Environment Waikato Technical Report 2006/27

Regional Estuary Monitoring Programme (REMP) Data Report: Benthic Macrofauna Communities and Sediments – July 2002 to April 2004

Southern Firth of Thames and Whaingaroa (Raglan) Harbour

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Table of Contents

Figures

Tables

Executive Summary

In April 2001 Environment Waikato initiated the Regional Estuary Monitoring Programme at five permanent monitoring sites in both the southern Firth of Thames and Whaingaroa (Raglan) Harbour. It is a long-term programme with the objective of monitoring the temporal changes in intertidal sediment characteristics and benthic macrofauna communities which may occur as a direct or indirect consequence of catchment activity and/or estuary development. This report presents the results of monitoring the sediments and a suite of 26 'indicator' taxa characteristic of the intertidal benthic communities. It is envisaged that the Regional Estuary Monitoring Programme will provide relevant information useful in setting policy and assisting with the sustainable management of estuaries in the Waikato Region.

The five permanent sites in the southern Firth of Thames and Whaingaroa Harbour were sampled in October 2002, April 2003, October 2003 and April 2004. Two sites from each harbour were additionally sampled in July 2002 and 2003 and January 2003 and 2004. Sampling the benthic macrofauna communities involved collecting 12 randomly located core samples from a permanent monitoring plot at each site. On each sampling occasion, replicate bulked sediment samples were collected for grain-size analysis, total organic carbon and total nitrogen content, with surface scrapes collected and analysed for chlorophyll-*a* and phaeophytin content. For each of the permanent monitoring sites, changes in the assemblages of monitored benthic macrofauna taxa over time were shown graphically and examined further using a suite of multivariate statistical methods.

Results from the July 2002 to April 2004 monitoring period indicate that there are distinct differences in the benthic macrofauna communities between sites in each estuary. Although each site displayed some changes in assemblage composition over time, there were no apparent clear or systematic temporal patterns evident in either estuary. The most consistently common taxa found at sites in the southern Firth of Thames included the polychaetes *Aonides oxycephala* and capitellids, and the bivalves *Austrovenus stutchburyi, Nucula hartvigiana, Arthritica bifurca* and *Paphies australis.* For Whaingaroa Harbour, consistently common taxa included the polychaetes *Aquilaspio aucklandica* and *Cossura* sp., and the bivalves *Austrovenus stutchburyi*, *Nucula hartvigiana* and *Arthritica bifurca*.

While the overall distribution of sediment grain size has remained relatively constant at the monitoring sites, some quite significant variations in the mud and gravel content of sediments have occurred over the study period. These changes have been particularly noticeable at Kaiaua in the Firth of Thames, and Haroto Bay in Raglan. In general, there have been small fluctuations in the relative content of mud at sites in the Firth of Thames and Raglan, but little indication of a progressive trend for change. This will need to be investigated statistically in the full analysis report (due 2006/07).

Changes in sediment level have been recorded at four sites in the Firth of Thames at monthly intervals. Data has shown that fluctuations in bed levels of up to 90 mm occur at individual plates over monthly time periods. When the changes at the six plates are averaged to provide a measure of change over the whole site at each date, fluctuations are smaller (<30 mm), indicating the presence of large bedforms and migration of sediment within the site.

There is no clear trend apparent for ongoing sediment accretion or erosion at any of the sites.

The sediment variable or combination of variables that best explained the assemblage composition for sites in the southern Firth of Thames was the sediment chlorophyll-*a* content. For Whaingaroa Harbour, the best combination of variables was dry weight of shell-hash, percentage mud and the proportion of surficial sediments in the size range of 500 – 1000 µm.

This report documents the data found from two years of the monitoring programme. Detailed discussion and analysis of trends or patterns of change over time in the benthic macrofaunal communities will be reported on every five years in a separate trend report series for the Regional Estuary Monitoring Programme.

It is recommended that the monitoring programme continue as outlined in Turner (2001), with a review undertaken in 2006 to assess all aspects of the sampling protocol. It is strongly advised that the formal quality control assessment protocols for the sorting, identification and enumeration of benthic core samples continue to be rigorously implemented.

1 Introduction

Environment Waikato initiated the Regional Estuary Monitoring Programme in April 2001. The programme samples permanent monitoring sites in the southern Firth of Thames and Whaingaroa (Raglan) Harbour. Within the programme, sediment characteristics and benthic macrofauna communities[1] are monitored as indicators of estuarine health at five fixed locations in each estuary. It is a long-term state of the environment programme with the objective of monitoring the temporal changes in intertidal sediments and benthic macrofauna communities which may occur as a direct or indirect consequence of catchment activity and/or estuary development. The programme provides information on the ecology of the intertidal benthic macrofauna communities in these estuaries and will ultimately provide information relevant for estuary management in the Waikato Region. Details of the rationale and design of the programme are provided in Turner (2000 and 2001).

The results of the pilot study undertaken in April 2001 were presented in Turner et al. (2002), and the results from the first year of monitoring in Turner and Carter (2004). Results of the sediment sampling up to April 2003 were reported in Gibberd and Carter (2005). This report presents the results from the monitoring programme from July 2002 to April 2004. Time series analyses to determine any trends in the data will be carried out in a separate trends report series, which will be published every five years.

The key variables measured in the Regional Estuary Monitoring Programme are:

1 Twenty-six "indicator" taxa[2] characteristic of intertidal mud / sand-flat benthic macrofauna communities, selected to represent a variety of taxonomic groups and a range of life-histories, ecological niches and feeding methods (see Hewitt et al. 2001).
2 Sediment physical, chemical and biological characteristics:
   - Grain-size;
   - Organic matter content;
   - Benthic micro-algal biomass (quantified by chlorophyll-*a* and phaeophytin concentration);
   - Rates of sediment deposition and erosion.

Sediment data is collected along with biological information, to provide information about the physical and chemical environment which influences biological communities.

A pilot study was carried out in April 2001, to establish a baseline for detecting changes over time in the benthic macrofauna communities and sediment characteristics (Turner et al., 2002). The permanent sites are monitored at 3- or 6-monthly intervals to provide information on temporal (seasonal, annual and longer-term) and spatial patterns of variability in the intertidal sand-flat benthic communities and sediment characteristics.

The Regional Estuary Monitoring Programme is based on similar monitoring programmes designed by NIWA and undertaken by other Regional Councils (e.g. Auckland Regional Council).

2 Methods

The methods are outlined in Turner (2001), Turner et al. (2002) and Turner and Carter (2004).

[1] Benthic macrofauna communities include the variety of organisms (e.g., shellfish, crabs, polychaetes [marine worms], crustaceans) that live in or on the bottom sediments. The "macrofauna" comprises those animals which are retained by a 500 µm mesh sieve.

[2] 'Taxa' is used here to indicate that some benthic macrofauna can not reliably be identified to species level and that therefore some of the 'taxa' or monitored may include more than one species.

2.1 Field Sites and Sampling Regime

Five permanent sites in the southern Firth of Thames (Figure 1) and five sites in Whaingaroa (Raglan) Harbour (Figure 2) are monitored. These sites are considered to be representative of the intertidal mud / sand-flats and are distributed throughout the main area of each estuary. The site codes are presented in Table 1, which also details when sampling was undertaken.

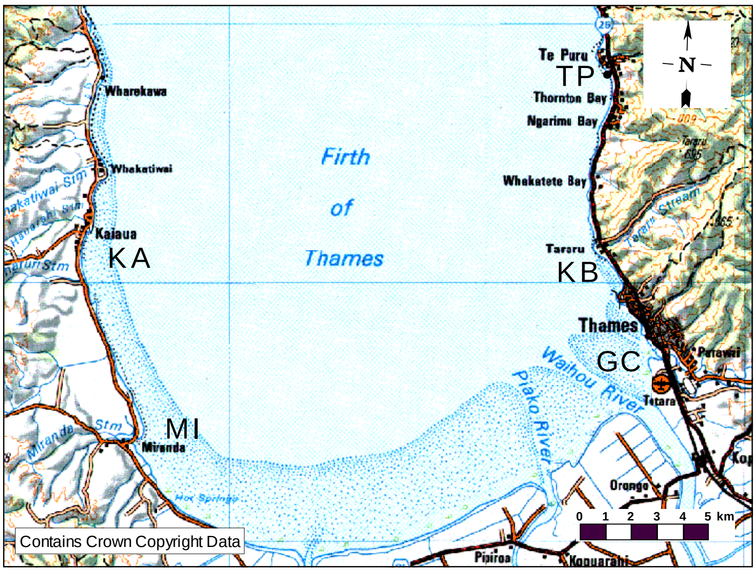

Figure 1: **Location of permanent monitoring sites in the southern Firth of Thames.**

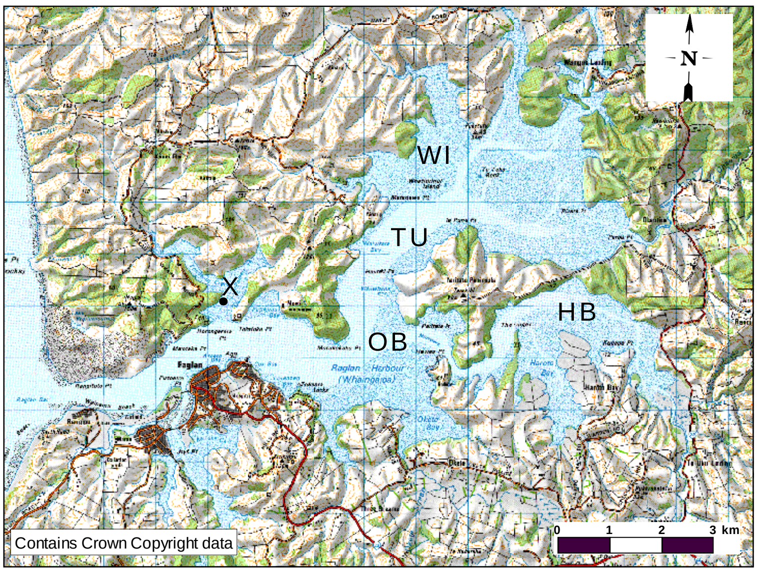

Figure 2: **Location of permanent monitoring sites in Whaingaroa Harbour.**

Table 1: Details of permanent monitoring sites and sampling regime in southern Firth of Thames and Whaingaroa Harbour.

Estuary	Site Name	Site Code	Sampled
Firth of Thames	Kaiaua	KA	April, October
	Miranda	MI	January, April, July, October
	Thames (Gun Club)	GC	April, October
	Kuranui Bay	KB	January, April, July, October
	Te Puru	TP	April, October
Whaingaroa	Whatitirinui Island	WI	January, April, July, October
	Te Puna Point	TU	April, October
	Okete Bay	OB	January, April, July, October
	Haroto Bay	HB	April, October
	Ponganui Creek	X	April, October

Permanent monitoring plots (approximately 100 m x 100 m) were randomly located at the mid-intertidal level at each site. Wooden posts mark the corners of each monitoring plot.

2.2 Sample Collection and Processing

2.2.1 Benthic Macrofauna

On each sampling occasion 12[3] core samples (13 cm diameter, 15 cm deep) were collected from within each monitoring plot. Each plot was divided into 12 equal-sized sectors and one core sample taken randomly (randomly derived Cartesian co-ordinates) from within each sector (see Thrush et al., 1988). To minimise sample interdependence (spatial autocorrelation) samples were not positioned within a 5 m radius of each other. To preclude any effects of localised modification of sampled populations from previous sampling occasions, samples were not taken within 5 m of previous sampling positions over any 6-month period.

Macrofauna were separated from the sediment by sieving (500 µm mesh), preserved with 70% isopropyl alcohol in seawater and stained with 0.1% Rose Bengal. In the laboratory, the macrofauna were sorted, with indicator species/taxa identified and counted. Indicator bivalve species were measured (shell width) and recorded into different size-classes: *Arthritica bifurca*: < 2 mm; > 2 mm; *Austrovenus stutchburyi* (cockle): < 5 mm, > 5 mm; *Macomona liliana* (wedge shell): < 5 mm, 5-15 mm, > 15 mm; *Nucula hartvigiana* (nut-shell): < 2 mm, > 2 mm; *Paphies australis* (pipi): < 5 mm, 5-15 mm, > 15 mm; *Theora lubrica*: < 5 mm, > 5mm. The remaining species (i.e. non-indicator species) were classified into major taxonomic groups and counted. Samples were stored in 50% isopropyl alcohol.

From each site where sufficient numbers of shellfish were available, 20-30 adult-sized individuals of *Austrovenus stutchburyi*, *Macomona liliana*, and *Paphies australis* were selected, frozen and retained for condition analysis.[4] No condition analyses have been undertaken to date.

After sorting, the remaining non-living material (e.g. broken shells – 'shell-hash') was dried at 70°C for 48 hours and weighed to dry weight.

2.2.2 Sediment Characteristics

At each site, sediment samples were collected from within the monitoring plot for the analysis of physical and chemical sediment characteristics. Grain-size, organic matter content and photosynthetic pigment concentration, are known to influence the distribution and abundance of benthic macrofauna.

[3] See Hewitt et al. (2001) and Turner (2001) for justification.
[4] Bivalves for condition analysis were removed during sieving and prior to sample preservation in isopropyl alcohol.

2.2.2.1 Surficial Sediment Grain-Size

Five replicate bulked surface sediment samples were collected from each monitoring plot on each sampling occasion for grain-size analysis. Samples were stored frozen. Prior to analyses, samples were pre-treated with 10% hydrogen peroxide to remove organic material and 1*M* HCl to remove carbonate material. Calgon was added as a dispersant and samples were placed in an ultrasonic bath for 10 minutes to aid disaggregation. Samples were then analysed using a Galai laser sediment analyser.

2.2.2.2 Sediment Organic Matter Content

A sub-sample from each bulked sediment sample was analysed for total organic carbon and total nitrogen content using an automated CHN analyser. Samples were dried and finely ground before analysis. Sediment for total organic carbon analysis was pre-treated with acid to remove carbonate material prior to analysis.

2.2.2.3 Sediment Photosynthetic Pigment Concentration

Five replicate surface sediment scrapes were collected from each monitoring plot on each sampling occasion. Samples were stored in black containers and frozen until analysis. Sediments were analysed for chlorophyll-*a* and phaeophytin content. Chlorophyll-*a* was extracted from the sediment by boiling in 95% ethanol and the extract analysed using a spectrophotometer. Acidification was used to separate plant degradation products (phaeophytin) from chlorophyll-*a*.

2.2.3 Southern Firth of Thames Bed Level

As part of the REMP, fluctuations in bed levels are also measured at monitoring sites in the Firth of Thames. Concrete plates have been buried across a transect at each monitoring site. The depth of sediment on top of the plates is measured to detect changes in the bed level. A pilot study to test the method was undertaken in 2003, and is presented in full in Collins (2003).

Sediment level measurements have been taken monthly since March 2003 at four sites in the Firth of Thames (Kuranui Bay, Gun Club, Miranda and Kaiaua). This report summarises the data from the sampling to date and provides recommendations for future continuation of this part of the programme. This report provides a summary of sediment level data collected monthly between March 2003 and April 2004.

The monitoring technique for sediment elevation measurements is described fully in Collins (2003). Concrete tiles (300 mm x 300 mm x 40 mm) were buried to depth of approximately 200 mm. Plates were buried at approximately 50 m spacing on a cross-shore transect, extending 100 m landward and seaward of the benthic monitoring site. Plates are numbered from the most landward (1) to the most seaward (6). The location of each buried plate has been accurately surveyed and is routinely located by small wooden marker pegs. Knitting needles were used to locate the plate surface. Shell material between the needle and the plate can cause an inaccurate reading, so a number of needles of equal length were placed in the sediment to check that the measured surface is flat. Ten measurements were taken from each plate at each sampling date.

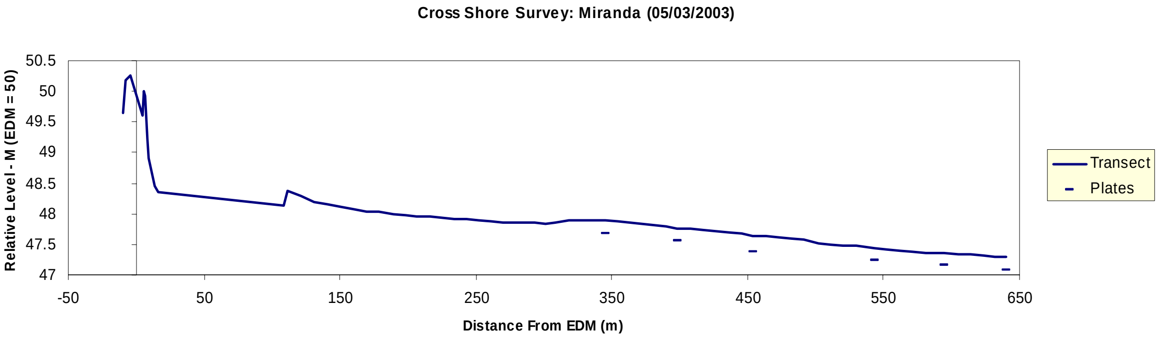

Figure 3: Typical cross-shore transect and plate locations for a sampling site in the Firth of Thames (Miranda).

2.3 Statistical Analysis

Changes in the assemblages of indicator benthic macrofauna species/taxa over time at each of the permanent monitoring sites were examined using multivariate statistical methods (PRIMER v5; PRIMER-E Ltd. Plymouth 2001). Non-metric multidimensional scaling (MDS) ordinations based on Bray-Curtis similarities of taxa abundance data provides a visualisation of assemblage composition in a two-dimensional plot. In non-metric MDS, an ordination is constructed of the mean taxa abundances on different sampling dates at each of the sites. In this ordination, sample points are mapped in a specified number of dimensions (in this case two) in such a way that the rank order of the distances between sample points in the ordination reflects the rank order of the corresponding (dis)similarities in the similarity matrix (Clarke and Warwick, 2001). The stress value is a measure of how accurately the ordination preserves the between-sample point relationships in low-dimensional space, with low values indicating a good ordination with no indication that a misleading interpretation has been achieved. Plots of the MDS ordinations of the different sites on different sampling dates allow identification of trends or other patterns of change in the assemblages of indicator taxa benthic macrofauna.

Significance testing for differences in assemblage composition between different sampling dates at each of the sites was undertaken using one-way analysis of similarities randomisation tests based on rank similarities of the samples (PRIMER ANOSIM routine [Analysis of Similarities]). This procedure tests the statistical significance of differences between groups of samples based on the composition of their benthic macrofauna assemblages. The null hypothesis is that there are no differences in assemblage composition on different sampling dates. The ANOSIM global test was used to indicate whether there were significant differences between any of the sampling dates at each site. The global *R* value gives an indication of the extent of any differences, where values range between 0 (indistinguishable) and 1 (well separated).[5] The significant differences at each site were explored further using ANOSIM pairwise comparison tests. These tests followed on from the global test if significant differences were found to exist, and show specifically which sampling dates were significantly different from each other as well as the extent of any differences.[6] For each of these comparisons (Date 1 vs. Date 2, Date 1 vs. Date 3, Date 2 vs. Date 3 etc.) the test statistic *(R)* is generated, which indicates the relative similarity of the assemblages between the two sampling dates that are being compared. Note that the nominal levels of Type I error (α = 0.05, i.e., the error rates per comparison) of these comparisons were not corrected to maintain the error rate per site (i.e., the probability that there will be an error in any of all comparisons) at 0.05. Such procedures would

[5] *R* values can be interpreted as follows; *R* > 0.75 = well separated, R > 0.5 = overlapping but clearly different, R < 0.25 barely separable (Clarke and Gorley, 2001).

[6] The important message from the ANOSIM pair-wise tests is usually not so much the significance level, but the pair-wise *R* values, since this gives an absolute measure of how separated the groups are (Clarke and Gorley, 2001).

have required the nominal level to be set at α = 0.017 for three tests and α = 0.005 for 10 tests and would have increased the risk of Type II errors in each comparison.

Other statistical tests used include the PRIMER SIMPER ("similarity percentages") and BVSTEP routines. SIMPER was used to examine the contribution of each indicator taxa to the average Bray-Curtis dissimilarity between two sampling dates. Here, species with high average contributions relative to the standard deviation are considered to be important in the differentiation of assemblages on the different sampling dates. BVSTEP was used to identify the smallest subset of indicator taxa which explain most of the pattern observed in the full set of taxa. This is (somewhat arbitrarily) taken to be when the Bray-Curtis similarity matrix of the subset of taxa correlates to at least $\rho \geq 0.95$ with the similarity matrix of the full set of taxa. BVSTEP differs from SIMPER analysis in that it considers all the data from all the sampling dates at once rather than comparing pairs of samples.

A square-root transformation was applied to the data to reduce the influence that dominant taxa have on the results. Because only a sub-set of the taxa in the communities have been monitored, the dominance of taxa in the sub-set does not necessarily reflect their true dominance in the whole community, so it is appropriate to reduce their influence on the analysis (Morrisey et al., 1999). The MDS ordination was based on the mean abundance values for each indicator taxa from all the samples at each site on each sampling date. ANOSIM, SIMPER and BVSTEP analyses used the indicator taxa data from each replicate sample collected at each site on each sampling date. The number of individuals of each indicator bivalve species in all the size-classes combined was used in all analyses.

The BIO-ENV routine in PRIMER was used to discern the relationship between multivariate assemblage composition and sediment variables. Where sediment variables were highly correlated, only one variable was included. The analyses used the mean abundance values for each indicator taxa from all the samples at each site on each sampling date and the mean values for sediment variables. Certain sediment variables were log transformed as the BIO-ENV routine requires that environmental variables not show marked skewness across the samples.

For the Firth of Thames the following sediment variables were included in the BIO-ENV analysis: grain size fractions of <3.9 µm; 3.9 to 31 µm; 31 to 62.5 µm; < 62.5 µm; 62.5 to 125 µm; 125 to 250 µm; 250 to 500 µm; 500 to 1000 µm; 1000 to 2000 µm; median grain-size, dry weight of shell-hash; total nitrogen and total organic carbon content; chlorophyll-*a* and phaeophytin concentrations. Of these the sediment grain size fraction 1000 to 2000 µm; the median grain-size; the shell-hash content and the pigment concentrations were log-transformed prior to analysis. For Whaingaroa (Raglan) Harbour, the following sediment variables were included in the BIO-ENV analysis: < 62.5 µm; 62.5 to 125 µm; 125 to 250 µm; 250 to 500 µm; 500 to 1000 µm; 1000 to 2000 µm; median grain-size, dry weight of shell-hash; total nitrogen and total organic carbon content; chlorophyll-*a* and phaeophytin concentrations. Of these, only the median grain-size was log-transformed.

The BIO-ENV routine identifies the subsets of the environmental variables which yield the best matches between biological (species abundances) and abiotic (sediment variables) (dis)similarity matrices, as measured by Spearman rank correlation (ρ_s). It is important to note that linking patterns in the benthic macrofauna assemblages to those of sediment variables provides only an indication of which sediment characteristics may be important in contributing to the biological pattern, they do not actually prove cause-and-effect. Causality can only be demonstrated by manipulative field or laboratory experiments (Clarke and Warwick, 2001).

3 Results

3.1 Benthic Macrofauna Community Structure

3.1.1 Southern Firth of Thames

Figure 4 shows the mean total number of individuals and the major taxonomic group composition of the intertidal benthic macrofauna communities at each of the permanent monitoring sites in the Firth of Thames on each sampling date between July 2002 and April 2004.

Between July 2002 and April 2004, the biggest changes in the total number of individuals and taxonomic composition occurred at sites TP and GC. The total number of individuals and major taxonomic group composition at sites KA, MI and KB showed less variation between sampling dates. Bivalves were the most abundant groups at sites TP and KA, whereas polychaetes were the most abundant groups at most of the sampling events at KA and MI. Site KB had roughly equal numbers of bivalves, polychaetes and crustaceans.

The total abundance of benthic invertebrates fluctuated over time for individual sites. At site GC, polychaetes constituted 60 to 65% of individuals in October 2002 and April 2003, but polychaete numbers declined to only 13% of total individuals in April 2004, where the total abundance had dropped to less than half that of October 2002 and April 2003. Sites KA and KB showed no consistent trend in abundance. At KA, bivalves were the most common group, constituting 55 to 85% of all macrofauna, whereas at KB the abundance of bivalves was as low as 20 to 30% at many of the sampling events. Sites TP and MI showed an initial increase in total abundance, followed by a decrease. Site MI showed high abundance of polychaetes (35 to 85% of total abundance), and relatively low levels of bivalves and crustaceans. Differences in total abundance were mainly caused by changes in the number of polychaetes, with crustaceans and bivalves playing a minor part. At site TP, bivalves accounted for 80 to 95% of total abundance, and temporal variation was mainly caused by fluctuations in the number of bivalves.

The data is included in full in Appendix 1.

3.1.2 Whaingaroa (Raglan) Harbour

Figure 5 shows the mean total number of individuals and the major taxonomic group composition of the intertidal benthic macrofauna communities at each of the permanent monitoring sites in Whaingaroa (Raglan) Harbour on each sampling date between July 2002 and April 2004.

Bivalves dominated numerically at site TU, where they accounted for 50 to 65%. The total abundance decreased over time at this site, primarily because of decreases in the number of polychaetes. The total abundance at site HB dropped from about 110 individuals in October 2002 to between 50 and 65 at subsequent sampling events, mainly caused by a decrease in the abundance of bivalves. At site X and WI, bivalves constituted close to half the total number of individuals, and no particular trend in total abundance, or abundance of specific macrobenthic groups over time was evident. At site OB, polychaetes constituted 60 to 85% of all individuals, and no specific trend in abundance over time was detected.

The data is included in full in Appendix 2.

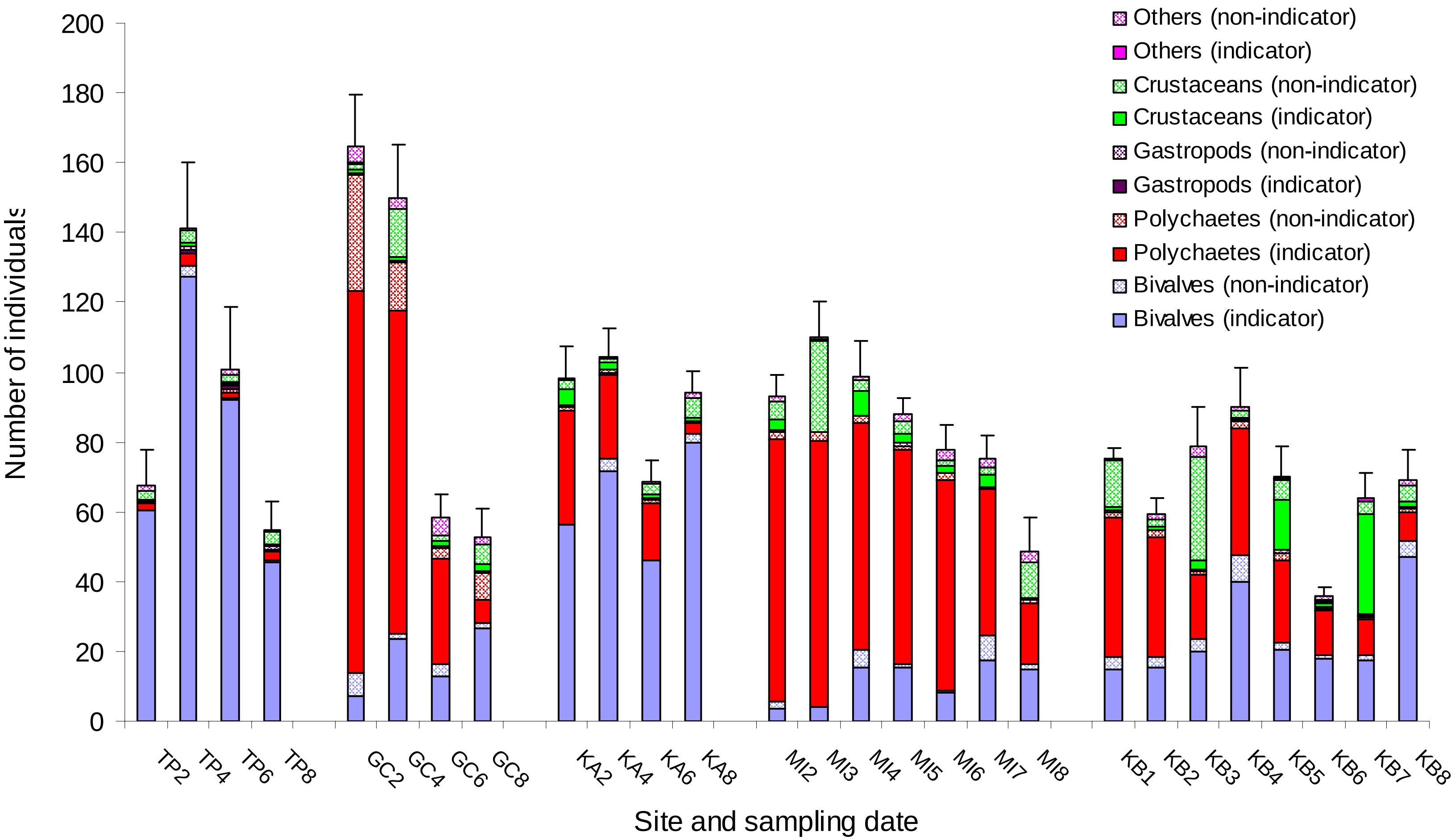

Figure 4: **Mean (± standard error) total number of individuals and major taxonomic group composition of intertidal benthic macrofauna communities at the permanent monitoring sites in the southern Firth of Thames between July 2002 and April 2004. Sampling dates: Jul 02 = 1, Oct 02 = 2, Jan 03 = 3, Apr 03 = 4, Jul 03 = 5, Oct 03 = 6, Jan 04 = 7, Apr 04 = 8. NB: samples were lost for MI1.**

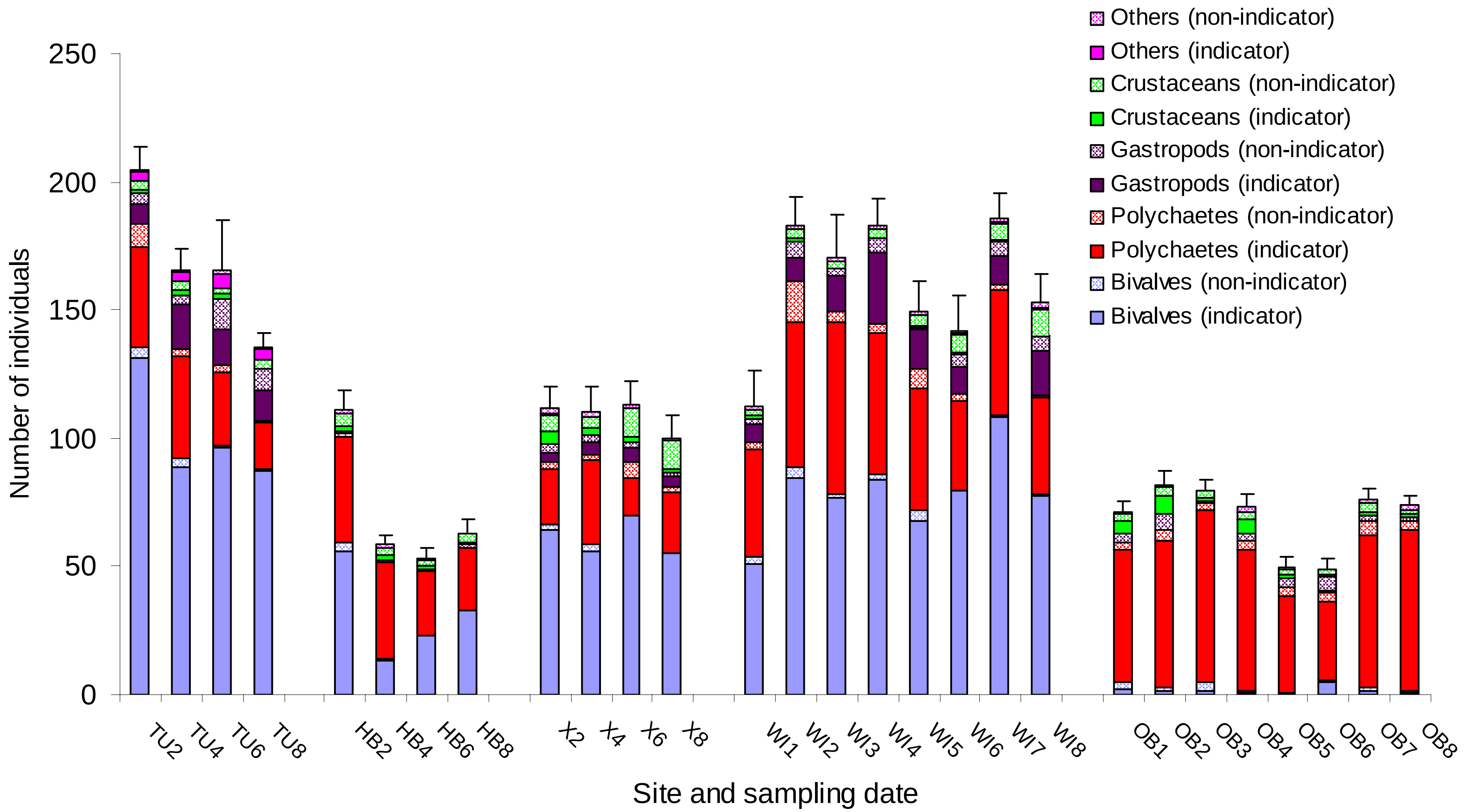

Figure 5: **Mean (± standard error) total number of individuals and major taxonomic group composition of intertidal benthic macrofauna communities at the permanent monitoring sites in Whaingaroa Harbour between July 2002 and April 2004. Sampling dates: Jul 02 = 1, Oct 02 = 2, Jan 03 = 3, Apr 03 = 4, Jul 03 = 5, Oct 03 = 6, Jan 04 = 7, Apr 04 = 8.**

3.2 Changes in the Abundance of Individual Species and Taxonomic groups

3.2.1 Southern Firth of Thames

The five most common species/taxonomic groups (indicator and non-indicator) at each of the permanent monitoring sites in the southern Firth of Thames on each sampling date between July 2002 and April 2004 are listed in Table 2.

Table 2: The five most common species/taxonomic groups on each sampling date for each permanent monitoring site in the southern Firth of Thames. 'Other polychaetes', 'Other bivalves', 'Other crustaceans' and 'Other amphipods' denote non-indicator species of these taxonomic groups.

	TP	GC	KA	MI	KB
Jul-02					*Capitellidae*
					Other amphipods
					Austrovenus
					Magelona
					Aonides
Oct-02	*Nucula*	*Aonides*	*Nucula*	*Aonides*	*Capitellidae*
	Paphies	*Other polychaetes*	*Capitellidae*	*Capitellidae*	*Austrovenus*
	Other amphipods	*Other bivalves*	*Austrovenus*	*Other polychaetes*	*Aonides*
	Austrovenus	*Nemerteans*	*Magelona*	*Nereidae*	*Magelona*
	Nemerteans	*Nereidae*	*Arthritica*	*Corophiidae*	*Arthritica*
Jan-03				*Aonides*	*Shrimps/Mysids*
				Shrimps/Mysids	*Arthritica*
				Macamona	*Capitellidae*
				Other polychaetes	*Aonides*
				Nereidae	*Austrovenus*
Apr-03	*Nucula*	*Aonides*	*Nucula*	*Aonides*	*Capitellidae*
	Paphies	*Austrovenus*	*Austrovenus*	*Austrovenus*	*Austrovenus*
	Austrovenus	*Other polychaetes*	*Capitellidae*	*Nereidae*	*Macamona*
	Other bivalves	*Macamona*	*Macamona*	*Corophiidae*	*Other bivalves*
	Isopods	*Isopods*	*Magelona*	*Macamona*	*Aonides*
Jul-03				*Aonides*	*Corophiidae*
				Orbinia	*Austrovenus*
				Macamona	*Capitellidae*
				Austrovenus	*Aonides*
				Corophiidae	*Macamona*
Oct-03	*Nucula*	*Aonides*	*Nucula*	*Aonides*	*Arthritica*
	Paphies	*Macamona*	*Capitellidae*	*Orbinia*	*Austrovenus*
	Austrovenus	*Paphies*	*Magelona*	*Macamona*	*Aonides*
	Isopods	*Other bivalves*	*Nereidae*	*Austrovenus*	*Glycera sp.*
	Other polychaetes	*Other polychaetes*	*Austrovenus*	*Capitellidae*	*Capitellidae*
Jan-04				*Aonides*	*Corophiidae*
				Macamona	*Austrovenus*
				Other bivalves	*Aonides*
				Austrovenus	*Arthritica*
				Corophiidae	*Other bivalves*
Apr-04	*Nucula*	*Paphies*	*Nucula*	*Aonides*	*Austrovenus*
	Paphies	*Other polychaetes*	*Austrovenus*	*Other crustaceans*	*Arthritica*
	Shrimps/Mysids	*Aonides*	*Macamona*	*Austrovenus*	*Other bivalves*
	Austrovenus	*Other amphipods*	*Shrimps/Mysids*	*Macamona*	*Macamona*
	Pseudopolydora	*Colurostylis*	*Other bivalves*	*Other bivalves*	*Aonides*

At site TP, the most abundant taxonomic groups did not change much over the two years of monitoring. *Nucula hartvigiana* (8 to 225 individuals core^{-1}), *Paphies australis* (4 to 45 individuals core^{-1}) and *Austrovenus stutchburyi* (0 to 15 individuals core^{-1}) remained amongst the five most abundant taxa at this site at all sampling events. At site GC, the most abundant taxa changed over time. The polychaete *Aonides oxycephala* was most abundant at three out of four sampling events (1 to 143 individuals core^{-1}). Non-indicator polychaetes ('other polychaetes') showed medium to high abundance at 0 to 103 individuals core^{-1}, and *Macomona liliana* and 'other bivalves' showed abundances of 0 to 20 individuals core^{-1} and 0 to 55 individuals per core, respectively.

At site KA, *Nucula hartvigiana* was the most common species (7 to 91 individuals per core) over the two years. Capitellid polychaetes were second highest in abundance (0 to 58 individuals core^{-1}) in October 2002 and 2003, whereas *Austrovenus stutchburyi* was second highest in abundance (6 to 41 individuals core^{-1}) in April 2003 and 2004. The polychaete *Magelona dakini*, and the bivalve *Macamona liliana* were also common at this site. At site MI, the polychaete *Aonides oxycephala* was the most abundant species at all sampling events (4 to 153 individuals core^{-1}). Other species with high abundance include *Austrovenus stutchburyi* (0 to 16 individuals core^{-1}), Macamona liliana (1 to 22 individuals core^{-1}), and Corophidae (0 to 18 individuals core^{-1}). At site KB, the abundance of individual taxa changed over time. In July and October 2002, and April 2003, capitellid polychaetes were the most abundant taxa (1 to 112 individuals core^{-1}); in July 2003 and January 2004, corophid amphipods were most abundant (0 to 77 individuals core^{-1}); whereas *Arthritica bifurca* dominated in October 2003 (0 to 35 individuals core^{-1}) and *Austrovenus stutchburyi* dominated in April 2004 (13 to 118 individuals core^{-1}).

Mean abundances of selected indicator species/taxa at each of the sites on each sampling date are shown in Figure 6.

Corophiid amphipods were most common at site KB, although a few occurred at MI (Figure 5a). At site KB they occurred in high numbers in July 2003 and January 2004. At site MI they seemed to occur in October 2002, April 2003, and January 2004. A few phoxocephalid amphipods occurred at site KA in October 2002, and they were present also in October 2003 and April 2004 (Figure 6b). Low numbers of phoxocephalids also occurred at site TP in April 2003.

Bivalves occurred in high numbers at a number of sites. *Arthritica bifurca* was most abundant at site KB, where abundances rose from just over 2 individuals core^{-1} in July 2002 to more than 10 individuals core^{-1} in January 2003 (Figure 6c). Abundances fell again in April and July 2003, but rose once more in October 2003, with continued high numbers in January and April 2004. The vast majority of *A. bifurca* recorded were less than 2 mm long. At site KA, abundances were highest in October 2002, and declined subsequently. Once again, the majority of individuals were less than 2 mm long. At all other sites, abundances were low.

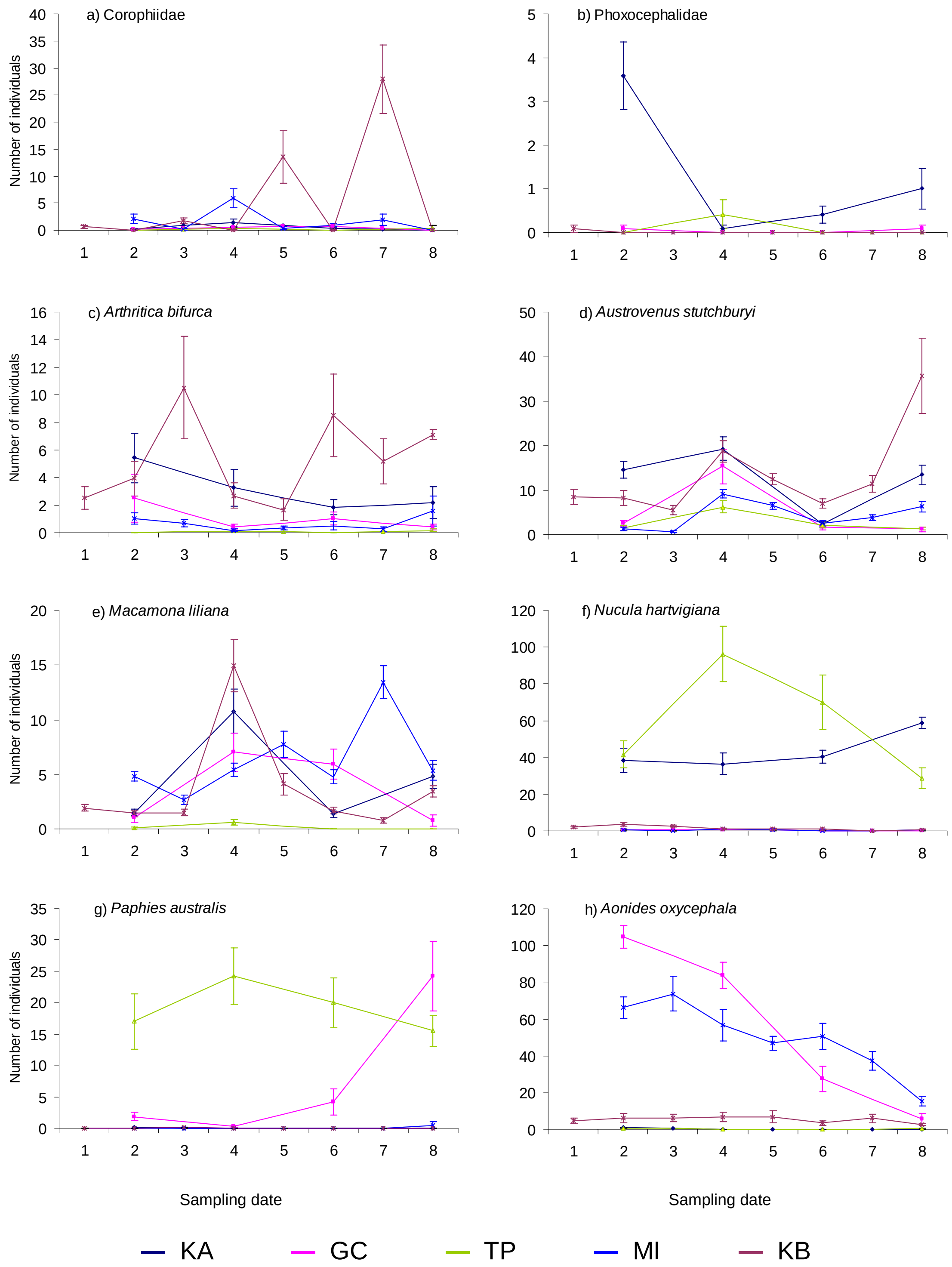

Figure 6: **The mean (± standard error) number of selected indicator species/taxa on each sampling date at each of the permanent monitoring sites in the southern Firth of Thames. Sampling dates: Jul 02 = 1, Oct 02 = 2, Jan 03 = 3, Apr 03 = 4, Jul 03 = 5, Oct 03 = 6, Jan 04 = 7, Apr 04 = 8. Note the different scales on the vertical axes. NB: samples were lost for MI1.**

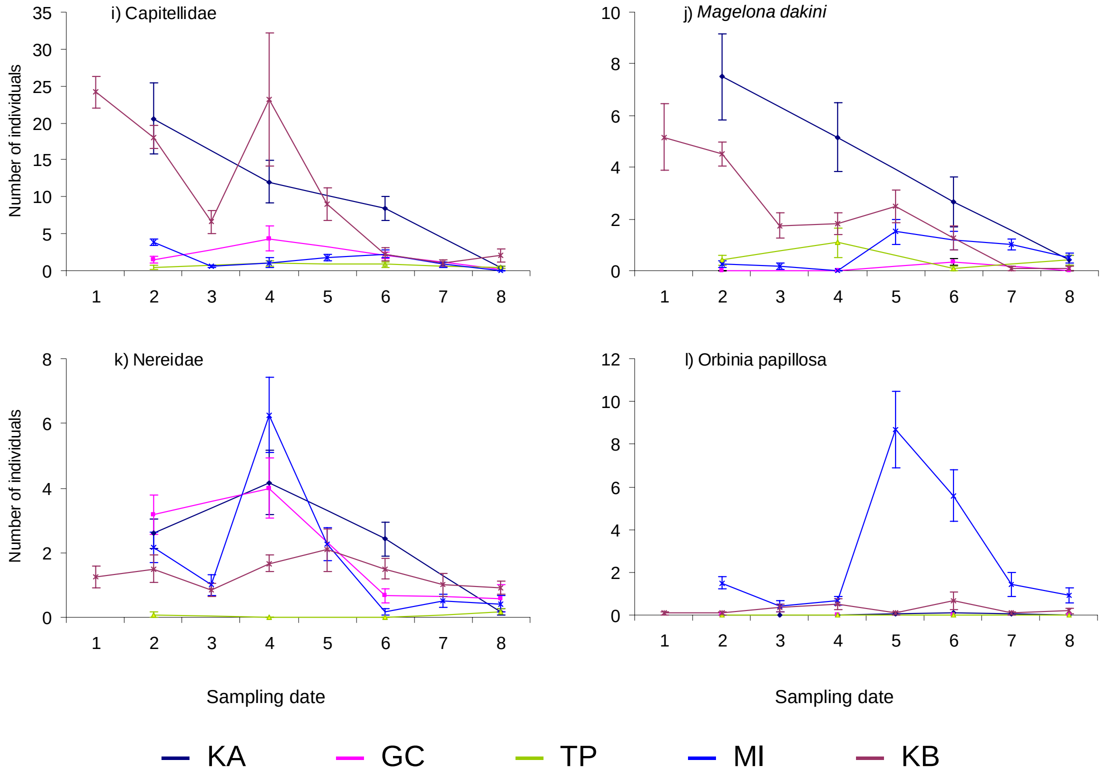

Figure 6. (cont.)

Austrovenus stutchburyi was most abundant at all sites in April (2003 and 2004), and showed lowest abundances at all sites in October 2003 (Figure 6d). Numbers were highest at site KB in April 2004, where the average number of *A. stutchburyi* per core was close to 40 individuals. The seasonal increase in *A. stutchburyi* was mainly attributable to an increase in individuals of less than 5 mm length. *Macomona liliana* was relatively abundant at all sites apart from TP (Figure 6e). At sites KB and KA, peaks of juvenile (total length < 5 mm) *M. liliana* abundance occurred in April 2003, whereas at site MI, an influx of juveniles (< 5 mm long) caused an increase in abundance in January 2004. *Nucula hartvigiana* was present in high abundances at sites TP and KA (Figure 6f). At site TP, a juvenile influx caused abundances to peak in April 2003, whereas at site KA abundances remained relatively constant until April 2004 where a slight increase occurred, again caused by an increase in juveniles (individuals of < 2 mm length). *Paphies australis* was present mainly in samples from Sites TP and GC (Figure 6g). At TP, mainly large individuals (> 20 mm total length) were present, and numbers remained relatively constant throughout the two years, whereas at site GC, numbers increased over time, mainly through an influx of juveniles (individuals < 5 mm long).

Polychaete numbers varied between sites and over time. By far the most abundant polychaete was *Aonides oxycephala* (Figure 6h). This species was most abundant at sites GC and MI, at both these sites numbers declined over the two years of monitoring reported here. Capitellid polychaete numbers were highest at sites KB and KA (Figure 6i). At site KB abundance of capitellids fluctuated, with high values in July and October 2002, and April 2003, and lower values at other times. At site KA capitellid abundance decreased over the two years. *Magelona dakini* was less abundant than capitellid polychaetes (Figure 6j). This species was most abundant at sites KA and KB, where again abundances decreased over time from July 2002 to April 2004. Nereid polychaetes were present at all sites, but at site TP only occurred in very low numbers (Figure 6k). At other sites abundances of nereids fluctuated, with medium to high abundances from October 2002 to October 2003, and lower numbers present in January and April of 2004. *Orbinia papillosa* was present in high numbers only at site MI, where abundances were low apart from July and October 2003 (Figure 6l).

3.2.2 Whaingaroa (Raglan) Harbour

The five most common species/taxonomic groups (indicator and non-indicator) at each of the permanent monitoring sites in Whaingaroa (Raglan) Harbour on each sampling date between July 2002 and April 2004 are listed in Table 3.

The most abundant species largely remained the same at sites TU, X, WI and OB. At TU, the bivalves *Austrovenus stutchburyi* and *Nucula hartvigiana* were the most common species, numbering between 2 and 93 and 0 and 77 individuals core^{-1}, respectively. Present in lower numbers were the polychaetes *Aquilaspio aucklandica* (1 to 42 individuals core^{-1}), and Capitellidae (0 to 27 individuals core^{-1}). At site X, the bivalves *A. stutchburyi* and *N. bifurca* dominated again, at 8 to 63 and 0 to 60 individuals core^{-1}, respectively. Present in lower numbers again was the polychaete *A. aucklandica*, at 1 to 54 individuals core^{-1}.

At site WI, the most abundant taxa remained much the same over the two years of monitoring reported here. *A. stutchburyi* was most abundant six out of eight sampling events; sample abundances ranged from 3 to 84 individuals core^{-1}. Capitellid polychaetes and the bivalve *N. hartvigiana* were next in abundance, at 2 to 48 and 0 to 84 individuals core^{-1}, respectively. The limpet *Notoacmea* sp. and the polychaete *A. aucklandica* were also among the top five most abundant species at this site. At site OB, the two most common taxa were capitellid polychaetes (2 to 49 individuals core^{-1}) and *Cossura* sp. (0 to 41 individuals core^{-1}). Non-indicator gastropods and polychaetes were frequently present too. At site HB, the community composition changed over the two years reported here. In October 2002, *A. stutchburyi* was the most abundant species (15 to 49 individuals core^{-1}), but this species was present in lower numbers at subsequent sampling events (1 to 24 individuals core^{-1}). Capitellid polychaetes were abundant in October 2002, April 2003 and October 2003 (up to 37 individuals core^{-1}), with lower abundances in April 2004 (up to 13 individuals core^{-1}). *A. bifurca* was abundant throughout (0 to 51 individuals core^{-1}), and nereid polychaetes were present in lower numbers (1 to 27 individuals core^{-1}).

Table 3: The five most common species/taxonomic groups on each sampling date for each permanent monitoring site in Whaingaroa Harbour.

	TU	HB	X	WI	OB
Jul-02				*Capitellidae*	*Cossura sp.*
				Austrovenus	*Capitellidae*
				Nucula	*Other gastropods*
				Macamona	*Aricidea sp.*
				Notoacmea sp.	*Phoxocephalidae*
Oct-02	*Austrovenus*	*Austrovenus*	*Austrovenus*	*Austrovenus*	*Capitellidae*
	Nucula	*Capitellidae*	*Nucula*	*Capitellidae*	*Cossura sp.*
	Aquilaspio	*Arthritica*	*Aquilaspio*	*Nucula*	*Phoxocephalidae*
	Capitellidae	*Nereidae*	*Capitellidae*	*Other polychaetes*	*Other gastropods*
	Arthritica	*Other amphipods*	*Notoacmea sp.*	*Notoacmea sp.*	*Other polychaetes*
Jan-03				*Capitellidae*	*Capitellidae*
				Austrovenus	*Cossura sp.*
				Nucula	*Aquilaspio*
				Notoacmea sp.	*Other bivalves*
				Aquilaspio	*Other polychaetes*
Apr-03	*Austrovenus*	*Capitellidae*	*Nucula*	*Austrovenus*	*Capitellidae*
	Nucula	*Nereidae*	*Aquilaspio*	*Capitellidae*	*Cossura sp.*
	Notoacmea sp.	*Austrovenus*	*Austrovenus*	*Nucula*	*Nereidae*
	Aquilaspio	*Arthritica*	*Capitellidae*	*Notoacmea sp.*	*Phoxocephalidae*
	Capitellidae	*Aquilaspio*	*Macamona*	*Aquilaspio*	*Euchone sp.*
Jul-03				*Austrovenus*	*Capitellidae*
				Nucula	*Cossura sp.*
				Capitellidae	*Nereidae*
				Notoacmea sp.	*Other gastropods*
				Aquilaspio	*Other polychaetes*
Oct-03	*Austrovenus*	*Capitellidae*	*Austrovenus*	*Austrovenus*	*Capitellidae*
	Nucula	*Austrovenus*	*Nucula*	*Nucula*	*Cossura sp.*
	Notoacmea sp.	*Arthritica*	*Macamona*	*Capitellidae*	*Other gastropods*
	Capitellidae	*Nereidae*	*Other polychaetes*	*Notoacmea sp.*	*Nereidae*
	Other gastropods	*Macamona*	*Amphipods*	*Aquilaspio*	*Other polychaetes*
Jan-04				*Austrovenus*	*Capitellidae*
				Nucula	*Cossura sp.*
				Capitellidae	*Aquilaspio*
				Aquilaspio	*Other polychaetes*
				Notoacmea sp.	*Euchone sp.*
Apr-04	*Austrovenus*	*Arthritica*	*Nucula*	*Austrovenus*	*Capitellidae*
	Nucula	*Nereidae*	*Austrovenus*	*Nucula*	*Cossura sp.*
	Notoacmea sp.	*Austrovenus*	*Aquilaspio*	*Capitellidae*	*Aquilaspio*
	Aquilaspio	*Capitellidae*	*Other crustaceans*	*Notoacmea sp.*	*Other polychaetes*
	Other gastropods	*Other amphipods*	*Capitellidae*	*Aquilaspio*	*Aricidea sp.*

The mean abundances of selected indicator species/taxa at each of the sites on each sampling date are shown in Figure 7.

