	2	0	1	0.2
Whau	24	8	0	3	0.7
Whau	25	7	0	1	0.6
Whau	26	7	0	2	0.6
Whau	27	5	0	2	0.4
Whau	28	9	1	2	0.8
Whau	29	5	0	1	0.4
Whau	30	0	0	0	0.0
Whau	31	8	0.5	2	0.7
Whau	32	7	1	1	0.6
Whau	33	6	0.5	1	0.5
Whau	34	14	1	2	1.2
Whau	35	4	0	1	0.3
Whau	36	12	1	2	1.0
Whau	37	12	1	2	1.0
Whau	38	12	1	3	1.0
Whau	39	11	1	3	0.9

Site	Series	Total	Median	Range	Mean
Whau	40	20	1.5	3	1.7
Whau	41	10	0.5	2	0.8
Whau	42	14	0	3	1.2
Whau	43	8	0.5	2	0.7
Whau	44	8	0	2	0.7
Whau	45	6	0	1	0.5