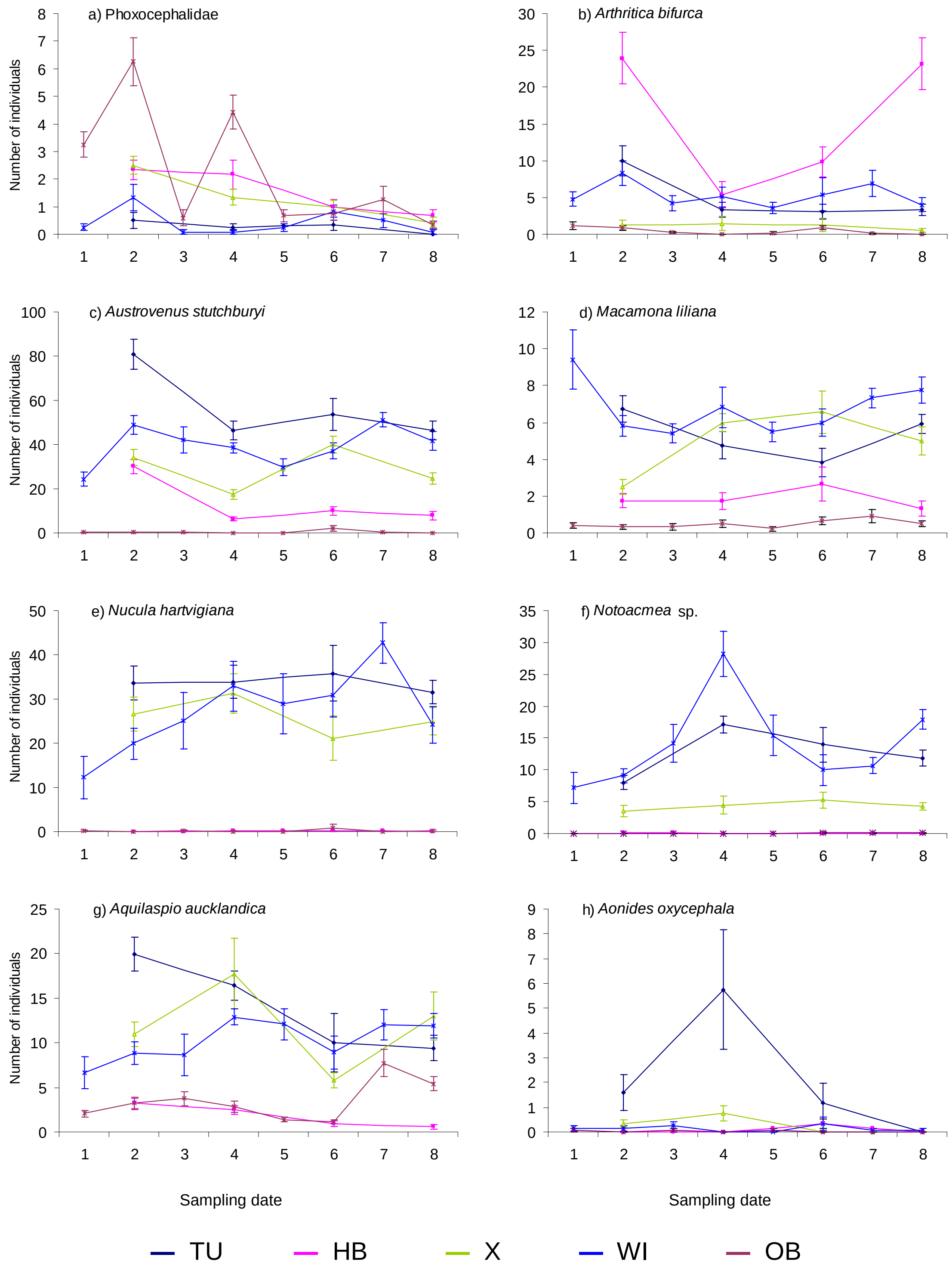

Figure 7: **The mean (± standard error) number of selected indicator species/taxa on each sampling date at each of the permanent monitoring sites in Whaingaroa Harbour. Sampling dates: Jul 02 = 1, Oct 02 = 2, Jan 03 = 3, Apr 03 = 4, Jul 03 = 5, Oct 03 = 6, Jan 04 = 7, Apr 04 = 8. Note the different scales on the vertical axis.**

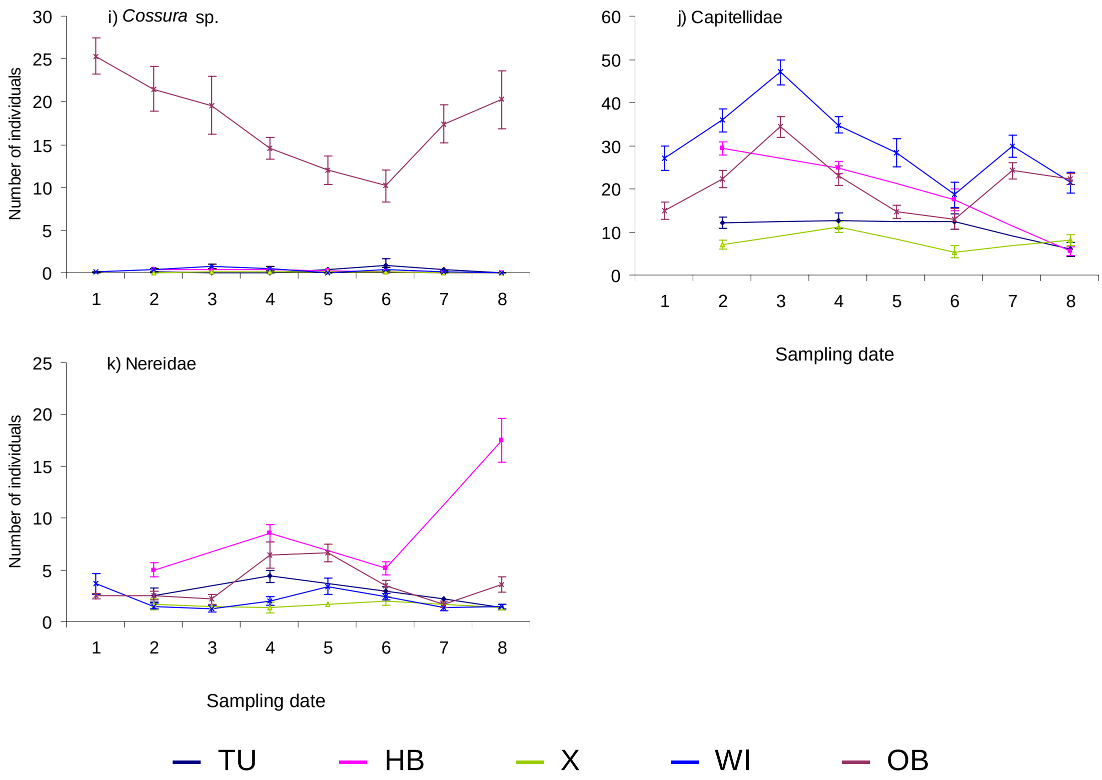

Figure 7. (cont.)

The abundance of phoxocephalid amphipods fluctuated at site OB, but remained much the same over the two year period reported here at all other sites (Figure 7a). At site OB, numbers were high in July and October 2002 and April 2003, and lower thereafter.

The abundance of the indicator bivalve species showed great temporal and spatial variation. *Arthritica bifurca* was present in high numbers at site HB in October 2002, but decreased in abundance in April and October 2003, after which abundance increased again (Figure 7b). The majority of individuals of this species recorded were juveniles at all sampling events (of less than 2 mm total length). Lower numbers of *A. bifurca* were present at sites TU and WI, and even lower numbers still at sites X and OB. *Austrovenus stutchburyi* was present in high numbers at sites TU, WI and X, and in lower numbers at site HB (Figure 7c). At site TU and X, when abundances rose they were caused by an influx of juveniles (individuals measuring less than 5 mm of total length). At site HB almost all individuals recorded measured less than 5 mm of length.

Macamona liliana was most abundant at sites WI, TU and X, with lower numbers present at sites HB and OB (Figure 7d). At site HB, the majority of individuals found measured less than 5 mm, whereas at sites TU and WI, the numbers were quite evenly spread amongst size classes. At site X, numbers increased because of an influx of smaller individuals (< 5 mm) in April 2003, and juveniles kept appearing in high numbers in subsequent samples from this site. *Nucula hartvigiana* was present in high numbers at sites TU, WI and X (Figure 7e). Abundance of this species was relatively constant at sites X and TU, whereas at site WI, numbers increased steadily from July 2002 to January 2004, after which they declined to an intermediate value in April 2004. Increases were partly caused by an influx of smaller individuals (< 5 mm).

The limpet *Notoacmea* sp. was present in high numbers at sites WI and TU, and in lower numbers at site X (Figure 7f). At site WI, abundance of this species peaked in April 2003 and again in April 2004, in what may be a seasonal pattern of higher abundance in the autumn.

Polychaetes showed great variation in abundance over time and within and between sites. *Aquilaspio aucklandica* was present in high numbers at sites TU, WI and X, and in lower numbers at sites HB and OB (Figure 7g). At site X the species peaked in abundance in April (2003 and 2004). At site TU *A. aucklandica* seemed to decline in abundance over the two year period presented here, whereas at site OB an increase in abundance was detected in January and April 2004. *Aonides oxycephala* was present in low numbers at all sites apart from TU, where a peak in abundance (to about 6 individuals core^{-1}) was noted in July 2003 (Figure 7h). *Cossura* sp. was present in high numbers only at site OB, where numbers initially decreased gradually from just over 25 individuals core^{-1} in July 2002 to below 15 individuals core^{-1} in October 2003, with a subsequent increase in abundance noted in January and April 2004 (Figure 7i).

Capitellid polychaetes were among the most abundant species at most sites (Figure 7j). At sites WI and OB numbers peaked in January (2003 and 2004), whereas at site HB a gradual decline was observed from about 30 individuals core^{-1} in October 2002 to less than 10 individuals core^{-1} in April 2004. At sites TU and X populations remained steady over the period presented here. Nereid polychaetes were present in low numbers at all sites (Figure 7k). At site HB abundances increased from between 5 and 10 individuals core^{-1} from October 2002 to October 2003, to between 15 and 20 individuals core^{-1} in April 2004.

3.3 Changes in the Composition of Indicator Species/Taxa Assemblages

3.3.1 Southern Firth of Thames

Figure 8 shows the non-metric multi-dimensional scaling (MDS) ordination of the square-root transformed benthic macrofauna assemblage data at each of the five monitoring sites from July 2002 to April 2004.

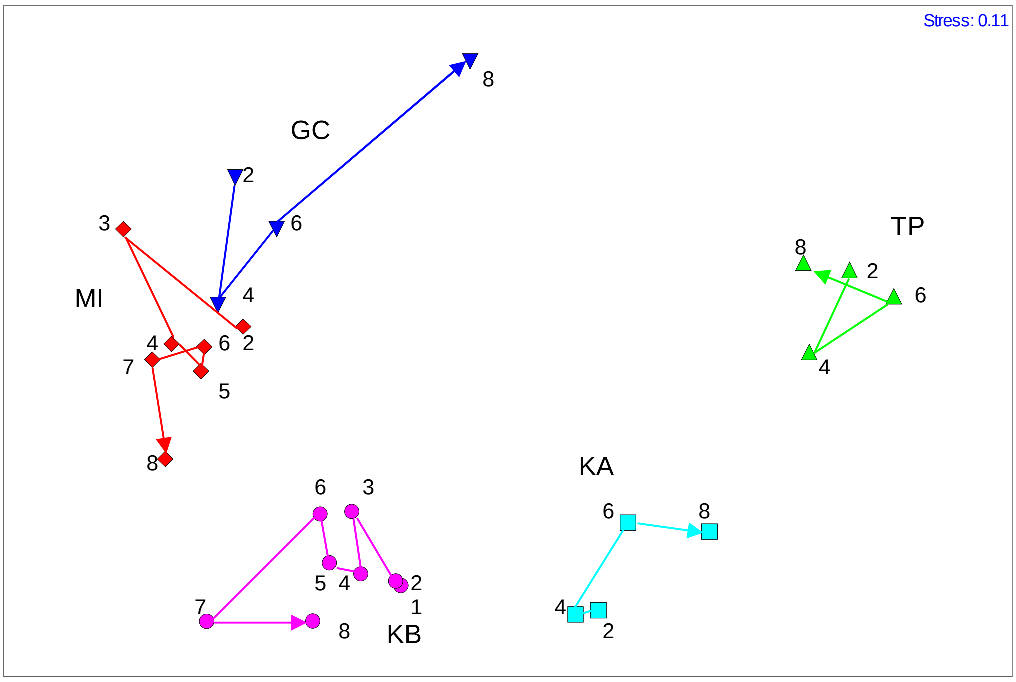

Figure 8: Non-metric multi-dimensional scaling (MDS) ordination of the square-root transformed southern Firth of Thames benthic macrofauna assemblage data based on mean abundance values for each indicator taxa from all the samples at each site on each sampling date. Sampling dates: Jul 02 = 1, Oct 02 = 2, Jan 03 = 3, Apr 03 = 4, Jul 03 = 5, Oct 03 = 6, Jan 04 = 7, Apr 04 = 8.

The MDS plot provides a visual representation of the relative similarities of the assemblages of indicator taxa at the various sites and sampling times. The distances between points (samples) reflects their relative dissimilarity in species composition: points that are close together have very similar assemblages, points which are far apart have few species in common, or the same species but at different levels of abundance. The arrowed lines linking the points indicate the direction of change through time; the longer the line the more the assemblages have changed. The medium stress value (0.11) for the two-dimensional ordination indicates that the representation of the similarities in assemblage composition was not perfect.

From Figure 8 it is apparent that each site clusters separately, apart from some slight overlap between sites MI and GC. This indicates that benthic macrobenthic communities were most similar at sites MI and GC.

At each of the sites, some change in community composition occurred over time. The magnitude of change was biggest at site GC, where a large shift occurred between October 2003 and April 2004. At sites MI, KB, KA and TP changes in community assemblage over time were relatively minor.

The directional change over time showed no consistency between sites; site TP seemed to change in an anti-clockwise manner over time, whereas at site KA, changes occurred in a clockwise manner on the plot. At site TP, a cyclic pattern may be indicated, here the community assemblage composition in April 2004 seemed to return to one close to that found in October 2002. A similar pattern was indicated at site KB, where the direction of change from January 2004 to April 2004 indicated that the community composition is becoming more similar to that found at the first sampling event in July 2002. A seasonal cyclical pattern was indicated at site MI, where the community composition in October 2002 and October 2003 were similar.

The ANOSIM global test (shown in Table 4) was used to indicate whether there were significant differences between any of the sampling dates at each site. The ANOSIM global tests indicate that for all of the five sites, there were significant differences in assemblage composition between sampling dates at the $P < 0.01$ level[7]. The mid-range global R values at all sites apart from TP indicate some separation with a degree of overlap between community composition at different sampling dates. At site TP, the relatively low global R value (0.120) indicates that the assemblage compositions were barely separable between sampling dates even though they were found to be significantly different.

The significant differences at each site were explored further using ANOSIM pairwise comparison tests.

[7] R values can be interpreted as follows; $R > 0.75$ = well separated, $R > 0.5$ = overlapping but clearly different, $R < 0.25$ barely separable (Clarke and Gorley, 2001).

Table 4: ANOSIM pairwise tests of the square-root transformed southern Firth of Thames benthic macrofauna assemblage data based on mean abundance values for each indicator species/taxa from all the samples at each site on each sampling date.

Pairwise	KA		GC		TP		MI		KB	
Comparison	*R*	*P*	*R*	*P*	*R*	*P*	*R*	*P*	*R*	*P*
Jul-02, Oct-02	-	-	-	-	-	-	-	-	0.093	ns
Jul-02, Jan-03	-	-	-	-	-	-	-	-	0.362	**
Jul-02, Apr-03	-	-	-	-	-	-	-	-	0.592	**
Jul-02, Jul-03	-	-	-	-	-	-	-	-	0.439	**
Jul-02, Oct-03	-	-	-	-	-	-	-	-	0.626	**
Jul-02, Jan-04	-	-	-	-	-	-	-	-	0.876	**
Jul-02, Apr-04	-	-	-	-	-	-	-	-	0.742	**
Oct-02, Jan-03	-	-	-	-	-	-	0.376	**	0.311	**
Oct-02, Apr-03	0.327	**	0.297	**	0.111	*	0.533	**	0.541	**
Oct-02, Jul-03	-	-	-	-	-	-	0.592	**	0.442	**
Oct-02, Oct-03	0.436	**	0.605	**	0.030	ns	0.261	**	0.565	**
Oct-02, Jan-04	-	-	-	-	-	-	0.634	**	0.907	**
Oct-02, Apr-04	0.835	**	0.913	**	0.069	ns	0.857	**	0.705	**
Jan-03, Apr-03	-	-	-	-	-	-	0.763	**	0.569	**
Jan-03, Jul-03	-	-	-	-	-	-	0.862	**	0.335	**
Jan-03, Oct-03	-	-	-	-	-	-	0.579	**	0.126	*
Jan-03, Jan-04	-	-	-	-	-	-	0.676	**	0.645	**
Jan-03, Apr-04	-	-	-	-	-	-	0.787	**	0.548	**
Apr-03, Jul-03	-	-	-	-	-	-	0.665	**	0.277	**
Apr-03, Oct-03	0.485	**	0.481	**	0.047	ns	0.643	**	0.599	**
Apr-03, Jan-04	-	-	-	-	-	-	0.606	**	0.873	**
Apr-03, Apr-04	0.764	**	0.926	**	0.348	**	0.665	**	0.486	**
Jul-03, Oct-03	-	-	-	-	-	-	0.284	**	0.473	**
Jul-03, Jan-04	-	-	-	-	-	-	0.371	**	0.409	**
Jul-03, Apr-04	-	-	-	-	-	-	0.649	**	0.465	**
Oct-03, Jan-04	-	-	-	-	-	-	0.344	**	0.635	**
Oct-03, Apr-04	0.727	**	0.672	**	0.160	**	0.627	**	0.366	**
Jan-04, Apr-04	-	-	-	-	-	-	0.376	**	0.600	**
Global R	0.595	**	0.597	**	0.120	**	0.551	**	0.512	**

** $P < 0.01$
* $P < 0.05$
ns $P > 0.05$
- no pairwise comparison as the site was not sampled on all possible dates

At site KA, all four sampling dates (October 2002, April 2003, October 2003 and April 2004) were significantly different from each other. R values ranged from 0.327 to 0.835, indicating a range of degrees of separation of community composition at the site at the different sampling dates. The clearest separation (R > 0.7) was between April 2004 and the other three sampling dates, which suggests a shift in community composition in the April 2004 samples. At site GC, R values ranged from 0.297 to 0.926, and all sampling dates showed significant differences. The highest degree of separation (R > 0.9) was once again found in comparisons with April 2004, from which October 2002 and April 2003 samples showed clear separation. In contrast, comparisons between April 2003 and October 2002 and October 2003, showed that community composition at these times were barely separable. At site TP R values were generally very low (0.030-0.348), indicating that although some of the differences were significant, community composition was not easily separated between different sampling events. For site MI, all comparisons showed significant differences in community composition at the different sampling dates, but the large range of R values (0.261 to 0.862) indicated that only some of the samples (October 2002 versus April 2004; and January 2003 versus April 2003, July 2003 and April 2004) were well separated. At site KB, all but one comparison (July 2002 versus October 2002) showed significant differences between different sampling dates, with R values ranging from 0.093 to 0.876. Sample date comparisons where community composition showed high separation (R > 0.75) included January 2004 versus July 2002, October 2002 and April

2003. At this site, only two comparisons were barely separable (July 2002 versus October 2002 and January 2003 versus October 2003).

The analysis indicates that seasonal and annual differences between macrofaunal assemblages exist at all of the sites apart from TP. Potential cyclic variation in community composition is likely to be identified as more sampling data becomes available.

The smallest combination of indicator species/taxa at each of the sites in the southern Firth of Thames which best accounts for the pattern represented by the full set of indicator species/taxa over the first year of the monitoring programme, were determined using BVSTEP (Table 5). The five species/taxa which contributed most to determining the Bray-Curtis dissimilarities between all the sampling dates during the first year of the monitoring programme at each of the sites were ascertained using SIMPER, and are listed in Table 6. In the SIMPER results, species/taxa are ordered by their average contribution to the total average dissimilarity between Sample Dates. The percentage of the total dissimilarity that is contributed by each species is also given, and these percentages are then cumulated. Note that only the first five species are listed in each case, which for the southern Firth of Thames sites accounted for between 46-80% of the dissimilarity between sample dates.

The combination of indicator species/taxa that best accounted for the pattern of the full set of indicator species/taxa over the first year of the monitoring programme, and the indicator species/taxa which contributed most to the dissimilarities between sampling dates, differed among the monitoring sites. At site TP, three of the total of 26 indicator species accounted for a large proportion of the full pattern ($\rho = 0.951$) (Table 5). The bivalves *Austrovenus stutchburyi, Nucula hartvigiana* and *Paphies australis* were consistently the most important species contributing to the differences in assemblage composition among sampling dates at this site (Table 6). At site GC, four species accounted for the majority of the full pattern ($\rho = 0.952$), these were the bivalves *Austrovenus stutchburyi*, *Macamona liliana* and *Paphies australis*, as well as the polychaete *Aonides oxycephala* (Table 5). These species were also indicated as being among the top five most important in contributing to the differences among sampling dates at the site (Table 6). At site MI, a total of nine species were found to account for the majority of the variation in the similarity matrix ($\rho = 0.950$) (Table 5). Of these, the polychaete *Aonides oxycephala* was found to be consistently important in contributing to the differences among sampling dates at the site (Table 6). At site KB, 10 species accounted for the majority of the full pattern observed ($\rho = 0.955$) (Table 5). Most of these were represented in the list of species most important in contributing to the differences among sampling dates at the site (Table 6), most consistently the polychaete *Aonides oxycephala* and capitellid polychaetes. At KA, 11 species accounted for the majority of the similarities ($\rho = 0.952$) (Table 5). Different suites of species/taxa were important in contributing to the differences among sampling dates at KA, but two species/taxa (the bivalve *Nucula hartvigiana* and capitellid polychaetes) were consistently important (Table 6).

Table 5: BVSTEP analysis to identify the smallest subset of indicator species/taxa whose similarity matrix across all the sample dates at each permanent monitoring site in the southern Firth of Thames correlates with that for the full indicator species/taxa set, at ρ ≥0.95.

Site	Correlation (ρ)	Species/Taxa
KA	0.952	Corophiidae Phoxocephalidae *Arthritica bifurca* *Austrovenus stutchburyi* *Macamona liliana* *Nucula hartvigiana* *Theora lubrica* *Aricidea* sp. Capitellidae *Magelona dakini* Nereidae
GC	0.952	*Austrovenus stutchburyi* *Macamona liliana* *Paphies australis* *Aonides oxycephala*
TP	0.951	*Austrovenus stutchburyi* *Nucula hartvigiana* *Paphies australis*
MI	0.950	Corophiidae *Colurostylis lemurum* *Austrovenus stutchburyi* *Macamona liliana* *Aonides oxycephala* Capitellidae *Magelona dakini* Nereidae *Orbinia papillosa*
KB	0.955	Corophiidae *Arthritica bifurca* *Austrovenus stutchburyi* *Macamona liliana* *Nucula hartvigiana* *Aonides oxycephala* *Glycera* sp. Capitellidae *Magelona dakini* Nereidae

Table 6: SIMPER analysis breakdown of average dissimilarity between Sample Dates at each of the permanent monitoring sites in the southern Firth of Thames into contributions from each indicator species/taxa.

KA	Species/Taxa	Average Abun-dance Date 1	Average Abun-dance Date 2	Average Dissimilarity	Contribution %	Cum. Contribution %
KA Oct-02 & Apr-03 dissimilarity = 33.14	*Macamona liliana*	1.09	3.14	3.91	11.8	11.8
	Nucula hartvigiana	5.94	5.81	3.61	10.89	22.69
	Phoxocephalidae	1.67	0.08	3.1	9.34	32.03
	Capitellidae	4.23	3.29	3.06	9.22	41.26
	Arthritica bifurca	1.88	1.38	2.81	8.49	49.75
KA Oct-02 & Oct-03 dissimilarity = 38.37	*Austrovenus stutchburyi*	3.71	1.25	5.68	14.81	14.81
	Capitellidae	4.23	2.65	4.34	11.31	26.12
	Magelona dakini	2.48	1.24	3.77	9.82	35.94
	Nucula hartvigiana	5.94	6.27	3.75	9.78	45.72
	Phoxocephalidae	1.67	0.37	3.26	8.49	54.21
KA Oct-02 & Apr 04 dissimilarity = 43.36	*Capitellidae*	4.23	0.5	8.49	19.59	19.59
	Nucula hartvigiana	5.94	7.63	5.16	11.89	31.48
	Magelona dakini	2.48	0.37	5.01	11.55	43.03
	Arthritica bifurca	1.88	0.94	3.64	8.4	51.43
	Nereidae	1.54	0.17	3.23	7.45	58.88
KA Apr-03 & Oct-03 dissimilarity = 39.25	*Austrovenus stutchburyi*	4.29	1.25	6.85	17.46	17.46
	Macamona liliana	3.14	0.93	4.92	12.53	29.98
	Nucula hartvigiana	5.81	6.27	3.51	8.95	38.94
	Magelona dakini	2.1	1.24	2.91	7.41	46.35
	Capitellidae	3.29	2.65	2.81	7.15	53.50
KA Apr-03 & Apr-04 dissimilarity = 40.75	*Capitellidae*	3.29	0.5	6.35	15.58	15.58
	Nucula hartvigiana	5.81	7.63	4.86	11.94	27.52
	Magelona dakini	2.1	0.37	4.01	9.84	37.36
	Nereidae	1.88	0.17	3.85	9.44	46.8
	Macamona liliana	3.14	2	3.2	7.86	54.66
KA Oct-03 & Apr-04 dissimilarity = 43.77	*Austrovenus stutchburyi*	1.25	3.56	6.3	14.39	14.39
	Capitellidae	2.65	0.5	6.08	13.9	28.29
	Nucula hartvigiana	6.27	7.63	4.32	9.87	38.16
	Nereidae	1.42	0.17	3.55	8.12	46.28
	Macamona liliana	0.93	2	3.43	7.84	54.12
GC						
GC Oct-02 & Apr-03 dissimilarity = 33.74	*Austrovenus stutchburyi*	1.4	3.27	6.45	19.12	19.12
	Aonides oxycephala	10.17	9.05	4.85	14.39	33.5
	Macamona liliana	0.73	2.32	4.4	13.05	46.55
	Capitellidae	0.88	1.61	3.25	9.64	56.19
	Paphies australis	1.03	0.25	2.51	7.43	63.62
GC Oct-02 & Oct-03 dissimilarity = 48.53	*Aonides oxycephala*	10.17	4.71	17.33	35.71	35.71
	Macamona liliana	0.73	2.24	5.08	10.47	46.18
	Paphies australis	1.03	1.69	3.72	7.67	53.84
	Nereidae	1.69	0.57	3.52	7.26	61.10
	Austrovenus stutchburyi	1.4	0.91	3.21	6.61	67.71
GC Oct-02 & Apr 04 dissimilarity = 70.09	*Aonides oxycephala*	10.17	1.82	29.99	42.79	42.79
	Paphies australis	1.03	4.56	12.48	17.81	60.60
	Nereidae	1.69	0.35	5.12	7.3	67.90
	Austrovenus stutchburyi	1.4	0.75	3.64	5.19	73.08
	Colurostylis lemurum	0.49	1.19	3.6	5.14	78.22
GC Apr-03 & Oct-03 dissimilarity = 47.30	*Aonides oxycephala*	9.05	4.71	13.41	28.35	28.35
	Austrovenus stutchburyi	3.27	0.91	7.9	16.71	45.06
	Paphies australis	0.25	1.69	4.63	9.78	54.84
	Macamona liliana	2.32	2.24	3.98	8.41	63.25
	Nereidae	1.8	0.57	3.89	8.22	71.47

Table 6 (cont.)

GC cont.	Species/Taxa	Average Abun-dance Date 1	Average Abun-dance Date 2	Average Dissimilarity	Contribution %	Cum. Contribution %
GC Apr-03 & Apr-04 dissimilarity = 75.42	*Aonides oxycephala*	9.05	1.82	24.82	32.91	32.91
	Paphies australis	0.25	4.56	14.89	19.74	52.66
	Austrovenus stutchburyi	3.27	0.75	9	11.93	64.59
	Macamona liliana	2.32	0.41	6.51	8.63	73.22
	Nereidae	1.8	0.35	5.12	6.78	80.01
GC Oct-03 & Apr-04 dissimilarity = 60.09	*Aonides oxycephala*	4.71	1.82	14.25	23.71	23.71
	Paphies australis	1.69	4.56	13.07	21.76	45.47
	Macamona liliana	2.24	0.41	8.34	13.88	59.34
	Capitellidae	1.22	0.12	5.13	8.53	67.88
	Colurostylis lemurum	0.74	1.19	4.09	6.81	74.69
TP						
TP Oct-02 & Apr-03 dissimilarity = 42.98	*Nucula hartvigiana*	6.11	9.52	12.08	28.11	28.11
	Paphies australis	3.14	4.24	9.42	21.92	50.03
	Austrovenus stutchburyi	0.83	2.29	5.28	12.3	62.32
	Capitellidae	0.26	0.68	2.5	5.82	68.15
	Magelona dakini	0.37	0.57	2.36	5.5	73.64
TP Oct-02 & Oct-03 dissimilarity = 41.24	*Nucula hartvigiana*	6.11	7.94	11.08	26.87	26.87
	Paphies australis	3.14	3.83	10.4	25.22	52.10
	Austrovenus stutchburyi	0.83	1.14	3.88	9.4	61.50
	Capitellidae	0.26	0.62	2.62	6.35	67.85
	Pseudopolydora complex	0.25	0.54	1.92	4.66	72.51
TP Oct-02 & Apr-04 dissimilarity = 41.09	*Paphies australis*	3.14	3.54	11.42	27.78	27.78
	Nucula hartvigiana	6.11	5.16	9.39	22.86	50.64
	Austrovenus stutchburyi	0.83	0.97	3.74	9.1	59.74
	Pseudopolydora complex	0.25	0.7	2.9	7.06	66.80
	Aonides oxycephala	0.46	0.28	2.52	6.13	72.93
TP Apr-03 & Oct-03 dissimilarity = 35.62	*Nucula hartvigiana*	9.52	7.94	8.89	24.95	24.95
	Paphies australis	4.24	3.83	7.59	21.3	46.24
	Austrovenus stutchburyi	2.29	1.14	3.98	11.19	57.43
	Capitellidae	0.68	0.62	2.23	6.26	63.70
	Pseudopolydora complex	0.51	0.54	1.93	5.43	69.13
TP Apr-03 & Apr 04 dissimilarity = 43.03	*Nucula hartvigiana*	9.52	5.16	13.76	31.97	31.97
	Paphies australis	4.24	3.54	8.09	18.8	50.77
	Austrovenus stutchburyi	2.29	0.97	4.57	10.62	61.39
	Pseudopolydora complex	0.51	0.7	2.5	5.82	67.21
	Capitellidae	0.68	0.37	2.35	5.46	72.66
TP Oct-03 & Apr-04 dissimilarity = 39.20	*Nucula hartvigiana*	7.94	5.16	10.98	28.01	28.01
	Paphies australis	3.83	3.54	8.88	22.65	50.67
	Austrovenus stutchburyi	1.14	0.97	3.25	8.3	58.97
	Pseudopolydora complex	0.54	0.7	2.84	7.25	66.21
	Capitellidae	0.62	0.37	2.38	6.07	72.28
MI						
MI Oct-02 & Jan 03 dissimilarity = 33.37	*Aonides oxycephala*	8.03	8.4	5.18	15.53	15.53
	Capitellidae	1.91	0.53	4.27	12.79	28.32
	Corophiidae	1	0.17	2.9	8.69	37.01
	Orbinia papillosa	1.09	0.31	2.78	8.32	45.33
	Nereidae	1.35	0.74	2.68	8.04	53.36
MI Oct-02 & Apr-03 dissimilarity = 35.32	*Aonides oxycephala*	8.03	7.21	5.46	15.46	15.46
	Austrovenus stutchburyi	0.87	2.97	5.38	15.23	30.69
	Corophiidae	1	2.06	3.97	11.24	41.93
	Capitellidae	1.91	0.55	3.93	11.12	53.05
	Nereidae	1.35	2.3	3.21	9.1	62.15

Table 6 (cont.)

MI cont.	Species/Taxa	Average Abun-dance Date 1	Average Abun-dance Date 2	Average Dissimilarity	Contribution %	Cum. Contribution %
MI Oct-02 & Jul-03 dissimilarity = 32.93	*Orbinia papillosa*	1.09	2.78	4.14	12.58	12.58
	Austrovenus stutchburyi	0.87	2.5	4.08	12.37	24.96
	Aonides oxycephala	8.03	6.79	4.05	12.3	37.26
	Colurostylis lemurum	0.6	1.44	2.54	7.7	44.96
	Corophiidae	1	0.31	2.36	7.17	52.13
MI Oct-02 & Oct-03 dissimilarity = 32.68	*Aonides oxycephala*	8.03	6.88	5.37	16.44	16.44
	Nereidae	1.35	0.17	3.26	9.97	26.41
	Orbinia papillosa	1.09	2.25	3.22	9.84	36.25
	Corophiidae	1	0.76	2.44	7.47	43.72
	Austrovenus stutchburyi	0.87	1.47	2.38	7.29	51.01
MI Oct-02 & Jan-04 dissimilarity = 38.76	*Aonides oxycephala*	8.03	5.94	6.62	17.08	17.08
	Macamona liliana	2.17	3.59	3.91	10.09	27.17
	Capitellidae	1.91	0.57	3.81	9.84	37.02
	Austrovenus stutchburyi	0.87	1.8	3.21	8.29	45.31
	Corophiidae	1	0.88	3.06	7.9	53.20
MI Oct-02 & Apr-04 dissimilarity = 51.76	*Aonides oxycephala*	8.03	3.74	13.76	26.58	26.58
	Capitellidae	1.91	0	6.05	11.69	38.27
	Austrovenus stutchburyi	0.87	2.36	4.95	9.57	47.84
	Nereidae	1.35	0.31	3.7	7.16	54.99
	Corophiidae	1	0	3.1	6	60.99
MI Jan-03 & Apr-03 dissimilarity = 41.09	*Aonides oxycephala*	8.4	7.21	7.35	17.89	17.89
	Austrovenus stutchburyi	0.57	2.97	7.24	17.61	35.50
	Corophiidae	0.17	2.06	5.7	13.87	49.36
	Nereidae	0.74	2.3	5.25	12.77	62.14
	Colurostylis lemurum	0	1.09	3.13	7.62	69.75
MI Jan-03 & Jul 03 dissimilarity = 40.33	*Orbinia papillosa*	0.31	2.78	7.02	17.41	17.41
	Austrovenus stutchburyi	0.57	2.5	5.58	13.83	31.24
	Aonides oxycephala	8.4	6.79	5.55	13.76	45.00
	Colurostylis lemurum	0	1.44	4.14	10.27	55.26
	Macamona liliana	1.58	2.68	3.43	8.5	63.76
MI Jan-03 & Oct-03 dissimilarity = 38.15	*Aonides oxycephala*	8.4	6.88	7.32	19.19	19.19
	Orbinia papillosa	0.31	2.25	6.2	16.25	35.44
	Austrovenus stutchburyi	0.57	1.47	3.27	8.57	44.01
	Capitellidae	0.53	1.31	3.18	8.33	52.33
	Magelona dakini	0.17	0.85	2.59	6.8	59.13
MI Jan-03 & Jan 04 dissimilarity = 41.84	*Aonides oxycephala*	8.4	5.94	8.89	21.24	21.24
	Macamona liliana	1.58	3.59	6.6	15.79	37.03
	Austrovenus stutchburyi	0.57	1.8	4.47	10.68	47.71
	Colurostylis lemurum	0	1.05	3.32	7.93	55.64
	Corophiidae	0.17	0.88	2.88	6.88	62.51
MI Jan 03 & Apr-04 dissimilarity = 50.37	*Aonides oxycephala*	8.4	3.74	18.38	36.48	36.48
	Austrovenus stutchburyi	0.57	2.36	7.08	14.05	50.53
	Arthritica bifurca	0.52	0.58	3.2	6.36	56.89
	Macamona liliana	1.58	2.23	3.11	6.17	63.06
	Nereidae	0.74	0.31	2.86	5.68	68.73
MI Apr-03 & Jul-03 dissimilarity = 32.51	*Orbinia papillosa*	0.62	2.78	5.22	16.07	16.07
	Aonides oxycephala	7.21	6.79	5.04	15.51	31.57
	Corophiidae	2.06	0.31	4.4	13.55	45.12
	Nereidae	2.3	1.37	3.12	9.61	54.73
	Capitellidae	0.55	1.16	2.55	7.84	62.57
MI Apr-03 & Oct-03 dissimilarity = 38.90	*Aonides oxycephala*	7.21	6.88	6.19	15.91	15.91
	Nereidae	2.3	0.17	5.8	14.92	30.83
	Orbinia papillosa	0.62	2.25	4.34	11.17	41.99
	Austrovenus stutchburyi	2.97	1.47	4.09	10.52	52.51
	Corophiidae	2.06	0.76	4.04	10.4	62.91

Table 6 (cont.)

MI cont.	Species/Taxa	Average Abun-dance Date 1	Average Abun-dance Date 2	Average Dissimilarity	Contribution %	Cum. Contribution %
MI Apr-03 & Jan-04 dissimilarity = 37.56	*Aonides oxycephala*	7.21	5.94	6.61	17.6	17.60
	Nereidae	2.3	0.45	5.33	14.19	31.79
	Corophiidae	2.06	0.88	4.49	11.94	43.73
	Macamona liliana	2.29	3.59	3.69	9.82	53.54
	Austrovenus stutchburyi	2.97	1.8	3.38	9.01	62.55
MI Apr-03 & Apr-04 dissimilarity = 45.71	*Aonides oxycephala*	7.21	3.74	11.26	24.62	24.62
	Nereidae	2.3	0.31	6.61	14.46	39.09
	Corophiidae	2.06	0	6.26	13.69	52.78
	Austrovenus stutchburyi	2.97	2.36	3.05	6.67	59.44
	Colurostylis lemurum	1.09	0.25	2.96	6.48	65.92
MI Jul-03 & Oct-03 dissimilarity = 29.07	*Aonides oxycephala*	6.79	6.88	4.13	14.19	14.19
	Nereidae	1.37	0.17	3.11	10.7	24.89
	Austrovenus stutchburyi	2.5	1.47	2.87	9.89	34.78
	Orbinia papillosa	2.78	2.25	2.6	8.94	43.72
	Colurostylis lemurum	1.44	0.66	2.36	8.11	51.82
MI Jul-03 & Jan-04 dissimilarity = 31.41	*Orbinia papillosa*	2.78	0.8	5.39	17.17	17.17
	Aonides oxycephala	6.79	5.94	4.12	13.1	30.27
	Macamona liliana	2.68	3.59	2.93	9.32	39.59
	Nereidae	1.37	0.45	2.63	8.38	47.97
	Capitellidae	1.16	0.57	2.39	7.61	55.59
MI Jul-03 & Apr-03 dissimilarity = 43.49	*Aonides oxycephala*	6.79	3.74	9.44	21.71	21.71
	Orbinia papillosa	2.78	0.65	6.49	14.93	36.64
	Colurostylis lemurum	1.44	0.25	3.63	8.35	44.99
	Nereidae	1.37	0.31	3.5	8.05	53.04
	Capitellidae	1.16	0	3.46	7.96	60.99
MI Oct 03 & Jan-04 dissimilarity = 34.49	*Aonides oxycephala*	6.88	5.94	5.83	16.91	16.91
	Orbinia papillosa	2.25	0.8	4.6	13.33	30.24
	Macamona liliana	2.13	3.59	4.32	12.53	42.77
	Capitellidae	1.31	0.57	2.97	8.6	51.36
	Corophiidae	0.76	0.88	2.64	7.65	59.02
MI Oct-03 & Apr-04 dissimilarity = 45.11	*Aonides oxycephala*	6.88	3.74	10.98	24.33	24.33
	Orbinia papillosa	2.25	0.65	5.62	12.45	36.78
	Capitellidae	1.31	0	4.35	9.64	46.42
	Austrovenus stutchburyi	1.47	2.36	3.76	8.33	54.75
	Corophiidae	0.76	0	2.58	5.72	60.46
MI Jan-04 & Apr-04 dissimilarity = 40.73	*Aonides oxycephala*	5.94	3.74	8.31	20.41	20.41
	Macamona liliana	3.59	2.23	5.02	12.32	32.73
	Austrovenus stutchburyi	1.8	2.36	3.49	8.56	41.29
	Colurostylis lemurum	1.05	0.25	3.15	7.72	49.01
	Corophiidae	0.88	0	3.02	7.41	56.42
KB						
KB Jul 02 & Oct 02 dissimilarity = 30.84	*Aonides oxycephala*	1.76	2.1	3.45	11.19	11.19
	Arthritica bifurca	1.16	1.63	3.24	10.51	21.70
	Austrovenus stutchburyi	2.75	2.71	2.67	8.65	30.34
	Magelona dakini	1.94	2.09	2.65	8.6	38.95
	Capitellidae	4.86	4.2	2.39	7.74	46.68
KB Jul-02 & Jan-03 dissimilarity = 40.68	*Capitellidae*	4.86	2.31	6.85	16.85	16.85
	Arthritica bifurca	1.16	2.68	5.13	12.6	29.45
	Aonides oxycephala	1.76	2	4.11	10.11	39.56
	Magelona dakini	1.94	1.09	3.64	8.95	48.50
	Austrovenus stutchburyi	2.75	2.22	2.79	6.86	55.37

Table 6 (cont.)

KB	Species/Taxa	Average Abun-dance Date 1	Average Abun-dance Date 2	Average Dissimilarity	Contribution %	Cum. Contribution %
KB Jul-02 & Apr 03 dissimilarity = 41.00	*Capitellidae*	4.86	4.08	5.39	13.13	13.13
	Macamona liliana	1.34	3.71	5.32	12.98	26.12
	Austrovenus stutchburyi	2.75	4.22	3.89	9.48	35.59
	Aonides oxycephala	1.76	2.11	3.51	8.55	44.15
	Magelona dakini	1.94	1.19	3.07	7.48	51.62
KB Jul-02 & Jul-03 dissimilarity = 43.52	*Capitellidae*	4.86	2.68	6.07	13.95	13.95
	Corophiidae	0.52	2.83	5.83	13.4	27.35
	Aonides oxycephala	1.76	2	3.96	9.1	36.45
	Magelona dakini	1.94	1.31	3.39	7.79	44.23
	Aquilaspio aucklandica	1.47	0.4	2.92	6.71	50.95
KB Jul-02 & Oct-03 dissimilarity = 47.67	*Capitellidae*	4.86	1.16	10.55	22.13	22.13
	Arthritica bifurca	1.16	2.35	5.36	11.24	33.37
	Magelona dakini	1.94	0.85	4.25	8.91	42.28
	Aonides oxycephala	1.76	1.47	3.84	8.05	50.33
	Aquilaspio aucklandica	1.47	0.4	3.32	6.96	57.29
KB Jul-02 & Jan 04 dissimilarity = 59.24	*Corophiidae*	0.52	4.93	11.53	19.47	19.47
	Capitellidae	4.86	0.7	11.27	19.03	38.50
	Magelona dakini	1.94	0.08	5.13	8.66	47.16
	Aonides oxycephala	1.76	1.9	4.39	7.42	54.58
	Arthritica bifurca	1.16	1.83	3.89	6.57	61.15
KB Jul-02 & Apr-04 dissimilarity = 55.31	*Capitellidae*	4.86	1.01	11.35	20.53	20.53
	Austrovenus stutchburyi	2.75	5.22	8.35	15.09	35.62
	Magelona dakini	1.94	0.08	5.53	10	45.62
	Arthritica bifurca	1.16	2.03	4.77	8.63	54.25
	Aquilaspio aucklandica	1.47	0.08	3.96	7.17	61.42
KB Oct-02 & Jan-03 dissimilarity = 39.52	*Capitellidae*	4.2	2.31	5.25	13.29	13.29
	Arthritica bifurca	1.63	2.68	4.72	11.94	25.23
	Aonides oxycephala	2.1	2	4.15	10.51	35.74
	Magelona dakini	2.09	1.09	2.87	7.27	43.01
	Austrovenus stutchburyi	2.71	2.22	2.67	6.75	49.76
KB Oct-02 & Apr-03 dissimilarity = 39.37	*Macamona liliana*	1.06	3.71	5.97	15.17	15.17
	Capitellidae	4.2	4.08	4.84	12.29	27.46
	Austrovenus stutchburyi	2.71	4.22	4.01	10.2	37.65
	Aonides oxycephala	2.1	2.11	3.51	8.9	46.56
	Arthritica bifurca	1.63	1.34	2.64	6.7	53.25
KB Oct-02 & Jul-03 dissimilarity = 42.99	*Corophiidae*	0.08	2.83	6.3	14.65	14.65
	Capitellidae	4.2	2.68	4.77	11.09	25.75
	Aonides oxycephala	2.1	2	4.07	9.47	35.21
	Arthritica bifurca	1.63	0.85	3.32	7.72	42.94
	Austrovenus stutchburyi	2.71	3.48	2.86	6.64	49.58
KB Oct-02 & Oct-03 dissimilarity = 45.71	*Capitellidae*	4.2	1.16	8.71	19.06	19.06
	Arthritica bifurca	1.63	2.35	4.96	10.86	29.92
	Aonides oxycephala	2.1	1.47	3.99	8.72	38.64
	Magelona dakini	2.09	0.85	3.76	8.23	46.86
	Glycera sp.	0.4	1.43	3.37	7.38	54.25
KB Oct-02 & Jan-04 dissimilarity = 60.97	*Corophiidae*	0.08	4.93	12.81	21.02	21.02
	Capitellidae	4.2	0.7	9.53	15.63	36.65
	Magelona dakini	2.09	0.08	5.42	8.9	45.55
	Aonides oxycephala	2.1	1.9	4.43	7.26	52.81
	Nucula hartvigiana	1.65	0	4.4	7.22	60.03

Table 6 (cont.)

KB	Species/Taxa	Average Abun-dance Date 1	Average Abun-dance Date 2	Average Dissimilarity	Contribution %	Cum. Contribution %
KB Oct-02 & Apr-04 dissimilarity = 52.99	*Capitellidae*	4.2	1.01	9.52	17.97	17.97
	Austrovenus stutchburyi	2.71	5.22	8.59	16.21	34.18
	Magelona dakini	2.09	0.08	5.87	11.08	45.25
	Arthritica bifurca	1.63	2.03	4.6	8.67	53.93
	Aonides oxycephala	2.1	1.29	3.66	6.92	60.84
KB Jan-03 & Apr-03 dissimilarity = 46.35	*Macamona liliana*	1.14	3.71	6.18	13.33	13.33
	Capitellidae	2.31	4.08	5.67	12.24	25.56
	Austrovenus stutchburyi	2.22	4.22	5.02	10.83	36.40
	Arthritica bifurca	2.68	1.34	4.39	9.46	45.86
	Aonides oxycephala	2	2.11	4.16	8.97	54.83
KB Jan-03 & Jul-03 dissimilarity = 45.99	*Corophiidae*	1	2.83	5.88	12.8	12.80
	Arthritica bifurca	2.68	0.85	5.52	12.01	24.80
	Aonides oxycephala	2	2	4.72	10.26	35.07
	Capitellidae	2.31	2.68	3.91	8.5	43.56
	Austrovenus stutchburyi	2.22	3.48	3.5	7.61	51.17
KB Jan-03 & Oct-03 dissimilarity = 42.08	*Arthritica bifurca*	2.68	2.35	6.13	14.57	14.57
	Aonides oxycephala	2	1.47	4.76	11.31	25.89
	Capitellidae	2.31	1.16	4.59	10.91	36.79
	Corophiidae	1	0.08	3.05	7.25	44.04
	Glycera sp.	0.96	1.43	2.77	6.58	50.62
KB Jan-03 & Jan-04 dissimilarity = 53.48	*Corophiidae*	1	4.93	10.96	20.48	20.48
	Arthritica bifurca	2.68	1.83	5.38	10.06	30.55
	Capitellidae	2.31	0.7	5.12	9.56	40.11
	Aonides oxycephala	2	1.9	5.04	9.42	49.54
	Nucula hartvigiana	1.47	0	4.12	7.7	57.24
KB Jan-03 & Apr-04 dissimilarity = 53.79	*Austrovenus stutchburyi*	2.22	5.22	10.17	18.9	18.90
	Arthritica bifurca	2.68	2.03	6.12	11.38	30.28
	Capitellidae	2.31	1.01	5.24	9.74	40.02
	Aonides oxycephala	2	1.29	4.54	8.45	48.47
	Magelona dakini	1.09	0.08	3.27	6.07	54.55
KB Apr-03 & Jul-03 dissimilarity = 42.55	*Corophiidae*	0.08	2.83	5.93	13.93	13.93
	Capitellidae	4.08	2.68	5.42	12.73	26.66
	Macamona liliana	3.71	1.83	4.69	11.03	37.69
	Aonides oxycephala	2.11	2	4.09	9.61	47.30
	Arthritica bifurca	1.34	0.85	2.67	6.27	53.58
KB Apr-03 & Oct-03 dissimilarity = 48.47	*Capitellidae*	4.08	1.16	7.65	15.79	15.79
	Macamona liliana	3.71	1.15	6.63	13.69	29.48
	Austrovenus stutchburyi	4.22	2.53	4.69	9.68	39.16
	Arthritica bifurca	1.34	2.35	4.58	9.46	48.62
	Aonides oxycephala	2.11	1.47	4.12	8.5	57.12
KB Apr-03 & Jan-04 dissimilarity = 59.65	*Corophiidae*	0.08	4.93	11.93	20	20.00
	Capitellidae	4.08	0.7	8.22	13.78	33.77
	Macamona liliana	3.71	0.64	7.64	12.81	46.58
	Aonides oxycephala	2.11	1.9	4.45	7.46	54.04
	Austrovenus stutchburyi	4.22	3.22	3.55	5.95	60.00
KB Apr-03 & Apr-04 dissimilarity = 47.46	*Capitellidae*	4.08	1.01	8.24	17.35	17.35
	Macamona liliana	3.71	1.65	5.61	11.83	29.18
	Austrovenus stutchburyi	4.22	5.22	5.53	11.65	40.83
	Arthritica bifurca	1.34	2.03	4.21	8.88	49.70
	Aonides oxycephala	2.11	1.29	3.9	8.23	57.93
KB Jul-03 & Oct-03 dissimilarity = 50.01	*Corophiidae*	2.83	0.08	7.17	14.34	14.34
	Arthritica bifurca	0.85	2.35	5.75	11.49	25.84
	Capitellidae	2.68	1.16	5.09	10.17	36.01
	Aonides oxycephala	2	1.47	4.53	9.06	45.07
	Austrovenus stutchburyi	3.48	2.53	3.11	6.21	51.28

Table 6 (cont.)

KB	Species/Taxa	Average Abun-dance Date 1	Average Abun-dance Date 2	Average Dissimilarity	Contribution %	Cum. Contribution %
KB Jul-03 & Jan-04 dissimilarity = 49.79	*Corophiidae*	2.83	4.93	8.54	17.16	17.16
	Capitellidae	2.68	0.7	5.45	10.94	28.10
	Aonides oxycephala	2	1.9	4.94	9.93	38.03
	Arthritica bifurca	0.85	1.83	4.09	8.21	46.24
	Macamona liliana	1.83	0.64	3.47	6.97	53.21
KB Jul-03 & Apr 04 dissimilarity = 52.86	*Corophiidae*	2.83	0	7.29	13.79	13.79
	Austrovenus stutchburyi	3.48	5.22	7.28	13.77	27.56
	Capitellidae	2.68	1.01	5.51	10.42	37.98
	Arthritica bifurca	0.85	2.03	4.94	9.35	47.33
	Aonides oxycephala	2	1.29	4.17	7.89	55.21
KB Oct-03 & Jan-04 dissimilarity = 55.61	*Corophiidae*	0.08	4.93	14.94	26.87	26.87
	Arthritica bifurca	2.35	1.83	5.82	10.46	37.33
	Aonides oxycephala	1.47	1.9	5.03	9.04	46.37
	Austrovenus stutchburyi	2.53	3.22	3.69	6.64	53.02
	Capitellidae	1.16	0.7	3.17	5.7	58.72
KB Oct-03 & Apr 04 dissimilarity = 50.91	*Austrovenus stutchburyi*	2.53	5.22	10.54	20.7	20.70
	Arthritica bifurca	2.35	2.03	6.67	13.09	33.79
	Glycera sp.	1.43	0.31	4.32	8.49	42.28
	Aonides oxycephala	1.47	1.29	3.82	7.5	49.78
	Capitellidae	1.16	1.01	3.58	7.03	56.81
KB Jan 04 & Apr 04 dissimilarity = 58.24	*Corophiidae*	4.93	0	15.46	26.54	26.54
	Austrovenus stutchburyi	3.22	5.22	8.5	14.6	41.14
	Arthritica bifurca	1.83	2.03	5.41	9.29	50.43
	Aonides oxycephala	1.9	1.29	4.74	8.13	58.56
	Macamona liliana	0.64	1.65	3.61	6.2	64.76

The differences between the sampling dates were most pronounced at GC (also reflected in the MDS ordination in Figure 8), where the highest average dissimilarity was recorded (i.e., assemblage composition was least similar between sampling dates). The high average dissimilarity was mainly caused by a shift in community composition in April 2004. This shift can also be seen in Figure 8. Bray-Curtis dissimilarities between sampling dates were smallest (also reflected in the MDS ordination in Figure 8) at KA and MI (i.e. at these locations, the assemblage composition was most similar between sampling dates).

There were no consistent patterns evident in the dissimilarities between sampling dates among the different monitoring sites. For example, there was little indication that assemblage composition at any of the sites was becoming increasingly dissimilar over time – with the possible exception of GC, where the latest sampling point considered here (April 2004) showed an increase in dissimilarity to previous samples taken at the site. The combination of indicator species/taxa that best accounted for the pattern for the full set of indicator species/taxa for the period April 2002 to April 2004, and the indicator species/taxa which contributed most to the dissimilarities between sampling dates, differed among the monitoring sites.

3.3.2 Whaingaroa (Raglan) Harbour

The MDS ordination of the square-root transformed benthic macrofauna assemblage data at each of the five permanent monitoring sites over the period July 2002-April 2004 is presented in Figure 9.

The plot shows that the five sites form discrete clusters, indicating that the assemblages at each site were distinct from each other, and that these differences persisted over the monitored period. The assemblages at sites WI, TU and X were most similar, whereas those at sites HB and OB were both distinctly different from all other sites. The low stress value (0.05) indicates that an acceptable representation of the similarities in assemblage composition was achieved.

Figure 9 also shows that at each site some change in assemblage composition occurred over time. Changes observed at sites HB and OB were far greater than those seen at sites WI, TU and X. Figure 12 shows a close-up of sites WI, TU and X. Within each of the site groups, the points representing the different times of sampling do not appear to exhibit any particularly clear or systematic patterns of change during the two years of the monitoring programme shown.

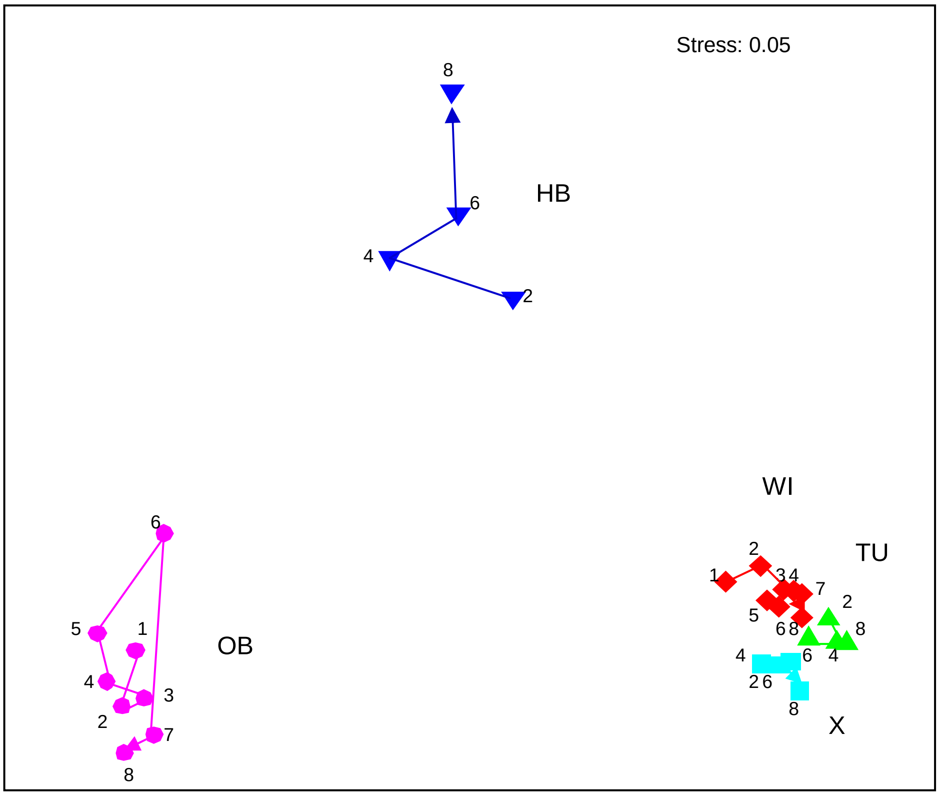

Figure 9: Non-metric multi-dimensional scaling (MDS) ordination of the square-root transformed Whaingaroa Harbour benthic macrofauna assemblage data based on mean abundance values for each indicator taxa from all the samples at each site on each sampling date. Sampling dates: Jul 02 = 1, Oct 02 = 2, Jan 03 = 3, Apr 03 = 4, Jul 03 = 5, Oct 03 = 6, Jan 04 = 7, Apr 04 = 8.

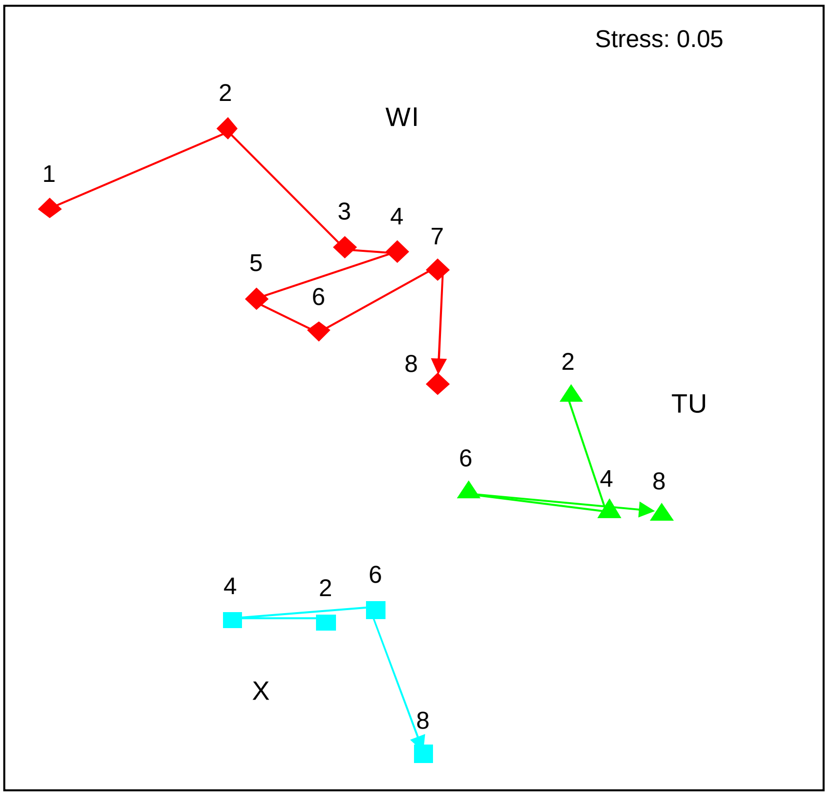

Figure 10: **Close-up of the non-metric multi-dimensional scaling (MDS) ordination of the square-root transformed Whaingaroa Harbour benthic macrofauna assemblage data based on mean abundance values for sites TU, X and WI. Sampling dates: Jul 02 = 1, Oct 02 = 2, Jan 03 = 3, Apr 03 = 4, Jul 03 = 5, Oct 03 = 6, Jan 04 = 7, Apr 04 = 8.**

The ANOSIM global test was used to indicate whether there were significant differences between any of the sampling dates at each site. Results indicate that there were significant differences ($P < 0.01$) in assemblage composition at all sites over the sampling dates. However, although community compositions were significantly different, global R values were low ($R < 0.25$) at sites TU and X, indicating that assemblages were barely separable at these two sites. At sites WI and OB global R values were somewhat higher ($0.5 > R < 0.25$), indicating considerable overlap in assemblage composition between sampling dates at these sites. Only site HB had a global R value of > 0.5, indicating some overlap but clear differences between sampling dates.

The significant differences at each site were explored further using ANOSIM pairwise comparison tests, with results presented in Table 7.

Table 7: ANOSIM tests of the square-root transformed Whaingaroa Harbour benthic macrofauna assemblage data based on mean abundance values for each indicator species/taxa from all the samples at each site on each sampling date.

Pairwise	TU		HB		X		WI		OB	
Comparison	*R*	*P*	*R*	*P*	*R*	*P*	*R*	*P*	*R*	*P*
Jul-02, Oct-02	-	-	-	-	-	-	0.269	**	0.160	**
Jul-02, Jan-03	-	-	-	-	-	-	0.294	**	0.532	**
Jul-02, Apr-03	-	-	-	-	-	-	0.392	**	0.570	**
Jul-02, Jul-03	-	-	-	-	-	-	0.115	*	0.474	**
Jul-02, Oct-03	-	-	-	-	-	-	0.239	**	0.469	**
Jul-02, Jan-04	-	-	-	-	-	-	0.440	**	0.713	**
Jul-02, Apr-04	-	-	-	-	-	-	0.362	**	0.593	**
Oct-02, Jan-03	-	-	-	-	-	-	0.189	**	0.423	**
Oct-02, Apr-03	0.330	**	0.800	**	0.255	**	0.369	**	0.293	**
Oct-02, Jul-03	-	-	-	-	-	-	0.295	**	0.444	**
Oct-02, Oct-03	0.184	**	0.489	**	0.219	**	0.239	**	0.365	**
Oct-02, Jan-04	-	-	-	-	-	-	0.359	**	0.434	**
Oct-02, Apr-04	0.415	**	0.902	**	0.155	**	0.409	**	0.449	**
Jan-03, Apr-03	-	-	-	-	-	-	0.197	**	0.343	**
Jan-03, Jul-03	-	-	-	-	-	-	0.284	**	0.492	**
Jan-03, Oct-03	-	-	-	-	-	-	0.405	**	0.523	**
Jan-03, Jan-04	-	-	-	-	-	-	0.321	**	0.189	**
Jan-03, Apr-04	-	-	-	-	-	-	0.394	**	0.323	**
Apr-03, Jul-03	-	-	-	-	-	-	0.158	*	0.408	**
Apr-03, Oct-03	0.083	*	0.241	**	0.350	**	0.340	**	0.572	**
Apr-03, Jan-04	-	-	-	-	-	-	0.387	**	0.331	**
Apr-03, Apr-04	0.373	**	0.860	**	0.146	**	0.233	**	0.513	**
Jul-03, Oct-03	-	-	-	-	-	-	0.150	*	0.199	**
Jul-03, Jan-04	-	-	-	-	-	-	0.355	**	0.585	**
Jul-03, Apr-04	-	-	-	-	-	-	0.153	**	0.528	**
Oct-03, Jan-04	-	-	-	-	-	-	0.195	**	0.488	**
Oct-03, Apr-04	0.120	**	0.490	**	0.120	**	0.191	**	0.524	**
Jan-04, Apr-04	-	-	-	-	-	-	0.198	**	0.213	**

** $P < 0.01$
* $P < 0.05$
ns $P > 0.05$
- no pairwise comparison as the site was not sampled on all possible dates

At all sites all sampling dates were significantly different from each other. For all sites, apart from HB and to a lesser extent OB, the pairwise *R* values were typically low ($R < 0.5$), indicating that although there were significant differences in assemblage composition over the sampling dates, there was also a degree of overlap with some sampling dates being barely separable. At site OB, slightly higher pairwise *R* values were found, particularly at comparisons involving July 2002. At site HB, three of six pairwise comparisons found high pairwise *R* values ($R > 0.75$), indicating that community assemblages could be clearly separated between different sampling dates.

The results suggest that there are likely to be seasonal, and potentially annual, differences among the benthic macrofauna assemblages at each of the sites in Whaingaroa (Raglan) Harbour.

The smallest combination of indicator species/taxa at each of the sites in Whaingaroa Harbour which best accounts for the pattern for the full set of indicator species/taxa over the first year of the monitoring programme are listed in Table 8. The five species/taxa which contributed most to determining the Bray-Curtis dissimilarities between all the sampling dates during the first year of the monitoring programme at each of the sites are listed in Table 9. Species/taxa are ordered by their average contribution to the total average dissimilarity between Sample Dates. The percentage of the total dissimilarity that is contributed by each species is also given, and these percentages are then cumulated. Note that only the first five species are listed in each case, which for the Whaingaroa Harbour sites accounted for between 42-68% of the dissimilarity between sample dates.

Table 8: BVSTEP analysis to identify the smallest subset of indicator species/taxa whose similarity matrix across all the sample dates at each permanent monitoring site in Whaingaroa Harbour correlates with that for the full indicator species/taxa set, at ρ ≥0.95.

Site	Correlation (ρ)	Species/Taxa
TU	0.950	*Arthritica bifurca*
		Austrovenus stutchburyi
		Nucula hartvigiana
		Paphies australis
		Notoacmea sp.
		Anthopleura aureoradiata
		Aquilaspio aucklandica
		Aonides oxycephala
		Glycera sp.
		Capitellidae
		Nereidae
		Paraonidae
HB	0.953	*Arthritica bifurca*
		Austrovenus stutchburyi
		Macamona liliana
		Aquilaspio aucklandica
		Aricidea sp.
		Pseudopolydora complex
		Capitellidae
		Nereidae
X	0.955	*Colurostylis lemurum*
		Arthritica bifurca
		Austrovenus stutchburyi
		Macamona liliana
		Nucula hartvigiana
		Notoacmea sp.
		Aquilaspio aucklandica
		Aricidea sp.
		Capitellidae
		Nereidae
WI	0.954	*Colurostylis lemurum*
		Arthritica bifurca
		Austrovenus stutchburyi
		Nucula hartvigiana
		Theora lubrica
		Notoacmea sp.
		Aquilaspio aucklandica
		Aonides oxycephala
		Aricidea sp.
		Glycera sp.
		Capitellidae
		Nereidae
		Paraonidae
OB	0.951	Phoxocephalidae
		Colurostylis lemurum
		Arthritica bifurca
		Austrovenus stutchburyi
		Aquilaspio aucklandica
		Aricidea sp.
		Cossura sp.
		Euchone sp.
		Glycera sp.
		Capitellidae
		Magelona dakini
		Nereidae
		Paraonidae

Table 9: **SIMPER analysis breakdown of average dissimilarity between Sample Dates at each of the permanent monitoring sites in Whaingaroa Harbour into contributions from each indicator species/taxa.**

TU	Species/Taxa	Average Abun-dance Date 1	Average Abun-dance Date 2	Average Dissimilarity	Contribution %	Cum. Contribution %
TU Oct-02 & Apr-03 dissimilarity = 22.38	*Austrovenus stutchburyi*	8.91	6.73	3.17	14.15	14.15
	Arthritica bifurca	2.89	1.60	2.34	10.47	24.62
	Aonides oxycephala	0.76	1.73	2.19	9.79	34.42
	Notoacmea sp	2.76	4.11	1.90	8.48	42.90
	Nucula hartvigiana	5.68	5.72	1.75	7.82	50.72
TU Oct-02 & Oct-03 dissimilarity = 27.48	*Austrovenus stutchburyi*	8.91	7.03	3.66	13.3	13.30
	Nucula hartvigiana	5.68	5.51	3.1	11.28	24.58
	Aquilaspio aucklandica	4.41	2.82	2.93	10.67	35.25
	Arthritica bifurca	2.89	1.47	2.66	9.67	44.91
	Notoacmea sp.	2.76	3.42	2.15	7.82	52.74
TU Oct-02 & Apr-04 dissimilarity = 23.71	*Austrovenus stutchburyi*	8.91	6.73	3.44	14.52	14.52
	Capitellidae	3.42	2.05	2.48	10.48	25.00
	Arthritica bifurca	2.89	1.64	2.43	10.25	35.25
	Aquilaspio aucklandica	4.41	2.95	2.3	9.69	44.95
	Nucula hartvigiana	5.68	5.56	1.71	7.22	52.17
TU Apr-03 & Oct-03 dissimilarity = 25.03	*Nucula hartvigiana*	5.72	5.51	3.22	12.85	12.85
	Austrovenus stutchburyi	6.73	7.03	2.9	11.57	24.43
	Aquilaspio aucklandica	4	2.82	2.62	10.45	34.88
	Aonides oxycephala	1.73	0.6	2.41	9.63	44.51
	Notoacmea sp	4.11	3.42	2.16	8.63	53.14
TU Apr-03 & Apr-04 dissimilarity = 21.93	*Capitellidae*	3.46	2.05	2.66	12.14	12.14
	Aonides oxycephala	1.73	0	2.64	12.05	24.19
	Aquilaspio aucklandica	4	2.95	1.91	8.72	32.91
	Austrovenus stutchburyi	6.73	6.73	1.9	8.65	41.56
	Nucula hartvigiana	5.72	5.56	1.71	7.82	49.37
TU Oct-03 & Apr-04 dissimilarity = 26.27	*Nucula hartvigiana*	5.51	5.56	3.47	13.21	13.21
	Austrovenus stutchburyi	7.03	6.73	3.22	12.26	25.47
	Capitellidae	3.43	2.05	2.75	10.47	35.94
	Notoacmea sp	3.42	3.38	2.28	8.69	44.63
	Aquilaspio aucklandica	2.82	2.95	2.17	8.27	52.90
HB						
HB Oct-02 & Apr-03 dissimilarity = 29.50	*Austrovenus stutchburyi*	5.39	2.44	6.82	23.11	23.11
	Arthritica bifurca	4.74	2.08	6.34	21.49	44.60
	Paraonidae	0.88	0	2.04	6.92	51.52
	Macamona liliana	1.12	1.05	1.95	6.62	58.14
	Nereidae	2.19	2.88	1.93	6.55	64.69
HB Oct-03 & Oct-03 dissimilarity = 31.28	*Austrovenus stutchburyi*	5.39	3.01	5.85	18.71	18.71
	Arthritica bifurca	4.74	2.87	5.08	16.25	34.96
	Capitellidae	5.4	4.04	3.5	11.19	46.14
	Aquilaspio aucklandica	1.73	0.7	2.65	8.47	54.61
	Macamona liliana	1.12	1.36	2.16	6.9	61.51
HB Oct-02 & Apr-04 dissimilarity = 38.48	*Capitellidae*	5.4	2.22	7.65	19.87	19.87
	Austrovenus stutchburyi	5.39	2.62	6.73	17.5	37.37
	Nereidae	2.19	4.09	4.55	11.82	49.19
	Arthritica bifurca	4.74	4.67	3.3	8.58	57.77
	Aquilaspio aucklandica	1.73	0.49	3.05	7.94	65.71
HB Apr-03 & Oct-03 dissimilarity = 27.75	*Arthritica bifurca*	2.08	2.87	4.44	15.99	15.99
	Capitellidae	4.97	4.04	3.49	12.59	28.59
	Austrovenus stutchburyi	2.44	3.01	2.99	10.78	39.37
	Macamona liliana	1.05	1.36	2.89	10.43	49.80
	Aquilaspio aucklandica	1.4	0.7	2.87	10.33	60.13

Table 9. (cont.)

HB	Species/Taxa	Average Abun-dance Date 1	Average Abun-dance Date 2	Average Dissimilarity	Contribution %	Cum. Contribution %
HB Apr-03 & Apr-04 dissimilarity = 37.46	*Capitellidae*	4.97	2.22	8.09	21.61	21.61
	Arthritica bifurca	2.08	4.67	7.73	20.63	42.24
	Nereidae	2.88	4.09	3.76	10.04	52.28
	Aquilaspio aucklandica	1.4	0.49	3.17	8.46	60.74
	Austrovenus stutchburyi	2.44	2.62	2.76	7.38	68.12
HB Oct-03 & Apr-04 dissimilarity = 35.26	*Arthritica bifurca*	2.87	4.67	6.16	17.48	17.48
	Capitellidae	4.04	2.22	5.79	16.41	33.88
	Nereidae	2.22	4.09	5.62	15.94	49.82
	Austrovenus stutchburyi	3.01	2.62	3.74	10.6	60.43
	Macamona liliana	1.36	0.96	2.67	7.57	68.00
X						
X Oct-02 & Apr-03 dissimilarity = 28.63	*Nucula hartvigiana*	4.96	5.09	4.08	14.25	14.25
	Austrovenus stutchburyi	5.76	4.09	3.37	11.79	26.03
	Aquilaspio aucklandica	3.21	3.98	2.49	8.68	34.72
	Notoacmea sp	1.61	1.72	2.45	8.55	43.27
	Capitellidae	2.53	3.28	1.82	6.35	49.62
X Oct-02 & Oct-03 dissimilarity = 28.74	*Nucula hartvigiana*	4.96	4.21	4.12	14.33	14.33
	Macamona liliana	1.52	2.3	2.61	9.08	23.41
	Notoacmea sp	1.61	1.97	2.52	8.77	32.19
	Austrovenus stutchburyi	5.76	6.25	2.47	8.58	40.77
	Aquilaspio aucklandica	3.21	2.35	2.34	8.14	48.91
X Oct-02 & Apr-04 dissimilarity = 26.54	*Nucula hartvigiana*	4.96	4.9	2.88	10.85	10.85
	Austrovenus stutchburyi	5.76	4.89	2.59	9.74	20.59
	Aquilaspio aucklandica	3.21	3.37	2.49	9.37	29.96
	Phoxocephalidae	1.55	0.37	2.42	9.13	39.09
	Capitellidae	2.53	2.68	2.01	7.58	46.67
X Apr-03 & Oct-03 dissimilarity = 33.58	*Nucula hartvigiana*	5.09	4.21	5.37	15.98	15.98
	Austrovenus stutchburyi	4.09	6.25	4.45	13.25	29.23
	Aquilaspio aucklandica	3.98	2.35	3.46	10.32	39.55
	Notoacmea sp	1.72	1.97	2.86	8.51	48.06
	Capitellidae	3.28	2.12	2.81	8.36	56.42
X Apr-03 & Apr-04 dissimilarity = 28.49	*Nucula hartvigiana*	5.09	4.9	4.27	14.99	14.99
	Aquilaspio aucklandica	3.98	3.37	3.17	11.14	26.12
	Austrovenus stutchburyi	4.09	4.89	2.51	8.81	34.93
	Notoacmea sp	1.72	1.93	2.43	8.54	43.47
	Capitellidae	3.28	2.68	1.94	6.82	50.29
X Oct-03 & Apr-04 dissimilarity = 28.33	*Nucula hartvigiana*	4.21	4.9	3.92	13.84	13.84
	Austrovenus stutchburyi	6.25	4.89	3.41	12.04	25.87
	Aquilaspio aucklandica	2.35	3.37	2.91	10.28	36.15
	Capitellidae	2.12	2.68	2.64	9.3	45.45
	Notoacmea sp	1.97	1.93	2.47	8.7	54.15
WI						
WI Jul-02 & Oct-02 dissimilarity = 28.63	*Austrovenus stutchburyi*	4.76	6.93	3.73	13.03	13.03
	Nucula hartvigiana	2.9	4.3	3.51	12.25	25.28
	Arthritica bifurca	1.86	2.74	2.2	7.67	32.96
	Aquilaspio aucklandica	2.28	2.86	2.16	7.55	40.50
	Notoacmea sp	2.31	2.95	2.09	7.31	47.82
WI Jul-02 & Jan-03 dissimilarity = 31.24	*Nucula hartvigiana*	2.9	4.48	4.32	13.82	13.82
	Austrovenus stutchburyi	4.76	6.3	3.39	10.85	24.67
	Capitellidae	5.08	6.82	3.08	9.86	34.53
	Notoacmea sp	2.31	3.51	2.9	9.29	43.82
	Aquilaspio aucklandica	2.28	2.64	2.37	7.58	51.40

Table 9. (cont.)

WI	Species/Taxa	Average Abun-dance Date 1	Average Abun-dance Date 2	Average Dissimilarity	Contribution %	Cum. Contribution %
WI Jul-02 & Apr-03 dissimilarity = 29.71	*Nucula hartvigiana*	2.9	5.53	4.92	16.56	16.56
	Notoacmea sp	2.31	5.18	4.8	16.16	32.72
	Austrovenus stutchburyi	4.76	6.19	2.62	8.82	41.54
	Aquilaspio aucklandica	2.28	3.57	2.58	8.69	50.23
	Arthritica bifurca	1.86	2.05	2.01	6.75	56.98
WI Jul-02 & Jul-03 dissimilarity = 28.42	*Nucula hartvigiana*	2.9	5.03	4.89	17.2	17.20
	Notoacmea sp	2.31	3.63	3.42	12.02	29.22
	Aquilaspio aucklandica	2.28	3.38	2.74	9.64	38.86
	Austrovenus stutchburyi	4.76	5.33	2.55	8.97	47.83
	Capitellidae	5.08	5.21	2.16	7.6	55.43
WI Jul-02 & Oct-03 dissimilarity = 31.58	*Nucula hartvigiana*	2.9	5.38	5.13	16.25	16.25
	Austrovenus stutchburyi	4.76	6.01	2.96	9.37	25.62
	Capitellidae	5.08	4.13	2.72	8.61	34.23
	Notoacmea sp	2.31	2.84	2.7	8.56	42.79
	Aquilaspio aucklandica	2.28	2.73	2.55	8.07	50.86
WI Jul-02 & Jan-04 dissimilarity = 31.10	*Nucula hartvigiana*	2.9	6.41	5.98	19.22	19.22
	Austrovenus stutchburyi	4.76	7.12	3.91	12.59	31.8
	Aquilaspio aucklandica	2.28	3.36	2.44	7.86	39.66
	Notoacmea sp	2.31	3.19	2.28	7.32	46.98
	Arthritica bifurca	1.86	2.42	1.99	6.4	53.37
WI Jul-02 & Apr-04 dissimilarity = 30.37	*Nucula hartvigiana*	2.9	4.53	4.7	15.49	15.49
	Notoacmea sp	2.31	4.18	3.71	12.23	27.71
	Austrovenus stutchburyi	4.76	6.39	3.16	10.39	38.1
	Aquilaspio aucklandica	2.28	3.39	2.67	8.79	46.9
	Capitellidae	5.08	4.54	2.18	7.18	54.08
WI Oct-02 & Jan-03 dissimilarity = 22.97	*Nucula hartvigiana*	4.3	4.48	2.97	12.92	12.92
	Austrovenus stutchburyi	6.93	6.3	2.26	9.85	22.77
	Paraonidae	1.15	1.56	2	8.7	31.47
	Aquilaspio aucklandica	2.86	2.64	1.85	8.05	39.52
	Arthritica bifurca	2.74	1.77	1.84	8.03	47.55
WI Oct-02 & Apr-03 dissimilarity = 21.00	*Notoacmea* sp	2.95	5.18	3.16	15.03	15.03
	Nucula hartvigiana	4.3	5.53	2.5	11.91	26.93
	Paraonidae	1.15	0.89	1.65	7.88	34.81
	Arthritica bifurca	2.74	2.05	1.64	7.81	42.61
	Austrovenus stutchburyi	6.93	6.19	1.5	7.15	49.76
WI Oct-02 & Jul-03 dissimilarity = 23.05	*Austrovenus stutchburyi*	6.93	5.33	2.73	11.83	11.83
	Nucula hartvigiana	4.3	5.03	2.65	11.5	23.32
	Notoacmea sp	2.95	3.63	2.18	9.46	32.78
	Arthritica bifurca	2.74	1.78	1.75	7.57	40.35
	Capitellidae	5.95	5.21	1.7	7.37	47.72
WI Oct-02 & Oct-03 dissimilarity = 24.42	*Capitellidae*	5.95	4.13	2.86	11.73	11.73
	Nucula hartvigiana	4.3	5.38	2.39	9.79	21.52
	Arthritica bifurca	2.74	1.83	2.34	9.59	31.11
	Austrovenus stutchburyi	6.93	6.01	2.08	8.52	39.63
	Notoacmea sp	2.95	2.84	1.79	7.34	46.97
WI Oct-02 & Jan-04 dissimilarity = 21.20	*Nucula hartvigiana*	4.3	6.41	3.23	15.26	15.26
	Aricidea sp.	2.15	1.07	1.62	7.65	22.9
	Paraonidae	1.15	0.32	1.5	7.06	29.97
	Arthritica bifurca	2.74	2.42	1.47	6.92	36.89
	Austrovenus stutchburyi	6.93	7.12	1.37	6.44	43.33
WI Oct-02 & Apr-04 dissimilarity = 23.18	*Nucula hartvigiana*	4.3	4.53	2.73	11.78	11.78
	Capitellidae	5.95	4.54	2.21	9.53	21.31
	Aricidea sp.	2.15	0.75	2.13	9.18	30.48
	Notoacmea sp	2.95	4.18	1.93	8.31	38.8
	Arthritica bifurca	2.74	1.86	1.74	7.5	46.29

Table 9. (cont.)

WI	Species/Taxa	Average Abun-dance Date 1	Average Abun-dance Date 2	Average Dissimilarity	Contribution %	Cum. Contribution %
WI Jan-03 & Apr-03 dissimilarity = 22.09	*Nucula hartvigiana*	4.48	5.53	3.42	15.47	15.47
	Notoacmea sp	3.51	5.18	2.95	13.33	28.8
	Aquilaspio aucklandica	2.64	3.57	2.04	9.24	38.04
	Austrovenus stutchburyi	6.3	6.19	1.94	8.79	46.84
	Paraonidae	1.56	0.89	1.75	7.9	54.74
WI Jan-03 & Jul-03 dissimilarity = 25.79	*Nucula hartvigiana*	4.48	5.03	3.68	14.26	14.26
	Austrovenus stutchburyi	6.3	5.33	2.61	10.14	24.4
	Capitellidae	6.82	5.21	2.58	10	34.4
	Notoacmea sp	3.51	3.63	2.53	9.82	44.22
	Aquilaspio aucklandica	2.64	3.38	2.22	8.62	52.83
WI Jan-03 & Oct-03 dissimilarity = 29.12	*Capitellidae*	6.82	4.13	4.18	14.34	14.34
	Nucula hartvigiana	4.48	5.38	3.52	12.1	26.44
	Notoacmea sp	3.51	2.84	2.52	8.64	35.08
	Paraonidae	1.56	0	2.41	8.28	43.37
	Austrovenus stutchburyi	6.3	6.01	2.37	8.13	51.5
WI Jan-03 & Jan-04 dissimilarity = 24.79	*Nucula hartvigiana*	4.48	6.41	3.8	15.34	15.34
	Austrovenus stutchburyi	6.3	7.12	2.21	8.9	24.24
	Capitellidae	6.82	5.42	2.07	8.37	32.61
	Aquilaspio aucklandica	2.64	3.36	2.01	8.11	40.71
	Paraonidae	1.56	0.32	1.94	7.84	48.56
WI Jan-03 & Apr-04 dissimilarity = 26.33	*Nucula hartvigiana*	4.48	4.53	3.72	14.12	14.12
	Capitellidae	6.82	4.54	3.47	13.16	27.28
	Austrovenus stutchburyi	6.3	6.39	2.24	8.49	35.77
	Notoacmea sp	3.51	4.18	2.15	8.16	43.93
	Aquilaspio aucklandica	2.64	3.39	2.13	8.09	52.03
WI Apr-03 & Jul-03 dissimilarity = 20.41	*Notoacmea* sp	5.18	3.63	2.96	14.5	14.5
	Nucula hartvigiana	5.53	5.03	2.86	14	28.5
	Austrovenus stutchburyi	6.19	5.33	1.89	9.25	37.74
	Capitellidae	5.87	5.21	1.56	7.65	45.39
	Nereidae	1.29	1.62	1.35	6.63	52.02
WI Apr-03 & Oct-03 dissimilarity = 24.36	*Notoacmea* sp	5.18	2.84	3.82	15.67	15.67
	Capitellidae	5.87	4.13	2.7	11.09	26.76
	Nucula hartvigiana	5.53	5.38	2.4	9.87	36.62
	Arthritica bifurca	2.05	1.83	2.02	8.29	44.91
	Aquilaspio aucklandica	3.57	2.73	1.84	7.54	52.45
WI Apr-03 & Jan-04 dissimilarity = 20.11	*Notoacmea* sp	5.18	3.19	2.86	14.2	14.2
	Nucula hartvigiana	5.53	6.41	2.45	12.17	26.36
	Austrovenus stutchburyi	6.19	7.12	1.51	7.5	33.86
	Arthritica bifurca	2.05	2.42	1.48	7.35	41.21
	Glycera sp.	0.37	1.32	1.35	6.69	47.9
WI Apr-03 & Apr-04 dissimilarity = 19.57	*Nucula hartvigiana*	5.53	4.53	3.01	15.4	15.4
	Capitellidae	5.87	4.54	2.05	10.49	25.88
	Notoacmea sp	5.18	4.18	2.02	10.34	36.22
	Aricidea sp.	1.44	0.75	1.38	7.07	43.29
	Arthritica bifurca	2.05	1.86	1.37	7	50.29
WI Jul-03 & Oct-03 dissimilarity = 24.45	*Nucula hartvigiana*	5.03	5.38	2.9	11.86	11.86
	Notoacmea sp	3.63	2.84	2.89	11.83	23.69
	Capitellidae	5.21	4.13	2.55	10.44	34.13
	Austrovenus stutchburyi	5.33	6.01	2.17	8.89	43.02
	Aquilaspio aucklandica	3.38	2.73	2.06	8.41	51.44
WI Jul-03 & Jan-04 dissimilarity = 22.45	*Nucula hartvigiana*	5.03	6.41	3.19	14.22	14.22
	Austrovenus stutchburyi	5.33	7.12	2.84	12.67	26.89
	Notoacmea sp	3.63	3.19	2.08	9.26	36.15
	Capitellidae	5.21	5.42	1.53	6.8	42.95
	Nereidae	1.62	1.04	1.47	6.54	49.49

Table 9. (cont.)

WI	Species/Taxa	Average Abun-dance Date 1	Average Abun-dance Date 2	Average Dissimilarity	Contribution %	Cum. Contribution %
WI Jul-03 & Apr-04 dissimilarity = 21.55	*Nucula hartvigiana*	5.03	4.53	3.42	15.86	15.86
	Austrovenus stutchburyi	5.33	6.39	2.28	10.56	26.42
	Notoacmea sp	3.63	4.18	2.22	10.28	36.7
	Capitellidae	5.21	4.54	2	9.27	45.97
	Aricidea sp.	1.22	0.75	1.55	7.2	53.17
WI Oct-03 & Jan-04 dissimilarity = 23.54	*Nucula hartvigiana*	5.38	6.41	2.63	11.17	11.17
	Capitellidae	4.13	5.42	2.25	9.58	20.75
	Austrovenus stutchburyi	6.01	7.12	2.1	8.93	29.68
	Arthritica bifurca	1.83	2.42	2.07	8.81	38.49
	Aquilaspio aucklandica	2.73	3.36	1.89	8.01	46.5
WI Oct-03 & Apr-04 dissimilarity = 23.87	*Nucula hartvigiana*	5.38	4.53	3.02	12.66	12.66
	Notoacmea sp	2.84	4.18	2.8	11.72	24.38
	Capitellidae	4.13	4.54	2.05	8.61	32.99
	Arthritica bifurca	1.83	1.86	1.97	8.26	41.25
	Aquilaspio aucklandica	2.73	3.39	1.95	8.16	49.41
WI Jan-04 & Apr-04 dissimilarity = 20.32	*Nucula hartvigiana*	6.41	4.53	3.44	16.94	16.94
	Austrovenus stutchburyi	7.12	6.39	1.72	8.48	25.41
	Capitellidae	5.42	4.54	1.68	8.26	33.68
	Notoacmea sp	3.19	4.18	1.65	8.11	41.78
	Arthritica bifurca	2.42	1.86	1.48	7.27	49.05
OB						
OB Jul-02 & Oct-02 dissimilarity = 28.49	*Capitellidae*	3.74	4.67	2.89	10.16	10.16
	Aricidea sp.	1.72	0.86	2.75	9.64	19.8
	Paraonidae	1.17	1.64	2.73	9.57	29.37
	Cossura sp.	4.98	4.54	2.57	9.01	38.38
	Aquilaspio aucklandica	1.29	1.6	2.05	7.19	45.57
OB Jul-02 & Jan-03 dissimilarity = 34.20	*Capitellidae*	3.74	5.82	5.37	15.7	15.7
	Phoxocephalidae	1.75	0.43	3.41	9.98	25.68
	Cossura sp.	4.98	4.27	3.34	9.76	35.43
	Euchone sp.	0.08	1.25	2.97	8.69	44.12
	Aquilaspio aucklandica	1.29	1.77	2.18	6.37	50.49
OB Jul-02 & Apr-03 dissimilarity = 32.44	*Euchone* sp.	0.08	1.95	4.63	14.29	14.29
	Capitellidae	3.74	4.74	3.29	10.14	24.42
	Cossura sp.	4.98	3.77	3.21	9.88	34.3
	Aricidea sp.	1.72	0.83	2.78	8.56	42.87
	Paraonidae	1.17	0.53	2.56	7.9	50.77
OB Jul-02 & Jul-03 dissimilarity = 34.28	*Cossura* sp.	4.98	3.37	4.88	14.24	14.24
	Phoxocephalidae	1.75	0.57	3.47	10.13	24.37
	Aricidea sp.	1.72	0.79	3.25	9.47	33.84
	Nereidae	1.55	2.52	2.85	8.32	42.16
	Capitellidae	3.74	3.76	2.79	8.13	50.3
OB Jul-02 & Oct-03 dissimilarity = 39.30	*Cossura* sp.	4.98	2.94	5.97	15.19	15.19
	Aricidea sp.	1.72	0.08	4.61	11.74	26.92
	Capitellidae	3.74	3.39	3.7	9.4	36.33
	Phoxocephalidae	1.75	0.64	3.27	8.32	44.65
	Austrovenus stutchburyi	0.28	1.07	2.85	7.24	51.89
OB Jul-02 & Jan-04 dissimilarity = 37.37	*Euchone* sp.	0.08	1.88	4.45	11.92	11.92
	Aquilaspio aucklandica	1.29	2.57	3.7	9.91	21.83
	Capitellidae	3.74	4.89	3.36	8.99	30.83
	Aricidea sp.	1.72	0.56	3.13	8.39	39.21
	Cossura sp.	4.98	4.09	3	8.03	47.25

Table 9. (cont.)

OB	Species/Taxa	Average Abundance Date 1	Average Abundance Date 2	Average Dissimilarity	Contribution %	Cum. Contribution %
OB Jul-02 & Apr-04 dissimilarity = 34.85	*Phoxocephalidae*	1.75	0.33	3.4	9.75	9.75
	Cossura sp.	4.98	4.31	3.17	9.11	18.85
	Euchone sp.	0.08	1.3	2.95	8.46	27.31
	Capitellidae	3.74	4.7	2.85	8.17	35.48
	Goniada sp	0	1.12	2.62	7.51	43
OB Oct-02 & Jan-03 dissimilarity = 33.89	*Phoxocephalidae*	2.44	0.43	4.95	14.59	14.59
	Capitellidae	4.67	5.82	3.3	9.72	24.32
	Cossura sp.	4.54	4.27	3.11	9.16	33.48
	Paraonidae	1.64	0.7	3.09	9.11	42.59
	Euchone sp.	0.78	1.25	2.45	7.23	49.83
OB Oct-02 & Apr-03 dissimilarity = 29.82	*Paraonidae*	1.64	0.53	3.35	11.22	11.22
	Euchone sp.	0.78	1.95	3.25	10.91	22.13
	Cossura sp.	4.54	3.77	2.63	8.81	30.94
	Nereidae	1.47	2.41	2.46	8.26	39.2
	Capitellidae	4.67	4.74	2.18	7.32	46.52
OB Oct-02 & Jul-03 dissimilarity = 36.04	*Phoxocephalidae*	2.44	0.57	5.28	14.66	14.66
	Cossura sp.	4.54	3.37	3.98	11.03	25.69
	Paraonidae	1.64	0.51	3.79	10.52	36.21
	Nereidae	1.47	2.52	3.07	8.52	44.73
	Capitellidae	4.67	3.76	2.92	8.09	52.82
OB Oct-02 & Oct-03 dissimilarity = 40.40	*Phoxocephalidae*	2.44	0.64	5.06	12.53	12.53
	Cossura sp.	4.54	2.94	4.99	12.36	24.89
	Capitellidae	4.67	3.39	4.3	10.64	35.53
	Paraonidae	1.64	1.08	3.3	8.18	43.71
	Austrovenus stutchburyi	0.28	1.07	2.83	6.99	50.71
OB Oct-02 & Jan-04 dissimilarity = 33.93	*Phoxocephalidae*	2.44	0.81	4.13	12.16	12.16
	Aquilaspio aucklandica	1.6	2.57	3.32	9.79	21.96
	Paraonidae	1.64	0.73	3.26	9.6	31.56
	Euchone sp.	0.78	1.88	3.25	9.58	41.13
	Cossura sp.	4.54	4.09	2.77	8.15	49.28
OB Oct-02 & Apr-04 dissimilarity = 33.28	*Phoxocephalidae*	2.44	0.33	4.96	14.66	14.66
	Cossura sp.	4.54	4.31	3.07	9.07	23.74
	Paraonidae	1.64	1.72	2.76	8.15	31.88
	Goniada sp.	0	1.12	2.6	7.69	39.57
	Euchone sp.	0.78	1.3	2.36	6.98	46.55
OB Jan-03 & Apr-03 dissimilarity = 31.23	*Phoxocephalidae*	0.43	2.04	4.06	13.01	13.01
	Capitellidae	5.82	4.74	3.12	9.97	22.98
	Nereidae	1.35	2.41	2.8	8.98	31.96
	Euchone sp.	1.25	1.95	2.71	8.67	40.63
	Cossura sp.	4.27	3.77	2.63	8.42	49.05
OB Jan-03 & Jul-03 dissimilarity = 36.12	*Capitellidae*	5.82	3.76	6.02	16.65	16.65
	Cossura sp.	4.27	3.37	3.78	10.47	27.13
	Nereidae	1.35	2.52	3.47	9.62	36.74
	Euchone sp.	1.25	0.37	3.13	8.66	45.41
	Aquilaspio aucklandica	1.77	1.06	2.79	7.74	53.14
OB Jan-03 & Oct-03 dissimilarity = 43.74	*Capitellidae*	5.82	3.39	7.31	16.72	16.72
	Cossura sp.	4.27	2.94	4.68	10.7	27.42
	Euchone sp.	1.25	0	3.55	8.13	35.55
	Aricidea sp.	1.18	0.08	3.18	7.27	42.82
	Aquilaspio aucklandica	1.77	0.97	2.94	6.72	49.54
OB Jan-03 & Jan-04 dissimilarity = 31.65	*Aquilaspio aucklandica*	1.77	2.57	3.09	9.75	9.75
	Cossura sp.	4.27	4.09	2.83	8.95	18.7
	Capitellidae	5.82	4.89	2.8	8.85	27.55
	Euchone sp.	1.25	1.88	2.75	8.67	36.22
	Aricidea sp.	1.18	0.56	2.38	7.53	43.76

Table 9. (cont.)

OB	Species/Taxa	Average Abun-dance Date 1	Average Abun-dance Date 2	Average Dissimilarity	Contribution %	Cum. Contribution %
OB Jan-03 & Apr-04 dissimilarity = 32.34	*Cossura* sp.	4.27	4.31	3.45	10.66	10.66
	Capitellidae	5.82	4.7	2.81	8.68	19.33
	Paraonidae	0.7	1.72	2.78	8.59	27.92
	Goniada sp.	0	1.12	2.65	8.18	36.1
	Euchone sp.	1.25	1.3	2.31	7.15	43.25
OB Apr-03 & Jul-03 dissimilarity = 32.64	*Euchone* sp.	1.95	0.37	4.67	14.31	14.31
	Phoxocephalidae	2.04	0.57	4.25	13.03	27.34
	Capitellidae	4.74	3.76	3.39	10.39	37.73
	Cossura sp.	3.77	3.37	2.58	7.91	45.64
	Aricidea sp.	0.83	0.79	2.43	7.46	53.1
OB Apr-03 & Oct-03 dissimilarity = 42.80	*Euchone* sp.	1.95	0	5.61	13.1	13.1
	Capitellidae	4.74	3.39	4.69	10.96	24.06
	Phoxocephalidae	2.04	0.64	4.03	9.41	33.47
	Cossura sp.	3.77	2.94	3.46	8.09	41.57
	Austrovenus stutchburyi	0.08	1.07	2.94	6.87	48.43
OB Apr-03 & Jan-04 dissimilarity = 31.60	*Aquilaspio aucklandica*	1.53	2.57	3.42	10.83	10.83
	Phoxocephalidae	2.04	0.81	3.33	10.54	21.37
	Nereidae	2.41	1.2	3.05	9.66	31.03
	Colurostylis lemurum	0.96	0.23	2.2	6.95	37.98
	Euchone sp.	1.95	1.88	2.18	6.88	44.86
OB Apr-03 & Apr-04 dissimilarity = 33.46	*Phoxocephalidae*	2.04	0.33	4.07	12.17	12.17
	Paraonidae	0.53	1.72	3.42	10.22	22.39
	Cossura sp.	3.77	4.31	3	8.97	31.36
	Goniada sp	0.08	1.12	2.5	7.48	38.84
	Euchone sp.	1.95	1.3	2.4	7.17	46.01
OB Jul-03 & Oct-03 dissimilarity = 37.48	*Cossura* sp.	3.37	2.94	4.1	10.93	10.93
	Capitellidae	3.76	3.39	3.83	10.23	21.15
	Austrovenus stutchburyi	0.08	1.07	3.51	9.36	30.52
	Paraonidae	0.51	1.08	3.02	8.06	38.58
	Nereidae	2.52	1.81	2.84	7.56	46.15
OB Jul-03 & Jan-04 dissimilarity = 38.32	*Aquilaspio aucklandica*	1.06	2.57	4.85	12.66	12.66
	Euchone sp.	0.37	1.88	4.56	11.89	24.55
	Nereidae	2.52	1.2	3.83	9.99	34.54
	Capitellidae	3.76	4.89	3.55	9.26	43.8
	Cossura sp.	3.37	4.09	3.29	8.58	52.38
OB Jul 03 & Apr-04 dissimilarity = 36.73	*Cossura* sp.	3.37	4.31	4.12	11.23	11.23
	Paraonidae	0.51	1.72	3.76	10.24	21.46
	Aquilaspio aucklandica	1.06	2.25	3.44	9.36	30.82
	Euchone sp.	0.37	1.3	3.06	8.33	39.16
	Goniada sp.	0	1.12	3.02	8.21	47.37
OB Oct-03 & Jan-04 dissimilarity = 43.35	*Euchone* sp.	0	1.88	5.35	12.34	12.34
	Aquilaspio aucklandica	0.97	2.57	5.1	11.76	24.09
	Capitellidae	3.39	4.89	4.97	11.47	35.56
	Cossura sp.	2.94	4.09	4.2	9.68	45.24
	Austrovenus stutchburyi	1.07	0.28	2.88	6.65	51.89
OB Oct-03 & Apr-04 dissimilarity = 42.98	*Cossura* sp.	2.94	4.31	4.99	11.61	11.61
	Capitellidae	3.39	4.7	4.31	10.03	21.64
	Aquilaspio aucklandica	0.97	2.25	3.68	8.57	30.21
	Euchone sp.	0	1.3	3.49	8.13	38.33
	Paraonidae	1.08	1.72	2.92	6.8	45.14
OB Jan-04 & Apr-04 dissimilarity = 31.81	*Cossura* sp.	4.09	4.31	3.15	9.9	9.9
	Paraonidae	0.73	1.72	3.14	9.87	19.76
	Euchone sp.	1.88	1.3	2.42	7.6	27.36
	Goniada sp.	0.17	1.12	2.39	7.52	34.88
	Aquilaspio aucklandica	2.57	2.25	2.34	7.37	42.25

The combination of indicator taxa that best accounted for the pattern for the full set over the first year of the monitoring programme, and the indicator taxa which contributed most to the dissimilarities between sampling dates, differed among the monitoring sites. At site HB, eight taxa accounted for the majority of the full pattern (ρ = 0.953) (Table 8). Three taxa (the bivalves *Austrovenus stutchburyi* and *Arthritica bifurca*, and capitellid polychaetes) were consistently important contributors to the difference in community composition among sampling dates at this site (Table 9). At site X, the similarity matrices of ten taxa correlated well to that of the full set of indicator taxa (ρ = 0.955) (Table 8). Of these, three species (the bivalves *Nucula hartvigiana* and *Austrovenus stutchburyi*, and the polychaete *Aquilaspio aucklandica*) were consistently important contributors to the difference among sampling dates at the site (Table 9). At site TU, 12 taxa accounted for nearly the entire full pattern (ρ = 0.950) (Table 8). Of these, two species (the bivalves *Austrovenus stutchburyi* and *Nucula hartvigiana*) were consistently important in contributing to the differences between sites at different sampling dates (Table 9). At site WI, 13 taxa accounted for the majority of the full pattern (ρ = 0.954) (Table 8), of these three species (*Austrovenus stutchburyi*, *Nucula hartvigiana* and Notoacmea sp.) consistently contributed to the differences n assemblage composition among sampling dates (Table 9). At site OB, a minimum of 13 species were identified to correlate with the full indicator taxa set (ρ = 0.951) (Table 8). Three taxa (*Cossura* sp., capitellid polychaetes and *Euchone* sp.) were consistently important contributors to the differences in community composition among sampling dates at the site (Table 9).

The biggest differences between sampling dates were found at site OB, where the highest average dissimilarity was recorded. This is consistent with the MDS ordination shown in Figure 8. Bray-Curtis dissimilarities between sampling dates were smallest at sites TU and WI, again consistent with the patterns shown in Figure 8. No consistent patterns were found in the dissimilarities between sampling dates among different monitoring sites.

3.4 Sediment Characteristics

3.4.1 Surficial Sediment Grain-Size

3.4.1.1 Southern Firth of Thames

Kaiaua (KA) and Miranda (MI)

KA and MI sites are located on the western side of the southern Firth (Figure 1), and have similar sediment grain-size distributions. The sediment at both sites is poorly sorted and has a polymodal[8] sediment particle size distribution (see Appendix 3). At KA a layer of semi-fluid flocculent material (up to 20 cm deep) is often present between the shore and the monitoring plot. This layer overlies a firm sandy sediment surface, which is occasionally exposed. Sometimes a thin mobile mud layer (10-20 mm thick) is present at KA over some or all of the site.

The sediments are dominated at both sites by fine and very fine sand, with moderate medium and coarse sand content (typically 10-30%). The mud content in the sediments is consistently low at MI (1.5% - 2.3%), but has increased since July 2002, and particularly since April 2003 (2.5%), to 5% in April 2005 (Figure 11b). On closer examination of the sediment grain size distribution, it is clear that an increase has occurred in the mud and very fine sand content, and a corresponding decrease in the coarse sand content. This is reflected in a small decrease in median grain size over the period of the study (Figure 11a).

[8] Refers to the mode of the sediment grain-size distribution, i.e. the most frequently occurring particle size, or the highest point on a frequency curve. A sample can be unimodal (have one peak), bimodal (have two peaks) or polymodal (have many peaks in the distribution).

The mud content has been variable at KA, reducing from 5.3% in October 2002 to 2.8% in April 2004 (Figure 11b). The composition of sediments from the KA site has been quite consistent between October 2002 and April 2004 (Appendix 3). The percent composition of fine and medium sand in these sediments increased from 45 to 50% to 65 to 70% since October 2002.

KA is generally the muddiest of the Firth of Thames monitoring sites, with the highest percent of clay, silt and fine sand. However, after April 2003, the percentage of fines in sediments at MI increased to be similar to those at KA.

Kuranui Bay (KB) and Te Puru (TP)
Sediments at the KB and TP sites, located on the eastern side of the southern Firth (Figure 1) also have very similar grain-size distributions (see Appendix 3). Sediment at both sites is poorly sorted with a polymodal distribution. The grain size distribution at both sites shows three peaks, one a sharp high peak at 250-350 microns (medium sand), with this narrow band accounting consistently for 15 to 20% of the sediment by volume. Sediment at these two sites is also about one third fine sand, with another peak in the distribution between 130 and 250 microns.

At TP, sediment composition is very consistent within the site and throughout the study period (Appendix 3). Sediment at this site is composed almost completely of fine, medium and coarse sand, with less than one percent mud, except for in October 2002, when the mud content increased to 2.2% (Figure 11b). The percentage of gravel sized particles in TP sediments was only 1 to 3%.

At KB, the sediment composition is also relatively consistent, though with an apparent slight increase in fine material. The mud content varied between 0.9% and 2.9% (Figure 11b) between July 2002 and April 2004. To date there seems to be a small increase in the content of mud and very fine sand, accompanied by a small decrease in the coarse sand content (Appendix 3). Considerable variability in the mud content of early samples makes it more difficult to determine the presence of a trend. The overall distribution of sediment grain size changed very little after July 2002.

Gun Club (GC)
Sediment at the Gun Club site, located adjacent to the Waihou River in the south-eastern Firth (Figure 1), is the coarsest of the Firth of Thames monitoring sites (Figure 11a). The sediment results indicated predominantly medium and coarse sand and gravel, and a very low percent of clay and silt (0.9 to 1.7% mud), (Figure 11b). Sediment at the Gun Club site is better sorted than at other sites in the southern Firth, mostly due to a much smaller component of fine material. This site also recorded the greatest weight of shell-hash. This sediment composition and the large apparently mobile bedforms evident at the site indicate a higher energy physical environment than other monitoring sites in the Firth of Thames. This is also reflected in the significant fluctuations in bed level at this site (see Section 3.5).

The data are included in full in Appendix 3.

3.4.1.2 Whaingaroa (Raglan) Harbour

Sediment at all the sites is very poorly sorted with polymodal sediment particle size distributions. The poor sorting of these sediments in Whaingaroa Harbour is reflected in both a slightly higher content of both mud and of coarse material (coarse sand and gravel) than at sites in the southern Firth of Thames (except for the Gun Club site).

Haroto Bay (HB)
Sediments at Haroto Bay (up the Waitetuna River arm of the harbour, through the “narrows”, (Figure 1)) have the highest percent of clay and silt (up to 28% mud). The mud content of the sediments at Haroto Bay appears to be increasing consistently and significantly over time, from 12.6% in October 2002, to 28% in April 2004 (Figure 12b). This has resulted in an overall decrease in median grain size over the study period

(Figure 12a). This probably reflects the location of this site, which is closer to the sheltered upper reaches of the estuary than any of the other sites. Here sediments are exposed to less energetic wave reworking. This site is also closest to sources of fine sediment washed from the catchment.

At HB, there appears to have been an ongoing and quite marked increase in the percentage of mud in the sediment. This will need to be investigated statistically in the full analysis report (due 2006/07). At other sites in Raglan (X and OB), smaller increases in the percentage of mud have occurred.

Okete Bay (OB)
The sediment at Okete Bay is consistently dominated by fine and very fine sand, except for the first sampling date in April 2001, when a large gravel and coarse sand content was present (Turner *et al*., 2002). After October 2002, the content of mud and very fine sand has increased, and there has been a reduction in the percent composition of coarser material, particularly coarse sand. Interestingly, there has been very little change in median grain size (Figure 12a) despite an apparent increase in the mud content (Figure 12b).

Whatitirinui Island (WI)
WI had a higher mud content than the other sites in the initial survey in April 2001 (Turner *et al.* 2002), but three more years of data has shown that the content of mud at WI (5-10%) is similar to at other sites in the harbour (Figure 12b). The composition of the sediment at WI varied during the study period but there was no apparent trend for progressive change.

Te Puna Point (TU)
Sediments at TU are dominated by very fine sand and fine sand, with a mud content of up to 8.6% (though usually 1.5 to 5.0%) (Figure 12b). The gravel content is quite variable, ranging from almost none (0.3%) to over 20%. In April 2004, there was a high variability in the sediment samples taken due to one anomalous sample in each set, resulting in a higher average median grain size (Figure 12a). There is no apparent trend for change in the sediments over the study period.

Ponganui Creek (X)
Site X (Ponganui Creek) has been monitored since October 2001. Sampling was missed in October 2002. There has been a small decrease in the mean median grain size over the study period from 159 μm in April 2003 (168 μm in October 2001), to 143 μm in April 2004 (Figure 12a). There is a similar slight increase in mud content from 4.0% in April 2003 to 7.3% in April 2004 (Figure 12b). Future analysis will examine the significance of this change. The percentage of mud is the lowest of all the Raglan sites, at around 4 to 7%, with the sediment composition dominated by fine and very fine sand.

As observed at monitoring sites in the Firth of Thames, all five sites have three distinct peaks or “modes” in the sediment grain size composition. Sediment analysis results at all five sites show a small peak in the sediment distribution at 17.5-20.0 μm. A second peak in the distribution is a wide peak between 75-18 μm, again consistently present at all sites and all dates. Similarly a peak is consistently present in all samples between 500 and 1500 μm (coarse sand fraction), although this peak has reduced in size since April 2003. These three peaks in the sediment size distribution make the Raglan sediments distinctly different from those taken from the Firth of Thames.

The data are included in full in Appendix 3.

3.4.2 Shell Hash

3.4.2.1 Southern Firth of Thames

The dry weight of shell-hash in the sediment remained very consistent at MI and KB between July 2002 and April 2004 (Figure 11c). There were decreases in the dry weight of shell-hash at GC and TP. The most marked change was recorded at GC, which was also the site with the greatest dry weight of shell-hash. Mean dry weight of shell-hash decreased from 1090 $g.core^{-1}$ [9] at GC in October 2002 to 814 $g.core^{-1}$ in April 2004. This followed a similar increase between April 2001 and April 2002 (Turner *et al.*, 2002). There was a small decrease at TP from 288 $g.core^{-1}$ in October 2002 to 130 $g.core^{-1}$ in April 2004.

The data are included in full in Appendix 4.

3.4.2.2 Whaingaroa (Raglan) Harbour

The dry weight of shell-hash in the sediment remained very consistent at OB between October 2002 and April 2004 (Figure 12c). There were fluctuations in the shell hash content of sediment collected from HB and WI, but no clear trend for an overall increase or decrease. The shell hash content at TU increased from 147 $g.core^{-1}$ in October 2002, to 226 $g.core^{-1}$ in April 2004. There was a decrease from 381 $g.core^{-1}$ in October 2002 to 283 $g.core^{-1}$ in April 2004. This followed a large increase in shell hash content between April and October 2002.

The data are included in full in Appendix 4.

3.4.3 Sediment Organic Matter Content

3.4.3.1 Southern Firth of Thames

Sediment total organic carbon levels differed between sites and between sampling dates (Figure 11d). An increase in the mean total organic carbon (from < 0.5 g 100 g^{-1} before January 2004, to > 0.8 g 100 g^{-1} in April 2004) occurred at site GC, whereas the remainder of the sites showed some fluctuations (between 0.162 and 0.642 g 100 g^{-1}) but no increasing or decreasing trends. Sediment nitrogen levels appeared to decrease from July 2002 to April 2004 at sites KB, MI and KA, whereas those at sites TP and GC remained relatively uniform over this time period (Figure 11e).

The data are included in full in Appendix 5.

3.4.3.2 Whaingaroa (Raglan) Harbour

Total organic carbon levels were generally highest at site HB, where they ranged from 0.63 ± 0.02 to 0.89 ± 0.02 g 100 g^{-1} (Figure 12d). Here higher levels were generally found in October, and lower values in April. At site WI, total organic carbon concentrations fluctuated between 0.39 ± 0.02 g 100 g^{-1} (found in July 2002) and 0.72 ± 0.3 g 100 g^{-1} (found in April 2003). At site OB, values ranged from 0.45 ± 0.02 g 100 g^{-1} in October 2002, to 0.67 ± 0.01 g 100 g^{-1} in October 2003. At sites X and TU sediment total organic carbon levels were similar, and ranged from 0.30 to 0.53 g 100 g^{-1}.

Total nitrogen levels were similar at sites WI, TU and X (Figure 12e), where they ranged from 0.07 ± 0.01 to 0.12 ± 0.01 g 100 g^{-1}. At site OB, total nitrogen levels appeared to decrease, from 0.18 ± 0.01 g 100 g^{-1} in July 2002, to between 0.08 ± 0.002 and 0.10 ± 0.002 g 100 g^{-1} from October 2002 to April 2004. At site HB, levels decreased as well, from an initial 0.22 ± 0.04 in October 2002, to between 0.11 ± 0.002 and 0.15 ± 0.016 from April 2003 to April 2004.

The data are included in full in Appendix 5.

[9] Shell-hash dry weights are reported per 13 cm ø, 15 cm deep core.

3.4.4 Sediment Photosynthetic Pigment Concentration

3.4.4.1 Southern Firth of Thames

Surficial sediment chlorophyll-*a* levels appeared to increase for sites GC, KB and KA in April 2004 (Figure 11f). At site GC, chlorophyll-*a* levels initially remained below 7.5 mg kg^{-1}, but in April 2004 these increased to 24.9 ± 8.4 mg kg^{-1}. At site KB, chlorophyll-*a* levels between July 2002 and January 2004 ranged between 2.6 and 5.4 mg kg^{-1}, whereas in April 2004 15.6 ± 1.5 mg kg^{-1} chlorophyll-*a* was found at this site. At site KA, the increase in sediment chlorophyll-*a* concentration was less pronounced, with values ranging from 2.1 to 3.8 mg kg^{-1} between October 2002 and January 2004, and an increase to 9.8 ± 0.8 in April 2004.

Sediment phaeophytin levels also appeared elevated in April 2004 at sites KB, KA and MI (10.5, 8.3 and 4.8 mg kg^{-1}, respectively) (Figure 11g). At site GC a slight decrease in sediment phaeophytin levels occurred (from 4.5 mg kg^{-1} in April 2003, to 1.1 mg kg^{-1} in April 2004), whereas at site TP levels remained steady and low (0.9 to 1.0 mg kg^{-1}) between October 2002 and October 2003, increasing to 2.3 ± 1.2 mg kg^{-1} in April 2004.

The data are included in full in Appendix 6.

3.4.4.2 Whaingaroa (Raglan) Harbour

Mean chlorophyll-*a* concentrations at the sampling sites in Whaingaroa Harbour appeared to increase in April 2004 (Figure 12f), similar to the increase seen for the Firth of Thames (Figure 11f). Chlorophyll-*a* levels were generally higher at sites TU and X than at sites HB, OB and WI.

The levels of phaeophytin in the sediments appeared to increase steadily from July 2002 to April 2004 at sites HB, TU and X (Figure 12g). At OB, levels rose in July 2003 and again in April 2004, whereas at WI, phaeophytin levels peaked in January and April 2003 and again in January 2004.

The data are included in full in Appendix 6.

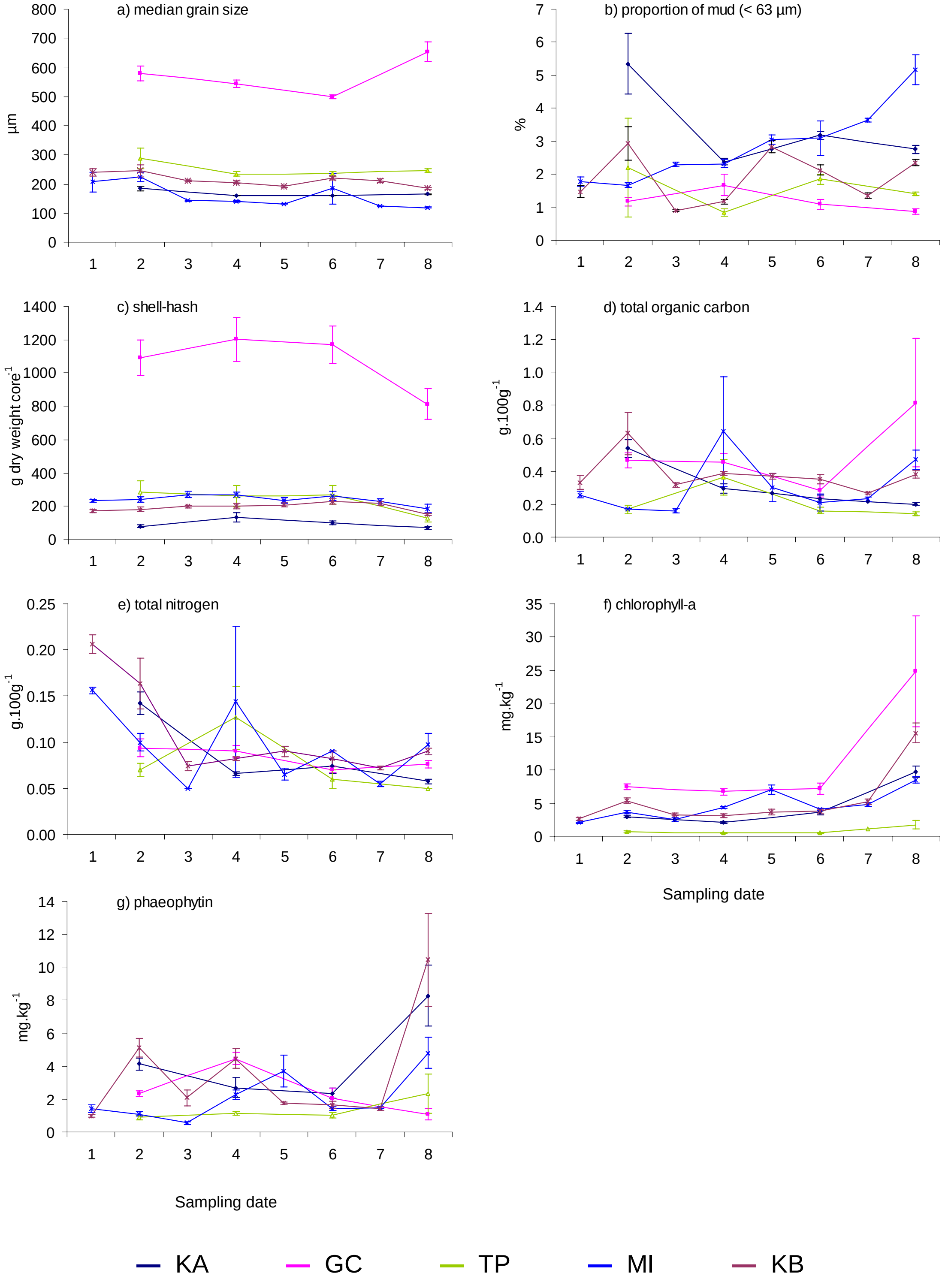

Figure 11: **Mean (± standard error) a) median grain-size, b) proportion of mud (< 63 µm), c) shell-hash dry weight, d) total organic carbon content, e) total nitrogen content, f) chlorophyll-*a* concentration and g) phaeophytin concentration of the sediment at the permanent monitoring sites in the southern Firth of Thames between July 2002 and April 2004. Sampling dates: Jul 02 = 1, Oct 02 = 2, Jan 03 = 3, Apr 03 = 4, Jul 03 = 5, Oct 03 = 6, Jan 04 = 7, Apr 04 = 8. Note the different scales on the vertical axis.**

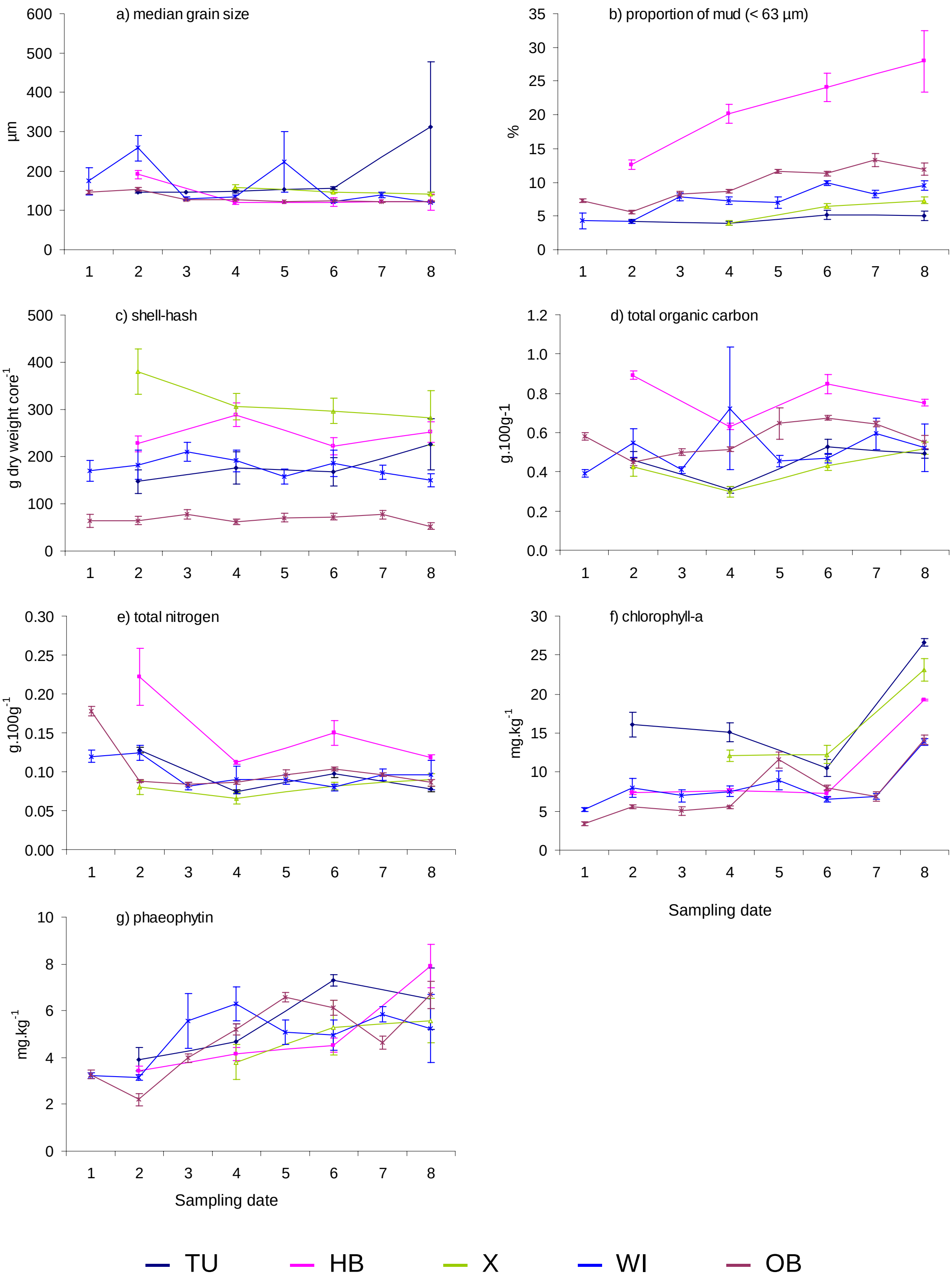

Figure 12: **Mean (± standard error) a) median grain-size, b) proportion of mud (< 63 µm), c) shell-hash dry weight, d) total organic carbon content, e) total nitrogen content, f) chlorophyll-*a* concentration and g) phaeophytin concentration of the sediment at the permanent monitoring sites in Whaingaroa Harbour between July 2002 and April 2004. Sampling dates: Jul 02 = 1, Oct 02 = 2, Jan 03 = 3, Apr 03 = 4, Jul 03 = 5, Oct 03 = 6, Jan 04 = 7, Apr 04 = 8. Note the different scales on the vertical axis.**

Linking Assemblage Composition to Sediment Characteristics

The intent of the Regional Estuary Monitoring Programme is to document existing environmental conditions (e.g., sediment grain-size, organic matter content, plant photosynthetic pigments), how these change in space and time, and to link these changes with changes in the benthic macrofauna communities. Such an integrated monitoring programme is more responsive to detecting overall trends. However, it is important to note that the linking of patterns in the benthic macrofauna assemblages to those of the measured sediment characteristics does not necessarily mean they are the cause of or explain the full ecological pattern, but is more an indication as to what may be influencing the macrofauna assemblages. Causality can only be demonstrated by manipulative field or laboratory experiments, where the effects of a single factor on community structure is investigated whilst all other factors are held constant or controlled (Clarke and Warwick, 2001).

3.4.5 Southern Firth of Thames

Sediment chlorophyll-*a* content was found to be the single sediment variable which best explained the patterns of macrofauna assemblage composition (Spearman rank correlation coefficient ρ_s = 0.517). This was the highest correlation obtained in the BIO-ENV analysis. The best 2-sediment variable combination was sediment chlorophyll-*a* concentration and dry weight of shell-hash (ρ_s = 0.479). The best 3-sediment variable combination retained chlorophyll-*a* concentration and dry weight of shell-hash, and added in the proportion of sediments in the size range 250 to 500 µm (ρ_s = 0.463).

3.4.6 Whaingaroa (Raglan) Harbour

The dry weight of shell hash was found to be the single sediment variable which best explained the patterns of assemblage composition (Spearman rank correlation coefficient ρ_s = 0.604). The best 2-sediment variable combination was dry weight of shell-hash and percentage mud (grain size < 62.5 µm) content of the surficial sediments (ρ_s = 0.641). The best 3-sediment variable combination retained dry weight of shell-hash and percentage mud (grain size <62.5 µm) and added in the proportion of surficial sediments in the size range of 500 – 1000 µm (ρ_s = 0.647). This was the highest correlation obtained in the BIO-ENV analysis.

3.5 Southern Firth of Thames Sediment Bed Level

3.5.1 Kaiaua

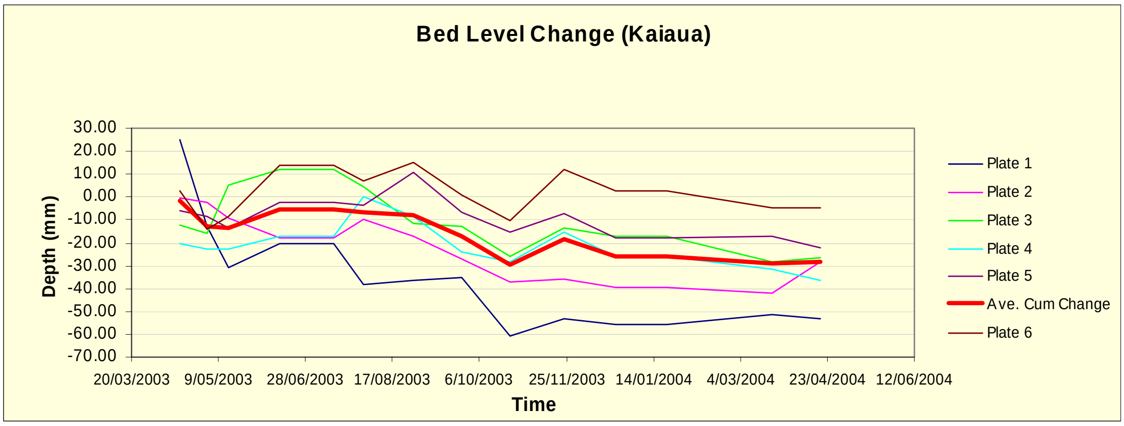

Figure 13: Cumulative change in sediment level over the monitoring period at Kaiaua.

Cumulative change in sediment level over the monitoring period at Kaiaua is shown in Figure 13. At KA, changes in sediment level were variable, with no average trend for change over the whole site. At plate 1, there is an apparent overall decrease in the thickness of sediment over the plate, suggesting an overall progressive lowering of the sediment surface. At plates 2-5, there is an apparent trend for a slight drop in bed level over the monitoring period. The magnitude of changes in sediment level was greatest at plate 1, with a range of fluctuation of approximately 85 mm. At plates 2-5, fluctuations in sediment levels were within a range of approximately 40 mm.

3.5.2 Miranda

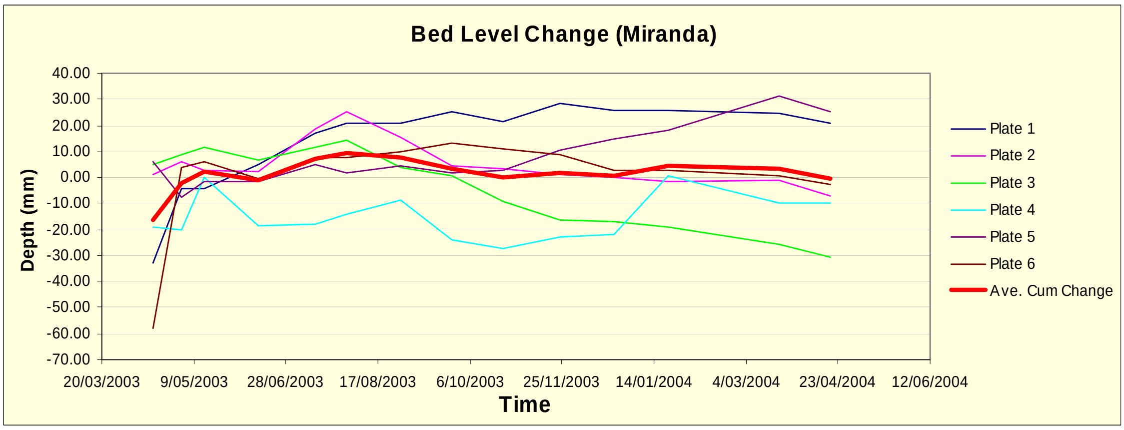

Figure 14: Cumulative change in sediment level over the monitoring period at Miranda.

Cumulative change in sediment level over the monitoring period at Miranda is shown in Figure 14. At MI, there was an apparent slight decrease in sediment level over the monitoring period at Plate 3. The average cumulative change over the whole site is relatively small (20 mm range). At plate 6, there was an increase in sediment level over the reported time period of approximately 60 mm, but this actually is a recovery from severe loss before April 2003. The sediment level change is not usually consistent at all the plates, most likely due to sediment re-distribution within the site.

3.5.3 Gun Club

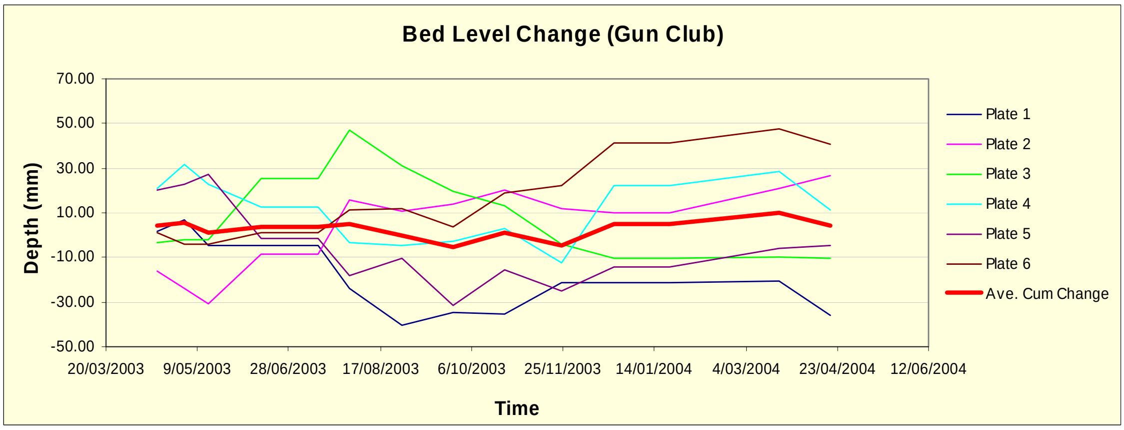

Figure 15: Cumulative change in sediment level over the monitoring period at the Gun Club.

Cumulative change in sediment level over the monitoring period at the Gun Club site is shown in Figure 15. At the Gun Club site, average cumulative change over the whole site was relatively small (approximately 10 mm range) and there is no apparent trend for overall loss or gain of sediment. However, the range of fluctuation at individual Plates (35-60 mm) is greater than at any other site (except for KB plate 1, see below). Although quite large fluctuations were seen at all plates, there is no apparent trend for progressive change. Large bedforms are consistently observed at this site, and these are influencing the sediment level at the plate scale between survey dates. This is further seen in the relatively small cumulative change over the whole site.

3.5.4 Kuranui Bay (Tararu)

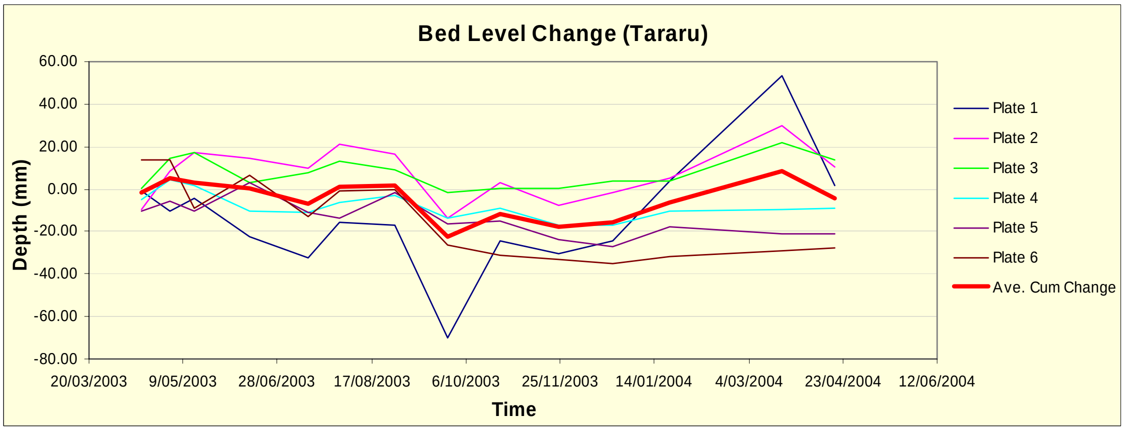

Figure 16: Cumulative change in sediment level at Tararu.

Cumulative change in sediment level over the monitoring period at Te Puru is shown in Figure 16. At Te Puru, average cumulative change over the whole site was relatively small (~30 mm range) and there was no apparent trend for overall loss or gain of sediment. At individual plates, fluctuations in sediment level were much greater. Major changes have also been observed very close to shore, at plate 1. Field observations indicates these changes are genuine, and are due to temporary mud deposits asssociated with changes in weather patterns.

Changes in sediment level have been recorded at four sites in the Firth of Thames at monthly intervals. Data has shown fluctuations in bed levels of up to 90 mm occur over individual plates. When the changes at the six plates are averaged to provide a measure of change over the whole site at each date, fluctuations are smaller (<30 mm), indicating the presence of large bedforms and migration of sediment within the site.

These surveys have provided valuable measurements of the magnitude of short and medium term changes in sediment bed level. This provides insight into the mobility of sediment in intertidal areas of the Firth of Thames and the likely depth of natural disturbance. Given the considerable variability in sediment level, infrequent surveys would be likely to produce misleading results. This further illustrates the difficulty in detecting long term changes in rates of accretion, which are likely to be greatly obscured by the much greater short and medium term fluctuations. Six or twelve-monthly sediment level measurements would therefore be prone to major errors associated with short term fluctuations and would not provide an accurate measure of long term change. There is no clear trend apparent for ongoing sediment accretion or loss at any of the sites.

4 Discussion and recommendations

This report documents the data from two years of the monitoring programme. Detailed discussion and analysis of trends or patterns of change over time in the benthic macrofaunal communities will be reported on every five years in a separate trend report series for the Regional Estuary Monitoring Programme. At present we are building up a picture of short-term changes (their nature, size and frequency) that affect these communities. In the future, information on these changes will enable long-term trends to be identified. It is in such trends that any impacts of long-term changes in the estuaries or their catchments are likely to become apparent.

The Regional Estuary Monitoring Programme should continue as outlined in Turner (2001). Monitoring should continue to be undertaken at two of the sites in each estuary at 3-monthly intervals (January, April, July and October) and at the three remaining sites at 6-monthly intervals (April and October) (Table 10 and Table 11).

Table 10: Past and recommended future 3- and 6-monthly sampling schedule at the five permanent monitoring sites in the southern Firth of Thames.

	KA	MI	GC	KB	TP
2001	Apr/Oct	Apr/Jly/Oct	Apr/Oct	Apr/Jly/Oct	Apr/Oct
2002	Apr/Oct	Jan/Apr/Jly/Oct	Apr/Oct	Jan/Apr/Jly/Oct	Apr/Oct
2003	Apr/Oct	Jan/Apr/Jly/Oct	Apr/Oct	Jan/Apr/Jly/Oct	Apr/Oct
2004	Apr/Oct	Jan/Apr/Jly/Oct	Apr/Oct	Jan/Apr/Jly/Oct	Apr/Oct
2005	Apr/Oct	Jan/Apr/Jly/Oct	Apr/Oct	Jan/Apr/Jly/Oct	Apr/Oct
2006	Apr/Oct	Jan/Apr/Jly/Oct	Apr/Oct	Jan/Apr/Jly/Oct	Apr/Oct

Table 11: Past and recommended future 3- and 6-monthly sampling schedule at the five permanent monitoring sites in Whaingaroa Harbour.

	KA	MI	GC	KB	TP
2001	Apr/Oct	Apr/Jly/Oct	Apr/Oct	Apr/Jly/Oct	Apr/Oct
2002	Apr/Oct	Jan/Apr/Jly/Oct	Apr/Oct	Jan/Apr/Jly/Oct	Apr/Oct
2003	Apr/Oct	Jan/Apr/Jly/Oct	Apr/Oct	Jan/Apr/Jly/Oct	Apr/Oct
2004	Apr/Oct	Jan/Apr/Jly/Oct	Apr/Oct	Jan/Apr/Jly/Oct	Apr/Oct
2005	Apr/Oct	Jan/Apr/Jly/Oct	Apr/Oct	Jan/Apr/Jly/Oct	Apr/Oct
2006	Apr/Oct	Jan/Apr/Jly/Oct	Apr/Oct	Jan/Apr/Jly/Oct	Apr/Oct

A review of the monitoring programme should be undertaken in 2006/2007 to assess whether any changes can be implemented in terms of frequency of sampling or the number of sites sampled, and/or the number of samples collected on each sampling occasion.

Continued monitoring will provide a measure of the patterns of temporal change in the sediment characteristics and the associated benthic communities. From these time-series it will be possible to distinguish trends from short-term variability, and thereby identify long-term changes in the sediment and benthic communities.

The Regional Estuary Monitoring Programme has implemented formal quality control and assessment protocols for the sorting, identification and enumeration of benthic core samples (Turner et al., 2002; see Appendix 6), and these need to continue to be implemented.

Rather than focusing on monitoring one or two species ("indicator species") which are presumed to be representative of the whole community in terms of their response to environmental changes, the Regional Estuary Monitoring Programme monitors a suite of 26 selected benthic macrofauna species and taxa. While monitoring a suite of species is more costly than monitoring only one or two indicator species, because it requires the identification and counting of more species of macrofauna, changes in a number of species present at the same site are more indicative of potential environmental stress than changes in a single species. By including a suite of species, the monitoring programme will be more likely to detect unexpected effects and will also provide a larger-scale picture of ecological changes.

NIWA were commissioned to recommend a suite of species to be monitored (Hewitt et al., 2001). The species were chosen to represent a range of different taxonomic groups (including, bivalve and gastropod molluscs, polychaete worms, and several types of crustaceans) and different life-styles (predators, filter-feeders and deposit-feeders). The following 26 taxa were recommended as an appropriate suite of indicator taxa for the southern Firth of Thames and Whaingaroa Harbour (Table 12):

Table 12: List of 26 recommended indicator taxa to be monitored in the southern Firth of Thames and Whaingaroa Harbour.

Order	Taxa	Order	Taxa
Amphipoda	*Paracorophium* sp.	Polychaeta	*Aglaophamus* sp.
	Phoxocephalidae		*Aquilaspio aucklandica*
Bivalvia	*Arthritica bifurca*		*Aonides oxycephala*
	Austrovenus stutchburyi		*Aricidea* sp.
	Macomona liliana		*Boccardia ?syrtis*
	Nucula hartvigiana		*Cossura* sp.
	Paphies australis		*Euchone* sp.
	Theora lubrica		*Glycera* sp.
Cnidaria	*Anthopleura aureoradiata*		*Goniada* sp.
Cumacea	*Colurostylis lemurum*		*Heteromastus filiformis*
Gastropoda	*Cominella adspersa*		*Magelona dakini*
	Notoacmea sp.		Nereidae
			Orbinia papillosa
			Paraonidae

The majority of species/taxa recorded at each of the monitoring sites are included in this suite of monitored taxa with non-indicator species making relatively small contributions numerically to the macrofauna communities (see Figure 6 and Figure 7).

Examination of the non-monitored species/taxa at sites in both the southern Firth of Thames and Whaingaroa Harbour has identified some species/taxonomic groups which occurred in high numbers. At this stage it is not proposed that changes to the list of monitored species should be implemented. However, it is important that the non-monitored species should continue to be identified (at least to taxonomic group) and counted to provide a broad description of the changes in macrofauna communities occurring at each site. This will provide a fuller description of the macrofauna communities and be useful in identifying potential incursions of introduced species such as *Musculista sentousi*.

The estuary sediment monitoring programme should continue as described. There are a number of additional pieces of work that will aid the ongoing development and refinement of the programme design, as outlined below.

The plate surveying technique needs to be assessed further based on the first 12-24 months of monthly data. A resurvey is recommended for the 2005/06 financial year to determine if there has been any settlement or movement of the plates. The data collected from the plate pilot study also needs to be examined to determine the adequacy and power of this method to detect change in the level of the sediments at the monitoring sites. An early analysis of this was undertaken in Collins (2003), but with limited data. This will be presented in the full analysis report for the REMP programme, due for completion by June 2007.

It is recommended that the impact of periodic rainfall-event driven sedimentation is investigated further. Monitoring at an event scale would help to better understand changes in the physical properties of the sediment associated with periodic influxes of material from the catchment and subsequent processes of recovery.

The current report provides a summary of the data gathered from April 2002 to April 2004 in the Regional Monitoring Programme. The length of record is not yet sufficient to identify progressive trends for change within the natural variation present. It is therefore recommended that the current monitoring regime be continued, and a summary of the field measurements to be taken over the next 12 months are given in Table 13 and Table 14. A summary report will be prepared by June 2007 that will present full analysis of the ecological and physical data for the monitoring period. This report will determine whether changes in the frequency or nature of sampling should be implemented.

Table 13: Recommended 3- and 6-monthly sampling schedule at the five permanent monitoring sites in the southern Firth of Thames.

	KA	MI	GC	KB	TP
2005	Apr/Oct	Jan/Apr/Jly/Oct	Apr/Oct	Jan/Apr/Jly/Oct	Apr/Oct
2006	Apr/Oct	Jan/Apr/Jly/Oct	Apr/Oct	Jan/Apr/Jly/Oct	Apr/Oct

Table 14: Recommended 3- and 6-monthly sampling schedule at the five permanent monitoring sites in Whaingaroa Harbour.

	KA	MI	GC	KB	TP
2005	Apr/Oct	Jan/Apr/Jly/Oct	Apr/Oct	Jan/Apr/Jly/Oct	Apr/Oct
2006	Apr/Oct	Jan/Apr/Jly/Oct	Apr/Oct	Jan/Apr/Jly/Oct	Apr/Oct

Sediment bed level surveys have provided valuable insight into the magnitude of short and medium term changes in sediment bed level. This provides insight into the mobility of sediment in intertidal areas of the Firth of Thames and the likely depth of natural disturbance. Given the considerable variability in sediment level, infrequent surveys would be likely to produce misleading results. This further illustrates the difficulty in detecting long term changes in rates of accretion, which are likely to be greatly obscured by the much greater short and medium term fluctuations. Six or twelve-monthly sediment level measurements would therefore be prone to major errors associated with short term fluctuations and would not provide an accurate measure of long term change.

In the long term, maintenance of the current monthly sediment level monitoring programme may not be possible. The 2007 analysis report will consider altering the sampling pattern to include short periods of relatively intensive monitoring, interspersed with periods of no monitoring. This would provide relatively accurate measurements of sediment level during each monitoring period and allow determination of changes between these monitoring cycles.

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Appendix 1 - Southern Firth of Thames species/taxonomic group abundances

KA October 2002

INDICATOR SPECIES		SIZE	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
			CORE NUMBER													
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	1	0	0	0	0	0	1	**2**	**0.2**
APHOX	*Phoxocephalidae*		8	8	4	0	4	5	5	2	0	1	3	3	**43**	**3.6**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	11	1	4	0	13	2	3	7	0	2	1	1	**45**	**3.8**
		>2	1	0	3	0	1	0	0	12	0	3	0	0	**20**	**1.7**
		Total	12	1	7	0	14	2	3	19	0	5	1	1	**65**	**5.4**
BAS	*Austrovenus stutchburyi*	<5	8	7	3	9	3	15	2	9	8	9	13	7	**93**	**7.8**
		>5	3	8	6	16	5	6	2	3	10	5	12	5	**81**	**6.8**
		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	11	15	9	25	8	21	4	12	18	14	25	12	**174**	**14.5**
BML	*Macamona liliana*	<5	1	1	1	4	0	2	1	0	1	1	1	0	**13**	**1.1**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	1	**1**	**0.1**
		Cond.analysis	0	0	1	0	0	0	0	0	1	1	0	1	**4**	**0.3**
		Total	1	1	2	4	0	2	1	0	2	2	1	2	**18**	**1.5**
BNH	*Nucula hartvigiana*	<2	8	2	5	1	0	4	2	1	0	2	2	9	**36**	**3.0**
		>2	28	20	16	9	21	35	32	34	27	68	49	82	**421**	**35.1**
		Total	36	22	21	10	21	39	34	35	27	70	51	91	**457**	**38.1**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	1	0	0	0	0	**1**	**0.1**
		Total	0	0	0	0	0	0	0	1	0	0	0	0	**1**	**0.1**
BTHL	*Theora lubrica*	<5	2	0	1	0	0	0	1	0	0	0	0	0	**4**	**0.3**
		>5	1	0	0	0	0	1	0	0	1	0	1	0	**4**	**0.3**
		Total	3	0	1	0	0	1	1	0	1	0	1	0	**8**	**0.7**
CUMACEANS																
CCL	*Colurostylis lemurum*		0	2	1	1	0	0	0	0	3	0	2	0	**9**	**0.8**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		0	0	0	0	0	1	0	0	0	0	0	0	**1**	**0.1**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	1	0	0	0	**1**	**0.1**
PAO	*Aonides oxycephala*		3	2	1	0	0	0	0	3	1	0	0	0	**10**	**0.8**
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	1	0	0	0	0	**1**	**0.1**
PBOC	Pseudopolydora complex		1	0	1	1	0	0	0	0	0	0	0	0	**3**	**0.3**
PCOS	*Cossura* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		2	0	0	1	1	0	1	1	0	0	0	0	**6**	**0.5**
PGLY	*Glycera* sp.		0	0	0	0	0	0	0	0	0	0	1	0	**1**	**0.1**
PHF	"Capitellidae"		40	7	7	8	24	17	39	20	10	58	8	9	**247**	**20.6**
PMD	*Magelona dakini*		0	2	3	2	6	13	10	19	8	15	6	6	**90**	**7.5**
PNIC	Nereidae		3	2	6	5	3	2	2	1	1	3	2	1	**31**	**2.6**
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PPAR	Paraonidae		1	0	0	0	1	0	0	0	0	0	0	0	**2**	**0.2**
NON INDICATOR SPECIES																
CAMPH	Amphipods		0	2	0	2	0	1	0	0	0	0	0	0	**5**	**0.4**
CCRAB	Crabs		1	1	0	0	1	0	1	0	0	1	1	1	**7**	**0.6**
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CISO	Isopods		0	0	0	0	0	1	0	0	0	0	1	0	**2**	**0.2**
COST	Ostracods		0	0	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
CSHR	Shrimps/Mysids		0	6	0	0	0	0	2	1	3	1	0	2	**15**	**1.3**
COTH	Other Crustaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BOTH	Bivalves		2	0	0	1	0	0	0	0	0	0	0	1	**4**	**0.3**
GOTH	Gastropods		0	0	0	2	0	0	0	0	0	1	2	0	**5**	**0.4**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
ONEM	Nemerteans		0	2	0	1	2	0	0	1	2	0	0	2	**10**	**0.8**
POTH	Polychaetes		1	4	3	1	0	0	0	2	0	0	0	0	**11**	**0.9**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
TOTAL			**125**	**77**	**67**	**64**	**85**	**106**	**103**	**118**	**77**	**171**	**105**	**132**	**1230**	**102.5**

KA April 2003

INDICATOR SPECIES			CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		0	6	0	1	0	0	0	6	1	0	2	1	**17**	**1.4**
APHOX	*Phoxocephalidae*		1	0	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	1	4	0	2	0	14	1	9	5	1	1	0	**38**	**3.2**
		>2	0	0	0	0	0	1	0	0	0	0	0	0	**1**	**0.1**
		Total	1	4	0	2	0	15	1	9	5	1	1	0	**39**	**3.3**
BAS	*Austrovenus stutchburyi*	<5	14	20	32	9	17	9	9	7	21	12	20	17	**187**	**15.6**
		>5	0	3	6	4	2	0	2	6	4	2	3	1	**33**	**2.8**
		Cond.analysis	0	1	3	2	0	0	0	0	3	0	2	0	**11**	**0.9**
		Total	14	24	41	15	19	9	11	13	28	14	25	18	**231**	**19.3**
BML	*Macamona liliana*	<5	7	6	30	12	6	8	10	9	7	1	11	16	**123**	**10.3**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Cond.analysis	1	0	0	0	0	1	1	0	1	1	1	0	**6**	**0.5**
		Total	8	6	30	12	6	9	11	9	8	2	12	16	**129**	**10.8**
BNH	*Nucula hartvigiana*	<2	5	10	5	4	8	13	7	0	3	1	1	17	**74**	**6.2**
		>2	46	8	2	17	49	25	35	43	26	20	29	63	**363**	**30.3**
		Total	51	18	7	21	57	38	42	43	29	21	30	80	**437**	**36.4**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BTHL	*Theora lubrica*	<5	2	0	6	0	4	2	0	1	0	0	0	1	**16**	**1.3**
		>5	2	3	0	0	2	0	0	0	0	0	0	2	**9**	**0.8**
		Total	4	3	6	0	6	2	0	1	0	0	0	3	**25**	**2.1**
CUMACEANS																
CCL	*Colurostylis lemurum*		0	1	0	1	0	0	0	0	1	1	0	0	**4**	**0.3**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		0	0	0	0	0	0	0	0	0	0	0	1	**1**	**0.1**
PAGL	*Aglaophamus* sp.		0	0	0	1	0	1	0	0	0	0	0	0	**2**	**0.2**
PAO	*Aonides oxycephala*		0	0	0	0	0	0	0	0	0	0	0	1	**1**	**0.1**
PAR	*Aricidea* sp.		0	2	1	0	0	4	1	1	0	0	0	0	**9**	**0.8**
PBOC	Pseudopolydora complex		0	1	0	3	0	0	1	0	0	0	0	0	**5**	**0.4**
PCOS	*Cossura* sp.		0	0	0	0	1	0	0	0	0	0	0	0	**1**	**0.1**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	2	0	2	0	1	0	0	0	0	**5**	**0.4**
PGLY	*Glycera* sp.		0	0	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
PHF	"Capitellidae"		11	6	14	6	8	9	42	10	11	5	7	15	**144**	**12.0**
PMD	*Magelona dakini*		4	1	3	2	4	7	8	1	17	3	3	9	**62**	**5.2**
PNIC	Nereidae		1	12	8	5	1	5	7	2	3	1	1	4	**50**	**4.2**
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PPAR	Paraonidae		0	0	1	0	2	0	0	1	0	0	0	1	**5**	**0.4**
NON INDICATOR SPECIES																
CAMPH	Amphipods		0	0	0	1	0	0	0	0	0	0	0	0	**1**	**0.1**
CCRAB	Crabs		0	1	1	0	0	0	0	0	0	0	0	0	**2**	**0.2**
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CISO	Isopods		0	0	0	3	0	0	0	0	1	0	0	0	**4**	**0.3**
COST	Ostracods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CSHR	Shrimps/Mysids		1	0	0	0	0	1	0	0	2	0	1	1	**6**	**0.5**
COTH	Other Crustaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BOTH	Bivalves		5	2	10	1	2	4	5	1	2	2	1	8	**43**	**3.6**
GOTH	Gastropods		1	1	2	0	1	0	5	0	1	0	2	0	**13**	**1.1**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
ONEM	Nemerteans		0	0	1	1	1	0	0	0	1	0	0	1	**5**	**0.4**
POTH	Polychaetes		4	0	0	0	0	2	1	1	0	0	0	0	**8**	**0.7**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
TOTAL			**106**	**88**	**126**	**77**	**108**	**108**	**135**	**99**	**110**	**50**	**85**	**159**	**1251**	**104.3**

KA October 2003

INDICATOR SPECIES			CORE NUMBER												TOTAL	MEAN
			1	2	3	4	5	6	7	8	9	10	11	12		
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	1	0	0	0	1	0	0	0	2	**4**	**0.3**
APHOX	*Phoxocephalidae*		1	0	0	1	0	0	0	1	0	0	2	0	**5**	**0.4**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	3	2	1	1	1	2	0	6	1	0	3	1	**21**	**1.8**
		>2	0	0	0	0	0	0	0	1	0	0	0	0	**1**	**0.1**
		Total	3	2	1	1	1	2	0	7	1	0	3	1	**22**	**1.8**
BAS	*Austrovenus stutchburyi*	<5	0	1	0	1	1	0	0	0	1	0	0	0	**4**	**0.3**
		>5	0	0	0	3	0	1	0	3	0	3	1	0	**11**	**0.9**
		Cond.analysis	0	1	3	3	0	1	0	4	0	0	1	0	**13**	**1.1**
		Total	0	2	3	7	1	2	0	7	1	3	2	0	**28**	**2.3**
BML	*Macamona liliana*	<5	2	0	0	0	2	0	0	2	2	1	0	0	**9**	**0.8**
		5-15	0	0	0	0	0	0	0	0	1	0	0	0	**1**	**0.1**
		>15	0	0	0	0	0	0	1	0	0	0	0	0	**1**	**0.1**
		Cond.analysis	0	0	1	1	0	0	1	1	0	1	0	0	**5**	**0.4**
		Total	2	0	1	1	2	0	2	3	3	2	0	0	**16**	**1.3**
BNH	*Nucula hartvigiana*	<2	22	11	2	3	12	6		3	4	2	9	7	**81**	**6.8**
		>2	27	32	21	22	39	25	50	37	24	26	49	51	**403**	**33.6**
		Total	49	43	23	25	51	31	50	40	28	28	58	58	**484**	**40.3**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CUMACEANS																
CCL	*Colurostylis lemurum*		0	1	0	1	1	0	1	0	0	0	1	0	**5**	**0.4**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	1	1	0	0	0	0	0	**2**	**0.2**
GNHE	*Notoacmea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		0	0	0	0	0	0	0	0	0	0	1	0	**1**	**0.1**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	1	1	2	0	1	**5**	**0.4**
PAO	*Aonides oxycephala*		0	0	0	0	0	0	0	0	0	0	0	3	**3**	**0.3**
PAR	*Aricidea* sp.		1	0	0	0	1	2	0	0	1	0	0	0	**5**	**0.4**
PBOC	Pseudopolydora complex		0	0	2	0	0	1	0	0	3	0	0	0	**6**	**0.5**
PCOS	*Cossura* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		1	0	0	0	0	1	2	0	0	1	0	0	**5**	**0.4**
PGLY	*Glycera* sp.		1	0	1	0	0	1	0	0	0	0	0	0	**3**	**0.3**
PHF	"Capitellidae"		10	10	1	0	13	5	4	10	10	9	22	7	**101**	**8.4**
PMD	*Magelona dakini*		1	1	0	0	0	0	4	4	4	3	12	3	**32**	**2.7**
PNIC	Nereidae		5	5	1	3	3	1	2	0	1	1	5	2	**29**	**2.4**
POP	*Orbinia papillosa*		0	0	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
PPAR	Paraonidae		0	3	0	0	0	0	0	0	0	0	0	2	**5**	**0.4**
NON INDICATOR SPECIES																
CAMPH	Amphipods		1	2	0	2	0	0	0	2	0	0	0	2	**9**	**0.8**
CCRAB	Crabs		0	0	0	0	0	0	0	0	0	0	0	1	**1**	**0.1**
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CISO	Isopods		0	0	0	0	0	0	0	0	0	3	0	0	**3**	**0.3**
COST	Ostracods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CSHR	Shrimps/Mysids		2	1	0	0	1	2	0	6	1	4	1	2	**20**	**1.7**
COTH	Other Crustaceans		0	0	0	0	0	0	1	1	0	0	1	0	**3**	**0.3**
BOTH	Bivalves		0	0	1	0	0	0	0	0	0	1	1	0	**3**	**0.3**
GOTH	Gastropods		1	0	0	0	0	2	1	0	0	1	0	0	**5**	**0.4**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
ONEM	Nemerteans		0	0	0	0	1	2	0	1	0	0	1	0	**5**	**0.4**
POTH	Polychaetes		2	0	1	1	1	1	0	1	1	1	1	1	**11**	**0.9**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	0	0	0	0	0	0	0	1	0	0	0	**1**	**0.1**
TOTAL			**80**	**70**	**36**	**43**	**76**	**54**	**68**	**85**	**56**	**59**	**111**	**85**	**823**	**68.6**

KA April 2004

INDICATOR SPECIES		SIZE	CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
APHOX	*Phoxocephalidae*		0	0	0	3	2	0	0	0	5	0	1	1	**12**	**1.0**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	14	2	2	2	0	0	0	0	0	0	1	4	**25**	**2.1**
		>2	0	0	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
		Total	14	2	3	2	0	0	0	0	0	0	1	4	**26**	**2.2**
BAS	*Austrovenus stutchburyi*	<5	6	32	15	18	14	8	6	8	12	10	8	5	**142**	**11.8**
		>5	0	0	1	4	1	0	0	0	0	0	2	0	**8**	**0.7**
		Cond.analysis	0	0	3	0	1	1	1	1	1	2	0	2	**12**	**1.0**
		Total	6	32	19	22	16	9	7	9	13	12	10	7	**162**	**13.5**
BML	*Macamona liliana*	<5	5	14	3	5	0	5	3	1	6	4	3	1	**50**	**4.2**
		5-15	2	1	1	2	0	0	0	0	0	0	0	1	**7**	**0.6**
		>15	0	0	0	0	0	0	0	0	0	0	1	0	**1**	**0.1**
		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	7	15	4	7	0	5	3	1	6	4	4	2	**58**	**4.8**
BNH	*Nucula hartvigiana*	<2	32	29	27	13	18	15	22	18	33	32	25	20	**284**	**23.7**
		>2	50	36	28	28	21	45	35	44	30	34	35	35	**421**	**35.1**
		Total	82	65	55	41	39	60	57	62	63	66	60	55	**705**	**58.8**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BTHL	*Theora lubrica*	<5	0	1	0	0	1	0	0	0	1	4	0	0	**7**	**0.6**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	1	0	0	1	0	0	0	1	4	0	0	**7**	**0.6**
CUMACEANS																
CCL	*Colurostylis lemurum*		0	0	0	0	0	0	1	0	0	0	0	1	**2**	**0.2**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	1	0	0	0	0	0	**1**	**0.1**
GNHE	*Notoacmea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAGL	*Aglaophamus* sp.		0	1	1	0	0	0	0	0	0	0	0	0	**2**	**0.2**
PAO	*Aonides oxycephala*		0	1	0	0	1	0	0	0	0	0	0	0	**2**	**0.2**
PAR	*Aricidea* sp.		0	1	0	0	0	1	0	1	0	0	0	1	**4**	**0.3**
PBOC	Pseudopolydora complex		0	2	0	0	0	1	0	0	3	0	1	0	**7**	**0.6**
PCOS	*Cossura* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGLY	*Glycera* sp.		0	0	0	0	0	0	1	0	0	0	0	0	**1**	**0.1**
PHF	"Capitellidae"		0	1	0	1	0	0	0	1	1	1	1	0	**6**	**0.5**
PMD	*Magelona dakini*		0	2	1	0	0	0	0	0	0	1	1	0	**5**	**0.4**
PNIC	Nereidae		1	0	0	0	0	0	0	0	0	0	0	1	**2**	**0.2**
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PPAR	Paraonidae		0	0	0	0	0	2	0	0	0	0	0	2	**4**	**0.3**
NON INDICATOR SPECIES																
CAMPH	Amphipods		0	0	0	0	0	0	0	0	0	0	1	0	**1**	**0.1**
CCRAB	Crabs		0	1	1	0	0	0	0	0	3	0	0	1	**6**	**0.5**
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CISO	Isopods		1	0	0	1	0	0	0	0	2	0	0	0	**4**	**0.3**
COST	Ostracods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CSHR	Shrimps/Mysids		6	1	1	8	3	4	1	0	10	2	6	8	**50**	**4.2**
COTH	Other Crustaceans		0	1	6	0	0	0	0	0	0	0	0	0	**7**	**0.6**
BOTH	Bivalves		1	6	0	4	0	7	0	0	5	2	3	3	**31**	**2.6**
GOTH	Gastropods		1	0	0	1	0	1	1	0	1	0	1	0	**6**	**0.5**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
ONEM	Nemerteans		0	0	1	0	0	0	0	1	1	0	0	0	**3**	**0.3**
POTH	Polychaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	8	8	0	0	0	0	0	0	0	0	0	**16**	**1.3**
TOTAL			**119**	**140**	**100**	**90**	**62**	**90**	**72**	**75**	**114**	**92**	**90**	**86**	**1130**	**94.2**

GC October 2002

INDICATOR SPECIES			1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
			CORE NUMBER													
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	1	1	0	0	0	0	0	**2**	**0.2**
APHOX	*Phoxocephalidae*		0	0	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	1	0	0	0	1	5	17	0	0	0	1	0	**25**	**2.1**
		>2	0	0	0	0	0	0	4	0	0	0	0	1	**5**	**0.4**
		Total	1	0	0	0	1	5	21	0	0	0	1	1	**30**	**2.5**
BAS	*Austrovenus stutchburyi*	<5	1	1	4	2	0	7	2	0	4	5	1	1	**28**	**2.3**
		>5	0	0	0	0	0	0	1	0	0	0	2	0	**3**	**0.3**
		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	1	1	4	2	0	7	3	0	4	5	3	1	**31**	**2.6**
BML	*Macamona liliana*	<5	0	0	0	0	0	0	0	0	0	1	0	0	**1**	**0.1**
		5-15	0	0	0	0	1	0	0	0	1	0	3	2	**7**	**0.6**
		>15	0	0	0	0	0	1	1	0	0	0	1	1	**4**	**0.3**
		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	1	1	1	0	1	1	4	3	**12**	**1.0**
BNH	*Nucula hartvigiana*	<2	0	0	0	0	0	0	0	0	1	0	0	0	**1**	**0.1**
		>2	0	0	1	1	0	2	0	0	0	1	1	0	**6**	**0.5**
		Total	0	0	1	1	0	2	0	0	1	1	1	0	**7**	**0.6**
BPA	*Paphies australis*	<5	1	0	0	5	0	2	0	0	1	1	0	0	**10**	**0.8**
		5-15	2	1	0	3	0	0	0	0	0	1	1	2	**10**	**0.8**
		>15 (cond,A)	1	0	0	0	0	0	0	0	0	0	0	1	**2**	**0.2**
		Total	4	1	0	8	0	2	0	0	1	2	1	3	**22**	**1.8**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CUMACEANS																
CCL	*Colurostylis lemurum*		3	0	2	0	0	0	3	1	0	0	0	0	**9**	**0.8**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		0	0	0	0	0	0	1	0	0	0	1	0	**2**	**0.2**
OTHER																
OAN	*Anthopleura aureoradiata*		2	0	0	0	0	2	0	0	0	1	0	1	**6**	**0.5**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		0	0	0	0	0	0	1	0	0	0	0	0	**1**	**0.1**
PAGL	*Aglaophamus* sp.		0	0	0	0	1	0	0	0	0	0	0	0	**1**	**0.1**
PAO	*Aonides oxycephala*		119	80	114	88	124	103	128	124	53	101	113	110	**1257**	**104.8**
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PBOC	Pseudopolydora complex		1	0	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
PCOS	*Cossura* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGLY	*Glycera* sp.		0	0	0	0	0	0	1	0	0	0	0	0	**1**	**0.1**
PHF	"Capitellidae"		0	0	0	1	0	3	2	0	3	4	3	1	**17**	**1.4**
PMD	*Magelona dakini*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PNIC	Nereidae		1	2	1	1	3	4	6	3	2	3	8	4	**38**	**3.2**
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PPAR	Paraonidae		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
NON INDICATOR SPECIES																
CAMPH	Amphipods		0	0	0	0	0	1	0	0	1	0	2	0	**4**	**0.3**
CCRAB	Crabs		1	0	0	0	0	2	3	0	0	0	1	0	**0**	**0.0**
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CISO	Isopods		0	0	0	1	1	0	1	0	0	0	2	0	**5**	**0.4**
COST	Ostracods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CSHR	Shrimps/Mysids		0	0	3	4	4	0	0	0	0	0	2	0	**13**	**1.1**
COTH	Other Crustaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BOTH	Bivalves		3	1	2	3	1	55	1	0	2	7	1	1	**77**	**6.4**
GOTH	Gastropods		0	0	0	1	1	0	0	0	0	0	0	0	**2**	**0.2**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		1	2	1	1	2	0	0	0	2	1	0	0	**10**	**0.8**
ONEM	Nemerteans		0	7	3	4	4	9	2	1	3	2	5	1	**41**	**3.4**
POTH	Polychaetes		14	21	30	34	22	103	28	12	16	45	47	25	**397**	**33.1**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	1	0	0	**1**	**0.1**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
TOTAL			**151**	**115**	**162**	**149**	**165**	**300**	**203**	**141**	**89**	**174**	**195**	**151**	**1988**	**165.7**

GC April 2003

INDICATOR SPECIES			CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		1	2	0	1	0	0	0	0	0	0	0	2	**6**	**0.5**
APHOX	*Phoxocephalidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	0	0	0	0	0	1	2	0	0	1	0	0	**4**	**0.3**
		>2	0	0	0	0	0	0	0	0	1	0	0	0	**1**	**0.1**
		Total	0	0	0	0	0	1	2	0	1	1	0	0	**5**	**0.4**
BAS	*Austrovenus stutchburyi*	<5	30	14	0	0	16	40	22	7	9	13	0	33	**184**	**15.3**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	30	14	0	0	16	40	22	7	9	13	0	33	**184**	**15.3**
BML	*Macamona liliana*	<5	5	7	1	1	6	9	11	0	7	12	1	19	**79**	**6.6**
		5-15	0	0	0	0	0	0	0	0	1	0	0	0	**1**	**0.1**
		>15	0	0	0	0	0	0	0	0	0	2	0	0	**2**	**0.2**
		Cond.analysis	0	0	0	0	0	0	0	0	1	0	0	1	**2**	**0.2**
		Total	5	7	1	1	6	9	11	0	9	14	1	20	**84**	**7.0**
BNH	*Nucula hartvigiana*	<2	0	1	0	0	0	0	3	3	0	0	0	0	**7**	**0.6**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	1	0	0	0	0	3	3	0	0	0	0	**7**	**0.6**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	1	0	0	0	**1**	**0.1**
		5-15	0	0	0	0	0	0	0	0	0	1	0	0	**1**	**0.1**
		>15	0	0	0	1	0	0	0	0	0	0	0	0	**1**	**0.1**
		Total	0	0	0	1	0	0	0	0	1	1	0	0	**3**	**0.3**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CUMACEANS																
CCL	*Colurostylis lemurum*		0	0	0	1	1	0	3	0	1	1	1	0	**8**	**0.7**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	0	0	0	1	3	0	0	**4**	**0.3**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		1	3	0	0	0	0	0	0	0	0	0	0	**4**	**0.3**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		90	68	35	93	98	68	76	87	143	93	70	84	**1005**	**83.8**
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PBOC	Pseudopolydora complex		0	0	0	0	0	0	0	0	0	0	0	1	**1**	**0.1**
PCOS	*Cossura* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGLY	*Glycera* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PHF	"Capitellidae"		7	0	0	2	3	16	16	1	2	2	0	3	**52**	**4.3**
PMD	*Magelona dakini*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PNIC	Nereidae		2	3	0	2	4	6	11	7	6	5	1	1	**48**	**4.0**
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PPAR	Paraonidae		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
NON INDICATOR SPECIES																
CAMPH	Amphipods		1	1	1	1	1	1	7	1	16	6	10	0	**46**	**3.8**
CCRAB	Crabs		0	0	1	0	0	1	2	1	0	3	4	0	**0**	**0.0**
CCUM	Cumaceans		0	0	0	1	0	1	0	0	0	0	0	0	**2**	**0.2**
CISO	Isopods		6	1	2	4	2	0	3	3	16	23	12	0	**72**	**6.0**
COST	Ostracods		0	0	0	0	2	0	0	0	0	0	0	0	**2**	**0.2**
CSHR	Shrimps/Mysids		0	0	0	0	1	1	0	0	0	1	1	1	**5**	**0.4**
COTH	Other Crustaceans		1	0	0	18	0	2	0	1	3	0	12	0	**37**	**3.1**
BOTH	Bivalves		4	3	0	1	1	7	1	0	0	0	1	2	**20**	**1.7**
GOTH	Gastropods		0	0	0	0	0	0	0	0	1	1	1	0	**3**	**0.3**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	1	0	0	4	3	0	2	1	0	0	0	**11**	**0.9**
ONEM	Nemerteans		0	1	1	2	1	4	5	1	4	0	1	5	**25**	**2.1**
POTH	Polychaetes		7	8	3	1	18	5	14	4	48	23	23	12	**166**	**13.8**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	1	0	0	0	0	**1**	**0.1**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
TOTAL			**155**	**113**	**44**	**129**	**158**	**165**	**176**	**119**	**262**	**190**	**138**	**164**	**1801**	**150.1**

GC October 2003

INDICATOR SPECIES			CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		0	1	0	0	1	0	0	1	4	1	0	1	**9**	**0.8**
APHOX	*Phoxocephalidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	0	4	0	1	0	0	0	0	3	0	0	4	**12**	**1.0**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	4	0	1	0	0	0	0	3	0	0	4	**12**	**1.0**
BAS	*Austrovenus stutchburyi*	<5	0	0	0	3	0	1	6	2	1	0	0	4	**17**	**1.4**
		>5	1	0	0	0	0	0	0	1	0	0	0	0	**2**	**0.2**
		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	1	0	0	3	0	1	6	3	1	0	0	4	**19**	**1.6**
BML	*Macamona liliana*	<5	1	2	1	1	6	1	13	12	4	8	5	13	**67**	**5.6**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	1	0	1	0	0	0	0	**2**	**0.2**
		Cond.analysis	1	1	0	0	0	0	0	0	0	0	0	0	**2**	**0.2**
		Total	2	3	1	1	6	2	13	13	4	8	5	13	**71**	**5.9**
BNH	*Nucula hartvigiana*	<2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BPA	*Paphies australis*	<5	1	4	23	3	1	0	3	2	1	3	2	4	**47**	**3.9**
		5-15	0	0	4	0	0	0	0	0	0	0	0	0	**4**	**0.3**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	1	4	27	3	1	0	3	2	1	3	2	4	**51**	**4.3**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CUMACEANS																
CCL	*Colurostylis lemurum*		0	2	0	3	4	0	1	0	0	1	3	0	**14**	**1.2**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	0	0	0	0	1	0	0	**1**	**0.1**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		20	1	15	80	50	44	8	23	54	20	5	8	**328**	**27.3**
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PBOC	Pseudopolydora complex		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PCOS	*Cossura* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGLY	*Glycera* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PHF	"Capitellidae"		3	4	0	3	0	4	1	2	1	0	3	4	**25**	**2.1**
PMD	*Magelona dakini*		0	1	0	1	1	0	1	0	0	0	0	0	**4**	**0.3**
PNIC	Nereidae		0	2	1	0	0	0	0	1	1	0	2	1	**8**	**0.7**
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PPAR	Paraonidae		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
NON INDICATOR SPECIES																
CAMPH	Amphipods		0	0	0	0	1	0	2	1	0	0	0	0	**4**	**0.3**
CCRAB	Crabs		0	0	0	0	2	0	0	0	0	0	0	0	**0**	**0.0**
CCUM	Cumaceans		0	0	0	1	0	1	0	0	0	0	0	0	**2**	**0.2**
CISO	Isopods		0	0	0	0	0	0	0	0	0	0	1	0	**1**	**0.1**
COST	Ostracods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CSHR	Shrimps/Mysids		0	0	1	0	0	3	0	0	2	0	0	0	**6**	**0.5**
COTH	Other Crustaceans		0	0	0	0	0	1	0	0	1	0	0	0	**2**	**0.2**
BOTH	Bivalves		3	9	6	3	4	2	7	2	3	0	0	3	**42**	**3.5**
GOTH	Gastropods		0	0	0	0	0	0	0	0	2	0	0	0	**2**	**0.2**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	1	2	2	0	0	0	0	0	0	**5**	**0.4**
ONEM	Nemerteans		0	0	0	0	1	1	0	0	2	0	0	0	**4**	**0.3**
POTH	Polychaetes		0	0	5	0	5	10	0	0	4	11	0	3	**38**	**3.2**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		14	3	0	0	0	0	3	28	0	0	1	0	**49**	**4.1**
TOTAL			**44**	**34**	**56**	**100**	**78**	**71**	**45**	**76**	**83**	**45**	**22**	**45**	**697**	**58.1**

GC April 2004

INDICATOR SPECIES		SIZE	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
			CORE NUMBER													
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	1	0	0	0	0	0	0	**1**	**0.1**
APHOX	*Phoxocephalidae*		0	0	0	0	0	0	0	0	0	0	1	0	**1**	**0.1**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	2	0	0	1	0	0	0	0	0	2	0	0	**5**	**0.4**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	2	0	0	1	0	0	0	0	0	2	0	0	**5**	**0.4**
BAS	*Austrovenus stutchburyi*	<5	1	0	1	1	0	0	0	1	1	0	2	7	**14**	**1.2**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	1	0	1	1	0	0	0	1	1	0	2	7	**14**	**1.2**
BML	*Macamona liliana*	<5	0	0	0	1	0	0	0	0	0	0	0	5	**6**	**0.5**
		5-15	0	0	0	0	0	0	0	0	0	0	0	1	**1**	**0.1**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Cond.analysis	0	0	0	1	0	0	0	0	0	0	1	0	**2**	**0.2**
		Total	0	0	0	2	0	0	0	0	0	0	1	6	**9**	**0.8**
BNH	*Nucula hartvigiana*	<2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BPA	*Paphies australis*	<5	26	15	56	18	36	24	50	18	3	11	5	9	**271**	**22.6**
		5-15	2	1	9	0	0	2	4	0	0	0	0	1	**19**	**1.6**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	28	16	65	18	36	26	54	18	3	11	5	10	**290**	**24.2**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CUMACEANS																
CCL	*Colurostylis lemurum*		0	2	3	2	0	0	6	2	3	1	3	2	**24**	**2.0**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER																
OAN	*Anthopleura aureoradiata*		0	1	0	0	0	0	1	0	0	0	0	0	**2**	**0.2**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		0	2	0	0	0	0	0	0	0	0	0	0	**2**	**0.2**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		35	9	3	0	2	1	0	1	6	1	1	11	**70**	**5.8**
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PBOC	Pseudopolydora complex		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PCOS	*Cossura* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGLY	*Glycera* sp.		0	1	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
PHF	"Capitellidae"		2	0	0	0	0	0	0	0	0	0	0	0	**2**	**0.2**
PMD	*Magelona dakini*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PNIC	Nereidae		5	1	1	0	0	0	0	0	0	0	0	0	**7**	**0.6**
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PPAR	Paraonidae		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
NON INDICATOR SPECIES																
CAMPH	Amphipods		0	0	1	9	1	1	10	4	2	0	0	2	**30**	**2.5**
CCRAB	Crabs		1	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	4	0	**4**	**0.3**
CISO	Isopods		0	3	1	2	1	2	0	4	1	0	0	0	**14**	**1.2**
COST	Ostracods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CSHR	Shrimps/Mysids		2	1	2	1	2	0	1	0	2	0	0	0	**11**	**0.9**
COTH	Other Crustaceans		1	0	2	3	0	0	0	1	0	0	0	0	**7**	**0.6**
BOTH	Bivalves		1	0	5	0	8	0	0	0	0	0	0	3	**17**	**1.4**
GOTH	Gastropods		3	0	0	0	0	0	0	0	0	0	0	2	**5**	**0.4**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		4	1	0	0	0	2	2	1	1	0	0	0	**11**	**0.9**
ONEM	Nemerteans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
POTH	Polychaetes		3	1	0	0	2	6	10	12	0	8	0	52	**94**	**7.8**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other (nematoda)		1	2	3	0	0	0	2	1	0	0	0	0	**9**	**0.8**
TOTAL			**89**	**40**	**87**	**39**	**52**	**39**	**86**	**45**	**19**	**23**	**17**	**95**	**630**	**52.5**

TP October 2002

INDICATOR SPECIES		SIZE	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
			CORE NUMBER													
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
APHOX	*Phoxocephalidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BAS	*Austrovenus stutchburyi*	<5	0	0	0	0	0	0	0	1	0	0	0	0	**1**	**0.1**
		>5	1	0	0	0	0	0	1	0	0	1	0	0	**3**	**0.3**
		Cond.analysis	1	0	0	0	5	0	1	5	0	1	1	0	**14**	**1.2**
		Total	2	0	0	0	5	0	2	6	0	2	1	0	**18**	**1.5**
BML	*Macamona liliana*	<5	0	0	0	1	0	0	0	0	0	0	0	0	**1**	**0.1**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	1	0	0	0	0	0	0	0	0	**1**	**0.1**
BNH	*Nucula hartvigiana*	<2	0	0	0	0	0	0	0	2	2	0	1	0	**5**	**0.4**
		>2	52	71	34	72	51	12	8	35	72	60	13	14	**494**	**41.2**
		Total	52	71	34	72	51	12	8	37	74	60	14	14	**499**	**41.6**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	1	1	1	0	0	0	0	1	0	0	**4**	**0.3**
		Cond.analysis	26	26	34	30	26	0	0	0	34	24	0	0	**200**	**16.7**
		Total	26	26	35	31	27	0	0	0	34	25	0	0	**204**	**17.0**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CUMACEANS																
CCL	*Colurostylis lemurum*		0	0	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
GASTROPODS																
GCA	*Cominella adspera*		0	0	1	0	2	0	0	0	0	0	0	0	**3**	**0.3**
GNHE	*Notoacmea* sp.		0	0	0	2	0	0	0	0	0	0	0	0	**2**	**0.2**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		0	0	1	0	0	3	0	3	0	0	0	1	**8**	**0.7**
PAR	*Aricidea* sp.		0	0	0	0	0	2	0	0	0	0	1	0	**3**	**0.3**
PBOC	Pseudopolydora complex		0	0	1	0	0	0	0	0	1	1	0	0	**3**	**0.3**
PCOS	*Cossura* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGLY	*Glycera* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PHF	"Capitellidae"		0	0	0	0	0	0	0	2	0	0	3	0	**5**	**0.4**
PMD	*Magelona dakini*		1	0	0	0	0	1	2	0	0	0	0	1	**5**	**0.4**
PNIC	Nereidae		0	0	0	0	0	0	0	0	0	0	0	1	**1**	**0.1**
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PPAR	Paraonidae		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
NON INDICATOR SPECIES																
CAMPH	Amphipods		1	1	0	0	7	6	0	4	0	0	0	1	**20**	**1.7**
CCRAB	Crabs		0	0	1	1	0	0	0	0	0	1	0	0	**0**	**0.0**
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CISO	Isopods		0	0	0	0	0	0	1	0	1	0	0	0	**2**	**0.2**
COST	Ostracods		0	0	0	0	2	0	0	0	0	0	0	0	**2**	**0.2**
CSHR	Shrimps/Mysids		0	1	1	1	0	0	0	0	0	0	1	0	**4**	**0.3**
COTH	Other Crustaceans		0	0	0	0	0	0	0	1	0	0	0	0	**1**	**0.1**
BOTH	Bivalves		0	0	0	1	0	0	0	0	3	0	0	0	**4**	**0.3**
GOTH	Gastropods		0	0	0	0	0	0	0	0	1	0	0	0	**1**	**0.1**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	1	1	0	0	0	1	1	**4**	**0.3**
EHOL	Holuthurians		0	0	0	0	0	0	0	0	0	0	0	3	**3**	**0.3**
ONEM	Nemerteans		0	0	0	0	0	3	2	1	0	0	2	3	**11**	**0.9**
POTH	Polychaetes		0	2	0	0	1	1	0	0	0	0	0	1	**5**	**0.4**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	0	0	0	0	0	1	0	0	0	1	1	**3**	**0.3**
TOTAL			**82**	**101**	**75**	**109**	**95**	**29**	**17**	**54**	**114**	**89**	**24**	**27**	**813**	**67.8**

TP April 2003

INDICATOR SPECIES		SIZE	CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	2	0	1	1	0	0	0	**4**	**0.3**
APHOX	*Phoxocephalidae*		0	1	0	0	0	0	0	0	0	4	0	0	**5**	**0.4**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	0	0	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
BAS	*Austrovenus stutchburyi*	<5	11	0	8	1	3	12	2	3	4	1	5	5	**55**	**4.6**
		>5	1	0	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
		Cond.analysis	2	1	1	0	1	3	4	1	0	0	1	4	**18**	**1.5**
		Total	14	1	9	1	4	15	6	4	4	1	6	9	**74**	**6.2**
BML	*Macamona liliana*	<5	2	0	0	0	0	0	2	0	0	1	2	0	**7**	**0.6**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	2	0	0	0	0	0	2	0	0	1	2	0	**7**	**0.6**
BNH	*Nucula hartvigiana*	<2	23	7	135	11	36	53	22	6	27	26	54	36	**436**	**36.3**
		>2	113	58	90	46	56	71	11	39	61	82	57	35	**719**	**59.9**
		Total	136	65	225	57	92	124	33	45	88	108	111	71	**1155**	**96.3**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	1	0	0	0	**1**	**0.1**
		Cond.analysis	20	31	45	33	28	0	0	32	35	36	30	0	**290**	**24.2**
		Total	20	31	45	33	28	0	0	32	36	36	30	0	**291**	**24.3**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CUMACEANS																
CCL	*Colurostylis lemurum*		0	0	1	0	1	0	0	0	0	0	0	0	**2**	**0.2**
GASTROPODS																
GCA	*Cominella adspera*		0	1	0	0	1	0	0	1	0	0	0	0	**3**	**0.3**
GNHE	*Notoacmea* sp.		0	0	7	0	0	0	0	0	0	0	0	0	**7**	**0.6**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		0	0	0	0	1	1	0	0	0	0	0	0	**2**	**0.2**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		0	0	0	0	0	0	0	0	0	1	0	0	**1**	**0.1**
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	0	0	0	0	1	**1**	**0.1**
PBOC	Pseudopolydora complex		0	0	4	3	0	0	0	0	1	2	0	0	**10**	**0.8**
PCOS	*Cossura* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGLY	*Glycera* sp.		0	0	0	0	0	0	0	0	0	1	0	0	**1**	**0.1**
PHF	"Capitellidae"		1	0	0	1	0	3	3	1	0	0	0	3	**12**	**1.0**
PMD	*Magelona dakini*		0	2	0	0	0	6	4	0	0	1	0	0	**13**	**1.1**
PNIC	Nereidae		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PPAR	Paraonidae		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
NON INDICATOR SPECIES																
CAMPH	Amphipods		1	0	0	1	1	0	0	1	3	0	1	2	**10**	**0.8**
CCRAB	Crabs		1	0	5	1	2	0	0	0	0	0	0	1	**0**	**0.0**
CCUM	Cumaceans		0	0	0	0	0	0	0	2	0	0	0	1	**3**	**0.3**
CISO	Isopods		1	0	2	0	2	0	0	0	0	1	0	11	**17**	**1.4**
COST	Ostracods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CSHR	Shrimps/Mysids		1	0	1	0	5	1	0	0	0	2	1	0	**11**	**0.9**
COTH	Other Crustaceans		0	0	0	2	0	0	0	0	0	0	0	0	**2**	**0.2**
BOTH	Bivalves		2	1	3	0	1	14	4	1	3	1	3	6	**39**	**3.3**
GOTH	Gastropods		2	0	8	1	0	0	0	0	0	0	0	2	**13**	**1.1**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
ONEM	Nemerteans		0	0	0	0	0	0	1	0	0	0	0	1	**2**	**0.2**
POTH	Polychaetes		0	0	0	0	0	1	1	0	0	0	0	0	**2**	**0.2**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	1	0	0	**1**	**0.1**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	0	0	0	0	0	6	0	0	0	0	3	**9**	**0.8**
TOTAL			**181**	**102**	**311**	**100**	**138**	**167**	**60**	**88**	**136**	**160**	**154**	**111**	**1698**	**141.5**

TP October 2003

INDICATOR SPECIES			CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
APHOX	*Phoxocephalidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BAS	*Austrovenus stutchburyi*	<5	0	0	0	0	1	1	0	0	0	0	0	1	**3**	**0.3**
		>5	1	0	0	0	1	1	0	0	0	0	0	0	**3**	**0.3**
		Cond.analysis	2	4	0	0	4	2	1	3	0	0	3	0	**19**	**1.6**
		Total	3	4	0	0	6	4	1	3	0	0	3	1	**25**	**2.1**
BML	*Macamona liliana*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BNH	*Nucula hartvigiana*	<2	5	39	23	23	75	4	25	9	21	11	5	3	**243**	**20.3**
		>2	47	56	96	39	127	21	6	50	59	53	24	19	**597**	**49.8**
		Total	52	95	119	62	202	25	31	59	80	64	29	22	**840**	**70.0**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	1	1	1	0	0	0	0	3	1	0	0	**7**	**0.6**
		Cond.analysis	9	31	31	29	31	0	0	25	29	25	23	0	**233**	**19.4**
		Total	9	32	32	30	31	0	0	25	32	26	23	0	**240**	**20.0**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CUMACEANS																
CCL	*Colurostylis lemurum*		0	0	0	2	0	0	0	0	0	1	1	2	**6**	**0.5**
GASTROPODS																
GCA	*Cominella adspera*		1	0	0	3	0	0	0	0	0	0	0	0	**4**	**0.3**
GNHE	*Notoacmea* sp.		0	0	1	3	3	0	0	0	1	1	0	0	**9**	**0.8**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		0	0	0	0	0	1	0	0	0	0	0	0	**1**	**0.1**
PAGL	*Aglaophamus* sp.		1	0	0	0	0	1	0	0	0	0	0	0	**2**	**0.2**
PAO	*Aonides oxycephala*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PBOC	Pseudopolydora complex		0	0	3	1	3	0	0	1	0	1	0	0	**9**	**0.8**
PCOS	*Cossura* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGLY	*Glycera* sp.		0	0	0	0	0	0	0	0	0	0	0	1	**1**	**0.1**
PHF	"Capitellidae"		0	0	1	4	0	1	0	0	0	1	1	2	**10**	**0.8**
PMD	*Magelona dakini*		0	0	0	0	0	1	0	0	0	0	0	0	**1**	**0.1**
PNIC	Nereidae		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PPAR	Paraonidae		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
NON INDICATOR SPECIES																
CAMPH	Amphipods		2	1	0	1	0	0	0	0	2	0	0	0	**6**	**0.5**
CCRAB	Crabs		0	1	0	0	0	0	0	0	0	0	0	1	**0**	**0.0**
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CISO	Isopods		2	1	4	0	2	1	0	1	0	3	0	0	**14**	**1.2**
COST	Ostracods		0	0	0	0	1	0	0	0	1	1	0	0	**3**	**0.3**
CSHR	Shrimps/Mysids		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
COTH	Other Crustaceans		0	1	0	0	0	0	0	0	0	3	0	0	**4**	**0.3**
BOTH	Bivalves		0	0	0	0	0	2	0	0	0	0	0	1	**3**	**0.3**
GOTH	Gastropods		0	0	1	2	0	0	0	0	1	0	0	0	**4**	**0.3**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
ONEM	Nemerteans		0	0	0	0	0	5	2	0	0	0	0	4	**11**	**0.9**
POTH	Polychaetes		2	0	3	0	1	1	1	1	1	0	0	1	**11**	**0.9**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	1	0	0	0	0	0	1	0	0	0	0	**2**	**0.2**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		1	0	2	0	0	0	0	0	0	0	0	0	**3**	**0.3**
TOTAL			**73**	**136**	**166**	**108**	**249**	**42**	**35**	**91**	**118**	**101**	**57**	**35**	**1209**	**100.8**

TP April 2004

INDICATOR SPECIES		SIZE	CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	0	5	0	0	0	0	0	**5**	**0.4**
APHOX	*Phoxocephalidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	0	0	0	0	0	0	1	0	0	0	0	0	**1**	**0.1**
		>2	0	0	0	1	0	0	0	0	0	0	0	0	**1**	**0.1**
		Total	0	0	0	1	0	0	1	0	0	0	0	0	**2**	**0.2**
BAS	*Austrovenus stutchburyi*	<5	4	0	0	0	0	0	0	0	0	0	0	0	**4**	**0.3**
		>5	0	1	0	0	0	0	0	1	0	0	0	0	**2**	**0.2**
		Cond.analysis	0	0	0	2	1	1	0	1	2	2	0	1	**10**	**0.8**
		Total	4	1	0	2	1	1	0	2	2	2	0	1	**16**	**1.3**
BML	*Macamona liliana*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BNH	*Nucula hartvigiana*	<2	11	5	10	10	6	5	8	14	8	27	11	22	**137**	**11.4**
		>2	8	18	14	32	14	9	5	15	8	56	12	17	**208**	**17.3**
		Total	19	23	24	42	20	14	13	29	16	83	23	39	**345**	**28.8**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	1	0	0	0	0	0	0	1	1	0	0	**3**	**0.3**
		Cond.analysis	4	20	20	20	20	20	0	20	19	20	0	20	**183**	**15.3**
		Total	4	21	20	20	20	20	0	20	20	21	0	20	**186**	**15.5**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CUMACEANS																
CCL	*Colurostylis lemurum*		0	2	0	0	0	0	0	0	0	0	0	0	**2**	**0.2**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	3	0	0	**3**	**0.3**
GNHE	*Notoacmea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAGL	*Aglaophamus* sp.		1	0	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
PAO	*Aonides oxycephala*		0	0	2	0	0	0	1	0	0	0	1	0	**4**	**0.3**
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PBOC	Pseudopolydora complex		0	5	2	0	0	0	0	1	3	4	0	0	**15**	**1.3**
PCOS	*Cossura* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGLY	*Glycera* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PHF	"Capitellidae"		0	1	0	1	0	0	0	1	0	0	2	0	**5**	**0.4**
PMD	*Magelona dakini*		1	0	0	0	0	0	1	0	0	0	2	1	**5**	**0.4**
PNIC	Nereidae		0	0	0	0	0	0	0	1	0	0	1	0	**2**	**0.2**
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PPAR	Paraonidae		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
NON INDICATOR SPECIES																
CAMPH	Amphipods		0	2	0	0	0	0	1	1	0	0	0	0	**4**	**0.3**
CCRAB	Crabs		0	0	0	0	1	3	0	0	0	7	0	0	**0**	**0.0**
CCUM	Cumaceans		1	0	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
CISO	Isopods		0	1	2	1	0	1	1	1	0	0	1	0	**8**	**0.7**
COST	Ostracods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CSHR	Shrimps/Mysids		0	3	1	1	1	0	3	1	0	13	4	0	**27**	**2.3**
COTH	Other Crustaceans		0	0	0	0	0	0	0	1	1	0	0	0	**2**	**0.2**
BOTH	Bivalves		1	0	0	0	0	0	0	0	0	2	1	0	**4**	**0.3**
GOTH	Gastropods		1	1	0	1	0	1	0	1	0	2	0	0	**7**	**0.6**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
ONEM	Nemerteans		0	0	0	0	0	0	0	0	0	1	0	0	**1**	**0.1**
POTH	Polychaetes		0	1	1	0	1	0	0	0	0	1	0	0	**4**	**0.3**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	0	0	0	0	0	2	1	1	0	1	0	**5**	**0.4**
TOTAL			**32**	**61**	**52**	**69**	**44**	**40**	**28**	**60**	**43**	**139**	**36**	**61**	**654**	**54.5**

MI October 2002

INDICATOR SPECIES			CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		3	11	0	0	0	0	3	5	0	1	1	1	**25**	**2.1**
APHOX	*Phoxocephalidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	4	0	0	0	1	1	2	1	0	0	0	1	**10**	**0.8**
		>2	1	1	0	0	0	0	0	0	0	0	0	0	**2**	**0.2**
		Total	5	1	0	0	1	1	2	1	0	0	0	1	**12**	**1.0**
BAS	*Austrovenus stutchburyi*	<5	1	0	0	1	0	1	1	2	0	1	1	0	**8**	**0.7**
		>5	0	0	2	0	0	0	0	0	0	0	1	0	**3**	**0.3**
		Cond.analysis	0	0	0	1	0	0	0	3	0	0	0	0	**4**	**0.3**
		Total	1	0	2	2	0	1	1	5	0	1	2	0	**15**	**1.3**
BML	*Macamona liliana*	<5	2	0	3	2	2	0	5	2	3	4	3	1	**27**	**2.3**
		5-15	1	1	0	0	0	1	0	0	0	0	0	1	**4**	**0.3**
		>15	1	0	1	0	2	1	0	1	1	3	0	1	**11**	**0.9**
		Cond.analysis	3	1	0	2	1	3	1	3	0	0	1	1	**16**	**1.3**
		Total	7	2	4	4	5	5	6	6	4	7	4	4	**58**	**4.8**
BNH	*Nucula hartvigiana*	<2	0	0	0	1	0	0	0	2	0	0	0	0	**3**	**0.3**
		>2	0	0	1	2	0	0	0	0	0	0	0	0	**3**	**0.3**
		Total	0	0	1	3	0	0	0	2	0	0	0	0	**6**	**0.5**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CUMACEANS																
CCL	*Colurostylis lemurum*		0	0	0	3	1	2	0	4	0	0	1	0	**11**	**0.9**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		0	0	0	0	1	0	0	0	0	0	0	0	**1**	**0.1**
OTHER																
OAN	*Anthopleura aureoradiata*		0	1	3	0	0	0	0	0	0	0	0	0	**4**	**0.3**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		0	0	0	1	0	0	0	0	0	2	0	1	**4**	**0.3**
PAGL	*Aglaophamus* sp.		0	1	0	0	0	0	0	0	0	0	1	0	**2**	**0.2**
PAO	*Aonides oxycephala*		52	29	43	82	67	87	48	79	65	100	58	84	**794**	**66.2**
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	0	1	0	0	0	**1**	**0.1**
PBOC	Pseudopolydora complex		0	0	1	3	1	0	1	0	0	0	1	0	**7**	**0.6**
PCOS	*Cossura* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	1	0	0	0	0	**1**	**0.1**
PGLY	*Glycera* sp.		0	0	0	0	0	0	1	0	0	0	1	0	**2**	**0.2**
PHF	"Capitellidae"		5	4	4	4	1	4	3	6	4	2	2	7	**46**	**3.8**
PMD	*Magelona dakini*		0	1	0	0	0	0	0	1	0	0	1	0	**3**	**0.3**
PNIC	Nereidae		0	2	6	1	2	2	1	1	3	4	3	1	**26**	**2.2**
POP	*Orbinia papillosa*		0	3	1	2	1	2	2	3	0	1	2	1	**18**	**1.5**
PPAR	Paraonidae		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
NON INDICATOR SPECIES																
CAMPH	Amphipods		5	4	0	1	1	1	0	6	1	3	2	1	**25**	**2.1**
CCRAB	Crabs		0	0	0	0	1	1	2	0	0	1	1	0	**6**	**0.5**
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CISO	Isopods		1	0	0	1	1	0	0	1	1	0	1	0	**6**	**0.5**
COST	Ostracods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CSHR	Shrimps/Mysids		1	0	5	2	3	1	2	4	0	1	1	1	**21**	**1.8**
COTH	Other Crustaceans		0	0	0	0	0	0	0	2	0	1	0	0	**3**	**0.3**
BOTH	Bivalves		0	5	4	1	0	3	0	1	2	1	0	2	**19**	**1.6**
GOTH	Gastropods		1	0	0	0	0	0	1	0	0	0	0	0	**2**	**0.2**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	1	0	0	0	0	0	0	0	1	0	**2**	**0.2**
ONEM	Nemerteans		1	1	1	3	3	0	0	0	1	1	3	0	**14**	**1.2**
POTH	Polychaetes		1	1	0	2	1	3	0	4	2	6	5	2	**27**	**2.3**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
TOTAL			**83**	**66**	**76**	**115**	**90**	**113**	**73**	**132**	**84**	**132**	**91**	**106**	**1161**	**96.8**

MI January 2003

INDICATOR SPECIES			CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	0	0	1	0	0	1	0	**2**	**0.2**
APHOX	*Phoxocephalidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	0	0	0	0	2	0	1	1	0	2	2	0	**8**	**0.7**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	2	0	1	1	0	2	2	0	**8**	**0.7**
BAS	*Austrovenus stutchburyi*	<5	0	0	0	0	1	1	0	0	1	0	0	0	**3**	**0.3**
		>5	0	0	0	0	0	1	1	2	0	0	0	0	**4**	**0.3**
		Cond.analysis	0	0	0	1	0	0	0	0	0	0	0	0	**1**	**0.1**
		Total	0	0	0	1	1	2	1	2	1	0	0	0	**8**	**0.7**
BML	*Macamona liliana*	<5	3	1	0	1	1	3	1	2	0	1	0	0	**13**	**1.1**
		5-15	0	0	0	0	0	0	0	0	1	0	0	0	**1**	**0.1**
		>15	0	0	0	1	0	0	0	2	1	1	0	0	**5**	**0.4**
		Cond.analysis	2	2	1	0	1	1	0	1	1	1	2	1	**13**	**1.1**
		Total	5	3	1	2	2	4	1	5	3	3	2	1	**32**	**2.7**
BNH	*Nucula hartvigiana*	<2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CUMACEANS																
CCL	*Colurostylis lemurum*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		0	0	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	2	0	0	0	0	0	0	0	0	**2**	**0.2**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		1	0	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		69	32	49	109	57	41	58	70	68	90	153	88	**884**	**73.7**
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PBOC	Pseudopolydora complex		0	0	0	0	0	1	1	0	0	0	0	0	**2**	**0.2**
PCOS	*Cossura* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	1	0	0	0	0	**1**	**0.1**
PGLY	*Glycera* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PHF	"Capitellidae"		0	0	1	2	0	0	0	1	1	1	1	0	**7**	**0.6**
PMD	*Magelona dakini*		0	0	0	0	0	0	0	0	1	0	1	0	**2**	**0.2**
PNIC	Nereidae		0	0	1	1	0	1	0	0	3	3	1	2	**12**	**1.0**
POP	*Orbinia papillosa*		0	3	0	0	0	1	0	0	0	0	0	1	**5**	**0.4**
PPAR	Paraonidae		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
NON INDICATOR SPECIES																
CAMPH	Amphipods		0	0	0	0	0	0	0	0	0	0	0	1	**1**	**0.1**
CCRAB	Crabs		1	0	1	0	0	0	0	0	0	0	0	1	**3**	**0.3**
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CISO	Isopods		0	0	0	1	0	0	2	1	0	0	0	0	**4**	**0.3**
COST	Ostracods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CSHR	Shrimps/Mysids		14	39	8	21	18	43	27	57	8	37	21	11	**304**	**25.3**
COTH	Other Crustaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BOTH	Bivalves		0	0	0	1	0	0	1	0	0	0	0	0	**2**	**0.2**
GOTH	Gastropods		0	0	0	1	1	0	0	0	0	0	0	0	**2**	**0.2**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	0	1	0	0	0	0	0	**1**	**0.1**
ONEM	Nemerteans		1	1	1	1	2	0	0	0	0	1	0	1	**8**	**0.7**
POTH	Polychaetes		2	1	1	12	1	4	0	1	2	3	1	0	**28**	**2.3**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
TOTAL			**93**	**79**	**64**	**154**	**84**	**97**	**93**	**140**	**87**	**140**	**183**	**106**	**1320**	**110.0**

MI April 2003

			CORE NUMBER													
INDICATOR SPECIES			**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**TOTAL**	**MEAN**
AMPHIPODS																
ACOR	*Corophiidae*		6	15	6	5	0	4	18	2	3	11	1	0	**71**	**5.9**
APHOX	*Phoxocephalidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	1	0	0	0	0	1	0	0	0	0	0	0	**2**	**0.2**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	1	0	0	0	0	1	0	0	0	0	0	0	**2**	**0.2**
BAS	*Austrovenus stutchburyi*	<5	16	6	11	8	11	7	12	6	7	2	9	9	**104**	**8.7**
		>5	0	0	0	1	1	0	1	0	0	1	0	0	**4**	**0.3**
		Cond.analysis	0	0	0	0	0	0	0	2	0	0	0	0	**2**	**0.2**
		Total	16	6	11	9	12	7	13	8	7	3	9	9	**110**	**9.2**
BML	*Macamona liliana*	<5	5	1	5	4	3	4	0	3	3	3	6	5	**42**	**3.5**
		5-15	2	1	0	0	0	3	0	1	0	0	1	1	**9**	**0.8**
		>15	1	2	0	0	0	0	1	0	0	0	0	0	**4**	**0.3**
		Cond.analysis	1	1	1	1	1	0	2	2	0	0	1	0	**10**	**0.8**
		Total	9	5	6	5	4	7	3	6	3	3	8	6	**65**	**5.4**
BNH	*Nucula hartvigiana*	<2	1	0	3	0	0	0	1	0	0	0	0	0	**5**	**0.4**
		>2	1	0	1	1	1	0	0	1	0	0	0	0	**5**	**0.4**
		Total	2	0	4	1	1	0	1	1	0	0	0	0	**10**	**0.8**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CUMACEANS																
CCL	*Colurostylis lemurum*		3	2	3	1	0	3	3	1	0	1	3	0	**20**	**1.7**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		111	56	61	81	84	11	65	76	17	54	48	16	**680**	**56.7**
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PBOC	Pseudopolydora complex		2	0	0	0	0	0	0	0	0	0	0	1	**3**	**0.3**
PCOS	*Cossura* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGLY	*Glycera* sp.		1	0	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
PHF	"Capitellidae"		0	1	8	0	0	0	0	3	0	1	0	0	**13**	**1.1**
PMD	*Magelona dakini*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PNIC	Nereidae		4	9	0	1	3	9	14	7	4	6	9	9	**75**	**6.3**
POP	*Orbinia papillosa*		1	1	0	0	1	0	1	0	1	1	0	2	**8**	**0.7**
PPAR	Paraonidae		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
NON INDICATOR SPECIES																
CAMPH	Amphipods		0	0	0	1	1	1	0	1	1	0	1	0	**6**	**0.5**
CCRAB	Crabs		0	0	0	3	0	0	0	0	0	0	0	0	**3**	**0.3**
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CISO	Isopods		0	2	0	6	1	5	1	1	1	2	2	0	**21**	**1.8**
COST	Ostracods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CSHR	Shrimps/Mysids		0	1	0	0	0	0	0	0	1	0	0	0	**2**	**0.2**
COTH	Other Crustaceans		0	1	0	0	0	0	1	0	0	0	0	1	**3**	**0.3**
BOTH	Bivalves		4	9	8	2	8	1	8	1	4	5	2	8	**60**	**5.0**
GOTH	Gastropods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	0	0	1	0	0	0	0	**1**	**0.1**
ONEM	Nemerteans		1	2	1	0	1	1	0	2	2	0	1	0	**11**	**0.9**
POTH	Polychaetes		2	0	2	3	0	1	2	4	1	0	4	1	**20**	**1.7**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	1	**1**	**0.1**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
TOTAL			**163**	**110**	**110**	**118**	**116**	**51**	**130**	**114**	**45**	**87**	**88**	**54**	**1186**	**98.8**

MI July 2003

INDICATOR SPECIES		SIZE	CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		1	0	0	0	0	0	1	0	0	0	0	3	**5**	**0.4**
APHOX	*Phoxocephalidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	0	1	0	1	0	0	0	0	1	1	0	0	**4**	**0.3**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	1	0	1	0	0	0	0	1	1	0	0	**4**	**0.3**
BAS	*Austrovenus stutchburyi*	<5	0	5	3	2	3	7	3	3	6	3	2	5	**42**	**3.5**
		>5	5	3	1	1	5	3	2	3	5	3	1	2	**34**	**2.8**
		Cond.analysis	1	0	0	0	0	0	1	0	0	0	0	0	**2**	**0.2**
		Total	6	8	4	3	8	10	6	6	11	6	3	7	**78**	**6.5**
BML	*Macamona liliana*	<5	9	4	1	3	6	7	6	8	1	11	0	3	**59**	**4.9**
		5-15	1	1	0	0	1	4	2	2	2	1	1	1	**16**	**1.3**
		>15	0	1	0	1	0	2	2	0	1	1	0	1	**9**	**0.8**
		Cond.analysis	0	1	2	0	0	1	1	1	1	1	1	0	**9**	**0.8**
		Total	10	7	3	4	7	14	11	11	5	14	2	5	**93**	**7.8**
BNH	*Nucula hartvigiana*	<2	0	1	0	0	0	0	0	0	1	0	0	0	**2**	**0.2**
		>2	0	0	0	0	1	0	0	0	1	0	0	1	**3**	**0.3**
		Total	0	1	0	0	1	0	0	0	2	0	0	1	**5**	**0.4**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BTHL	*Theora lubrica*	<5	0	0	0	0	1	0	0	0	0	0	0	1	**2**	**0.2**
		>5	0	0	0	0	1	0	0	0	0	0	0	0	**1**	**0.1**
		Total	0	0	0	0	2	0	0	0	0	0	0	1	**3**	**0.3**
CUMACEANS																
CCL	*Colurostylis lemurum*		2	1	2	2	3	1	2	1	6	4	2	1	**27**	**2.3**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	1	0	0	0	0	0	0	0	**1**	**0.1**
GNHE	*Notoacmea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		0	0	0	1	0	0	0	0	0	0	0	0	**1**	**0.1**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		36	34	73	72	40	44	42	46	50	41	46	37	**561**	**46.8**
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PBOC	Pseudopolydora complex		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PCOS	*Cossura* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	1	0	0	0	0	0	0	0	**1**	**0.1**
PGLY	*Glycera* sp.		0	0	0	0	0	1	1	0	0	0	0	0	**2**	**0.2**
PHF	"Capitellidae"		1	3	3	2	1	4	0	1	1	0	1	4	**21**	**1.8**
PMD	*Magelona dakini*		1	2	5	1	0	1	0	0	0	2	4	2	**18**	**1.5**
PNIC	Nereidae		2	5	1	1	1	3	1	2	6	3	0	2	**27**	**2.3**
POP	*Orbinia papillosa*		15	9	4	4	4	10	3	3	22	11	15	4	**104**	**8.7**
PPAR	Paraonidae		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
NON INDICATOR SPECIES																
CAMPH	Amphipods		2	0	4	7	0	0	0	2	5	0	2	1	**23**	**1.9**
CCRAB	Crabs		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CISO	Isopods		0	0	0	8	0	0	0	1	0	2	1	0	**12**	**1.0**
COST	Ostracods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CSHR	Shrimps/Mysids		0	0	0	1	0	1	0	1	4	1	0	2	**10**	**0.8**
COTH	Other Crustaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BOTH	Bivalves		1	4	0	0	0	1	0	1	2	1	1	2	**13**	**1.1**
GOTH	Gastropods		0	0	0	0	0	1	0	0	1	0	0	7	**9**	**0.8**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		2	0	1	1	1	0	1	0	1	0	0	1	**8**	**0.7**
ONEM	Nemerteans		2	1	1	1	3	2	1	1	0	2	1	2	**17**	**1.4**
POTH	Polychaetes		1	0	1	2	0	1	2	1	2	0	1	3	**14**	**1.2**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
TOTAL			**82**	**76**	**102**	**111**	**73**	**94**	**71**	**77**	**119**	**88**	**79**	**85**	**1057**	**88.1**

MI October 2003

INDICATOR SPECIES			CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		1	0	3	0	1	1	2	1	1	0	0	1	**11**	**0.9**
APHOX	*Phoxocephalidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	0	0	0	0	0	0	0	0	0	3	2	1	**6**	**0.5**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	3	2	1	**6**	**0.5**
BAS	*Austrovenus stutchburyi*	<5	1	0	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
		>5	6	3	1	0	0	2	3	2	3	1	2	2	**25**	**2.1**
		Cond.analysis	1	1	0	1	0	0	1	0	0	1	0	0	**5**	**0.4**
		Total	8	4	1	1	0	2	4	2	3	2	2	2	**31**	**2.6**
BML	*Macamona liliana*	<5	0	0	2	2	0	1	4	0	6	4	1	2	**22**	**1.8**
		5-15	4	4	1	2	0	3	0	1	1	0	0	2	**18**	**1.5**
		>15	0	0	0	2	1	0	2	1	1	0	0	0	**7**	**0.6**
		Cond.analysis	0	1	0	1	1	0	1	2	1	2	1	0	**10**	**0.8**
		Total	4	5	3	7	2	4	7	4	9	6	2	4	**57**	**4.8**
BNH	*Nucula hartvigiana*	<2	0	1	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
		>2	0	0	0	0	0	0	0	1	0	1	0	0	**2**	**0.2**
		Total	0	1	0	0	0	0	0	1	0	1	0	0	**3**	**0.3**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CUMACEANS																
CCL	*Colurostylis lemurum*		0	2	1	1	0	0	2	0	3	0	0	2	**11**	**0.9**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	1	0	0	0	0	0	0	0	0	**1**	**0.1**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		1	0	1	1	0	0	0	0	0	0	0	0	**3**	**0.3**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		38	18	71	81	29	14	48	58	76	90	39	43	**605**	**50.4**
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PBOC	Pseudopolydora complex		0	0	0	0	0	1	0	1	0	1	0	0	**3**	**0.3**
PCOS	*Cossura* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGLY	*Glycera* sp.		1	0	0	0	1	0	0	0	0	0	2	0	**4**	**0.3**
PHF	"Capitellidae"		2	4	1	1	0	4	3	0	1	2	3	6	**27**	**2.3**
PMD	*Magelona dakini*		2	4	1	1	2	1	1	0	0	0	0	2	**14**	**1.2**
PNIC	Nereidae		0	0	1	0	0	0	0	0	0	0	0	1	**2**	**0.2**
POP	*Orbinia papillosa*		3	16	6	2	4	11	4	7	5	2	3	4	**67**	**5.6**
PPAR	Paraonidae		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
NON INDICATOR SPECIES																
CAMPH	Amphipods		0	0	1	0	0	0	1	0	2	1	0	6	**11**	**0.9**
CCRAB	Crabs		0	0	0	0	0	0	1	0	0	0	0	1	**2**	**0.2**
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CISO	Isopods		0	0	1	0	0	0	0	1	0	0	0	0	**2**	**0.2**
COST	Ostracods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CSHR	Shrimps/Mysids		0	1	1	0	1	0	0	0	1	1	0	0	**5**	**0.4**
COTH	Other Crustaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BOTH	Bivalves		1	2	0	0	0	2	0	0	1	0	0	1	**7**	**0.6**
GOTH	Gastropods		0	0	0	0	0	1	0	0	0	0	0	0	**1**	**0.1**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		1	0	0	0	0	2	1	1	1	2	0	2	**10**	**0.8**
ONEM	Nemerteans		3	3	3	2	0	5	3	1	1	3	0	2	**26**	**2.2**
POTH	Polychaetes		2	2	6	1	0	1	1	3	1	3	2	4	**26**	**2.2**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
TOTAL			**67**	**62**	**101**	**99**	**40**	**49**	**78**	**80**	**105**	**117**	**55**	**82**	**935**	**77.9**

MI January 2004

INDICATOR SPECIES			CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		0	2	0	12	1	2	5	0	0	0	0	1	**23**	**1.9**
APHOX	*Phoxocephalidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	0	0	0	1	0	0	0	1	0	0	0	0	**2**	**0.2**
		>2	0	0	0	1	0	0	0	0	0	0	0	0	**1**	**0.1**
		Total	0	0	0	2	0	0	0	1	0	0	0	0	**3**	**0.3**
BAS	*Austrovenus stutchburyi*	<5	4	4	0	1	1	5	4	3	2	3	6	4	**37**	**3.1**
		>5	0	2	0	0	1	2	0	0	0	2	0	0	**7**	**0.6**
		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	1	**1**	**0.1**
		Total	4	6	0	1	2	7	4	3	2	5	6	5	**45**	**3.8**
BML	*Macamona liliana*	<5	10	12	0	4	11	8	8	17	16	11	9	10	**116**	**9.7**
		5-15	5	1	3	3	4	0	1	3	5	3	3	1	**32**	**2.7**
		>15	1	0	0	1	0	1	1	0	0	0	0	0	**4**	**0.3**
		Cond.analysis	0	0	1	1	1	1	1	2	1	1	0	0	**9**	**0.8**
		Total	16	13	4	9	16	10	11	22	22	15	12	11	**161**	**13.4**
BNH	*Nucula hartvigiana*	<2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CUMACEANS																
CCL	*Colurostylis lemurum*		4	1	0	2	1	3	0	1	2	4	0	1	**19**	**1.6**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	0	0	0	1	0	0	0	**1**	**0.1**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		0	2	0	2	1	1	0	0	2	1	0	0	**9**	**0.8**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		21	30	33	59	14	17	24	39	62	68	49	32	**448**	**37.3**
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PBOC	Pseudopolydora complex		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PCOS	*Cossura* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGLY	*Glycera* sp.		0	0	0	0	2	0	0	0	0	1	0	0	**3**	**0.3**
PHF	"Capitellidae"		1	2	1	0	3	0	0	0	3	0	0	0	**10**	**0.8**
PMD	*Magelona dakini*		1	2	0	0	2	0	1	1	1	1	2	1	**12**	**1.0**
PNIC	Nereidae		1	0	1	0	0	0	0	0	2	1	0	1	**6**	**0.5**
POP	*Orbinia papillosa*		2	6	0	0	0	1	1	0	3	0	0	4	**17**	**1.4**
PPAR	Paraonidae		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
NON INDICATOR SPECIES																
CAMPH	Amphipods		0	0	0	2	0	0	0	0	0	0	0	0	**2**	**0.2**
CCRAB	Crabs		0	2	2	4	1	1	1	0	2	0	0	1	**14**	**1.2**
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	1	0	0	**1**	**0.1**
CISO	Isopods		0	0	0	0	0	0	1	0	2	0	0	1	**4**	**0.3**
COST	Ostracods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CSHR	Shrimps/Mysids		0	0	0	0	2	0	1	0	0	0	1	0	**4**	**0.3**
COTH	Other Crustaceans		0	0	0	0	0	0	1	0	1	0	0	0	**2**	**0.2**
BOTH	Bivalves		1	12	0	1	11	2	10	7	4	5	9	22	**84**	**7.0**
GOTH	Gastropods		0	0	0	0	0	0	0	0	0	1	0	0	**1**	**0.1**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		1	1	1	2	0	1	2	0	0	2	2	0	**12**	**1.0**
ONEM	Nemerteans		0	3	1	0	1	1	2	1	1	1	1	2	**14**	**1.2**
POTH	Polychaetes		0	0	1	0	0	0	0	0	2	2	0	0	**5**	**0.4**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		1	0	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
TOTAL			**53**	**82**	**44**	**96**	**57**	**46**	**64**	**75**	**112**	**108**	**82**	**82**	**901**	**75.1**

MI April 2004

INDICATOR SPECIES		SIZE	CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
APHOX	*Phoxocephalidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	0	0	0	1	12	0	4	0	0	0	0	0	**17**	**1.4**
		>2	0	0	0	1	1	0	0	0	0	0	0	0	**2**	**0.2**
		Total	0	0	0	2	13	0	4	0	0	0	0	0	**19**	**1.6**
BAS	*Austrovenus stutchburyi*	<5	7	1	4	5	12	3	5	2	7	10	2	4	**62**	**5.2**
		>5	3	0	0	0	1	3	2	0	1	2	0	0	**12**	**1.0**
		Cond.analysis	1	0	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
		Total	11	1	4	5	13	6	7	2	8	12	2	4	**75**	**6.3**
BML	*Macamona liliana*	<5	6	2	7	4	10	3	3	2	6	4	0	4	**51**	**4.3**
		5-15	3	0	0	1	2	0	0	2	2	0	2	0	**12**	**1.0**
		>15	0	0	0	0	0	0	0	1	0	0	0	0	**1**	**0.1**
		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	9	2	7	5	12	3	3	5	8	4	2	4	**64**	**5.3**
BNH	*Nucula hartvigiana*	<2	0	0	1	0	0	0	0	1	0	0	1	0	**3**	**0.3**
		>2	0	0	0	0	0	0	0	1	0	0	0	0	**1**	**0.1**
		Total	0	0	1	0	0	0	0	2	0	0	1	0	**4**	**0.3**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	6	0	**6**	**0.5**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	6	0	**6**	**0.5**
BTHL	*Theora lubrica*	<5	0	0	0	1	0	2	0	0	4	0	0	0	**7**	**0.6**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	1	0	2	0	0	4	0	0	0	**7**	**0.6**
CUMACEANS																
CCL	*Colurostylis lemurum*		0	0	0	1	0	0	1	0	1	0	0	0	**3**	**0.3**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		0	1	0	1	0	2	0	0	0	0	1	1	**6**	**0.5**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		6	4	16	16	10	24	8	17	29	30	7	15	**182**	**15.2**
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PBOC	Pseudopolydora complex		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PCOS	*Cossura* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGLY	*Glycera* sp.		0	0	0	0	0	0	0	0	2	0	0	1	**3**	**0.3**
PHF	"Capitellidae"		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PMD	*Magelona dakini*		1	0	0	0	0	0	1	2	0	1	0	1	**6**	**0.5**
PNIC	Nereidae		0	0	0	0	1	0	0	0	1	0	3	0	**5**	**0.4**
POP	*Orbinia papillosa*		0	0	0	1	0	0	4	1	1	2	2	0	**11**	**0.9**
PPAR	Paraonidae		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
NON INDICATOR SPECIES																
CAMPH	Amphipods		0	0	0	0	0	0	1	1	1	0	1	0	**4**	**0.3**
CCRAB	Crabs		0	1	1	1	0	1	0	0	1	0	0	1	**6**	**0.5**
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CISO	Isopods		1	1	0	0	0	0	1	0	3	3	0	1	**10**	**0.8**
COST	Ostracods		0	1	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
CSHR	Shrimps/Mysids		0	2	5	0	2	2	0	0	0	0	0	1	**12**	**1.0**
COTH	Other Crustaceans		0	0	1	0	0	0	0	0	0	86	0	1	**88**	**7.3**
BOTH	Bivalves		3	3	0	0	3	1	2	2	3	2	0	1	**20**	**1.7**
GOTH	Gastropods		0	0	0	0	0	0	5	0	0	0	0	0	**5**	**0.4**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		2	0	1	0	0	0	0	0	0	0	0	2	**5**	**0.4**
ONEM	Nemerteans		0	0	1	0	0	1	0	1	0	0	0	0	**3**	**0.3**
POTH	Polychaetes		0	0	3	2	1	0	0	0	2	1	0	1	**10**	**0.8**
OOLIG	Oligochaetes		0	0	0	0	0	0	1	0	0	0	0	0	**1**	**0.1**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	0	0	0	8	0	14	0	0	5	0	0	**27**	**2.3**
TOTAL			**33**	**16**	**40**	**35**	**63**	**42**	**52**	**33**	**64**	**146**	**25**	**34**	**583**	**48.6**

KB July 2002

INDICATOR SPECIES			CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		2	1	1	2	0	2	0	0	0	0	0	0	**8**	**0.7**
APHOX	*Phoxocephalidae*		0	0	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	2	8	0	0	0	0	6	0	6	0	4	3	**29**	**2.4**
		>2	0	0	0	0	0	0	0	0	0	1	0	0	**1**	**0.1**
		Total	2	8	0	0	0	0	6	0	6	1	4	3	**30**	**2.5**
BAS	*Austrovenus stutchburyi*	<5	11	2	2	4	1	8	8	1	4	2	9	14	**66**	**5.5**
		>5	1	2	5	1	0	0	0	1	4	3	1	4	**22**	**1.8**
		Cond.analysis	5	1	0	1	0	1	1	0	2	0	0	3	**14**	**1.2**
		Total	17	5	7	6	1	9	9	2	10	5	10	21	**102**	**8.5**
BML	*Macamona liliana*	<5	0	0	0	0	0	0	0	0	0	1	0	0	**1**	**0.1**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	1	2	0	2	1	0	0	0	0	2	0	1	**9**	**0.8**
		Cond.analysis	0	1	1	1	0	3	1	2	1	0	3	0	**13**	**1.1**
		Total	1	3	1	3	1	3	1	2	1	3	3	1	**23**	**1.9**
BNH	*Nucula hartvigiana*	<2	0	3	0	0	1	0	0	1	0	1	0	0	**6**	**0.5**
		>2	1	2	1	0	1	3	2	2	4	1	0	2	**19**	**1.6**
		Total	1	5	1	0	2	3	2	3	4	2	0	2	**25**	**2.1**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CUMACEANS																
CCL	*Colurostylis lemurum*		0	1	0	1	0	0	0	0	0	0	0	0	**2**	**0.2**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	1	0	0	0	0	0	0	3	0	0	**4**	**0.3**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		2	6	3	4	1	1	0	2	4	5	2	1	**31**	**2.6**
PAGL	*Aglaophamus* sp.		0	0	1	0	0	0	0	0	1	0	0	0	**2**	**0.2**
PAO	*Aonides oxycephala*		9	15	4	10	6	1	1	1	0	7	1	0	**55**	**4.6**
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PBOC	Pseudopolydora complex		0	1	2	0	2	2	0	2	1	2	2	1	**15**	**1.3**
PCOS	*Cossura* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	1	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
PGLY	*Glycera* sp.		2	2	1	0	1	1	1	1	1	1	0	0	**11**	**0.9**
PHF	"Capitellidae"		13	16	17	21	20	27	30	34	29	19	31	33	**290**	**24.2**
PMD	*Magelona dakini*		9	0	0	8	13	3	8	8	1	1	9	2	**62**	**5.2**
PNIC	Nereidae		0	1	0	2	1	2	0	0	3	1	2	3	**15**	**1.3**
POP	*Orbinia papillosa*		0	1	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
PPAR	Paraonidae		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
NON INDICATOR SPECIES																
CAMPH	Amphipods		20	13	4	12	11	25	7	9	22	6	2	1	**132**	**11.0**
CCRAB	Crabs		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CISO	Isopods		0	0	0	0	0	0	0	0	0	0	0	1	**1**	**0.1**
COST	Ostracods		0	0	0	1	0	0	0	0	0	0	0	0	**1**	**0.1**
CSHR	Shrimps/Mysids		1	0	1	4	3	1	0	2	0	5	8	3	**28**	**2.3**
COTH	Other Crustaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BOTH	Bivalves		3	7	2	5	7	4	2	2	2	3	1	1	**39**	**3.3**
GOTH	Gastropods		0	0	1	1	0	0	0	2	1	0	1	3	**9**	**0.8**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
ONEM	Nemerteans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
POTH	Polychaetes		0	1	2	6	0	1	0	0	1	4	0	0	**15**	**1.3**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
TOTAL			**82**	**87**	**50**	**86**	**69**	**85**	**67**	**70**	**87**	**68**	**76**	**76**	**903**	**75.3**

KB October 2002

INDICATOR SPECIES		SIZE	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
			CORE NUMBER													
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	0	1	0	0	0	0	0	**1**	**0.1**
APHOX	*Phoxocephalidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	2	4	2	1	11	1	9	0	0	2	11	1	**44**	**3.7**
		>2	0	0	0	0	1	0	1	0	0	0	0	1	**3**	**0.3**
		Total	2	4	2	1	12	1	10	0	0	2	11	2	**47**	**3.9**
BAS	*Austrovenus stutchburyi*	<5	2	3	12	2	7	4	5	12	3	2	6	1	**59**	**4.9**
		>5	3	0	1	1	2	0	2	1	1	0	4	2	**17**	**1.4**
		Cond.analysis	1	3	9		2	0	2	2	1	1	1	0	**22**	**1.8**
		Total	6	6	22	3	11	4	9	15	5	3	11	3	**98**	**8.2**
BML	*Macamona liliana*	<5	0	0	0	0	1	1	0	0	0	0	0	0	**2**	**0.2**
		5-15	0	0	0	0	0	1	0	0	0	0	0	0	**1**	**0.1**
		>15	0	0	1	1	0	0	0	0	1	1	0	0	**4**	**0.3**
		Cond.analysis	1	0	2	1	1	1	0	1	0	1	1	1	**10**	**0.8**
		Total	1	0	3	2	2	3	0	1	1	2	1	1	**17**	**1.4**
BNH	*Nucula hartvigiana*	<2	0	0	8	0	1	2	0	1	2	0	0	0	**14**	**1.2**
		>2	2	2	6	1	2	1	2	2	5	0	1	4	**28**	**2.3**
		Total	2	2	14	1	3	3	2	3	7	0	1	4	**42**	**3.5**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BTHL	*Theora lubrica*	<5	1	0	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	1	0	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
CUMACEANS																
CCL	*Colurostylis lemurum*		0	1	0	0	1	0	1	2	0	0	0	4	**9**	**0.8**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		3	3	0	1	1	2	1	0	2	1	0	2	**16**	**1.3**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	1	0	0	0	0	0	**1**	**0.1**
PAO	*Aonides oxycephala*		9	32	0	7	5	2	1	2	4	2	3	7	**74**	**6.2**
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PBOC	Pseudopolydora complex		2	2	1	0	2	1	1	7	0	0	1	3	**20**	**1.7**
PCOS	*Cossura* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	2	0	1	1	1	0	0	1	0	1	**7**	**0.6**
PGLY	*Glycera* sp.		2	0	0	0	0	0	0	1	1	0	2	0	**6**	**0.5**
PHF	"Capitellidae"		26	24	20	12	16	17	7	21	18	24	15	17	**217**	**18.1**
PMD	*Magelona dakini*		5	3	3	2	4	6	4	5	8	4	4	6	**54**	**4.5**
PNIC	Nereidae		2	5	3	2	1	1	2	1	0	0	1	0	**18**	**1.5**
POP	*Orbinia papillosa*		0	0	0	0	1	0	0	0	0	0	0	0	**1**	**0.1**
PPAR	Paraonidae		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
NON INDICATOR SPECIES																
CAMPH	Amphipods		0	2	0	1	0	0	0	1	0	1	2	0	**7**	**0.6**
CCRAB	Crabs		0	1	0	0	0	1	0	0	0	1	1	1	**5**	**0.4**
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CISO	Isopods		0	0	1	0	0	0	0	7	0	0	0	1	**9**	**0.8**
COST	Ostracods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CSHR	Shrimps/Mysids		0	1	0	0	1	0	1	1	0	2	0	0	**6**	**0.5**
COTH	Other Crustaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BOTH	Bivalves		2	5	0	3	9	2	1	1	2	3	5	4	**37**	**3.1**
GOTH	Gastropods		0	0	0	1	0	0	1	0	0	1	0	0	**3**	**0.3**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
ONEM	Nemerteans		2	0	1	0	0	0	2	4	0	0	5	2	**16**	**1.3**
POTH	Polychaetes		2	4	0	2	2	0	1	2	4	4	0	0	**21**	**1.8**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	0	0	0	0	0	0	1	0	0	0	0	**1**	**0.1**
TOTAL			**67**	**95**	**72**	**38**	**72**	**44**	**47**	**75**	**52**	**51**	**63**	**58**	**734**	**61.2**

KB January 2003

INDICATOR SPECIES		SIZE	CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		5	1	1	2	0	5	0	0	2	3	1	0	**20**	**1.7**
APHOX	*Phoxocephalidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	0	0	1	16	35	5	16	17	6	4	0	3	**103**	**8.6**
		>2	1	2	0	8	8	2	0	1	1	0	0	0	**23**	**1.9**
		Total	1	2	1	24	43	7	16	18	7	4	0	3	**126**	**10.5**
BAS	*Austrovenus stutchburyi*	<5	1	2	0	3	1	1	4	0	1	0	2	6	**21**	**1.8**
		>5	4	3	1	0	3	3	5	0	0	1	1	1	**22**	**1.8**
		Cond.analysis	4	3	1	2	0	3	4	2	1	0	2	1	**23**	**1.9**
		Total	9	8	2	5	4	7	13	2	2	1	5	8	**66**	**5.5**
BML	*Macamona liliana*	<5	0	0	0	0	0	0	1	0	0	0	0	0	**1**	**0.1**
		5-15	0	1	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
		>15	0	0	0	1	0	0	0	0	0	0	0	1	**2**	**0.2**
		Cond.analysis	0	0	2	3	1	1	0	2	1	2	1	1	**14**	**1.2**
		Total	0	1	2	4	1	1	1	2	1	2	1	2	**18**	**1.5**
BNH	*Nucula hartvigiana*	<2	0	0	0	0	1	0	1	1	0	0	0	0	**3**	**0.3**
		>2	1	4	2	1	6	3	4	0	2	3	0	2	**28**	**2.3**
		Total	1	4	2	1	7	3	5	1	2	3	0	2	**31**	**2.6**
BPA	*Paphies australis*	<5	0	0	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CUMACEANS																
CCL	*Colurostylis lemurum*		0	0	0	1	2	2	0	2	2	1	1	0	**11**	**0.9**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	0	1	0	0	0	0	0	**1**	**0.1**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		1	0	1	1	1	0	1	1	0	3	1	0	**10**	**0.8**
PAGL	*Aglaophamus* sp.		0	1	1	0	0	0	0	0	0	0	0	1	**3**	**0.3**
PAO	*Aonides oxycephala*		2	13	14	6	19	3	0	2	0	13	3	0	**75**	**6.3**
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PBOC	Pseudopolydora complex		0	0	2	0	1	0	1	0	0	1	0	0	**5**	**0.4**
PCOS	*Cossura* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGLY	*Glycera* sp.		0	1	1	4	1	1	2	3	2	0	1	0	**16**	**1.3**
PHF	"Capitellidae"		8	0	3	4	14	12	2	2	2	12	6	14	**79**	**6.6**
PMD	*Magelona dakini*		4	0	1	0	2	2	1	1	0	5	4	1	**21**	**1.8**
PNIC	Nereidae		0	1	0	0	2	1	1	2	1	1	0	1	**10**	**0.8**
POP	*Orbinia papillosa*		0	1	2	0	0	0	1	0	0	0	0	0	**4**	**0.3**
PPAR	Paraonidae		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
NON INDICATOR SPECIES																
CAMPH	Amphipods		0	0	0	0	1	0	0	0	0	0	0	0	**1**	**0.1**
CCRAB	Crabs		0	0	0	0	1	1	0	0	1	0	0	0	**3**	**0.3**
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CISO	Isopods		1	0	0	0	0	2	3	2	0	0	0	0	**8**	**0.7**
COST	Ostracods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CSHR	Shrimps/Mysids		31	19	41	41	75	20	9	20	0	21	6	61	**344**	**28.7**
COTH	Other Crustaceans		0	1	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
BOTH	Bivalves		1	2	4	6	9	0	0	6	1	3	2	6	**40**	**3.3**
GOTH	Gastropods		5	0	0	0	0	1	0	0	0	1	0	0	**7**	**0.6**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
ONEM	Nemerteans		1	0	2	3	0	4	0	3	13	4	2	2	**34**	**2.8**
POTH	Polychaetes		0	2	0	0	1	1	0	2	0	0	4	0	**10**	**0.8**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	1	0	0	0	0	0	0	**1**	**0.1**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
TOTAL			**70**	**57**	**81**	**102**	**184**	**74**	**57**	**69**	**36**	**78**	**37**	**101**	**946**	**78.8**

KB April 2003

			CORE NUMBER												TOTAL	MEAN
			1	2	3	4	5	6	7	8	9	10	11	12		
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	1	0	0	0	0	0	0	0	**1**	**0.1**
APHOX	*Phoxocephalidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BIVALVES																
BAB	*Arthritica bifurca*	<2	2	1	0	1	1	1	2	1	6	7	10	0	**32**	**2.7**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	2	1	0	1	1	1	2	1	6	7	10	0	**32**	**2.7**
BAS	*Austrovenus stutchburyi*	<5	19	4	19	12	17	12	31	13	9	11	17	16	**180**	**15.0**
		>5	0	0	1	0	0	6	2	0	0	1	1	2	**13**	**1.1**
		Cond.analysis	5	1	4	0	2	4	4	1	2	0	5	4	**32**	**2.7**
		Total	24	5	24	12	19	22	37	14	11	12	23	22	**225**	**18.8**
BML	*Macamona liliana*	<5	5	3	21	11	5	11	22	14	19	27	5	22	**165**	**13.8**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	1	0	**1**	**0.1**
		Cond.analysis	1	1	3	0	2	0	0	1	2	0	1	2	**13**	**1.1**
		Total	6	4	24	11	7	11	22	15	21	27	7	24	**179**	**14.9**
BNH	*Nucula hartvigiana*	<2	2	0	0	0	0	0	0	1	0	0	0	0	**3**	**0.3**
		>2	4	2	0	1	0	3	1	0	0	0	1	0	**12**	**1.0**
		Total	6	2	0	1	0	3	1	1	0	0	1	0	**15**	**1.3**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BTHL	*Theora lubrica*	<5	0	1	2	0	1	4	14	1	2	0	1	2	**28**	**2.3**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	1	2	0	1	4	14	1	2	0	1	2	**28**	**2.3**
CUMACEANS																
CCL	*Colurostylis lemurum*		0	1	1	0	1	0	0	1	2	2	1	1	**10**	**0.8**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	0	1	0	0	0	0	0	0	0	**1**	**0.1**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		2	1	4	2	0	1	0	1	0	0	1	0	**12**	**1.0**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		2	9	31	12	6	0	1	4	6	9	0	1	**81**	**6.8**
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PBOC	Pseudopolydora complex		0	1	3	1	0	1	1	0	0	2	2	0	**11**	**0.9**
PCOS	*Cossura* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	0	2	0	0	1	0	0	0	**3**	**0.3**
PGLY	*Glycera* sp.		0	0	1	0	1	0	0	0	0	0	1	1	**4**	**0.3**
PHF	"Capitellidae"		1	4	11	11	7	5	25	4	48	30	20	112	**278**	**23.2**
PMD	*Magelona dakini*		0	0	2	2	1	1	2	1	2	4	5	2	**22**	**1.8**
PNIC	Nereidae		2	2	2	3	1	1	0	2	1	3	1	2	**20**	**1.7**
POP	*Orbinia papillosa*		0	3	1	1	0	0	0	1	0	0	0	0	**6**	**0.5**
PPAR	Paraonidae		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
NON INDICATOR SPECIES																
CAMPH	Amphipods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CCRAB	Crabs		2	0	0	0	0	0	1	1	0	0	1	0	**5**	**0.4**
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CISO	Isopods		6	1	0	1	1	0	0	4	0	0	1	3	**17**	**1.4**
COST	Ostracods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CSHR	Shrimps/Mysids		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
COTH	Other Crustaceans		0	0	0	0	0	0	0	0	1	1	0	0	**2**	**0.2**
BOTH	Bivalves		4	9	9	9	7	10	10	3	9	7	7	5	**89**	**7.4**
GOTH	Gastropods		0	0	0	0	0	0	0	0	0	0	2	1	**3**	**0.3**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	0	1	0	0	0	0	0	**1**	**0.1**
ONEM	Nemerteans		0	1	0	0	1	1	0	0	1	0	1	4	**9**	**0.8**
POTH	Polychaetes		3	1	7	2	4	0	1	4	3	2	0	0	**27**	**2.3**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
TOTAL			**60**	**46**	**122**	**69**	**60**	**63**	**118**	**58**	**114**	**106**	**85**	**180**	**1081**	**90.1**

KB July 2003

INDICATOR SPECIES		SIZE	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
			CORE NUMBER													
AMPHIPODS																
ACOR	*Corophiidae*		48	4	13	27	8	42	2	0	17	0	2	0	**163**	**13.6**
APHOX	*Phoxocephalidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	1	0	0	0	0	3	9	3	1	3	0	0	**20**	**1.7**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	1	0	0	0	0	3	9	3	1	3	0	0	**20**	**1.7**
BAS	*Austrovenus stutchburyi*	<5	12	7	5	8	6	9	13	11	10	12	11	7	**111**	**9.3**
		>5	7	4	0	0	1	5	4	2	2	3	7	0	**35**	**2.9**
		Cond.analysis	0	0	0	1	0	0	1	0	0	0	0	2	**4**	**0.3**
		Total	19	11	5	9	7	14	18	13	12	15	18	9	**150**	**12.5**
BML	*Macamona liliana*	<5	2	5	2	7	1	1	1	2	5	11	4	0	**41**	**3.4**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	1	0	0	0	0	0	0	0	0	1	1	0	**3**	**0.3**
		Cond.analysis	0	0	0	1	1	1	1	0	0	1	0	0	**5**	**0.4**
		Total	3	5	2	8	2	2	2	2	5	13	5	0	**49**	**4.1**
BNH	*Nucula hartvigiana*	<2	0	1	0	0	1	0	0	0	1	0	0	0	**3**	**0.3**
		>2	2	2	0	3	0	0	0	0	1	1	0	1	**10**	**0.8**
		Total	2	3	0	3	1	0	0	0	2	1	0	1	**13**	**1.1**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	1	2	0	2	2	0	**7**	**0.6**
		>5	1	0	0	0	3	0	0	2	2	0	0	0	**8**	**0.7**
		Total	1	0	0	0	3	0	1	4	2	2	2	0	**15**	**1.3**
CUMACEANS																
CCL	*Colurostylis lemurum*		2	1	0	6	1	0	1	2	1	0	0	0	**14**	**1.2**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER																
OAN	*Anthopleura aureoradiata*		0	1	0	0	0	1	0	0	0	0	0	0	**2**	**0.2**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		0	0	0	2	2	0	0	0	1	1	0	0	**6**	**0.5**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		2	9	38	16	6	1	1	0	3	5	1	0	**82**	**6.8**
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PBOC	Pseudopolydora complex		1	0	1	3	1	1	1	0	1	1	2	0	**12**	**1.0**
PCOS	*Cossura* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	1	0	1	2	1	0	0	2	1	0	0	**8**	**0.7**
PGLY	*Glycera* sp.		1	0	1	1	1	2	1	1	1	1	1	0	**11**	**0.9**
PHF	"Capitellidae"		3	4	2	26	9	6	8	19	12	4	15	0	**108**	**9.0**
PMD	*Magelona dakini*		0	1	4	6	4	0	1	3	3	2	6	0	**30**	**2.5**
PNIC	Nereidae		1	6	1	0	1	4	6	4	1	0	1	0	**25**	**2.1**
POP	*Orbinia papillosa*		0	0	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
PPAR	Paraonidae		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
NON INDICATOR SPECIES																
CAMPH	Amphipods		0	1	4	0	0	0	0	0	0	0	0	0	**5**	**0.4**
CCRAB	Crabs		0	0	0	0	0	0	2	0	0	0	1	0	**3**	**0.3**
CCUM	Cumaceans		0	0	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
CISO	Isopods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
COST	Ostracods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CSHR	Shrimps/Mysids		1	6	7	10	6	3	5	0	3	7	0	1	**49**	**4.1**
COTH	Other Crustaceans		0	0	5	1	0	0	0	1	0	0	1	0	**8**	**0.7**
BOTH	Bivalves		0	2	5	4	0	6	1	3	1	2	1	0	**25**	**2.1**
GOTH	Gastropods		2	2	0	1	1	0	3	0	0	1	1	1	**12**	**1.0**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	1	0	0	0	0	0	0	0	0	**1**	**0.1**
ONEM	Nemerteans		0	1	3	2	0	2	1	0	0	0	0	0	**9**	**0.8**
POTH	Polychaetes		3	1	2	4	1	2	0	3	3	1	0	0	**20**	**1.7**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
TOTAL			**90**	**59**	**95**	**131**	**56**	**90**	**63**	**58**	**71**	**60**	**57**	**12**	**842**	**70.2**

KB October 2003

INDICATOR SPECIES			CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	1	0	**1**	**0.1**
APHOX	*Phoxocephalidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	19	0	3	0	1	8	35	9	1	2	12	12	**102**	**8.5**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	19	0	3	0	1	8	35	9	1	2	12	12	**102**	**8.5**
BAS	*Austrovenus stutchburyi*	<5	7	2	1	0	2	7	5	3	1	3	4	1	**36**	**3.0**
		>5	2	1	3	1	3	5	6	5	1	0	4	2	**33**	**2.8**
		Cond.analysis	0	1	1	0	2	1	0	2	1	2	1	3	**14**	**1.2**
		Total	9	4	5	1	7	13	11	10	3	5	9	6	**83**	**6.9**
BML	*Macamona liliana*	<5	1	0	3	3	2	0	0	1	0	1	1	0	**12**	**1.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	1	0	0	0	0	0	0	1	1	0	0	**3**	**0.3**
		Cond.analysis	1	1	0	0	0	0	0	0	0	1	1	1	**5**	**0.4**
		Total	2	2	3	3	2	0	0	1	1	3	2	1	**20**	**1.7**
BNH	*Nucula hartvigiana*	<2	0	0	0	0	0	0	0	1	0	0	1	0	**2**	**0.2**
		>2	2	1	1	1	0	0	2	1	0	1	0	0	**9**	**0.8**
		Total	2	1	1	1	0	0	2	2	0	1	1	0	**11**	**0.9**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CUMACEANS																
CCL	*Colurostylis lemurum*		1	1	3	1	0	0	0	1	2	2	0	0	**11**	**0.9**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		0	0	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
OTHER																
OAN	*Anthopleura aureoradiata*		1	0	1	0	0	0	0	0	0	0	0	0	**2**	**0.2**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		1	1	0	0	0	0	0	2	0	2	0	0	**6**	**0.5**
PAGL	*Aglaophamus* sp.		0	0	0	0	1	0	0	0	0	0	0	0	**1**	**0.1**
PAO	*Aonides oxycephala*		2	4	16	7	3	1	0	2	6	1	0	0	**42**	**3.5**
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PBOC	Pseudopolydora complex		0	1	0	0	0	0	0	0	0	0	1	0	**2**	**0.2**
PCOS	*Cossura* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGLY	*Glycera* sp.		3	5	3	2	4	1	0	6	5	2	1	0	**32**	**2.7**
PHF	"Capitellidae"		0	0	1	11	2	1	1	2	1	3	0	4	**26**	**2.2**
PMD	*Magelona dakini*		1	1	1	4	0	1	1	0	5	1	0	0	**15**	**1.3**
PNIC	Nereidae		4	2	1	0	1	2	2	1	2	0	2	1	**18**	**1.5**
POP	*Orbinia papillosa*		0	3	4	0	0	0	0	0	0	0	0	1	**8**	**0.7**
PPAR	Paraonidae		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
NON INDICATOR SPECIES																
CAMPH	Amphipods		0	2	0	0	0	0	0	0	0	0	0	0	**2**	**0.2**
CCRAB	Crabs		0	1	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CISO	Isopods		1	0	0	0	1	0	0	0	0	0	0	0	**2**	**0.2**
COST	Ostracods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CSHR	Shrimps/Mysids		0	0	0	1	0	1	0	0	0	0	0	0	**2**	**0.2**
COTH	Other Crustaceans		0	0	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
BOTH	Bivalves		0	2	3	0	2	0	1	1	4	0	0	1	**14**	**1.2**
GOTH	Gastropods		0	0	0	0	0	0	0	0	0	0	0	4	**4**	**0.3**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
ONEM	Nemerteans		2	2	2	1	1	1	1	0	0	0	0	0	**10**	**0.8**
POTH	Polychaetes		1	0	1	1	3	0	0	0	0	1	0	1	**8**	**0.7**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	0	0	1	0	1	0	0	0	0	0	0	**2**	**0.2**
TOTAL			**49**	**32**	**50**	**34**	**28**	**30**	**54**	**37**	**30**	**23**	**29**	**31**	**427**	**35.6**

KB January 2004

INDICATOR SPECIES			CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		15	48	7	14	20	36	17	8	51	34	77	8	**335**	**27.9**
APHOX	*Phoxocephalidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	6	4	0	1	8	15	12	0	0	5	0	3	**54**	**4.5**
		>2	0	0	2	0	0	2	2	0	0	2	0	0	**8**	**0.7**
		Total	6	4	2	1	8	17	14	0	0	7	0	3	**62**	**5.2**
BAS	*Austrovenus stutchburyi*	<5	7	5	1	9	1	17	1	2	10	9	17	15	**94**	**7.8**
		>5	4	5	0	2	4	4	6	2	2	0	1	5	**35**	**2.9**
		Cond.analysis	5	0	0	0	2	0	0	0	0	0	0	1	**8**	**0.7**
		Total	16	10	1	11	7	21	7	4	12	9	18	21	**137**	**11.4**
BML	*Macamona liliana*	<5	1	0	0	0	0	1	0	0	0	2	0	0	**4**	**0.3**
		5-15	0	0	0	0	0	0	0	0	1	0	1	0	**2**	**0.2**
		>15	0	0	0	0	0	0	0	0	0	1	0	0	**1**	**0.1**
		Cond.analysis	0	1	0	0	0	0	1	0	0	0	0	0	**2**	**0.2**
		Total	1	1	0	0	0	1	1	0	1	3	1	0	**9**	**0.8**
BNH	*Nucula hartvigiana*	<2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CUMACEANS																
CCL	*Colurostylis lemurum*		2	0	1	0	1	0	0	1	2	0	3	0	**10**	**0.8**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		0	0	0	0	0	0	0	0	1	0	0	0	**1**	**0.1**
OTHER																
OAN	*Anthopleura aureoradiata*		1	0	1	0	2	2	3	0	2	1	0	1	**13**	**1.1**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		0	0	1	1	0	0	0	0	0	1	0	0	**3**	**0.3**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		4	17	25	14	5	2	2	0	2	2	0	0	**73**	**6.1**
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PBOC	Pseudopolydora complex		0	1	0	2	2	0	1	0	1	1	0	0	**8**	**0.7**
PCOS	*Cossura* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGLY	*Glycera* sp.		0	0	2	1	1	2	2	0	1	2	0	1	**12**	**1.0**
PHF	"Capitellidae"		4	1	1	0	0	0	0	0	0	2	4	1	**13**	**1.1**
PMD	*Magelona dakini*		0	0	0	0	0	0	0	0	0	0	0	1	**1**	**0.1**
PNIC	Nereidae		0	1	0	0	1	3	2	3	0	2	0	0	**12**	**1.0**
POP	*Orbinia papillosa*		0	0	0	0	1	0	0	0	0	0	0	0	**1**	**0.1**
PPAR	Paraonidae		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
NON INDICATOR SPECIES																
CAMPH	Amphipods		3	0	0	0	0	0	0	0	0	0	0	0	**3**	**0.3**
CCRAB	Crabs		2	0	1	1	1	1	0	0	1	0	0	2	**9**	**0.8**
CCUM	Cumaceans		0	0	0	0	1	0	0	0	0	0	1	0	**2**	**0.2**
CISO	Isopods		0	0	0	0	0	1	1	0	0	0	1	0	**3**	**0.3**
COST	Ostracods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CSHR	Shrimps/Mysids		1	1	1	0	0	0	5	1	4	1	0	0	**14**	**1.2**
COTH	Other Crustaceans		0	0	0	0	0	1	5	0	2	0	1	0	**9**	**0.8**
BOTH	Bivalves		1	2	7	1	0	1	1	1	0	2	2	0	**18**	**1.5**
GOTH	Gastropods		1	0	0	1	1	0	0	0	3	0	3	0	**9**	**0.8**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
ONEM	Nemerteans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
POTH	Polychaetes		1	0	0	3	2	1	0	1	1	1	0	0	**10**	**0.8**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
TOTAL			**58**	**86**	**50**	**50**	**53**	**89**	**61**	**19**	**84**	**68**	**111**	**38**	**767**	**63.9**

KB April 2004

INDICATOR SPECIES			CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
APHOX	*Phoxocephalidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	0	14	0	2	2	12	14	14	11	1	2	0	**72**	**6.5**
		>2	0	0	0	0	1	0	0	3	1	0	1	0	**6**	**0.5**
		Total	0	14	0	2	3	12	14	17	12	1	3	0	**78**	**7.1**
BAS	*Austrovenus stutchburyi*	<5	0	24	20	12	19	29	25	31	30	22	28	111	**351**	**31.9**
		>5	0	0	4	1	1	4	6	7	1	3	5	7	**39**	**3.5**
		Cond.analysis	0	0	0	0	0	2	0	0	0	0	0	0	**2**	**0.2**
		Total	0	24	24	13	20	35	31	38	31	25	33	118	**392**	**35.6**
BML	*Macamona liliana*	<5	0	4	5	4	2	1	1	6	4	2	3	4	**36**	**3.3**
		5-15	0	0	0	1	0	0	0	0	0	0	1	0	**2**	**0.2**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	4	5	5	2	1	1	6	4	2	4	4	**38**	**3.5**
BNH	*Nucula hartvigiana*	<2	0	1	0	0	1	1	0	0	0	0	0	0	**3**	**0.3**
		>2	0	1	0	1	0	0	0	0	2	1	0	0	**5**	**0.5**
		Total	0	2	0	1	1	1	0	0	2	1	0	0	**8**	**0.7**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BTHL	*Theora lubrica*	<5	0	0	2	0	0	1	0	0	0	0	0	0	**3**	**0.3**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	2	0	0	1	0	0	0	0	0	0	**3**	**0.3**
CUMACEANS																
CCL	*Colurostylis lemurum*		0	0	4	4	0	2	0	0	3	5	2	0	**20**	**1.8**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	0	0	0	0	0	1	0	**1**	**0.1**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		0	0	0	1	0	0	0	0	0	0	0	0	**1**	**0.1**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		0	2	6	2	7	2	1	3	1	2	1	0	**27**	**2.5**
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PBOC	Pseudopolydora complex		0	2	1	1	2	1	2	2	0	0	3	5	**19**	**1.7**
PCOS	*Cossura* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	1	0	0	**1**	**0.1**
PGLY	*Glycera* sp.		0	0	0	1	1	0	0	0	0	3	0	0	**5**	**0.5**
PHF	"Capitellidae"		0	0	0	5	1	1	3	1	0	1	1	10	**23**	**2.1**
PMD	*Magelona dakini*		0	0	0	0	0	0	0	0	0	0	0	1	**1**	**0.1**
PNIC	Nereidae		0	1	1	0	1	0	0	2	1	1	2	1	**10**	**0.9**
POP	*Orbinia papillosa*		0	0	1	1	0	0	0	0	0	0	0	0	**2**	**0.2**
PPAR	Paraonidae		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
NON INDICATOR SPECIES																
CAMPH	Amphipods		0	0	0	0	0	0	0	1	0	1	1	1	**4**	**0.4**
CCRAB	Crabs		0	1	1	1	4	0	4	0	0	1	2	1	**15**	**1.4**
CCUM	Cumaceans		0	0	0	0	0	0	0	2	0	0	0	0	**2**	**0.2**
CISO	Isopods		0	0	0	3	5	5	3	2	2	1	1	1	**23**	**2.1**
COST	Ostracods		0	0	0	1	0	0	0	0	0	0	0	0	**1**	**0.1**
CSHR	Shrimps/Mysids		0	0	0	1	0	0	0	0	0	0	0	0	**1**	**0.1**
COTH	Other Crustaceans		0	0	0	0	1	0	0	1	1	0	0	0	**3**	**0.3**
BOTH	Bivalves		0	6	2	11	2	2	6	4	3	5	2	6	**49**	**4.5**
GOTH	Gastropods		0	0	1	0	0	1	0	1	0	0	0	0	**3**	**0.3**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
ONEM	Nemerteans		0	0	0	0	0	1	0	0	0	0	1	3	**5**	**0.5**
POTH	Polychaetes		0	0	2	3	1	1	3	0	0	4	0	0	**14**	**1.3**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	0	1	1	0	1	0	0	0	3	1	2	**9**	**0.8**
TOTAL			**0**	**56**	**51**	**57**	**51**	**67**	**68**	**80**	**60**	**57**	**58**	**153**	**758**	**63.2**

Appendix 2 - Whaingaroa Harbour species/taxonomic group abundances

TU October 2002

INDICATOR SPECIES			CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
APHOX	*Phoxocephalidae*		0	0	0	0	0	0	0	0	2	0	3	1	**6**	**0.5**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	7	17	14	21	5	4	12	6	3	0	21	10	**120**	**10.0**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	7	17	14	21	5	4	12	6	3	0	21	10	**120**	**10.0**
BAS	*Austrovenus stutchburyi*	<5	36	49	36	72	20	72	51	79	55	47	22	42	**581**	**48.4**
		>5	33	55	17	34	32	18	48	26	27	24	19	12	**345**	**28.8**
		Cond.analysis	5		5	5	5	5	5	5	5		4	2	**46**	**3.8**
		Total	74	104	58	111	57	95	104	110	87	71	45	56	**972**	**81.0**
BML	*Macamona liliana*	<5	6	2	1	0	0	2	2	0	3	1	3	1	**21**	**1.8**
		5-15	0	1	0	3	4	3	2	8	2	2	3	2	**30**	**2.5**
		>15	4	0	3	1	0	0	0	0	2	0	2	2	**14**	**1.2**
		Cond.analysis			1	2	3	3	2	2	1		2		**16**	**1.3**
		Total	10	3	5	6	7	8	6	10	8	3	10	5	**81**	**6.8**
BNH	*Nucula hartvigiana*	<2	6	7	5	9	10	8	6	6	3	3	1	6	**70**	**5.8**
		>2	34	16	49	29	35	30	45	27	14	21	12	21	**333**	**27.8**
		Total	40	23	54	38	45	38	51	33	17	24	13	27	**403**	**33.6**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BTHL	*Theora lubrica*	<5	0	0	0	1	0	1	0	0	0	0	0	0	**2**	**0.2**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	1	0	1	0	0	0	0	0	0	**2**	**0.2**
CUMACEANS																
CCL	*Colurostylis lemurum*		0	1	4	1	0	0	0	0	2	2	0	2	**12**	**1.0**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	1	0	0	0	0	0	0	**1**	**0.1**
GNHE	*Notoacmea* sp.		6	6	8	6	14	4	11	16	7	6	4	8	**96**	**8.0**
OTHER																
OAN	*Anthopleura aureoradiata*		3	0	1	9	2	3	1	7	3	4	3	2	**38**	**3.2**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		29	33	22	22	15	11	17	17	16	14	17	26	**239**	**19.9**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		1	0	1	6	0	0	0	0	6	5	0	0	**19**	**1.6**
PAR	*Aricidea* sp.		0	0	1	0	0	3	1	0	0	0	2	3	**10**	**0.8**
PBOC	Pseudopolydora complex		1	1	0	0	0	1	2	0	0	2	0	0	**7**	**0.6**
PCOS	*Cossura* sp.		0	0	0	1	0	0	0	0	0	0	0	0	**1**	**0.1**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGLY	*Glycera* sp.		0	1	2	0	1	1	2	0	1	0	0	0	**8**	**0.7**
PHF	"Capitellidae"		13	16	10	8	9	18	16	8	5	8	17	18	**146**	**12.2**
PMD	*Magelona dakini*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PNIC	Nereidae		2	6	2	3	1	1	2	0	7	6	0	1	**31**	**2.6**
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PPAR	Paraonidae		0	0	1	1	0	1	0	0	0	0	0	3	**6**	**0.5**
NON INDICATOR SPECIES																
CAMPH	Amphipods		2	8	1	1	0	0	1	2	1	6	1	0	**23**	**1.9**
CCRAB	Crabs		1	4	3	1	2	1	2	2	4	2	4	3	**0**	**0.0**
CCUM	Cumaceans		0	1	1	0	0	0	0	0	2	0	0	0	**4**	**0.3**
CISO	Isopods		1	0	0	1	1	0	0	2	0	0	0	0	**5**	**0.4**
COST	Ostracods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CSHR	Shrimps/Mysids		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
COTH	Other Crustaceans		0	2	0	0	0	0	0	1	1	0	2	1	**7**	**0.6**
BOTH	Bivalves		2	3	3	3	2	2	2	0	8	6	9	9	**49**	**4.1**
GOTH	Gastropods		2	6	6	3	2	0	9	8	6	5	3	1	**51**	**4.3**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
ONEM	Nemerteans		1	1	2	0	1	0	1	1	0	1	1	1	**10**	**0.8**
POTH	Polychaetes		17	11	11	10	4	11	7	4	5	5	8	14	**107**	**8.9**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
TOTAL			**212**	**247**	**211**	**253**	**168**	**204**	**247**	**227**	**191**	**170**	**163**	**191**	**2455**	**204.6**

TU April 2003

INDICATOR SPECIES			CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
APHOX	*Phoxocephalidae*		1	0	1	0	0	1	0	0	0	0	0	0	**3**	**0.3**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	3	0	3	1	4	2	13	2	8	1	1	2	**40**	**3.3**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	3	0	3	1	4	2	13	2	8	1	1	2	**40**	**3.3**
BAS	*Austrovenus stutchburyi*	<5	20	10	11	15	12	12	11	28	15	19	22	28	**203**	**16.9**
		>5	35	13	33	29	34	10	8	27	23	35	23	41	**311**	**25.9**
		Cond.analysis		5	5	5	5	6	2		5		5	5	**43**	**3.6**
		Total	55	28	49	49	51	28	21	55	43	54	50	74	**557**	**46.4**
BML	*Macamona liliana*	<5	1	0	1	1	1	0	0	0	1	0	1	0	**6**	**0.5**
		5-15	0	3	0	1	0	0	1	6	2	2	2	4	**21**	**1.8**
		>15	3	0	0	0	2	1	1	0	0	0	1	0	**8**	**0.7**
		Cond.analysis			4	2			2	5	1	3	1	4	**22**	**1.8**
		Total	4	3	5	4	3	1	4	11	4	5	5	8	**57**	**4.8**
BNH	*Nucula hartvigiana*	<2	1	13	3	2	8	7	3	4	3	5	0	12	**61**	**5.1**
		>2	15	31	58	39	23	9	22	27	26	40	26	30	**346**	**28.8**
		Total	16	44	61	41	31	16	25	31	29	45	26	42	**407**	**33.9**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CUMACEANS																
CCL	*Colurostylis lemurum*		1	2	3	0	1	0	0	4	5	2	4	0	**22**	**1.8**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		13	19	25	19	23	17	15	21	10	19	12	13	**206**	**17.2**
OTHER																
OAN	*Anthopleura aureoradiata*		9	1	3	4	11	3	1	3	1	4	0	3	**43**	**3.6**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		20	14	23	8	16	12	27	13	10	22	18	14	**197**	**16.4**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		0	6	19	26	0	1	0	8	2	5	2	0	**69**	**5.8**
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	0	0	1	0	0	**1**	**0.1**
PBOC	Pseudopolydora complex		0	0	0	1	0	0	0	0	0	0	0	1	**2**	**0.2**
PCOS	*Cossura* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGLY	*Glycera* sp.		1	0	0	2	0	0	0	1	0	0	1	1	**6**	**0.5**
PHF	"Capitellidae"		26	11	9	7	9	18	13	7	7	8	16	20	**151**	**12.6**
PMD	*Magelona dakini*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PNIC	Nereidae		5	4	3	2	4	2	8	3	6	3	7	6	**53**	**4.4**
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PPAR	Paraonidae		1	0	0	0	0	1	0	0	0	0	0	0	**2**	**0.2**
NON INDICATOR SPECIES																
CAMPH	Amphipods		0	2	1	1	1	1	1	0	0	0	0	1	**8**	**0.7**
CCRAB	Crabs		2	4	1	0	1	1	0	0	2	2	0	0	**0**	**0.0**
CCUM	Cumaceans		0	0	0	0	1	0	0	2	0	1	0	2	**6**	**0.5**
CISO	Isopods		0	0	0	0	0	0	0	0	1	1	0	0	**2**	**0.2**
COST	Ostracods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CSHR	Shrimps/Mysids		0	0	0	0	0	0	0	0	0	0	0	1	**1**	**0.1**
COTH	Other Crustaceans		2	1	2	4	2	0	9	3	2	0	0	0	**25**	**2.1**
BOTH	Bivalves		0	4	1	4	5	10	2	1	1	2	4	8	**42**	**3.5**
GOTH	Gastropods		1	2	2	3	6	4	4	5	6	4	2	2	**41**	**3.4**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
ONEM	Nemerteans		2	1	1	1	0	0	0	0	1	2	0	0	**8**	**0.7**
POTH	Polychaetes		3	4	4	2	0	1	1	4	1	1	7	6	**34**	**2.8**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other (chiton)		1	1	1	0	0	1	0	1	0	0	0	0	**5**	**0.4**
TOTAL			**166**	**151**	**217**	**179**	**169**	**120**	**144**	**175**	**139**	**182**	**155**	**204**	**1988**	**165.7**

TU October 2003

INDICATOR SPECIES			CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
APHOX	*Phoxocephalidae*		0	0	1	1	0	0	0	2	0	0	0	0	**4**	**0.3**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	1	0	1	2	4	13	4	6	0	1	1	3	**36**	**3.0**
		>2	0	0	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
		Total	1	0	2	2	4	13	4	6	0	1	1	3	**37**	**3.1**
BAS	*Austrovenus stutchburyi*	<5	9	22	19	19	14	38	23	30	2	27	30	33	**266**	**22.2**
		>5	20	20	20	33	18	25	36	51	0	43	63	30	**359**	**29.9**
		Cond.analysis		5	5	0	0	5	5	0	0	0	0	0	**20**	**1.7**
		Total	29	47	44	52	32	68	64	81	2	70	93	63	**645**	**53.8**
BML	*Macamona liliana*	<5	0	2	1	0	1	2	0	0	0	4	0	1	**11**	**0.9**
		5-15	0	2	2	2	0	1	2	0	0	0	1	1	**11**	**0.9**
		>15	0	3	1	0	1	1	0	0	0	2	3	1	**12**	**1.0**
		Cond.analysis	0	2	1	1	3	0	2	1	0	1	0	1	**12**	**1.0**
		Total	0	9	5	3	5	4	4	1	0	7	4	4	**46**	**3.8**
BNH	*Nucula hartvigiana*	<2	2	3	5	5	1	8	8	8	0	2	11	12	**65**	**5.4**
		>2	3	24	35	43	12	31	24	42	0	46	66	39	**365**	**30.4**
		Total	5	27	40	48	13	39	32	50	0	48	77	51	**430**	**35.8**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CUMACEANS																
CCL	*Colurostylis lemurum*		0	0	1	1	0	0	0	1	1	8	3	1	**16**	**1.3**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		2	19	8	13	6	30	15	25	0	26	12	12	**168**	**14.0**
OTHER																
OAN	*Anthopleura aureoradiata*		7	9	6	7	2	12	6	5	0	6	6	1	**67**	**5.6**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		4	2	11	7	4	42	16	12	1	14	4	3	**120**	**10.0**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		0	0	1	1	1	0	0	0	0	10	1	0	**14**	**1.2**
PAR	*Aricidea* sp.		0	0	0	0	0	4	0	0	0	0	0	1	**5**	**0.4**
PBOC	Pseudopolydora complex		2	0	0	2	0	0	0	0	0	0	1	0	**5**	**0.4**
PCOS	*Cossura* sp.		0	0	0	0	0	0	0	0	10	0	0	0	**10**	**0.8**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGLY	*Glycera* sp.		1	1	0	0	1	1	1	0	1	1	2	0	**9**	**0.8**
PHF	"Capitellidae"		20	8	10	8	11	27	10	11	16	5	13	9	**148**	**12.3**
PMD	*Magelona dakini*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PNIC	Nereidae		6	1	3	4	2	4	4	3	4	1	0	3	**35**	**2.9**
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PPAR	Paraonidae		0	0	0	0	2	0	0	0	0	0	0	0	**2**	**0.2**
NON INDICATOR SPECIES																
CAMPH	Amphipods		1	0	2	1	1	1	1	1	1	0	1	2	**12**	**1.0**
CCRAB	Crabs		1	0	0	1	0	0	1	2	1	0	1	2	**0**	**0.0**
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CISO	Isopods		0	1	0	0	0	0	0	0	0	2	1	0	**4**	**0.3**
COST	Ostracods		0	0	0	0	0	0	0	1	0	0	0	0	**1**	**0.1**
CSHR	Shrimps/Mysids		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
COTH	Other Crustaceans		0	2	0	6	0	0	2	1	0	3	0	0	**14**	**1.2**
BOTH	Bivalves		0	0	0	0	0	0	0	0	2	0	1	0	**3**	**0.3**
GOTH	Gastropods		5	12	11	5	8	9	8	19	8	25	26	7	**143**	**11.9**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	0	0	0	0	1	0	1	**2**	**0.2**
ONEM	Nemerteans		0	0	0	1	0	0	1	0	0	2	0	0	**4**	**0.3**
POTH	Polychaetes		1	1	0	2	2	13	0	0	4	1	6	4	**34**	**2.8**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other (chiton)		1	0	0	0	0	1	2	0	0	3	0	0	**7**	**0.6**
TOTAL			**86**	**139**	**145**	**165**	**94**	**268**	**171**	**221**	**51**	**234**	**253**	**167**	**1985**	**165.4**

TU April 2004

INDICATOR SPECIES			CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
APHOX	*Phoxocephalidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	6	1	1	0	5	2	3	3	1	4	4	10	**40**	**3.3**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	6	1	1	0	5	2	3	3	1	4	4	10	**40**	**3.3**
BAS	*Austrovenus stutchburyi*	<5	20	31	11	7	16	18	10	17	7	2	12	16	**167**	**13.9**
		>5	17	35	37	37	19	33	12	36	41	22	44	14	**347**	**28.9**
		Cond.analysis	5	5	3	6	2	5	3	5	3	0	5	2	**44**	**3.7**
		Total	42	71	51	50	37	56	25	58	51	24	61	32	**558**	**46.5**
BML	*Macamona liliana*	<5	0	0	0	0	1	0	0	0	0	1	0	0	**2**	**0.2**
		5-15	0	3	2	1	4	1	3	2	5	3	0	0	**24**	**2.0**
		>15	4	1	4	2	1	0	3	1	4	2	4	4	**30**	**2.5**
		Cond.analysis	0	1	2	2	2	3	0	2	0	1	2	0	**15**	**1.3**
		Total	4	5	8	5	8	4	6	5	9	7	6	4	**71**	**5.9**
BNH	*Nucula hartvigiana*	<2	5	2	3	8	5	3	3	2	5	4	1	3	**44**	**3.7**
		>2	20	30	37	43	31	35	18	35	20	26	26	14	**335**	**27.9**
		Total	25	32	40	51	36	38	21	37	25	30	27	17	**379**	**31.6**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	1	0	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
		Total	1	0	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CUMACEANS																
CCL	*Colurostylis lemurum*		0	0	0	2	1	0	0	0	0	0	0	0	**3**	**0.3**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		9	16	14	8	13	7	15	7	19	12	6	16	**142**	**11.8**
OTHER																
OAN	*Anthopleura aureoradiata*		9	4	6	2	2	7	4	5	0	2	12	1	**54**	**4.5**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		11	14	9	11	11	6	19	13	4	2	3	10	**113**	**9.4**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAR	*Aricidea* sp.		1	0	0	0	0	0	1	0	0	0	0	0	**2**	**0.2**
PBOC	Pseudopolydora complex		1	0	0	0	0	0	1	0	0	0	0	0	**2**	**0.2**
PCOS	*Cossura* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGLY	*Glycera* sp.		1	1	1	0	0	1	4	0	0	0	0	0	**8**	**0.7**
PHF	"Capitellidae"		15	9	1	2	10	11	0	11	0	1	2	10	**72**	**6.0**
PMD	*Magelona dakini*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PNIC	Nereidae		1	2	1	1	0	1	1	3	3	1	2	1	**17**	**1.4**
POP	*Orbinia papillosa*		0	1	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
PPAR	Paraonidae		2	0	0	0	0	0	0	0	0	0	0	0	**2**	**0.2**
NON INDICATOR SPECIES																
CAMPH	Amphipods		0	0	0	0	0	0	0	0	0	0	1	0	**1**	**0.1**
CCRAB	Crabs		1	0	0	0	2	1	2	0	1	1	0	1	**0**	**0.0**
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CISO	Isopods		0	0	0	0	0	0	1	0	2	0	0	0	**3**	**0.3**
COST	Ostracods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CSHR	Shrimps/Mysids		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
COTH	Other Crustaceans		0	0	3	6	3	0	0	1	19	5	0	0	**37**	**3.1**
BOTH	Bivalves		0	0	0	1	0	0	0	0	4	0	0	0	**5**	**0.4**
GOTH	Gastropods		13	10	6	14	7	5	10	4	6	16	7	3	**101**	**8.4**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	0	0	0	0	1	0	0	**1**	**0.1**
ONEM	Nemerteans		0	0	0	0	0	0	1	0	0	0	0	0	**1**	**0.1**
POTH	Polychaetes		2	0	1	0	1	0	0	0	2	1	0	1	**8**	**0.7**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other (chiton)		0	0	1	1	0	0	1	0	1	0	0	0	**4**	**0.3**
TOTAL			**144**	**166**	**143**	**154**	**136**	**139**	**115**	**147**	**147**	**107**	**131**	**106**	**1626**	**135.5**

HB October 2002

INDICATOR SPECIES			CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
APHOX	*Phoxocephalidae*		1	3	4	4	3	4	2	1	2	2	1	1	**28**	**2.3**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	20	0	28	25	9	33	20	51	30	17	28	8	**269**	**22.4**
		>2	2	11	2	0	0	1	2	0	0	0	0	0	**18**	**1.5**
		Total	22	11	30	25	9	34	22	51	30	17	28	8	**287**	**23.9**
BAS	*Austrovenus stutchburyi*	<5	22	24	16	15	29	20	21	40	37	34	45	30	**333**	**27.8**
		>5	0	0	1	0	3	1	2	6	0	4	1	1	**19**	**1.6**
		Cond.analysis	0	0	0	0	2	0	1	3	0	1	1	1	**9**	**0.8**
		Total	22	24	17	15	34	21	24	49	37	39	47	32	**361**	**30.1**
BML	*Macamona liliana*	<5	3	2	0	3	2	0	1	2	2	0	1	0	**16**	**1.3**
		5-15	0	0	0	0	1	0	0	0	0	0	2	0	**3**	**0.3**
		>15	0	0	0	0	0	0	0	1	0	0	0	1	**2**	**0.2**
		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	3	2	0	3	3	0	1	3	2	0	3	1	**21**	**1.8**
BNH	*Nucula hartvigiana*	<2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	1	0	**1**	**0.1**
		>5	0	0	0	0	0	1	0	0	0	0	1	0	**2**	**0.2**
		Total	0	0	0	0	0	1	0	0	0	0	2	0	**3**	**0.3**
CUMACEANS																
CCL	*Colurostylis lemurum*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		0	0	0	0	0	2	0	0	0	0	0	0	**2**	**0.2**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		4	1	2	2	4	1	8	3	3	2	5	4	**39**	**3.3**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAR	*Aricidea* sp.		0	0	0	0	0	0	1	2	0	0	3	0	**6**	**0.5**
PBOC	Polydorids *(Boccardia syrtis)*		0	2	0	0	1	3	0	1	2	3	2	0	**14**	**1.2**
PCOS	*Cossura* sp.		0	0	0	1	1	0	0	0	1	1	0	0	**4**	**0.3**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGLY	*Glycera* sp.		1	1	0	0	1	0	1	1	0	1	0	0	**6**	**0.5**
PHF	Capitellidae *(Heteromastus filiformis)*		32	22	24	29	23	32	37	37	31	26	30	29	**352**	**29.3**
PMD	*Magelona dakini*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PNIC	Nereidae		3	5	9	4	3	6	3	3	8	3	8	5	**60**	**5.0**
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PPAR	Paraonidae		0	1	1	0	0	3	2	0	1	1	2	4	**15**	**1.3**
NON INDICATOR SPECIES																
CAMPH	Amphipods		4	2	6	5	1	2	6	8	3	9	1	4	**51**	**4.3**
CCRAB	Crabs		1	0	2	1	0	0	0	1	2	0	0	1	**8**	**0.7**
CCUM	Cumaceans		0	1	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
CISO	Isopods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
COST	Ostracods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CSHR	Shrimps/Mysids		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
COTH	Other Crustaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BOTH	Bivalves		0	6	4	2	1	2	7	2	2	2	6	5	**39**	**3.3**
GOTH	Gastropods		0	0	0	0	1	0	0	0	0	0	0	1	**2**	**0.2**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
ONEM	Nemerteans		3	0	2	2	1	1	1	1	2	2	0	0	**15**	**1.3**
POTH	Polychaetes		0	1	0	1	0	0	1	5	2	1	4	2	**17**	**1.4**
OOLIG	Oligochaetes		0	1	0	1	0	0	0	0	0	0	0	2	**4**	**0.3**
OFLAT	Flatworms		0	1	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
TOTAL			**96**	**84**	**101**	**95**	**86**	**112**	**116**	**168**	**128**	**109**	**142**	**99**	**1336**	**111.3**

HB April 2003

			CORE NUMBER													
INDICATOR SPECIES			**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**TOTAL**	**MEAN**
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
APHOX	*Phoxocephalidae*		1	1	1	2	2	3	1	3	0	3	7	2	**26**	**2.2**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	10	5	2	23	5	2	3	6	2	3	2	1	**64**	**5.3**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	10	5	2	23	5	2	3	6	2	3	2	1	**64**	**5.3**
BAS	*Austrovenus stutchburyi*	<5	5	4	3	2	5	5	10	6	8	4	6	9	**67**	**5.6**
		>5	2	0	0	0	0	0	0	0	1	0	0	0	**3**	**0.3**
		Cond.analysis	1	0	0	0	2	0	0	1	1	0	0	0	**5**	**0.4**
			8	4	3	2	7	5	10	7	10	4	6	9	**75**	**6.3**
BML	*Macamona liliana*	<5	0	3	0	2	0	2	2	1	3	0	4	1	**18**	**1.5**
		5-15	0	0	0	0	0	2	0	0	0	0	0	0	**2**	**0.2**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Cond.analysis	0	0	0	0	0	0	1	0	0	0	0	0	**1**	**0.1**
		Total	0	3	0	2	0	4	3	1	3	0	4	1	**21**	**1.8**
BNH	*Nucula hartvigiana*	<2	0	0	0	0	0	0	1	1	0	0	0	0	**2**	**0.2**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	1	1	0	0	0	0	**2**	**0.2**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CUMACEANS																
CCL	*Colurostylis lemurum*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		0	3	2	4	1	4	5	4	2	0	4	1	**30**	**2.5**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	0	2	0	0	0	**2**	**0.2**
PBOC	Polydorids *(Boccardia syrtis)*		2	1	1	0	0	1	1	1	1	1	0	1	**10**	**0.8**
PCOS	*Cossura* sp.		0	0	0	0	0	0	1	2	1	0	0	0	**4**	**0.3**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGLY	*Glycera* sp.		0	1	0	0	1	0	0	0	0	0	0	1	**3**	**0.3**
PHF	Capitellidae *(Heteromastus filiformis)*		26	26	26	27	21	21	23	24	15	25	34	31	**299**	**24.9**
PMD	*Magelona dakini*		0	1	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
PNIC	Nereidae		10	8	6	11	3	5	8	13	10	12	9	8	**103**	**8.6**
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PPAR	Paraonidae		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
NON INDICATOR SPECIES																
CAMPH	Amphipods		0	2	0	3	0	5	0	3	6	1	4	2	**26**	**2.2**
CCRAB	Crabs		1	1	0	1	2	1	1	1	1	2	0	0	**0**	**0.0**
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CISO	Isopods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
COST	Ostracods		0	0	0	0	0	0	0	1	0	0	0	0	**1**	**0.1**
CSHR	Shrimps/Mysids		0	0	0	0	0	0	0	0	1	0	0	0	**1**	**0.1**
COTH	Other Crustaceans		0	0	0	1	0	0	0	0	0	0	2	0	**3**	**0.3**
BOTH	Bivalves		0	0	0	0	0	3	1	0	0	0	0	0	**4**	**0.3**
GOTH	Gastropods		0	0	0	0	1	0	0	0	0	0	0	0	**1**	**0.1**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
ONEM	Nemerteans		1	1	0	0	1	1	2	0	0	0	0	0	**6**	**0.5**
POTH	Polychaetes		0	1	2	1	0	1	0	1	1	0	0	0	**7**	**0.6**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	1	0	0	0	0	0	0	**1**	**0.1**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		3	1	0	0	0	2	4	4	0	0	1	1	**16**	**1.3**
TOTAL			**62**	**59**	**43**	**77**	**44**	**59**	**64**	**72**	**55**	**51**	**73**	**58**	**706**	**58.8**

HB October 2003

INDICATOR SPECIES			CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
APHOX	*Phoxocephalidae*		0	0	1	0	0	2	1	2	2	1	2	1	**12**	**1.0**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	0	0	9	15	22	17	11	2	8	6	18	4	**112**	**9.3**
		>2	0	6	0	0	0	0	0	0	0	0	0	0	**6**	**0.5**
		Total	0	6	9	15	22	17	11	2	8	6	18	4	**118**	**9.8**
BAS	*Austrovenus stutchburyi*	<5	0	7	4	6	6	4	16	7	11	5	14	19	**99**	**8.3**
		>5	0	4	0	0	4	1	1	0	1	1	2	5	**19**	**1.6**
		Cond.analysis	1	0	0	0	0	2	0	0	0	0	0	0	**3**	**0.3**
		Total	1	11	4	6	10	7	17	7	12	6	16	24	**121**	**10.1**
BML	*Macamona liliana*	<5	0	0	0	2	1	1	9	6	0	1	0	2	**22**	**1.8**
		5-15	0	1	0	1	0	1	1	2	1	1	1	1	**10**	**0.8**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	1	0	3	1	2	10	8	1	2	1	3	**32**	**2.7**
BNH	*Nucula hartvigiana*	<2	0	0	1	0	0	0	0	0	0	1	0	0	**2**	**0.2**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	1	0	0	0	0	0	0	1	0	0	**2**	**0.2**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CUMACEANS																
CCL	*Colurostylis lemurum*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		2	0	0	0	1	1	4	1	1	0	1	0	**11**	**0.9**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		0	0	1	0	0	0	0	0	1	0	2	0	**4**	**0.3**
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	0	0	1	1	0	**2**	**0.2**
PBOC	Pseudopolydora complex		0	3	1	3	2	1	1	2	0	0	0	2	**15**	**1.3**
PCOS	*Cossura* sp.		0	0	0	0	0	0	0	0	1	0	0	0	**1**	**0.1**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGLY	*Glycera* sp.		1	0	0	0	0	0	0	0	0	0	1	0	**2**	**0.2**
PHF	"Capitellidae"		9	20	13	11	20	24	18	27	6	32	5	24	**209**	**17.4**
PMD	*Magelona dakini*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PNIC	Nereidae		6	4	3	4	7	5	7	9	7	4	5	1	**62**	**5.2**
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PPAR	Paraonidae		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
NON INDICATOR SPECIES																
CAMPH	Amphipods		1	0	0	1	2	1	1	0	13	0	0	2	**21**	**1.8**
CCRAB	Crabs		2	2	1	0	0	1	1	0	2	0	1	2	**0**	**0.0**
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CISO	Isopods		0	0	0	0	0	0	0	0	0	0	0	1	**1**	**0.1**
COST	Ostracods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CSHR	Shrimps/Mysids		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
COTH	Other Crustaceans		0	0	1	4	1	0	1	0	0	0	0	0	**7**	**0.6**
BOTH	Bivalves		0	0	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
GOTH	Gastropods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
ONEM	Nemerteans		0	0	1	1	1	1	0	0	0	0	1	1	**6**	**0.5**
POTH	Polychaetes		0	0	0	1	0	1	0	2	1	0	2	2	**9**	**0.8**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	1	0	0	2	0	0	0	0	0	0	0	**3**	**0.3**
TOTAL			**22**	**48**	**37**	**49**	**69**	**63**	**72**	**60**	**55**	**53**	**56**	**67**	**639**	**53.3**

HB April 2004

INDICATOR SPECIES		SIZE	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
			CORE NUMBER													
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
APHOX	*Phoxocephalidae*		1	1	0	1	0	2	0	0	2	0	0	1	**8**	**0.7**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	48	37	16	23	39	12	8	15	17	15	26	22	**278**	**23.2**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	48	37	16	23	39	12	8	15	17	15	26	22	**278**	**23.2**
BAS	*Austrovenus stutchburyi*	<5	5	11	2	2	11	0	6	13	3	4	1	8	**66**	**5.5**
		>5	0	4	0	0	3	10	1	6	0	0	1	0	**25**	**2.1**
		Cond.analysis	1	1	0	0	0	0	0	2	0	0	0	0	**4**	**0.3**
		Total	6	16	2	2	14	10	7	21	3	4	2	8	**95**	**7.9**
BML	*Macamona liliana*	<5	0	0	2	1	3	0	0	0	1	1	1	1	**10**	**0.8**
		5-15	0	1	0	0	1	0	0	2	0	0	0	1	**5**	**0.4**
		>15	0	0	0	0	1	0	0	0	0	0	0	0	**1**	**0.1**
		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	1	2	1	5	0	0	2	1	1	1	2	**16**	**1.3**
BNH	*Nucula hartvigiana*	<2	0	0	0	0	0	0	0	0	0	0	0	1	**1**	**0.1**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	1	**1**	**0.1**
BPA	*Paphies australis*	<5	0	0	0	0	0	1	1	0	0	0	0	0	**2**	**0.2**
		5-15	1	0	0	0	0	0	0	0	0	0	1	0	**2**	**0.2**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	1	0	0	0	0	1	1	0	0	0	1	0	**4**	**0.3**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CUMACEANS																
CCL	*Colurostylis lemurum*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		0	1	0	2	1	0	1	0	2	0	0	0	**7**	**0.6**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAR	*Aricidea* sp.		0	1	0	0	0	1	0	2	3	0	0	0	**7**	**0.6**
PBOC	Pseudopolydora complex		2	0	1	0	0	0	0	0	0	0	0	2	**5**	**0.4**
PCOS	*Cossura* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGLY	*Glycera* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PHF	"Capitellidae"		3	6	2	13	2	6	1	11	6	3	7	6	**66**	**5.5**
PMD	*Magelona dakini*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PNIC	Nereidae		11	25	15	7	25	27	22	25	20	11	9	13	**210**	**17.5**
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PPAR	Paraonidae		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
NON INDICATOR SPECIES																
CAMPH	Amphipods		4	3	5	2	1	3	1	1	2	2	0	6	**30**	**2.5**
CCRAB	Crabs		0	0	0	1	0	1	1	1	0	1	0	1	**0**	**0.0**
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CISO	Isopods		0	1	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
COST	Ostracods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CSHR	Shrimps/Mysids		0	0	1	0	0	0	1	0	0	0	0	0	**2**	**0.2**
COTH	Other Crustaceans		0	0	1	0	0	0	0	0	0	2	2	0	**5**	**0.4**
BOTH	Bivalves		0	0	0	0	0	0	0	0	0	0	1	0	**1**	**0.1**
GOTH	Gastropods		0	11	0	2	2	0	1	0	1	0	1	0	**18**	**1.5**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
ONEM	Nemerteans		1	0	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
POTH	Polychaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
TOTAL			**77**	**103**	**45**	**54**	**89**	**63**	**44**	**78**	**57**	**39**	**50**	**62**	**755**	**62.9**

X October 2002

INDICATOR SPECIES			CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
APHOX	*Phoxocephalidae*		5	2	2	2	4	2	3	3	2	2	1	2	**30**	**2.5**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	0	0	7	0	0	2	2	0	0	0	4	0	**15**	**1.3**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	7	0	0	2	2	0	0	0	4	0	**15**	**1.3**
BAS	*Austrovenus stutchburyi*	<5	13	20	14	25	36	45	11	31	56	30	29	43	**353**	**29.4**
		>5	11	8	6	4	8	1	7	1	5	4	2	0	**57**	**4.8**
		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	24	28	20	29	44	46	18	32	61	34	31	43	**410**	**34.2**
BML	*Macamona liliana*	<5	2	0	4	0	3	0	0	0	0	0	0	0	**9**	**0.8**
		5-15	0	3	0	0	1	2	0	1	1	2	3	3	**16**	**1.3**
		>15	3	0	0	1	0	0	1	0	0	0	0	0	**5**	**0.4**
		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	5	3	4	1	4	2	1	1	1	2	3	3	**30**	**2.5**
BNH	*Nucula hartvigiana*	<2	23	4	2	3	12	10	2	2	12	11	7	11	**99**	**8.3**
		>2	4	12	2	5	8	22	34	26	30	9	33	35	**220**	**18.3**
		Total	27	16	4	8	20	32	36	28	42	20	40	46	**319**	**26.6**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CUMACEANS																
CCL	*Colurostylis lemurum*		6	1	1	1	3	2	1	3	0	4	3	2	**27**	**2.3**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		0	1	0	3	4	4	10	5	4	2	8	1	**42**	**3.5**
OTHER																
OAN	*Anthopleura aureoradiata*		1	0	0	0	0	0	0	0	0	1	0	1	**3**	**0.3**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		13	15	14	8	16	8	7	8	14	10	18	1	**132**	**11.0**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		0	1	0	0	0	1	1	0	1	0	0	0	**4**	**0.3**
PAR	*Aricidea* sp.		0	0	0	0	1	2	1	0	0	0	0	1	**5**	**0.4**
PBOC	Pseudopolydora complex		0	1	0	0	0	1	1	0	0	0	0	0	**3**	**0.3**
PCOS	*Cossura* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGLY	*Glycera* sp.		1	0	1	0	0	1	0	1	1	0	0	3	**8**	**0.7**
PHF	"Capitellidae"		6	4	0	7	7	8	13	8	7	11	5	10	**86**	**7.2**
PMD	*Magelona dakini*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PNIC	Nereidae		2	0	1	3	1	2	1	1	2	7	0	0	**20**	**1.7**
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PPAR	Paraonidae		0	0	1	1	2	0	1	0	0	0	0	0	**5**	**0.4**
NON INDICATOR SPECIES																
CAMPH	Amphipods		1	2	0	3	1	2	7	2	2	2	3	3	**28**	**2.3**
CCRAB	Crabs		0	0	0	0	0	4	1	2	0	2	0	1	**0**	**0.0**
CCUM	Cumaceans		0	0	0	0	0	1	0	1	1	0	2	0	**5**	**0.4**
CISO	Isopods		0	0	0	0	0	1	0	0	1	0	2	1	**5**	**0.4**
COST	Ostracods		3	3	0	0	4	2	1	0	3	0	0	2	**18**	**1.5**
CSHR	Shrimps/Mysids		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
COTH	Other Crustaceans		1	2	4	1	4	4	1	0	3	1	2	3	**26**	**2.2**
BOTH	Bivalves		4	0	3	0	4	4	0	0	2	3	1	1	**22**	**1.8**
GOTH	Gastropods		5	2	0	4	8	6	3	1	1	1	3	4	**38**	**3.2**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	0	0	0	0	2	0	0	**2**	**0.2**
ONEM	Nemerteans		1	0	0	2	1	0	1	0	2	2	0	2	**11**	**0.9**
POTH	Polychaetes		2	2	4	2	4	5	0	1	4	4	2	2	**32**	**2.7**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	0	0	0	1	0	0	1	7	0	0	7	**16**	**1.3**
TOTAL			**107**	**83**	**67**	**75**	**133**	**142**	**110**	**98**	**161**	**110**	**128**	**139**	**1343**	**111.9**

X April 2003

INDICATOR SPECIES			CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
APHOX	*Phoxocephalidae*		3	1	2	1	3	0	1	1	0	2	1	1	**16**	**1.3**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	0	0	0	11	0	0	1	0	0	0	5	0	**17**	**1.4**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	11	0	0	1	0	0	0	5	0	**17**	**1.4**
BAS	*Austrovenus stutchburyi*	<5	4	6	4	6	7	3	2	6	7	8	7	5	**65**	**5.4**
		>5	9	19	4	2	9	15	8	4	15	15	7	4	**111**	**9.3**
		Cond.analysis	5	0	0	0	5	5	5	0	0	5	5	3	**33**	**2.8**
		Total	18	25	8	8	21	23	15	10	22	28	19	12	**209**	**17.4**
BML	*Macamona liliana*	<5	5	4	1	2	2	3	1	3	6	4	3	4	**38**	**3.2**
		5-15	0	1	1	0	0	1	2	0	0	0	1	0	**6**	**0.5**
		>15	1	0	0	1	1	0	1	1	1	0	1	0	**7**	**0.6**
		Cond.analysis		2	2	1	2	1	5	1	2	3	1	1	**21**	**1.8**
		Total	6	7	4	4	5	5	9	5	9	7	6	5	**72**	**6.0**
BNH	*Nucula hartvigiana*	<2	9	9	0	0	6	6	12	7	4	4	12	6	**75**	**6.3**
		>2	36	20	0	0	33	35	30	27	28	28	35	29	**301**	**25.1**
		Total	45	29	0	0	39	41	42	34	32	32	47	35	**376**	**31.3**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CUMACEANS																
CCL	*Colurostylis lemurum*		1	0	1	0	0	1	2	2	0	2	2	3	**14**	**1.2**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	1	0	0	0	0	0	**1**	**0.1**
GNHE	*Notoacmea* sp.		5	0	0	0	7	2	14	4	6	3	1	12	**54**	**4.5**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		54	19	8	4	32	10	7	11	18	22	14	14	**213**	**17.8**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		0	0	0	0	2	0	1	3	0	2	1	0	**9**	**0.8**
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PBOC	Pseudopolydora complex		1	2	1	1	0	1	0	0	0	0	0	1	**7**	**0.6**
PCOS	*Cossura* sp.		0	0	1	1	0	0	0	0	0	0	0	0	**2**	**0.2**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGLY	*Glycera* sp.		0	0	0	1	1	0	1	0	0	0	1	0	**4**	**0.3**
PHF	"Capitellidae"		11	11	10	10	8	22	16	5	8	11	9	12	**133**	**11.1**
PMD	*Magelona dakini*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PNIC	Nereidae		0	0	3	6	0	0	0	2	0	2	1	2	**16**	**1.3**
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PPAR	Paraonidae		0	0	1	4	0	0	0	0	0	8	0	0	**13**	**1.1**
NON INDICATOR SPECIES																
CAMPH	Amphipods		5	3	2	2	3	6	1	0	0	1	1	4	**28**	**2.3**
CCRAB	Crabs		1	1	1	0	1	0	1	0	0	1	0	1	**0**	**0.0**
CCUM	Cumaceans		0	1	0	0	0	1	0	1	0	1	1	0	**5**	**0.4**
CISO	Isopods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
COST	Ostracods		1	0	0	0	0	0	4	0	0	0	1	0	**6**	**0.5**
CSHR	Shrimps/Mysids		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
COTH	Other Crustaceans		4	2	0	0	1	2	4	3	2	0	0	0	**18**	**1.5**
BOTH	Bivalves		2	1	4	1	1	1	1	4	5	3	3	2	**28**	**2.3**
GOTH	Gastropods		4	1	0	1	3	3	5	2	6	5	0	6	**36**	**3.0**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
ONEM	Nemerteans		1	1	2	0	2	1	0	1	4	2	3	0	**17**	**1.4**
POTH	Polychaetes		3	2	0	1	3	4	0	0	2	2	5	3	**25**	**2.1**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	2	0	0	**2**	**0.2**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	0	0	1	0	0	0	0	0	2	1	1	**5**	**0.4**
TOTAL			**165**	**106**	**48**	**57**	**132**	**123**	**126**	**88**	**114**	**138**	**122**	**114**	**1326**	**110.5**

X October 2003

INDICATOR SPECIES		SIZE	CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
APHOX	*Phoxocephalidae*		2	2	1	0	1	1	1	1	0	2	0	1	**12**	**1.0**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	0	1	11	1	0	0	0	0	0	0	1	1	**15**	**1.3**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	1	11	1	0	0	0	0	0	0	1	1	**15**	**1.3**
BAS	*Austrovenus stutchburyi*	<5	56	19	37	29	47	16	38	23	39	9	34	18	**365**	**30.4**
		>5	7	17	5	6	7	3	0	10	18	8	3	11	**95**	**7.9**
		Cond.analysis	0	1	0	5	1	3	1	5	0	3	1	1	**21**	**1.8**
		Total	63	37	42	40	55	22	39	38	57	20	38	30	**481**	**40.1**
BML	*Macamona liliana*	<5	6	7	0	4	4	7	4	6	8	0	4	2	**52**	**4.3**
		5-15	1	1	0	0	0	3	0	0	0	0	1	0	**6**	**0.5**
		>15	0	0	0	0	1	1	4	3	0	0	2	0	**11**	**0.9**
		Cond.analysis	3	1	0	0	1	1	2	0	0	0	1	1	**10**	**0.8**
		Total	10	9	0	4	6	12	10	9	8	0	8	3	**79**	**6.6**
BNH	*Nucula hartvigiana*	<2	14	12	12	3	8	17	22	15	4	1	2	14	**124**	**10.3**
		>2	8	5	4	2	14	15	38	20	4	1	0	19	**130**	**10.8**
		Total	22	17	16	5	22	32	60	35	8	2	2	33	**254**	**21.2**
BPA	*Paphies australis*	<5	0	0	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	1	0	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
		Total	1	0	1	0	0	0	0	0	0	0	0	0	**2**	**0.2**
BTHL	*Theora lubrica*	<5	0	0	3	0	0	0	0	0	0	0	0	0	**3**	**0.3**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	3	0	0	0	0	0	0	0	0	0	**3**	**0.3**
CUMACEANS																
CCL	*Colurostylis lemurum*		0	0	2	0	0	0	3	0	1	1	0	4	**11**	**0.9**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		5	3	2	1	12	10	12	4	4	0	0	10	**63**	**5.3**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	1	0	0	0	0	0	0	**1**	**0.1**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		3	9	13	4	5	3	7	7	6	3	5	5	**70**	**5.8**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAR	*Aricidea* sp.		0	0	0	1	0	0	0	0	0	0	0	0	**1**	**0.1**
PBOC	Pseudopolydora complex		0	0	0	0	0	0	0	0	0	0	0	1	**1**	**0.1**
PCOS	*Cossura* sp.		0	0	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGLY	*Glycera* sp.		0	0	1	2	2	4	0	0	1	1	2	1	**14**	**1.2**
PHF	"Capitellidae"		2	8	6	4	4	5	5	4	18	0	7	2	**65**	**5.4**
PMD	*Magelona dakini*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PNIC	Nereidae		3	0	5	2	2	2	2	3	2	2	1	0	**24**	**2.0**
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PPAR	Paraonidae		0	0	0	0	0	0	1	0	0	0	0	0	**1**	**0.1**
NON INDICATOR SPECIES																
CAMPH	Amphipods		4	1	1	0	0	3	7	0	3	7	4	11	**41**	**3.4**
CCRAB	Crabs		2	1	0	2	1	0	1	1	2	0	0	1	**0**	**0.0**
CCUM	Cumaceans		0	0	2	0	0	0	0	0	1	0	0	0	**3**	**0.3**
CISO	Isopods		0	0	1	0	2	1	1	0	0	1	0	0	**6**	**0.5**
COST	Ostracods		0	0	1	0	0	1	3	0	0	2	1	1	**9**	**0.8**
CSHR	Shrimps/Mysids		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
COTH	Other Crustaceans		3	14	5	0	3	4	0	0	26	14	2	2	**73**	**6.1**
BOTH	Bivalves		0	0	0	0	0	4	2	0	0	0	0	1	**7**	**0.6**
GOTH	Gastropods		2	1	1	0	12	1	5	6	2	0	0	1	**31**	**2.6**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	1	0	0	1	0	0	1	0	0	0	0	**3**	**0.3**
ONEM	Nemerteans		1	1	0	0	2	1	1	0	0	0	1	0	**7**	**0.6**
POTH	Polychaetes		5	7	4	8	9	16	3	5	11	1	2	2	**73**	**6.1**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	3	1	0	0	0	0	0	**4**	**0.3**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other (chiton)		1	0	0	0	0	0	0	1	0	0	1	0	**3**	**0.3**
TOTAL			**129**	**112**	**119**	**74**	**139**	**126**	**164**	**115**	**150**	**56**	**75**	**110**	**1358**	**113.2**

X April 2004

INDICATOR SPECIES			CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
APHOX	*Phoxocephalidae*		1	0	0	0	0	1	1	2	0	0	0	0	**5**	**0.4**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	0	1	3	0	1	0	0	1	0	0	0	0	**6**	**0.5**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	1	3	0	1	0	0	1	0	0	0	0	**6**	**0.5**
BAS	*Austrovenus stutchburyi*	<5	6	8	16	8	17	13	3	5	13	5	2	1	**97**	**8.1**
		>5	12	27	15	25	18	7	2	9	16	25	11	13	**180**	**15.0**
		Cond.analysis	5	0	0	1	0	4	5	0	0	0	0	5	**20**	**1.7**
		Total	23	35	31	34	35	24	10	14	29	30	13	19	**297**	**24.8**
BML	*Macamona liliana*	<5	4	2	4	1	0	0	0	3	5	2	0	1	**22**	**1.8**
		5-15	0	1	1	2	2	1	0	0	0	1	0	2	**10**	**0.8**
		>15	4	2	1	4	3	1	3	0	4	3	0	0	**25**	**2.1**
		Cond.analysis	0	0	1	0	1	1	0	0	0	0	0	0	**3**	**0.3**
		Total	8	5	7	7	6	3	3	3	9	6	0	3	**60**	**5.0**
BNH	*Nucula hartvigiana*	<2	4	2	3	7	6	1	5	3	6	4	0	7	**48**	**4.0**
		>2	20	27	19	13	26	18	11	48	29	21	15	5	**252**	**21.0**
		Total	24	29	22	20	32	19	16	51	35	25	15	12	**300**	**25.0**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CUMACEANS																
CCL	*Colurostylis lemurum*		3	4	0	0	0	2	0	2	1	3	0	0	**15**	**1.3**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		7	5	6	7	6	1	4	4	4	4	0	3	**51**	**4.3**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	0	0	2	0	0	0	1	**3**	**0.3**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		28	31	10	14	16	14	3	10	17	8	3	2	**156**	**13.0**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	1	0	1	1	0	**3**	**0.3**
PBOC	Pseudopolydora complex		0	0	0	0	0	0	0	1	0	0	0	0	**1**	**0.1**
PCOS	*Cossura* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	1	0	0	0	0	0	2	0	0	1	0	**4**	**0.3**
PGLY	*Glycera* sp.		1	2	0	0	0	1	0	0	0	0	0	1	**5**	**0.4**
PHF	"Capitellidae"		10	6	0	11	8	11	6	14	9	4	15	4	**98**	**8.2**
PMD	*Magelona dakini*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PNIC	Nereidae		1	1	4	2	2	1	1	2	1	1	1	0	**17**	**1.4**
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PPAR	Paraonidae		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
NON INDICATOR SPECIES																
CAMPH	Amphipods		2	3	2	4	1	1	0	0	2	0	0	1	**16**	**1.3**
CCRAB	Crabs		1	3	1	1	1	0	1	1	0	0	1	1	**0**	**0.0**
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CISO	Isopods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
COST	Ostracods		0	1	0	0	0	0	0	1	0	0	0	1	**3**	**0.3**
CSHR	Shrimps/Mysids		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
COTH	Other Crustaceans		3	16	11	1	22	4	0	5	18	20	7	5	**112**	**9.3**
BOTH	Bivalves		0	0	0	1	0	0	0	0	0	0	0	0	**1**	**0.1**
GOTH	Gastropods		2	0	1	3	0	1	0	0	4	1	0	0	**12**	**1.0**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	1	0	0	0	0	0	0	0	**1**	**0.1**
ONEM	Nemerteans		0	0	0	0	0	0	0	1	0	0	0	1	**2**	**0.2**
POTH	Polychaetes		1	2	1	1	0	1	4	4	1	1	6	3	**25**	**2.1**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other (chiton)		1	3	0	0	1	1	1	0	0	0	0	1	**8**	**0.7**
TOTAL			**116**	**148**	**99**	**106**	**132**	**85**	**50**	**121**	**130**	**104**	**63**	**58**	**1201**	**100.1**

WI July 2002

INDICATOR SPECIES			CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
APHOX	*Phoxocephalidae*		0	1	0	1	0	0	0	0	0	0	0	1	**3**	**0.3**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	4	8	0	7	7	4	9	5	0	0	4	9	**57**	**4.8**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	4	8	0	7	7	4	9	5	0	0	4	9	**57**	**4.8**
BAS	*Austrovenus stutchburyi*	<5	12	13	2	16	4	18	7	6	3	4	9	17	**111**	**9.3**
		>5	21	10	6	17	13	19	22	15	0	7	12	10	**152**	**12.7**
		Cond.analysis	4	4	2	0	4	0	2	5	0	0	8	0	**29**	**2.4**
		Total	37	27	10	33	21	37	31	26	3	11	29	27	**292**	**24.3**
BML	*Macamona liliana*	<5	8	1	8	1	1	4	6	4	0	3	2	1	**39**	**3.3**
		5-15	2	4	1	3	3	0	1	0	0	0	0	15	**29**	**2.4**
		>15	1	7	0	1	1	4	3	2	0	1	0	2	**22**	**1.8**
		Cond.analysis	0	6	0	2	1	4	2	2	2	0	2	2	**23**	**1.9**
		Total	11	18	9	7	6	12	12	8	2	4	4	20	**113**	**9.4**
BNH	*Nucula hartvigiana*	<2	0	16	3	23	3	6	1	4	1	2	4	7	**70**	**5.8**
		>2	0	4	0	38	16	6	3	7	0	0	3	0	**77**	**6.4**
		Total	0	20	3	61	19	12	4	11	1	2	7	7	**147**	**12.3**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	1	0	0	0	0	0	0	**1**	**0.1**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	1	0	0	0	0	0	0	**1**	**0.1**
BTHL	*Theora lubrica*	<5	1	0	3	0	0	0	0	0	0	0	0	0	**4**	**0.3**
		>5	0	0	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
		Total	1	0	4	0	0	0	0	0	0	0	0	0	**5**	**0.4**
CUMACEANS																
CCL	*Colurostylis lemurum*		2	2	1	0	0	2	1	0	0	0	1	1	**10**	**0.8**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		8	8	9	31	1	3	0	4	2	3	4	13	**86**	**7.2**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		12	5	4	18	18	2	3	5	0	1	4	8	**80**	**6.7**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		0	1	0	0	0	0	1	0	0	0	0	0	**2**	**0.2**
PAR	*Aricidea* sp.		5	0	4	1	7	3	3	1	0	7	1	2	**34**	**2.8**
PBOC	Pseudopolydora complex		1	0	2	2	2	1	0	0	0	0	0	0	**8**	**0.7**
PCOS	*Cossura* sp.		0	0	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGLY	*Glycera* sp.		0	0	1	3	0	0	1	0	0	0	1	1	**7**	**0.6**
PHF	"Capitellidae"		24	39	26	34	22	22	33	36	3	29	28	29	**325**	**27.1**
PMD	*Magelona dakini*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PNIC	Nereidae		3	1	4	0	4	3	13	3	0	6	3	4	**44**	**3.7**
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PPAR	Paraonidae		4	1	2	0	0	0	0	0	0	1	0	0	**8**	**0.7**
NON INDICATOR SPECIES																
CAMPH	Amphipods		0	1	2	0	0	1	4	0	2	0	4	0	**14**	**1.2**
CCRAB	Crabs		1	1	0	0	0	0	0	0	1	0	0	1	**4**	**0.3**
CCUM	Cumaceans		0	2	0	0	0	0	0	0	0	0	0	0	**2**	**0.2**
CISO	Isopods		1	0	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
COST	Ostracods		0	0	0	0	0	0	1	0	0	0	0	0	**1**	**0.1**
CSHR	Shrimps/Mysids		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
COTH	Other Crustaceans		4	0	0	2	0	0	0	0	0	0	0	0	**6**	**0.5**
BOTH	Bivalves		0	4	1	6	1	1	0	2	0	1	4	8	**28**	**2.3**
GOTH	Gastropods		2	0	2	8	1	1	0	0	1	3	1	4	**23**	**1.9**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
ONEM	Nemerteans		1	1	2	0	3	1	2	1	0	0	0	0	**11**	**0.9**
POTH	Polychaetes		6	7	4	5	0	2	1	1	0	1	0	3	**30**	**2.5**
OOLIG	Oligochaetes		0	2	0	0	0	0	0	0	0	0	0	0	**2**	**0.2**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other [Chiton]		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
TOTAL			**127**	**149**	**92**	**219**	**112**	**108**	**119**	**103**	**15**	**69**	**95**	**138**	**1346**	**112.2**

WI October 2002

INDICATOR SPECIES			CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
APHOX	*Phoxocephalidae*		0	1	2	6	0	1	1	2	2	0	0	1	**16**	**1.3**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	3	4	9	3	15	14	5	9	5	9	3	21	**100**	**8.3**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	3	4	9	3	15	14	5	9	5	9	3	21	**100**	**8.3**
BAS	*Austrovenus stutchburyi*	<5	38	34	74	54	15	27	22	16	24	39	18	22	**383**	**31.9**
		>5	8	10	2	16	8	22	28	17	10	5	31	26	**183**	**15.3**
		Cond.analysis	0	0	1	5	3	3	1	2	1	5	2	0	**23**	**1.9**
		Total	46	44	77	75	26	52	51	35	35	49	51	48	**589**	**49.1**
BML	*Macamona liliana*	<5	0	2	0	2	0	2	5	4	0	2	0	1	**18**	**1.5**
		5-15	3	0	3	3	3	1	1	2	1	4	2	4	**27**	**2.3**
		>15	0	2	0	2	2	3	1	1	3	1	1	0	**16**	**1.3**
		Cond.analysis	1	0	0	2	0	0	1	1	2	1	1	0	**9**	**0.8**
		Total	4	4	3	9	5	6	8	8	6	8	4	5	**70**	**5.8**
BNH	*Nucula hartvigiana*	<2	11	5	4	10	6	11	3	9	10	14	0	7	**90**	**7.5**
		>2	11	9	2	43	7	14	7	6	13	13	19	5	**149**	**12.4**
		Total	22	14	6	53	13	25	10	15	23	27	19	12	**239**	**19.9**
BPA	*Paphies australis*	<5	0	2	1	1	4	0	0	0	0	1	0	0	**9**	**0.8**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	2	1	1	4	0	0	0	0	1	0	0	**9**	**0.8**
BTHL	*Theora lubrica*	<5	0	0	0	6	5	0	0	0	0	0	0	0	**11**	**0.9**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	6	5	0	0	0	0	0	0	0	**11**	**0.9**
CUMACEANS			0	0	0	0	0	0	0	0	0	0	0	0		
CCL	*Colurostylis lemurum*		0	1	0	0	0	0	1	0	0	0	0	0	**2**	**0.2**
GASTROPODS			0	0	0	0	0	0	0	0	0	0	0	0		
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		17	12	9	9	6	11	3	6	9	9	12	6	**109**	**9.1**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		8	1	12	15	6	4	4	14	11	11	10	10	**106**	**8.8**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		0	0	1	1	0	0	0	0	0	0	0	0	**2**	**0.2**
PAR	*Aricidea* sp.		3	2	6	4	4	3	7	5	3	5	10	6	**58**	**4.8**
PBOC	Pseudopolydora complex		0	1	0	2	0	0	0	0	0	1	0	0	**4**	**0.3**
PCOS	*Cossura* sp.		0	0	1	0	1	1	0	0	0	0	0	1	**4**	**0.3**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGLY	*Glycera* sp.		0	1	1	2	1	1	0	0	0	1	1	1	**9**	**0.8**
PHF	"Capitellidae"		28	34	34	26	39	34	32	59	26	38	45	36	**431**	**35.9**
PMD	*Magelona dakini*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PNIC	Nereidae		0	1	3	2	1	2	2	1	1	1	3	1	**18**	**1.5**
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PPAR	Paraonidae		0	0	28	0	1	2	0	2	1	7	1	0	**42**	**3.5**
NON INDICATOR SPECIES																
CAMPH	Amphipods		3	2	1	6	1	4	3	0	1	1	0	4	**26**	**2.2**
CCRAB	Crabs		3	3	4	5	2	5	2	4	2	1	5	2	**0**	**0.0**
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CISO	Isopods		1	0	0	0	1	3	0	0	0	0	1	0	**6**	**0.5**
COST	Ostracods		1	1	0	0	1	1	1	1	0	0	2	0	**8**	**0.7**
CSHR	Shrimps/Mysids		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
COTH	Other Crustaceans		1	0	1	1	0	0	0	1	0	2	0	0	**6**	**0.5**
BOTH	Bivalves		8	1	9	1	0	2	0	3	7	9	3	6	**49**	**4.1**
GOTH	Gastropods		8	7	12	13	9	5	1	1	5	5	3	6	**75**	**6.3**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
ONEM	Nemerteans		1	1	2	0	0	4	0	3	2	1	2	1	**17**	**1.4**
POTH	Polychaetes		20	14	26	13	19	7	5	18	18	39	13	0	**192**	**16.0**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		1	0	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
TOTAL			**178**	**151**	**248**	**253**	**160**	**187**	**136**	**187**	**157**	**225**	**188**	**167**	**2199**	**183.3**

WI January 2003

INDICATOR SPECIES			CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
APHOX	*Phoxocephalidae*		0	0	0	0	0	0	1	0	0	0	0	0	**1**	**0.1**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	3	6	0	3	0	3	7	12	5	1	2	8	**50**	**4.2**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	3	6	0	3	0	3	7	12	5	1	2	8	**50**	**4.2**
BAS	*Austrovenus stutchburyi*	<5	60	43	25	11	47	20	8	17	17	13	16	16	**293**	**24.4**
		>5	12	6	33	6	18	11	3	16	8	9	37	17	**176**	**14.7**
		Cond.analysis	3	0	1	2	6	4	1	5	5	5	4		**36**	**3.0**
		Total	75	49	59	19	71	35	12	38	30	27	57	33	**505**	**42.1**
BML	*Macamona liliana*	<5	2	0	0	3	0	0	0	0	2	2	0	0	**9**	**0.8**
		5-15	5	2	6	2	5	1	2	0	2	1	2	0	**28**	**2.3**
		>15	0	0	0	0	0	2	0	2	1	0	3	3	**11**	**0.9**
		Cond.analysis		3	3	1	2	1	1	1	2	2		1	**17**	**1.4**
		Total	7	5	9	6	7	4	3	3	7	5	5	4	**65**	**5.4**
BNH	*Nucula hartvigiana*	<2	14	44	18	7	19	6	3	6	1	1	8	19	**146**	**12.2**
		>2	3	23	40	1	15	4	0	41	5	0	13	10	**155**	**12.9**
		Total	17	67	58	8	34	10	3	47	6	1	21	29	**301**	**25.1**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CUMACEANS			0	0	0	0	0	0	0	0	0	0	0	0		
CCL	*Colurostylis lemurum*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GASTROPODS			0	0	0	0	0	0	0	0	0	0	0	0		
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		31	29	17	5	28	5	2	16	16	4	8	9	**170**	**14.2**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	0	0	2	3	0	0	0	**5**	**0.4**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		15	16	11	3	15	3	3	27	1	5	1	4	**104**	**8.7**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		0	1	0	0	0	0	2	0	0	0	0	0	**3**	**0.3**
PAR	*Aricidea* sp.		10	4	4	5	3	6	8	2	2	3	2	2	**51**	**4.3**
PBOC	Pseudopolydora complex		0	4	1	2	0	1	0	1	0	3	0	2	**14**	**1.2**
PCOS	*Cossura* sp.		1	0	0	2	0	2	1	0	0	2	1	0	**9**	**0.8**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGLY	*Glycera* sp.		0	0	1	1	1	0	0	0	0	0	2	2	**7**	**0.6**
PHF	"Capitellidae"		63	40	39	48	59	50	37	46	41	62	33	46	**564**	**47.0**
PMD	*Magelona dakini*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PNIC	Nereidae		1	0	3	1	0	0	2	4	1	1	1	1	**15**	**1.3**
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PPAR	Paraonidae		1	4	2	6	4	3	1	0	5	12	0	2	**40**	**3.3**
NON INDICATOR SPECIES																
CAMPH	Amphipods		2	1	0	1	0	0	0	0	6	2	1	1	**14**	**1.2**
CCRAB	Crabs		0	3	0	0	3	0	0	3	2	2	3	0	**0**	**0.0**
CCUM	Cumaceans		0	0	0	0	0	0	0	1	0	0	0	0	**1**	**0.1**
CISO	Isopods		1	1	0	1	0	3	0	3	0	0	0	0	**9**	**0.8**
COST	Ostracods		0	0	1	0	0	0	0	0	0	0	1	0	**2**	**0.2**
CSHR	Shrimps/Mysids		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
COTH	Other Crustaceans		0	0	0	1	0	0	0	0	0	0	0	0	**1**	**0.1**
BOTH	Bivalves		2	6	0	0	0	3	0	0	2	2	0	0	**15**	**1.3**
GOTH	Gastropods		0	6	6	2	5	0	1	4	1	3	2	2	**32**	**2.7**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
ONEM	Nemerteans		2	1	1	2	3	1	0	0	5	0	0	0	**15**	**1.3**
POTH	Polychaetes		1	5	6	3	19	2	2	4	4	1	0	5	**52**	**4.3**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
TOTAL			**232**	**248**	**218**	**119**	**252**	**131**	**85**	**213**	**137**	**136**	**140**	**150**	**2045**	**170.4**

WI April 2003

INDICATOR SPECIES			CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
APHOX	*Phoxocephalidae*		0	0	0	0	0	0	1	0	0	0	0	0	**1**	**0.1**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	3	4	4	1	12	3	11	1	14	1	5	2	**61**	**5.1**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	3	4	4	1	12	3	11	1	14	1	5	2	**61**	**5.1**
BAS	*Austrovenus stutchburyi*	<5	13	10	7	15	14	12	8	19	13	10	10	11	**142**	**11.8**
		>5	26	28	19	25	18	9	18	31	40	20	22	25	**281**	**23.4**
		Cond.analysis	5	0	6	5	0	5	5	0	0	5	5	5	**41**	**3.4**
		Total	44	38	32	45	32	26	31	50	53	35	37	41	**464**	**38.7**
BML	*Macamona liliana*	<5	11	0	0	1	0	1	4	2	1	0	2	0	**22**	**1.8**
		5-15	4	5	1	3	0	1	0	1	0	2	1	0	**18**	**1.5**
		>15	0	0	2	2	5	0	0	1	1	4	1	1	**17**	**1.4**
		Cond.analysis	2	3	4	4	3	2	1	0	2	1	1	2	**25**	**2.1**
		Total	17	8	7	10	8	4	5	4	4	7	5	3	**82**	**6.8**
BNH	*Nucula hartvigiana*	<2	13	13	12	11	21	12	7	8	12	7	6	10	**132**	**11.0**
		>2	10	3	69	27	19	17	3	7	30	41	14	23	**263**	**21.9**
		Total	23	16	81	38	40	29	10	15	42	48	20	33	**395**	**32.9**
BPA	*Paphies australis*	<5	0	0	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
		5-15	0	0	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
		>15	0	0	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
		Total	0	0	3	0	0	0	0	0	0	0	0	0	**3**	**0.3**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CUMACEANS																
CCL	*Colurostylis lemurum*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		25	40	44	23	21	26	7	14	35	28	26	50	**339**	**28.3**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	0	1	0	0	0	3	0	0	0	**4**	**0.3**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		15	9	13	17	12	15	9	10	18	11	12	14	**155**	**12.9**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAR	*Aricidea* sp.		4	1	1	3	3	1	5	1	2	2	1	3	**27**	**2.3**
PBOC	Pseudopolydora complex		0	1	0	1	0	1	0	2	1	1	1	0	**8**	**0.7**
PCOS	*Cossura* sp.		1	0	0	0	1	0	0	2	0	0	0	2	**6**	**0.5**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGLY	*Glycera* sp.		1	0	0	0	0	2	0	0	0	1	1	0	**5**	**0.4**
PHF	"Capitellidae"		46	39	32	31	40	28	33	34	43	24	29	38	**417**	**34.8**
PMD	*Magelona dakini*		0	0	0	0	0	0	0	0	0	0	0	1	**1**	**0.1**
PNIC	Nereidae		4	0	1	2	1	1	5	4	2	2	1	1	**24**	**2.0**
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PPAR	Paraonidae		1	9	1	2	0	0	0	0	1	1	0	5	**20**	**1.7**
NON INDICATOR SPECIES																
CAMPH	Amphipods		0	0	1	5	0	1	0	0	0	0	2	2	**11**	**0.9**
CCRAB	Crabs		0	0	4	0	0	0	0	2	2	1	2	1	**0**	**0.0**
CCUM	Cumaceans		0	2	0	0	0	0	0	0	0	0	0	0	**2**	**0.2**
CISO	Isopods		1	0	1	1	1	2	0	1	1	0	1	0	**9**	**0.8**
COST	Ostracods		1	2	1	0	1	0	1	0	0	0	0	0	**6**	**0.5**
CSHR	Shrimps/Mysids		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
COTH	Other Crustaceans		0	0	2	0	2	2	1	0	1	0	0	1	**9**	**0.8**
BOTH	Bivalves		4	4	4	0	0	0	0	4	1	2	0	4	**23**	**1.9**
GOTH	Gastropods		3	7	8	10	1	3	2	2	7	8	5	9	**65**	**5.4**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
ONEM	Nemerteans		0	2	0	1	2	2	0	1	1	4	0	0	**13**	**1.1**
POTH	Polychaetes		6	9	2	3	7	1	0	2	2	1	6	3	**42**	**3.5**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	0	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
TOTAL			**199**	**191**	**243**	**193**	**185**	**147**	**121**	**149**	**233**	**177**	**154**	**213**	**2193**	**182.8**

WI July 2003

INDICATOR SPECIES			CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
APHOX	*Phoxocephalidae*		0	0	1	0	0	0	0	0	0	1	0	1	**3**	**0.3**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	2	2	11	3	1	1	6	2	4	4	5	2	**43**	**3.6**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	2	2	11	3	1	1	6	2	4	4	5	2	**43**	**3.6**
BAS	*Austrovenus stutchburyi*	<5	9	12	6	22	16	5	7	3	20	13	6	3	**122**	**10.2**
		>5	12	16	9	18	13	8	5	17	38	19	19	14	**188**	**15.7**
		Cond.analysis	5	4	5	4	4	2	1	4	4	5	4	5	**47**	**3.9**
		Total	26	32	20	44	33	15	13	24	62	37	29	22	**357**	**29.8**
BML	*Macamona liliana*	<5	0	0	0	0	0	1	0	1	0	0	0	0	**2**	**0.2**
		5-15	2	5	2	1	3	3	4	8	4	4	2	2	**40**	**3.3**
		>15	2	2	3	1	0	0	1	1	0	2	1	1	**14**	**1.2**
		Cond.analysis	0	0	0	1	2	1	2	0	1	0	2	1	**10**	**0.8**
		Total	4	7	5	3	5	5	7	10	5	6	5	4	**66**	**5.5**
BNH	*Nucula hartvigiana*	<2	12	6	1	10	3	12	7	2	7	5	14	3	**82**	**6.8**
		>2	30	6	10	19	28		32	20	86	11	21	2	**265**	**22.1**
		Total	42	12	11	29	31	12	39	22	93	16	35	5	**347**	**28.9**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CUMACEANS																
CCL	*Colurostylis lemurum*		0	1	0	0	0	3	0	1	0	1	0	0	**6**	**0.5**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		4	11	10	19	1	14	29	19	33	13	30	2	**185**	**15.4**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		6	11	23	9	21	10	18	9	15	4	9	10	**145**	**12.1**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAR	*Aricidea* sp.		0	4	3	0	3	3	0	0	3	3	4	4	**27**	**2.3**
PBOC	Pseudopolydora complex		1	0	2	1	0	0	0	3	0	0	0	0	**7**	**0.6**
PCOS	*Cossura* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGLY	*Glycera* sp.		1	1	0	1	1	0	0	0	0	1	1	2	**8**	**0.7**
PHF	"Capitellidae"		19	42	48	8	37	28	32	30	16	25	23	32	**340**	**28.3**
PMD	*Magelona dakini*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PNIC	Nereidae		0	6	3	0	5	4	2	3	1	3	4	10	**41**	**3.4**
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PPAR	Paraonidae		0	1	0	0	0	1	0	0	0	0	1	0	**3**	**0.3**
NON INDICATOR SPECIES																
CAMPH	Amphipods		0	4	3	6	0	5	5	0	4	1	4	0	**32**	**2.7**
CCRAB	Crabs		0	2	2	3	1	1	0	1	2	1	2	0	**0**	**0.0**
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CISO	Isopods		0	2	1	0	1	0	2	0	0	1	1	0	**8**	**0.7**
COST	Ostracods		0	0	1	0	0	0	1	1	0	1	0	0	**4**	**0.3**
CSHR	Shrimps/Mysids		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
COTH	Other Crustaceans		1	0	0	4	0	0	0	0	0	0	0	0	**5**	**0.4**
BOTH	Bivalves		0	3	4	0	4	6	1	5	1	7	12	3	**46**	**3.8**
GOTH	Gastropods		0	0	1	0	0	0	0	0	2	0	1	0	**4**	**0.3**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
ONEM	Nemerteans		0	1	1	1	1	3	0	0	0	0	0	1	**8**	**0.7**
POTH	Polychaetes		7	16	8	7	9	4	11	7	14	2	13	0	**98**	**8.2**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		1		2	1	0	0	2	0	3	1	0	0	**10**	**0.8**
TOTAL			**114**	**158**	**160**	**139**	**154**	**115**	**168**	**137**	**258**	**128**	**179**	**98**	**1793**	**149.4**

WI October 2003

INDICATOR SPECIES			CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
APHOX	*Phoxocephalidae*		1	1	2	0	1	2	1	0	0	1	0	1	**10**	**0.8**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	0	0	4	5	0	9	0	4	3	6	29	2	**62**	**5.2**
		>2	0	0	0	0	0	0	3	0	0	0	0	0	**3**	**0.3**
		Total	0	0	4	5	0	9	3	4	3	6	29	2	**65**	**5.4**
BAS	*Austrovenus stutchburyi*	<5	4	5	15	46	16	25	21	10	25	21	34	16	**238**	**19.8**
		>5	12	14	13	8	14	12	8	18	19	21	18	31	**188**	**15.7**
		Cond.analysis	0	5	0	1	0	1	2	0	5	1	5	0	**20**	**1.7**
		Total	16	24	28	55	30	38	31	28	49	43	57	47	**446**	**37.2**
BML	*Macamona liliana*	<5	0	1	1	1	0	2	0	0	0	1	2	0	**8**	**0.7**
		5-15	1	7	3	5	3	7	1	3	1	0	3	2	**36**	**3.0**
		>15	2	0	2	2	1	2	0	2	1	3	0	3	**18**	**1.5**
		Cond.analysis	0	0	1	1	1	0	1	0	1	2	2	1	**10**	**0.8**
		Total	3	8	7	9	5	11	2	5	3	6	7	6	**72**	**6.0**
BNH	*Nucula hartvigiana*	<2	14	6	17	4	3	10	9	3	11	18	10	17	**122**	**10.2**
		>2	14	8	5	45	28	21	11	8	17	56	27	7	**247**	**20.6**
		Total	28	14	22	49	31	31	20	11	28	74	37	24	**369**	**30.8**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	1	0	0	0	0	**1**	**0.1**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	1	0	0	0	0	**1**	**0.1**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	1	0	0	0	**1**	**0.1**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	1	0	0	0	**1**	**0.1**
CUMACEANS																
CCL	*Colurostylis lemurum*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		2	0	4	8	11	5	12	10	5	26	27	10	**120**	**10.0**
OTHER																
OAN	*Anthopleura aureoradiata*		3	0	0	2	0	0	0	0	0	0	0	0	**5**	**0.4**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		0	6	16	12	8	4	5	6	11	16	21	2	**107**	**8.9**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		0	0	3	0	0	0	0	0	0	0	1	0	**4**	**0.3**
PAR	*Aricidea* sp.		1	2	1	1	4	5	1	2	2	4	2	0	**25**	**2.1**
PBOC	Pseudopolydora complex		0	0	0	1	0	0	0	0	0	0	0	0	**1**	**0.1**
PCOS	*Cossura* sp.		1	0	0	0	0	0	1	1	2	0	0	0	**5**	**0.4**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		1	0	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
PGLY	*Glycera* sp.		0	0	1	1	0	1	2	2	0	1	2	0	**10**	**0.8**
PHF	"Capitellidae"		9	19	29	18	2	22	24	8	23	8	28	34	**224**	**18.7**
PMD	*Magelona dakini*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PNIC	Nereidae		1	2	2	3	4	3	2	4	1	2	3	2	**29**	**2.4**
POP	*Orbinia papillosa*		0	0	2	1	0	0	2	3	0	0	1	0	**9**	**0.8**
PPAR	Paraonidae		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
NON INDICATOR SPECIES																
CAMPH	Amphipods		1	0	0	1	2	1	1	1	4	6	3	1	**21**	**1.8**
CCRAB	Crabs		1	1	0	2	1	1	1	1	0	3	0	0	**0**	**0.0**
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CISO	Isopods		1	0	1	0	0	0	1	1	1	0	0	2	**7**	**0.6**
COST	Ostracods		2	1	1	0	0	2	1	2	2	0	1	0	**12**	**1.0**
CSHR	Shrimps/Mysids		0	1	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
COTH	Other Crustaceans		1	0	6	14	5	0	0	7	0	5	4	3	**45**	**3.8**
BOTH	Bivalves		0	0	2	0	0	0	0	0	0	0	0	0	**2**	**0.2**
GOTH	Gastropods		5	11	5	8	10	3	4	2	4	5	2	3	**62**	**5.2**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	1	0	0	0	0	1	1	**3**	**0.3**
ONEM	Nemerteans		0	0	0	0	0	0	0	1	0	0	1	0	**2**	**0.2**
POTH	Polychaetes		1	3	6	5	2	3	1	1	2	3	8	4	**39**	**3.3**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other (chiton)		0	0	0	0	0	0	1	1	0	0	3	0	**5**	**0.4**
TOTAL			**78**	**93**	**142**	**195**	**116**	**142**	**116**	**102**	**141**	**209**	**238**	**142**	**1703**	**141.9**

WI January 2004

INDICATOR SPECIES			CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	2	0	0	2	0	0	0	**4**	**0.3**
APHOX	*Phoxocephalidae*		1	0	0	0	0	0	0	0	1	3	1	0	**6**	**0.5**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	5	5	1	5	3	7	3	3	18	4	21	7	**82**	**6.8**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	5	5	1	5	3	7	3	3	18	4	21	7	**82**	**6.8**
BAS	*Austrovenus stutchburyi*	<5	35	22	21	21	20	17	18	26	25	32	17	32	**286**	**23.8**
		>5	13	29	25	15	30	18	18	38	36	39	21	21	**303**	**25.3**
		Cond.analysis	5	5	3	0	0	7	0	0	0	0	5	0	**25**	**2.1**
		Total	53	56	49	36	50	42	36	64	61	71	43	53	**614**	**51.2**
BML	*Macamona liliana*	<5	1	2	0	0	1	0	2	4	0	2	0	1	**13**	**1.1**
		5-15	0	0	1	2	0	4	1	1	2	1	2	3	**17**	**1.4**
		>15	1	2	7	1	4	5	4	2	5	4	7	0	**42**	**3.5**
		Cond.analysis	1	3	0	5	1	0	0	2	0	1	1	2	**16**	**1.3**
		Total	3	7	8	8	6	9	7	9	7	8	10	6	**88**	**7.3**
BNH	*Nucula hartvigiana*	<2	17	7	22	19	20	10	18	26	23	14	23	18	**217**	**18.1**
		>2	36	5	25	22	19	31	8	34	45	16	34	20	**295**	**24.6**
		Total	53	12	47	41	39	41	26	60	68	30	57	38	**512**	**42.7**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	1	0	0	0	0	0	0	0	0	**1**	**0.1**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	1	0	0	0	0	0	0	0	0	**1**	**0.1**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>5	0	0	0	0	0	0	0	0	0	2	0	0	**2**	**0.2**
		Total	0	0	0	0	0	0	0	0	0	2	0	0	**2**	**0.2**
CUMACEANS																
CCL	*Colurostylis lemurum*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		4	15	9	10	13	9	5	15	8	7	18	15	**128**	**10.7**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	1	0	0	1	2	3	1	4	0	**12**	**1.0**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		5	4	12	18	25	12	5	12	16	12	12	11	**144**	**12.0**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		0	0	0	0	0	0	0	0	1	0	0	0	**1**	**0.1**
PAR	*Aricidea* sp.		1	0	4	0	5	0	1	3	3	0	3	2	**22**	**1.8**
PBOC	Pseudopolydora complex		1	0	2	1	0	0	1	0	1	0	0	2	**8**	**0.7**
PCOS	*Cossura* sp.		0	0	1	0	0	0	0	1	0	0	0	0	**2**	**0.2**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGLY	*Glycera* sp.		2	2	3	6	1	1	1	1	1	2	2	1	**23**	**1.9**
PHF	"Capitellidae"		36	23	47	27	35	30	26	42	29	21	20	23	**359**	**29.9**
PMD	*Magelona dakini*		0	0	0	1	1	0	0	0	1	0	0	0	**3**	**0.3**
PNIC	Nereidae		1	1	1	0	1	3	1	0	1	3	1	4	**17**	**1.4**
POP	*Orbinia papillosa*		0	0	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
PPAR	Paraonidae		0	0	0	0	2	0	0	0	0	1	0	2	**5**	**0.4**
NON INDICATOR SPECIES																
CAMPH	Amphipods		0	1	3	0	4	1	2	8	0	0	0	2	**21**	**1.8**
CCRAB	Crabs		0	1	1	0	0	3	0	0	1	0	1	4	**0**	**0.0**
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CISO	Isopods		0	0	1	1	1	0	1	0	1	2	0	0	**7**	**0.6**
COST	Ostracods		0	1	1	1	2	1	1	0	0	0	2	0	**9**	**0.8**
CSHR	Shrimps/Mysids		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
COTH	Other Crustaceans		0	8	11	1	4	0	2	2	5	0	2	0	**35**	**2.9**
BOTH	Bivalves		3	0	1	0	0	0	1	0	0	1	0	1	**7**	**0.6**
GOTH	Gastropods		5	7	6	3	11	3	6	8	5	4	5	5	**68**	**5.7**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	1	1	0	0	0	0	3	0	0	0	**5**	**0.4**
ONEM	Nemerteans		0	0	0	1	0	1	2	1	0	0	1	1	**7**	**0.6**
POTH	Polychaetes		0	1	3	1	2	4	0	4	5	4	4	4	**32**	**2.7**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other (nematoda)		0	1	1	0	0	0	0	0	0	0	0	0	**2**	**0.2**
TOTAL			**173**	**145**	**214**	**164**	**205**	**169**	**128**	**235**	**241**	**176**	**207**	**181**	**2227**	**185.6**

WI April 2004

INDICATOR SPECIES			CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		1	0	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
APHOX	*Phoxocephalidae*		0	1	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	1	2	4	2	1	12	4	4	4	9	4	1	**48**	**4.0**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	1	2	4	2	1	12	4	4	4	9	4	1	**48**	**4.0**
BAS	*Austrovenus stutchburyi*	<5	30	22	16	14	18	25	30	18	27	18	21	11	**250**	**20.8**
		>5	4	6	14	70	10	11	19	18	10	23	17	21	**223**	**18.6**
		Cond.analysis	0	0	0	0	7	5	0	5	4	0	7	0	**28**	**2.3**
		Total	34	28	30	84	35	41	49	41	41	41	45	32	**501**	**41.8**
BML	*Macamona liliana*	<5	5	1	0	1	2	4	1	1	3	0	1	1	**20**	**1.7**
		5-15	1	3	5	1	0	2	0	0	4	0	1	0	**17**	**1.4**
		>15	5	6	3	4	3	1	6	4	4	4	2	1	**43**	**3.6**
		Cond.analysis	0	0	1	1	2	1	2	3	0	1	1	1	**13**	**1.1**
		Total	11	10	9	7	7	8	9	8	11	5	5	3	**93**	**7.8**
BNH	*Nucula hartvigiana*	<2	8	9	2	13	0	8	6	2	4	12	5	0	**69**	**5.8**
		>2	9	23	0	33	21	22	15	19	18	31	30	0	**221**	**18.4**
		Total	17	32	2	46	21	30	21	21	22	43	35	0	**290**	**24.2**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	1	0	**1**	**0.1**
		>15	0	0	0	0	0	0	0	0	0	0	1	0	**1**	**0.1**
		Total	0	0	0	0	0	0	0	0	0	0	2	0	**2**	**0.2**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CUMACEANS																
CCL	*Colurostylis lemurum*		0	0	0	0	0	0	0	0	0	1	0	0	**1**	**0.1**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		15	8	26	19	28	15	20	21	18	17	16	12	**215**	**17.9**
OTHER																
OAN	*Anthopleura aureoradiata*		2	0	1	2	0	1	0	0	2	3	1	0	**12**	**1.0**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		12	9	6	21	14	11	16	8	5	15	15	11	**143**	**11.9**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		0	1	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
PAR	*Aricidea* sp.		2	2	0	0	3	0	0	1	0	3	3	0	**14**	**1.2**
PBOC	Pseudopolydora complex		0	0	0	0	0	0	0	1	0	0	0	0	**1**	**0.1**
PCOS	*Cossura* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGLY	*Glycera* sp.		1	0	0	1	2	1	1	0	0	1	2	0	**9**	**0.8**
PHF	"Capitellidae"		31	33	21	9	22	24	27	8	15	16	31	20	**257**	**21.4**
PMD	*Magelona dakini*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PNIC	Nereidae		1	2	2	1	2	3	1	2	1	0	1	2	**18**	**1.5**
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PPAR	Paraonidae		0	1	3	0	1	0	0	0	0	0	1	0	**6**	**0.5**
NON INDICATOR SPECIES																
CAMPH	Amphipods		0	1	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
CCRAB	Crabs		0	0	2	1	2	0	3	2	1	1	4	3	**0**	**0.0**
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CISO	Isopods		0	0	0	0	0	1	0	2	1	0	0	0	**4**	**0.3**
COST	Ostracods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CSHR	Shrimps/Mysids		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
COTH	Other Crustaceans		1	2	15	55	6	2	5	19	6	6	1	1	**119**	**9.9**
BOTH	Bivalves		1	2	1	0	0	0	0	1	0	0	0	0	**5**	**0.4**
GOTH	Gastropods		3	3	7	6	4	5	4	9	3	9	4	2	**59**	**4.9**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
ONEM	Nemerteans		0	0	0	0	1	1	2	0	0	1	0	0	**5**	**0.4**
POTH	Polychaetes		0	0	0	2	1	1	0	1	1	0	2	2	**10**	**0.8**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other (chiton)		1	1	2	1	1	0	4	2	1	2	3	0	**18**	**1.5**
TOTAL			**134**	**138**	**131**	**257**	**151**	**156**	**166**	**151**	**132**	**173**	**175**	**89**	**1834**	**152.8**

OB July 2002

INDICATOR SPECIES			CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
APHOX	*Phoxocephalidae*		1	2	4	6	4	3	3	4	5	1	2	4	**39**	**3.3**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	6	0	2	2	1	0	0	2	1	0	0	0	**14**	**1.2**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	6	0	2	2	1	0	0	2	1	0	0	0	**14**	**1.2**
BAS	*Austrovenus stutchburyi*	<5	0	0	1	0	0	0	0	1	0	2	0	0	**4**	**0.3**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	1	0	0	0	0	1	0	2	0	0	**4**	**0.3**
BML	*Macamona liliana*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	1	0	0	0	0	0	0	0	0	**1**	**0.1**
		Cond.analysis	0	1	0	0	0	0	0	1	1	0	0	1	**4**	**0.3**
		Total	0	1	0	1	0	0	0	1	1	0	0	1	**5**	**0.4**
BNH	*Nucula hartvigiana*	<2	0	0	0	0	0	1	0	0	0	0	0	0	**1**	**0.1**
		>2	0	0	0	0	0	1	0	0	0	0	0	0	**1**	**0.1**
		Total	0	0	0	0	0	2	0	0	0	0	0	0	**2**	**0.2**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BTHL	*Theora lubrica*	<5	0	0	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
CUMACEANS																
CCL	*Colurostylis lemurum*		1	1	3	2	1	2	1	1	1	0	0	2	**15**	**1.3**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		0	2	2	1	2	3	2	4	2	3	0	4	**25**	**2.1**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		1	0	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
PAR	*Aricidea* sp.		1	1	2	1	4	3	5	7	4	8	3	1	**40**	**3.3**
PBOC	Pseudopolydora complex		0	0	0	0	0	0	0	1	0	0	2	0	**3**	**0.3**
PCOS	*Cossura* sp.		34	12	28	17	29	27	22	28	30	37	22	18	**304**	**25.3**
PEUC	*Euchone* sp.		0	0	0	1	0	0	0	0	0	0	0	0	**1**	**0.1**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGLY	*Glycera* sp.		2	0	0	1	2	0	1	0	1	1	0	1	**9**	**0.8**
PHF	"Capitellidae"		18	2	13	14	22	15	16	28	8	13	23	8	**180**	**15.0**
PMD	*Magelona dakini*		2	0	0	0	0	1	2	1	0	0	1	1	**8**	**0.7**
PNIC	Nereidae		3	2	2	2	4	1	2	2	4	4	2	2	**30**	**2.5**
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PPAR	Paraonidae		1	1	1	1	4	4	2	0	0	2	5	1	**22**	**1.8**
NON INDICATOR SPECIES																
CAMPH	Amphipods		2	0	0	1	0	1	1	0	2	0	0	0	**7**	**0.6**
CCRAB	Crabs		0	1	1	0	1	0	0	1	0	1	0	0	**5**	**0.4**
CCUM	Cumaceans		0	6	0	0	2	1	1	0	0	0	1	3	**14**	**1.2**
CISO	Isopods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
COST	Ostracods		1	1	0	1	1	0	0	0	1	0	1	0	**6**	**0.5**
CSHR	Shrimps/Mysids		0	0	0	1	0	0	0	0	1	0	0	0	**2**	**0.2**
COTH	Other Crustaceans		0	0	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
BOTH	Bivalves		1	1	3	1	2	3	3	4	3	7	1	4	**33**	**2.8**
GOTH	Gastropods		5	0	6	9	0	5	3	5	1	2	9	3	**48**	**4.0**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
ONEM	Nemerteans		0	0	0	1	2	0	1	0	0	1	0	3	**8**	**0.7**
POTH	Polychaetes		3	1	5	2	0	4	3	1	1	0	4	4	**28**	**2.3**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	0	0	0	0	0	2	0	0	1	0	0	**3**	**0.3**
TOTAL			**82**	**34**	**75**	**65**	**81**	**75**	**70**	**91**	**66**	**83**	**76**	**60**	**858**	**71.5**

OB October 2002

INDICATOR SPECIES			CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
APHOX	*Phoxocephalidae*		5	5	6	7	5	3	9	10	3	13	4	5	**75**	**6.3**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	0	2	0	3	2	0	0	0	1	1	0	1	**10**	**0.8**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	2	0	3	2	0	0	0	1	1	0	1	**10**	**0.8**
BAS	*Austrovenus stutchburyi*	<5	0	1	0	0	0	0	0	1	0	0	0	2	**4**	**0.3**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	1	0	0	0	0	0	1	0	0	0	2	**4**	**0.3**
BML	*Macamona liliana*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	1	0	0	1	0	0	0	0	0	0	0	**2**	**0.2**
		Cond.analysis	0	0	0	0	0	0	0	0	1	0	0	1	**2**	**0.2**
		Total	0	1	0	0	1	0	0	0	1	0	0	1	**4**	**0.3**
BNH	*Nucula hartvigiana*	<2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CUMACEANS																
CCL	*Colurostylis lemurum*		0	0	1	0	2	1	1	0	0	0	0	5	**10**	**0.8**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	5	0	0	0	0	0	0	0	0	0	**5**	**0.4**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		0	5	0	2	2	2	5	8	2	5	4	4	**39**	**3.3**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAR	*Aricidea* sp.		0	0	0	1	0	0	2	2	4	1	1	6	**17**	**1.4**
PBOC	Pseudopolydora complex		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PCOS	*Cossura* sp.		19	7	20	22	18	10	17	25	28	36	19	37	**258**	**21.5**
PEUC	*Euchone* sp.		1	1	5	1	0	0	3	1	0	0	0	2	**14**	**1.2**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGLY	*Glycera* sp.		0	0	0	2	0	1	0	0	1	2	0	2	**8**	**0.7**
PHF	"Capitellidae"		15	19	40	20	16	25	21	18	23	24	15	31	**267**	**22.3**
PMD	*Magelona dakini*		0	0	2	2	0	0	1	1	0	1	0	1	**8**	**0.7**
PNIC	Nereidae		2	1	4	3	3	4	5	0	2	2	3	1	**30**	**2.5**
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PPAR	Paraonidae		0	5	12	2	4	0	4	7	2	6	0	4	**46**	**3.8**
NON INDICATOR SPECIES																
CAMPH	Amphipods		3	0	0	4	0	1	6	3	0	0	1	1	**19**	**1.6**
CCRAB	Crabs		1	1	1	0	0	0	0	0	0	0	0	1	**0**	**0.0**
CCUM	Cumaceans		0	0	0	1	1	4	1	6	0	2	0	0	**15**	**1.3**
CISO	Isopods		0	0	3	0	0	1	1	0	0	0	0	0	**5**	**0.4**
COST	Ostracods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CSHR	Shrimps/Mysids		0	0	0	0	0	0	0	0	0	0	1	0	**1**	**0.1**
COTH	Other Crustaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BOTH	Bivalves		0	0	0	1	3	6	1	2	4	1	0	0	**18**	**1.5**
GOTH	Gastropods		0	7	5	10	4	10	8	15	3	4	3	2	**71**	**5.9**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
ONEM	Nemerteans		1	0	0	1	0	0	0	0	0	2	0	1	**5**	**0.4**
POTH	Polychaetes		5	10	2	1	3	4	3	4	4	4	7	2	**49**	**4.1**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	0	0	0	1	0	0	0	0	0	0	0	**1**	**0.1**
TOTAL			**52**	**65**	**106**	**83**	**65**	**72**	**88**	**103**	**78**	**104**	**58**	**109**	**979**	**81.6**

OB January 2003

INDICATOR SPECIES			CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
APHOX	*Phoxocephalidae*		1	0	0	0	3	0	0	1	0	0	2	0	**7**	**0.6**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	0	0	0	0	0	0	0	0	2	1	0	0	**3**	**0.3**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	2	1	0	0	**3**	**0.3**
BAS	*Austrovenus stutchburyi*	<5	0	0	0	0	0	1	0	0	1	1	1	0	**4**	**0.3**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	1	0	0	1	1	1	0	**4**	**0.3**
BML	*Macamona liliana*	<5	0	0	0	0	1	1	0	0	0	0	0	0	**2**	**0.2**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	1	0	0	0	0	0	0	**1**	**0.1**
		Cond.analysis	0	0	0	0	0	0	0	0	1	0	0	0	**1**	**0.1**
		Total	0	0	0	0	1	2	0	0	1	0	0	0	**4**	**0.3**
BNH	*Nucula hartvigiana*	<2	0	0	0	0	0	0	0	0	0	1	1	0	**2**	**0.2**
		>2	0	0	0	1	0	0	0	0	0	0	0	0	**1**	**0.1**
		Total	0	0	0	1	0	0	0	0	0	1	1	0	**3**	**0.3**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CUMACEANS																
CCL	*Colurostylis lemurum*		1	0	1	1	2	2	0	1	0	0	1	0	**9**	**0.8**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		8	5	2	3	4	1	8	0	6	1	4	3	**45**	**3.8**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		0	0	0	0	0	0	0	0	0	1	0	0	**1**	**0.1**
PAR	*Aricidea* sp.		1	2	0	1	2	3	1	8	3	0	1	1	**23**	**1.9**
PBOC	Pseudopolydora complex		0	10	0	0	0	0	0	1	1	1	0	1	**14**	**1.2**
PCOS	*Cossura* sp.		11	10	13	15	11	9	38	41	34	13	21	19	**235**	**19.6**
PEUC	*Euchone* sp.		1	7	4	1	6	1	3	3	2	0	0	0	**28**	**2.3**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGLY	*Glycera* sp.		0	0	1	0	0	1	1	0	0	0	1	0	**4**	**0.3**
PHF	"Capitellidae"		40	44	49	27	30	32	32	31	30	31	45	21	**412**	**34.3**
PMD	*Magelona dakini*		0	1	0	2	0	0	1	1	0	0	1	0	**6**	**0.5**
PNIC	Nereidae		1	0	1	4	1	2	2	2	5	3	1	4	**26**	**2.2**
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PPAR	Paraonidae		1	1	0	0	1	0	1	0	1	1	1	2	**9**	**0.8**
NON INDICATOR SPECIES																
CAMPH	Amphipods		0	1	1	3	2	3	0	0	2	0	2	2	**16**	**1.3**
CCRAB	Crabs		0	0	0	0	1	0	1	0	0	3	0	0	**0**	**0.0**
CCUM	Cumaceans		0	0	0	0	1	1	1	1	1	1	0	0	**6**	**0.5**
CISO	Isopods		1	0	0	1	0	0	0	1	0	1	1	2	**7**	**0.6**
COST	Ostracods		0	1	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
CSHR	Shrimps/Mysids		1	0	0	0	0	0	1	0	0	0	0	0	**2**	**0.2**
COTH	Other Crustaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BOTH	Bivalves		1	10	1	6	6	1	0	1	4	6	4	2	**42**	**3.5**
GOTH	Gastropods		0	2	1	0	1	0	0	0	0	0	3	0	**7**	**0.6**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
ONEM	Nemerteans		0	1	1	0	2	0	1	0	0	0	0	0	**5**	**0.4**
POTH	Polychaetes		4	2	10	4	6	2	3	3	1	2	0	2	**39**	**3.3**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
TOTAL			**72**	**97**	**85**	**69**	**80**	**61**	**94**	**95**	**94**	**67**	**90**	**59**	**958**	**79.8**

OB April 2003

INDICATOR SPECIES			CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
APHOX	*Phoxocephalidae*		3	5	3	3	3	7	5	4	9	5	1	5	**53**	**4.4**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BAS	*Austrovenus stutchburyi*	<5	0	1	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	1	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
BML	*Macamona liliana*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	1	0	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Cond.analysis	0	1	0	1	0	0	0	0	0	2	0	1	**5**	**0.4**
		Total	1	1	0	1	0	0	0	0	0	2	0	1	**6**	**0.5**
BNH	*Nucula hartvigiana*	<2	0	0	0	0	0	0	0	0	0	0	0	1	**1**	**0.1**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	1	**1**	**0.1**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CUMACEANS																
CCL	*Colurostylis lemurum*		2	0	3	1	1	1	2	1	1	1	0	1	**14**	**1.2**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		1	0	1	7	3	3	7	4	3	2	2	1	**34**	**2.8**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAR	*Aricidea* sp.		1	0	0	4	0	1	5	0	3	1	0	1	**16**	**1.3**
PBOC	Pseudopolydora complex		0	0	0	1	0	0	0	0	2	1	1	1	**6**	**0.5**
PCOS	*Cossura* sp.		19	8	13	16	14	16	19	17	22	12	12	7	**175**	**14.6**
PEUC	*Euchone* sp.		1	10	3	6	11	6	2	4	2	3	1	3	**52**	**4.3**
PGE	*Goniada* sp.		0	0	0	1	0	0	0	0	0	0	0	0	**1**	**0.1**
PGLY	*Glycera* sp.		0	0	0	0	0	1	0	2	0	1	0	0	**4**	**0.3**
PHF	"Capitellidae"		27	16	20	27	31	20	34	12	28	30	10	22	**277**	**23.1**
PMD	*Magelona dakini*		0	0	0	0	0	0	0	0	0	2	3	0	**5**	**0.4**
PNIC	Nereidae		4	3	6	3	7	3	5	2	14	14	11	5	**77**	**6.4**
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PPAR	Paraonidae		3	0	0	2	0	5	0	0	0	1	0	0	**11**	**0.9**
NON INDICATOR SPECIES																
CAMPH	Amphipods		0	2	0	0	0	2	0	1	1	0	0	4	**10**	**0.8**
CCRAB	Crabs		0	1	0	0	2	1	2	0	0	0	0	0	**0**	**0.0**
CCUM	Cumaceans		1	1	0	0	0	2	1	2	2	5	0	0	**14**	**1.2**
CISO	Isopods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
COST	Ostracods		1	0	0	0	1	2	0	1	0	1	0	1	**7**	**0.6**
CSHR	Shrimps/Mysids		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
COTH	Other Crustaceans		0	0	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
BOTH	Bivalves		0	0	1	0	4	0	1	4	0	2	0	0	**12**	**1.0**
GOTH	Gastropods		4	5	2	0	4	6	2	5	3	1	0	3	**35**	**2.9**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
ONEM	Nemerteans		2	1	1	2	2	4	0	1	0	2	0	2	**17**	**1.4**
POTH	Polychaetes		6	6	2	5	2	3	5	4	6	3	1	0	**43**	**3.6**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	1	**1**	**0.1**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	0	1	0	0	1	4	0	1	1	0	0	**8**	**0.7**
TOTAL			**76**	**60**	**57**	**79**	**85**	**84**	**94**	**64**	**97**	**90**	**42**	**59**	**881**	**73.4**

OB July 2003

INDICATOR SPECIES		SIZE	CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
APHOX	*Phoxocephalidae*		1	0	1	1	0	0	0	0	2	0	1	2	**8**	**0.7**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	2	0	0	0	0	0	0	0	0	0	0	0	**2**	**0.2**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	2	0	0	0	0	0	0	0	0	0	0	0	**2**	**0.2**
BAS	*Austrovenus stutchburyi*	<5	0	0	0	0	0	0	0	0	0	1	0	0	**1**	**0.1**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	1	0	0	**1**	**0.1**
BML	*Macamona liliana*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	1	**1**	**0.1**
		Cond.analysis	0	0	0	1	0	0	1	0	0	0	0	0	**2**	**0.2**
		Total	0	0	0	1	0	0	1	0	0	0	0	1	**3**	**0.3**
BNH	*Nucula hartvigiana*	<2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CUMACEANS																
CCL	*Colurostylis lemurum*		1	1	0	1	2	0	0	1	3	0	0	0	**9**	**0.8**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		1	3	3	0	1	1	1	0	2	2	2	1	**17**	**1.4**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		0	0	0	0	0	0	0	1	0	0	0	0	**1**	**0.1**
PAR	*Aricidea* sp.		2	0	7	1	1	0	0	1	2	1	0	0	**15**	**1.3**
PBOC	Pseudopolydora complex		0	0	0	1	0	0	0	0	0	0	0	0	**1**	**0.1**
PCOS	*Cossura* sp.		14	8	18	23	8	13	5	9	16	18	7	5	**144**	**12.0**
PEUC	*Euchone* sp.		2	0	0	0	0	0	0	0	1	1	1	0	**5**	**0.4**
PGE	*Goniada* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGLY	*Glycera* sp.		1	1	0	1	0	0	1	0	0	0	0	1	**5**	**0.4**
PHF	"Capitellidae"		14	12	12	11	14	26	20	6	14	20	11	15	**175**	**14.6**
PMD	*Magelona dakini*		0	1	0	0	0	1	0	0	0	2	0	0	**4**	**0.3**
PNIC	Nereidae		4	12	9	6	2	6	9	5	10	7	7	3	**80**	**6.7**
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PPAR	Paraonidae		1	1	0	0	1	0	0	0	2	3	0	0	**8**	**0.7**
NON INDICATOR SPECIES																
CAMPH	Amphipods		1	0	1	1	0	3	0	0	1	1	1	1	**10**	**0.8**
CCRAB	Crabs		1	0	0	0	2	0	0	0	0	0	0	0	**0**	**0.0**
CCUM	Cumaceans		1	0	0	0	0	1	0	0	0	0	0	1	**3**	**0.3**
CISO	Isopods		0	0	0	0	0	0	0	0	0	0	2	0	**2**	**0.2**
COST	Ostracods		0	0	0	0	1	1	0	0	0	0	0	1	**3**	**0.3**
CSHR	Shrimps/Mysids		1	0	0	0	2	0	0	0	0	0	0	0	**3**	**0.3**
COTH	Other Crustaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BOTH	Bivalves		1	0	0	0	0	1	0	0	0	1	0	0	**3**	**0.3**
GOTH	Gastropods		5	0	0	0	3	5	8	0	0	5	0	15	**41**	**3.4**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
ONEM	Nemerteans		3	0	0	0	5	3	0	1	0	1	0	0	**13**	**1.1**
POTH	Polychaetes		2	0	4	6	6	6	3	2	0	5	0	6	**40**	**3.3**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	0	0	0	0	1	0	0	0	0	0	0	**1**	**0.1**
TOTAL			**58**	**39**	**55**	**53**	**48**	**68**	**48**	**26**	**53**	**68**	**32**	**52**	**597**	**49.8**

OB October 2003

INDICATOR SPECIES			CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
APHOX	*Phoxocephalidae*		1	0	1	1	0	0	1	1	0	0	1	3	**9**	**0.8**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	2	1	0	1	2	1	0	0	3	1	0	0	**11**	**0.9**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	2	1	0	1	2	1	0	0	3	1	0	0	**11**	**0.9**
BAS	*Austrovenus stutchburyi*	<5	0	3	1	3	1	0	1	0	4	0	2	1	**16**	**1.3**
		>5	0	0	0	0	0	0	0	0	12	0	0	0	**12**	**1.0**
		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	3	1	3	1	0	1	0	16	0	2	1	**28**	**2.3**
BML	*Macamona liliana*	<5	0	1	1	1	0	0	0	0	0	0	0	0	**3**	**0.3**
		5-15	0	0	0	0	0	0	0	0	1	0	0	0	**1**	**0.1**
		>15	1	0	0	0	0	0	0	0	1	0	0	0	**2**	**0.2**
		Cond.analysis	0	0	1	0	1	0	0	0	0	0	0	0	**2**	**0.2**
		Total	1	1	2	1	1	0	0	0	2	0	0	0	**8**	**0.7**
BNH	*Nucula hartvigiana*	<2	0	0	0	0	0	0	0	0	1	0	0	0	**1**	**0.1**
		>2	0	0	0	0	0	0	0	0	9	0	0	0	**9**	**0.8**
		Total	0	0	0	0	0	0	0	0	10	0	0	0	**10**	**0.8**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BTHL	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	1	0	0	**1**	**0.1**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	1	0	0	**1**	**0.1**
CUMACEANS																
CCL	*Colurostylis lemurum*		0	0	1	0	0	0	0	0	1	0	0	0	**2**	**0.2**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		0	0	0	0	0	0	0	0	2	0	0	0	**2**	**0.2**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		2	0	2	1	1	1	2	0	1	1	2	1	**14**	**1.2**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAR	*Aricidea* sp.		0	0	0	0	1	0	0	0	0	0	0	0	**1**	**0.1**
PBOC	Pseudopolydora complex		0	0	0	0	0	0	1	0	0	0	0	0	**1**	**0.1**
PCOS	*Cossura* sp.		12	3	4	14	9	11	16	4	0	11	18	20	**122**	**10.2**
PEUC	*Euchone* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PGE	*Goniada* sp.		1	0	0	0	2	0	0	0	0	0	0	0	**3**	**0.3**
PGLY	*Glycera* sp.		1	1	1	2	0	3	0	1	0	0	2	1	**12**	**1.0**
PHF	"Capitellidae"		16	2	23	13	12	11	14	6	1	15	11	32	**156**	**13.0**
PMD	*Magelona dakini*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PNIC	Nereidae		5	2	2	3	3	4	4	6	1	2	7	3	**42**	**3.5**
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PPAR	Paraonidae		2	1	6	1	3	2	1	0	0	1	0	4	**21**	**1.8**
NON INDICATOR SPECIES																
CAMPH	Amphipods		0	4	0	3	2	2	2	0	0	0	1	1	**15**	**1.3**
CCRAB	Crabs		1	3	0	2	1	2	2	1	0	0	0	0	**0**	**0.0**
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CISO	Isopods		0	0	0	0	0	0	0	0	2	0	0	0	**2**	**0.2**
COST	Ostracods		0	1	2	2	0	1	0	1	0	0	0	0	**7**	**0.6**
CSHR	Shrimps/Mysids		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
COTH	Other Crustaceans		0	0	0	0	0	0	1	0	0	0	0	0	**1**	**0.1**
BOTH	Bivalves		1	0	1	0	1	0	0	0	0	0	0	6	**9**	**0.8**
GOTH	Gastropods		6	14	11	9	2	5	4	3	0	7	5	2	**68**	**5.7**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
ONEM	Nemerteans		0	1	1	0	0	0	0	0	0	0	0	0	**2**	**0.2**
POTH	Polychaetes		1	6	9	2	4	4	2	2	1	3	5	2	**41**	**3.4**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
TOTAL			**52**	**43**	**67**	**58**	**45**	**47**	**51**	**25**	**40**	**42**	**54**	**76**	**588**	**49.0**

OB January 2004

INDICATOR SPECIES			CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
APHOX	*Phoxocephalidae*		2	0	1	1	1	0	2	0	2	6	0	0	**15**	**1.3**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	0	0	0	0	0	0	0	0	1	0	0	0	**1**	**0.1**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	1	0	0	0	**1**	**0.1**
BAS	*Austrovenus stutchburyi*	<5	2	0	1	0	0	0	0	1	0	0	0	0	**4**	**0.3**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	2	0	1	0	0	0	0	1	0	0	0	0	**4**	**0.3**
BML	*Macamona liliana*	<5	0	2	1	2	0	0	0	0	3	1	0	0	**9**	**0.8**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	1	0	0	**1**	**0.1**
		Cond.analysis	0	0	0	1	0	0	0	0	0	0	0	0	**1**	**0.1**
		Total	0	2	1	3	0	0	0	0	3	2	0	0	**11**	**0.9**
BNH	*Nucula hartvigiana*	<2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BTHL	*Theora lubrica*	<5	0	0	0	0	2	0	0	0	0	0	0	1	**3**	**0.3**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	2	0	0	0	0	0	0	1	**3**	**0.3**
CUMACEANS																
CCL	*Colurostylis lemurum*		0	0	0	0	0	1	0	0	0	3	0	0	**4**	**0.3**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	1	0	0	0	**1**	**0.1**
GNHE	*Notoacmea* sp.		0	0	0	0	0	0	0	0	0	0	1	0	**1**	**0.1**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		0	9	3	3	12	5	21	7	8	10	7	8	**93**	**7.8**
PAGL	*Aglaophamus* sp.		1	0	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
PAO	*Aonides oxycephala*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAR	*Aricidea* sp.		1	0	0	0	0	3	4	1	0	0	1	0	**10**	**0.8**
PBOC	Pseudopolydora complex		1	0	0	0	0	0	1	0	0	1	0	0	**3**	**0.3**
PCOS	*Cossura* sp.		12	15	8	13	12	11	21	13	29	18	32	25	**209**	**17.4**
PEUC	*Euchone* sp.		3	7	6	0	6	2	2	5	3	3	11	2	**50**	**4.2**
PGE	*Goniada* sp.		0	0	0	0	1	0	0	0	1	0	0	0	**2**	**0.2**
PGLY	*Glycera* sp.		1	2	2	0	0	0	1	2	0	2	1	0	**11**	**0.9**
PHF	"Capitellidae"		18	22	23	17	20	18	27	35	26	19	31	35	**291**	**24.3**
PMD	*Magelona dakini*		0	0	1	1	0	0	0	0	0	0	0	0	**2**	**0.2**
PNIC	Nereidae		2	2	1	3	2	1	1	1	0	4	1	2	**20**	**1.7**
POP	*Orbinia papillosa*		0	1	2	0	0	0	0	0	0	0	0	0	**3**	**0.3**
PPAR	Paraonidae		1	7	1	0	1	0	2	3	0	0	0	0	**15**	**1.3**
NON INDICATOR SPECIES																
CAMPH	Amphipods		1	2	0	6	1	4	0	0	0	6	4	2	**26**	**2.2**
CCRAB	Crabs		0	0	1	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CISO	Isopods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
COST	Ostracods		2	0	1	0	2	1	0	2	1	0	1	0	**10**	**0.8**
CSHR	Shrimps/Mysids		0	0	0	0	1	0	0	0	0	0	0	0	**1**	**0.1**
COTH	Other Crustaceans		7	0	0	0	0	0	1	0	0	0	0	0	**8**	**0.7**
BOTH	Bivalves		1	3	0	2	1	1	1	0	3	2	1	1	**16**	**1.3**
GOTH	Gastropods		4	1	2	4	2	4	0	0	2	3	3	0	**25**	**2.1**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
ONEM	Nemerteans		2	0	0	0	0	0	2	1	3	0	0	0	**8**	**0.7**
POTH	Polychaetes		4	2	4	2	6	6	3	15	8	5	4	5	**64**	**5.3**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	1	0	0	0	0	**1**	**0.1**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		0	0	0	0	0	0	1	0	0	0	0	0	**1**	**0.1**
TOTAL			**65**	**75**	**58**	**55**	**70**	**57**	**90**	**87**	**91**	**84**	**98**	**81**	**910**	**75.8**

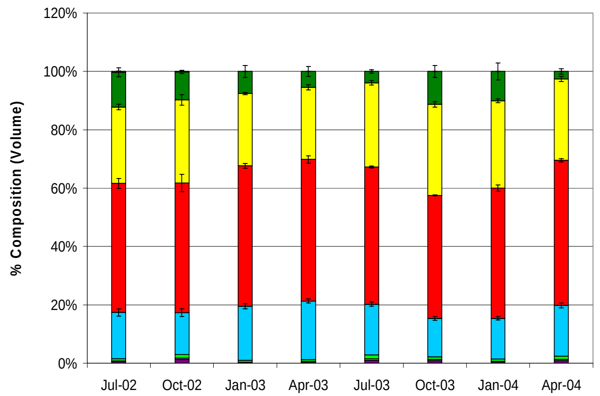
OB April 2004

INDICATOR SPECIES			CORE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	MEAN
AMPHIPODS																
ACOR	*Corophiidae*		0	0	0	0	2	0	1	0	0	0	0	0	**3**	**0.3**
APHOX	*Phoxocephalidae*		0	1	1	0	0	1	0	0	1	0	0	0	**4**	**0.3**
BIVALVES		**SIZE**														
BAB	*Arthritica bifurca*	<2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BAS	*Austrovenus stutchburyi*	<5	0	0	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
BML	*Macamona liliana*	<5	0	0	1	1	0	0	1	0	0	0	0	0	**3**	**0.3**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	1	0	0	0	0	1	0	0	0	0	0	0	**2**	**0.2**
		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	1	**1**	**0.1**
		Total	1	0	1	1	0	1	1	0	0	0	0	1	**6**	**0.5**
BNH	*Nucula hartvigiana*	<2	0	0	0	0	0	0	0	0	0	1	0	0	**1**	**0.1**
		>2	0	0	0	0	2	0	0	0	0	0	0	0	**2**	**0.2**
		Total	0	0	0	0	2	0	0	0	0	1	0	0	**3**	**0.3**
BPA	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BTHL	*Theora lubrica*	<5	0	0	0	1	0	0	0	0	0	0	0	0	**1**	**0.1**
		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	1	0	0	0	0	0	0	0	0	**1**	**0.1**
CUMACEANS																
CCL	*Colurostylis lemurum*		1	1	0	4	0	0	2	1	2	0	0	0	**11**	**0.9**
GASTROPODS																
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		0	0	0	0	0	0	0	1	0	0	0	0	**1**	**0.1**
OTHER																
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
POLYCHAETES																
PAA	*Aquilaspio aucklandica*		4	3	5	6	4	4	4	7	10	1	10	7	**65**	**5.4**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAR	*Aricidea* sp.		4	1	4	1	0	0	0	1	3	2	1	1	**18**	**1.5**
PBOC	Pseudopolydora complex		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PCOS	*Cossura* sp.		12	24	41	19	24	19	8	3	24	39	21	9	**243**	**20.3**
PEUC	*Euchone* sp.		4	4	4	0	1	0	0	2	4	2	3	4	**28**	**2.3**
PGE	*Goniada* sp.		1	8	2	0	2	1	1	1	3	1	0	1	**21**	**1.8**
PGLY	*Glycera* sp.		2	1	0	0	0	1	0	1	1	2	1	1	**10**	**0.8**
PHF	"Capitellidae"		18	17	27	21	30	20	24	28	26	16	20	21	**268**	**22.3**
PMD	*Magelona dakini*		0	1	0	1	0	1	0	0	0	1	0	2	**6**	**0.5**
PNIC	Nereidae		7	1	1	3	0	2	8	3	2	6	5	5	**43**	**3.6**
POP	*Orbinia papillosa*		0	0	0	0	0	0	2	0	0	0	0	2	**4**	**0.3**
PPAR	Paraonidae		5	10	2	6	7	1	7	1	3	0	2	1	**45**	**3.8**
NON INDICATOR SPECIES																
CAMPH	Amphipods		2	0	0	0	0	0	1	0	1	3	0	0	**7**	**0.6**
CCRAB	Crabs		0	2	2	0	0	0	1	0	0	0	0	1	**0**	**0.0**
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CISO	Isopods		0	0	0	0	1	0	0	0	0	0	0	0	**1**	**0.1**
COST	Ostracods		0	3	0	2	0	0	1	1	0	0	0	0	**7**	**0.6**
CSHR	Shrimps/Mysids		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
COTH	Other Crustaceans		0	0	0	3	1	0	0	0	0	0	0	0	**4**	**0.3**
BOTH	Bivalves		1	0	2	1	0	1	0	0	0	0	0	0	**5**	**0.4**
GOTH	Gastropods		1	0	0	4	0	1	0	1	0	2	2	0	**11**	**0.9**
EFEZ	*Fellaster zealandiae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
EHOL	Holuthurians		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
ONEM	Nemerteans		0	2	0	0	0	0	0	1	1	0	1	0	**5**	**0.4**
POTH	Polychaetes		2	5	1	6	4	3	5	6	6	3	4	3	**48**	**4.0**
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
OTHER	Misc. Other		1	2	1	0	2	1	11	1	0	0	1	1	**21**	**1.8**
TOTAL			**66**	**86**	**95**	**79**	**80**	**57**	**77**	**59**	**87**	**79**	**71**	**60**	**890**	**74.2**

Appendix 3 – Sediment Grain Size Distribution

Firth of Thames

KB



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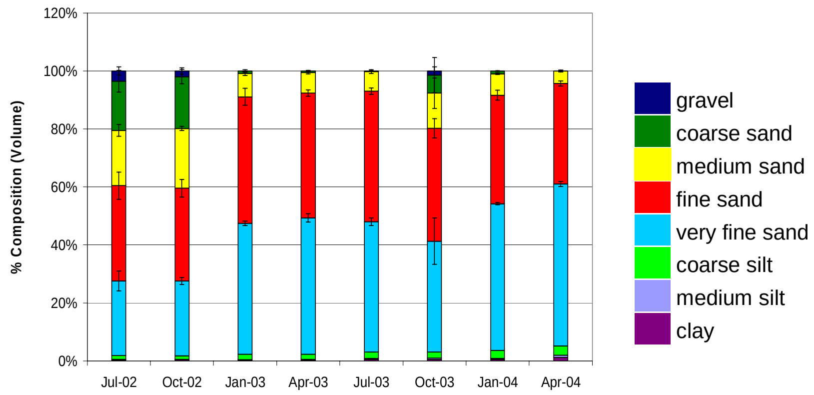

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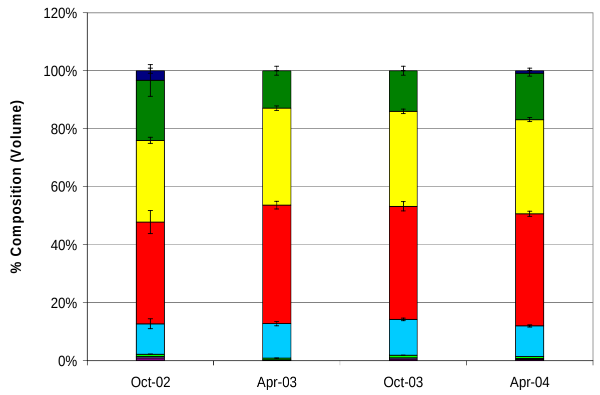

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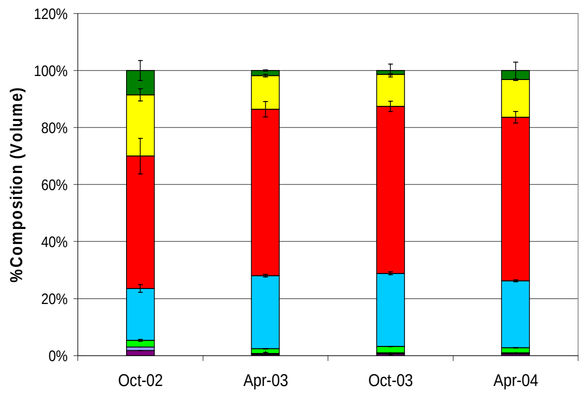

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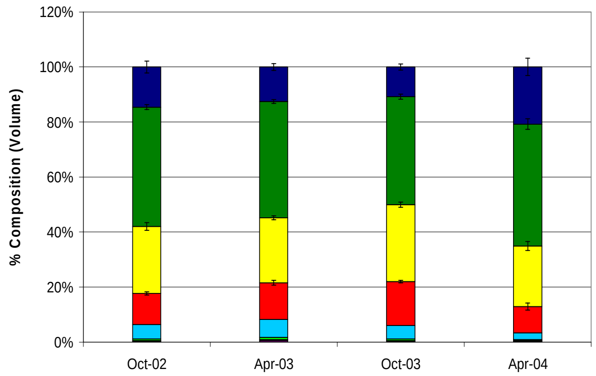
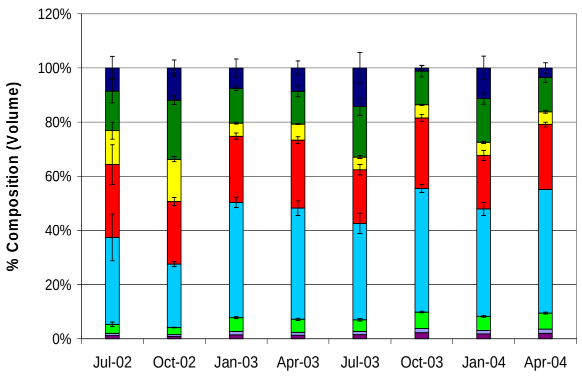


Whaingaroa Harbour

WI



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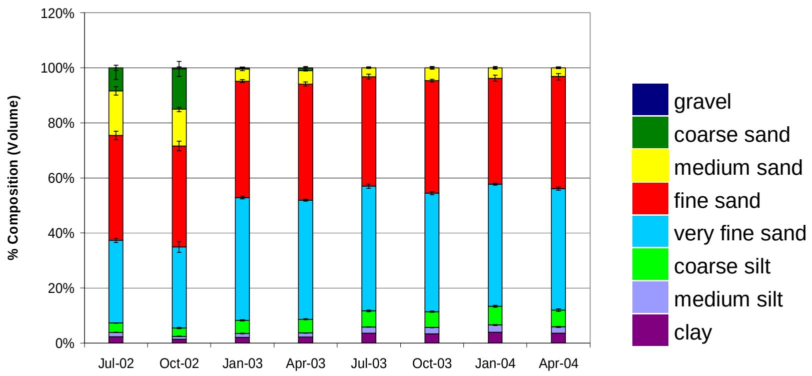

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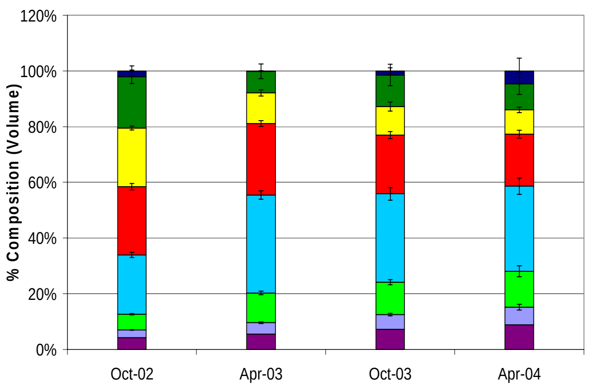

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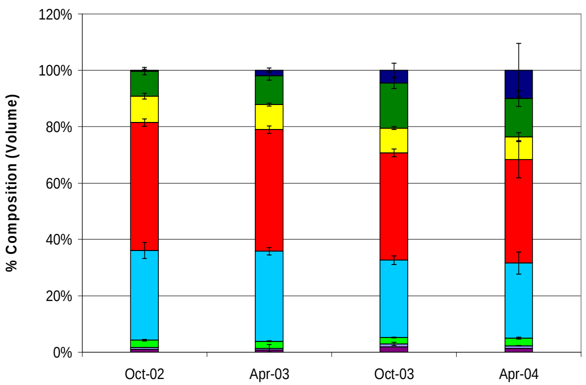

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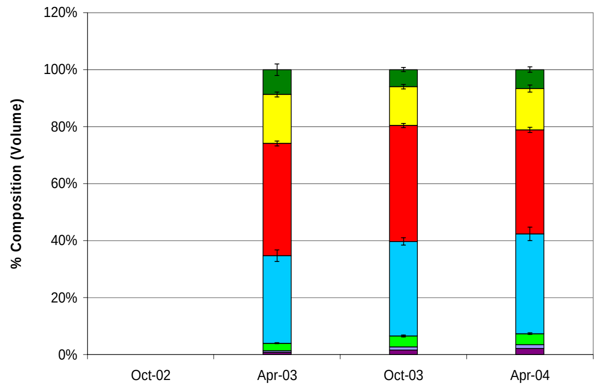
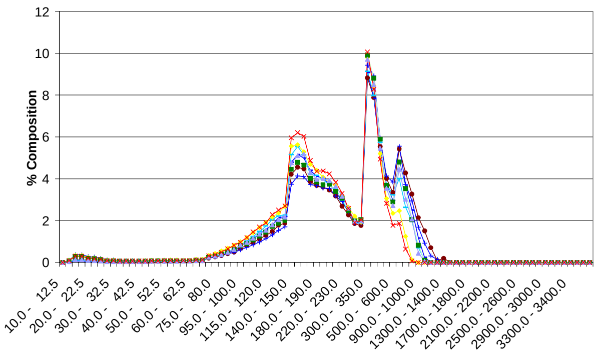


Firth of Thames

KB



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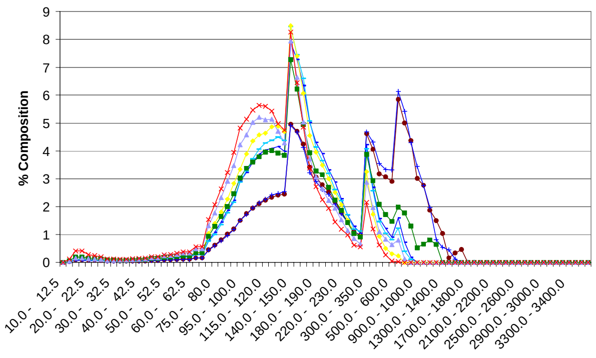

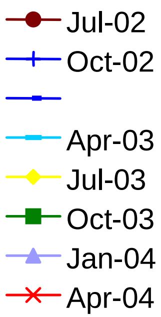

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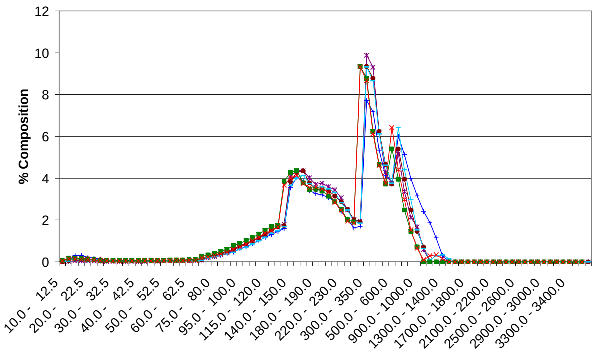

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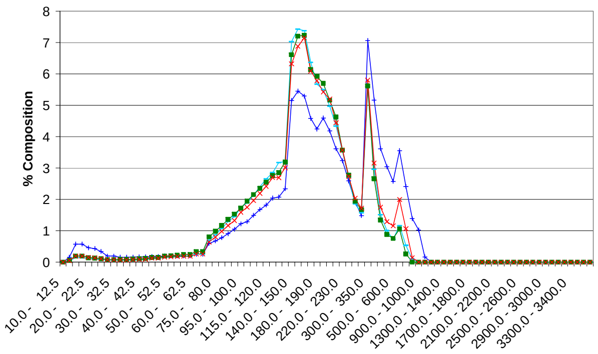

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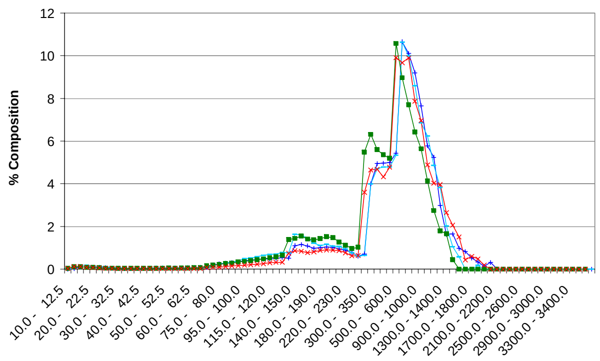

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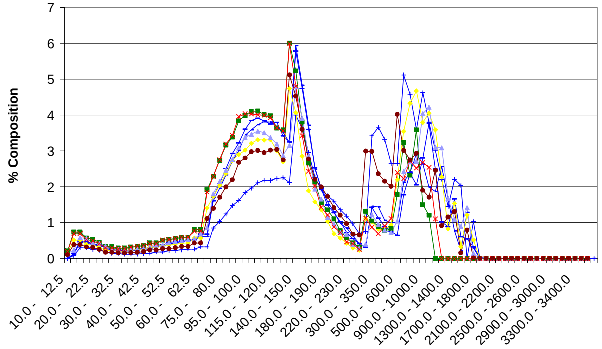
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50.0 - 52.5
60.0 - 62.5
75.0 - 80.0
95.0 - 100.0
115.0 - 120.0
140.0 - 150.0
180.0 - 190.0
220.0 - 230.0
300.0 - 350.0
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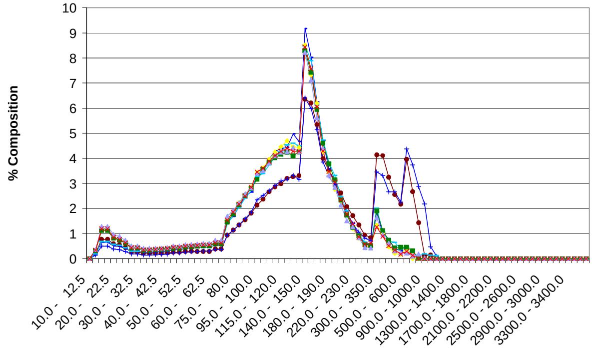
OB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60.0 - 62.5
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95.0 - 100.0
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140.0 - 150.0
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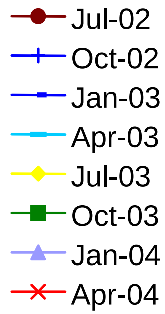
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Oct-02
Jan-03
Apr-03
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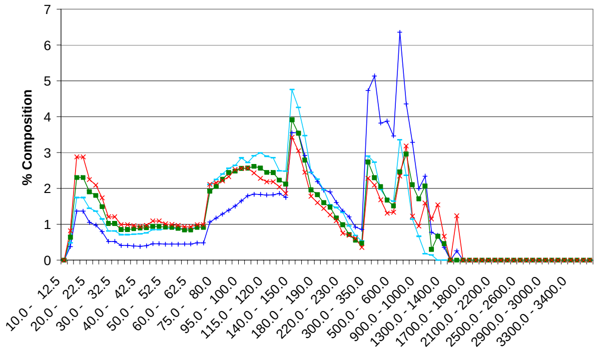
Jan-04
Apr-04

HB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6
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10.0 - 12.5
20.0 - 22.5
30.0 - 32.5
40.0 - 42.5
50.0 - 52.5
60.0 - 62.5
75.0 - 80.0
95.0 - 100.0
115.0 - 120.0
140.0 - 150.0
180.0 - 190.0
220.0 - 230.0
300.0 - 350.0
500.0 - 600.0
900.0 - 1000.0
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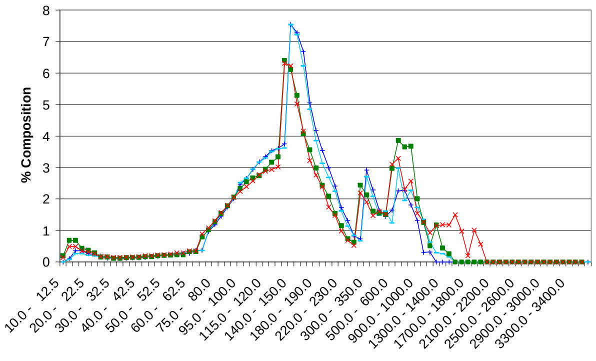
TU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115.0 - 120.0
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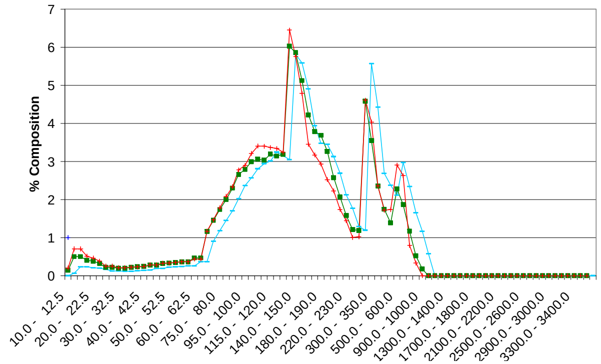
X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1300.0 - 1400.0
1700.0 - 1800.0
2100.0 - 2200.0
2500.0 - 2600.0
2900.0 - 3000.0
3300.0 - 3400.0

Appendix 4 – Dry weight shell-hash

Southern Firth of Thames

July 2002

Site	Sample No.	Initial tray weight	Final weight	Shell hash weight (g)
MI	1	10.1	212.0	201.9
	2	9.9	226.7	216.8
	3	10.2	225.4	215.2
	4	9.7	287.0	277.3
	5	10.3	193.1	182.8
	6	10.3	192.9	182.6
	7	10.0	245.6	235.6
	8	9.7	261.5	251.8
	9	9.8	292.4	282.6
	10	10.0	223.4	213.4
	11	10.0	274.6	264.6
	12	9.8	281.6	271.8
KB	1	10.0	169.1	159.1
	2	9.7	192.8	183.1
	3	9.7	208.5	198.8
	4	9.7	196.0	186.3
	5	9.9	212.8	202.9
	6	9.9	179.4	169.5
	7	10.0	151.3	141.3
	8	10.1	156.6	146.5
	9	9.8	202.7	192.9
	10	10.0	191.9	181.9
	11	10.0	168.5	158.5
	12	9.6	142.4	132.8

Whaingaroa Harbour

Site	Sample No.	Initial tray weight	Final weight	Shell hash weight (g)
WI	13	6.6	255.6	249.0
	14	14.1	146.1	132.0
	16	6.7	326.0	319.3
	18	13.9	120.5	106.6
	19	14.0	109.7	95.7
	20	13.8	95.7	81.9
	4	6.8	105.2	98.4
	5	13.9	243.2	229.3
	6	14.1	271.5	257.4
	7	13.8	195.0	181.2
	8	14.3	172.0	157.7
	9	6.5	142.9	136.4
OB	1	10.4	114.3	103.9
	2	9.9	68.9	59.0
	3	9.8	55.7	45.9
	4	10.2	41.5	31.3
	5	10.7	70.2	59.5
	6	10.0	45.1	35.1
	7	10.3	58.2	47.9
	8	9.9	225.2	215.3
	9	9.9	47.2	37.3
	10	10.0	50.6	40.6
	11	9.8	65.8	56.0
	12	9.9	47.2	37.3

Southern Firth of Thames

October 2002

Site	Sample No.	Initial tray weight	Final weight	Shell hash weight (g)
KA	1	10.0	90.5	80.5
	2	9.7	88.0	78.3
	3	10.4	62.5	52.1
	4	9.7	84.6	74.9
	5	10.1	59.5	49.4
	6	10.1	95.8	85.7
	7	10.0	75.3	65.3
	8	9.9	71.2	61.3
	9	9.6	89.6	80.0
	10	10.4	82.6	72.2
	11	9.9	130.3	120.4
	12	10.2	150.5	140.3
GC	1	14.4	937.0	922.6
	2	24.2	1294.6	1270.4
	3	14.0	1318.5	1304.5
	4	13.8	1085.6	1071.8
	5	13.9	853.7	839.8
	6	13.9	981.5	967.6
	7	14.0	677.7	663.7
	8	14.3	749.6	735.3
	9	28.2	1875.3	1847.1
	10	28.1	1697.1	1669.0
	11	13.9	850.3	836.4
	12	14.1	964.8	950.7
TP	1	10.0	53.1	43.1
	2	10.5	291.3	280.8
	3	10.0	140.8	130.8
	4	9.9	190.3	180.4
	5	9.9	146.6	136.7
	6	9.7	389.7	380.0
	7	9.7	477.4	467.7
	8	9.9	391.1	381.2
	9	10.0	96.4	86.4
	10	9.8	137.9	128.1
	11	9.8	429.8	420.0
	12	13.9	832.4	818.5
MI	1	10.1	188.7	178.6
	2	9.8	196.3	186.5
	3	9.7	335.8	326.1
	4	9.8	361.3	351.5
	5	9.7	250.9	241.2
	6	10.0	212.6	202.6
	7	10.0	162.3	152.3
	8	9.7	233.6	223.9
	9	9.3	290.9	281.6
	10	10.1	182.2	172.1
	11	9.6	302.1	292.5
	12	10.5	288.3	277.8
KB	1	10.0	220.2	210.2
	2	9.8	181.8	172.0
	3	9.8	149.3	139.5
	4	9.8	283.8	274.0
	5	9.5	173.2	163.7
	6	6.8	158.7	151.9
	7	9.8	140.0	130.2
	8	10.0	184.2	174.2
	9	10.2	190.9	180.7
	10	10.0	175.6	165.6
	11	10.3	158.0	147.7
	12	10.1	274.3	264.2

Whaingaroa Harbour

Site	Sample No.	Initial tray weight	Final weight	Shell hash weight (g)
TU	1	14.1	139.5	125.4
	2	13.9	113.2	99.3
	3	14.2	174.8	160.6
	4	13.8	127.3	113.5
	5	14.1	94.3	80.2
	6	13.8	185.5	171.7
	7	14.1	155.0	140.9
	8	13.9	118.0	104.1
	9	14.2	111.8	97.6
	10	14.3	143.3	129.0
	11	14.0	150.2	136.2
	12	14.0	420.3	406.3
HB	1	13.6	174.5	160.9
	2	13.9	130.5	116.6
	3	14.1	285.7	271.6
	4	13.8	156.8	143.0
	5	14.2	279.7	265.5
	6	13.8	325.8	312.0
	7	14.3	252.3	238.0
	8	14.0	277.3	263.3
	9	14.1	225.7	211.6
	10	13.9	317.7	303.8
	11	14.2	244.1	229.9
	12	14.0	222.9	208.9
X	1	14.2	270.3	256.1
	2	13.9	223.6	209.7
	3	14.1	325.4	311.3
	4	13.9	342.7	328.8
	5	14.2	184.1	169.9
	6	14.2	399.7	385.5
	7	13.9	407.6	393.7
	8	14.2	734.1	719.9
	9	13.8	367.6	353.8
	10	13.8	307.7	293.9
	11	14.1	516.1	502.0
	12	14.1	658.3	644.2
WI	1	6.8	141.2	134.4
	2	14.0	197.8	183.8
	3	13.8	507.6	493.8
	4	6.8	135.3	128.5
	5	13.8	155.9	142.1
	6	14.2	137.3	123.1
	7	6.6	131.6	125.0
	8	14.3	121.3	107.0
	9	14.0	235.9	221.9
	10	14.3	121.3	107.0
	11	6.7	237.4	230.7
	12	13.9	205.9	192.0
OB	1	14.2	138.2	124.0
	2	6.8	70.2	63.4
	3	6.8	63.5	56.7
	4	6.4	22.9	16.5
	5	7.0	46.4	39.4
	6	14.0	136.9	122.9
	7	6.7	42.9	36.2
	8	6.9	73.1	66.2
	9	7.0	57.8	50.8
	10	6.5	88.0	81.5
	11	14.1	64.8	50.7
	12	6.8	76.1	69.3

Southern Firth of Thames

January 2003

Site	Sample No.	Initial tray weight	Final weight	Shell hash weight (g)
MI	1	9.6	204.4	194.8
	2	9.7	227.3	217.6
	3	9.9	317.7	307.8
	4	9.9	385.3	375.4
	5	10.0	278.7	268.7
	6	9.7	220.2	210.5
	7	9.7	165.2	155.5
	8	10.1	275.2	265.1
	9	10.2	294.9	284.7
	10	9.9	282.5	272.6
	11	9.8	379.7	369.9
	12	10.0	321.4	311.4
KB	1	10.0	203.5	193.5
	2	9.7	185.0	175.3
	3	10.0	240.5	230.5
	4	9.9	182.2	172.3
	5	10.0	259.5	249.5
	6	9.8	238.7	228.9
	7	9.9	164.0	154.1
	8	10.0	248.5	238.5
	9	10.1	216.1	206.0
	10	9.7	194.8	185.1
	11	10.1	223.3	213.2
	12	10.2	161.7	151.5

Whaingaroa Harbour

Site	Sample No.	Initial tray weight	Final weight	Shell hash weight (g)
WI	1	13.8	287.6	273.8
	2	14.2	195.7	181.5
	3	14.3	152.2	137.9
	4	14.1	359.6	345.5
	5	14.0	231.9	217.9
	6	14.1	146.3	132.2
	7	13.9	139.9	126.0
	8	13.9	197.8	183.9
	9	13.9	202.9	189.0
	10	13.8	312.3	298.5
	11	9.7	257.4	247.7
	12	9.9	203.0	193.1
OB	1	9.7	137.8	128.1
	2	10.1	90.5	80.4
	3	9.7	121.8	112.1
	4	10.3	54.0	43.7
	5	9.9	95.1	85.2
	6	9.7	152.5	142.8
	7	10.1	69.7	59.6
	8	10.0	58.6	48.6
	9	9.7	55.0	45.3
	10	9.7	64.9	55.2
	11	9.7	53.6	43.9
	12	9.8	105.1	95.3

Southern Firth of Thames

April 2003

Site	Sample No.	Initial tray weight	Final weight	Shell hash weight (g)
KA	1	9.4	89.5	80.1
	2	9.6	97.3	87.7
	3	10.3	135.4	125.1
	4	9.9	446.6	436.7
	5	9.9	127.8	117.9
	6	10.0	87.8	77.8
	7	10.0	175.9	165.9
	8	9.8	124.2	114.4
	9	9.8	90.3	80.5
	10	9.7	64.3	54.6
	11	9.9	103.8	93.9
	12	9.7	199.0	189.3
GC	1	6.7	716.2	709.5
	2	13.6	1229.7	1216.1
	3	23.2	1587.8	1564.6
	4	20.5	1800.0	1779.5
	5	13.2	1446.7	1433.5
	6	13.4	819.0	805.6
	7	13.9	800.0	786.1
	8	20.5	1630.0	1609.5
	9	20.8	1868.4	1847.6
	10	20.8	1296.4	1275.6
	11	13.1	798.0	784.9
	12	13.9	616.4	602.5
TP	1	13.8	538.0	524.2
	2	10.0	53.1	43.1
	3	10.0	318.1	308.1
	4	10.1	552.7	542.6
	5	10.4	711.0	700.6
	6	10.8	79.9	69.1
	7	10.1	308.7	298.6
	8	10.0	172.9	162.9
	9	9.8	120.5	110.7
	10	9.7	90.2	80.5
	11	10.0	159.7	149.7
	12	9.9	158.1	148.2
MI	1	10.0	147.3	137.3
	2	9.9	321.8	311.9
	3	9.7	327.7	318.0
	4	10.0	223.8	213.8
	5	10.0	301.0	291.0
	6	9.7	226.2	216.5
	7	9.7	266.0	256.3
	8	9.7	295.6	285.9
	9	9.7	352.4	342.7
	10	10.1	281.3	271.2
	11	9.8	307.1	297.3
	12	10.1	325.6	315.5
KB	1	9.9	254.4	244.5
	2	9.7	186.9	177.2
	3	10.1	242.8	232.7
	4	9.9	339.0	329.1
	5	9.7	240.9	231.2
	6	10.4	202.9	192.5
	7	9.9	145.3	135.4
	8	9.4	168.6	159.2
	9	10.0	162.7	152.7
	10	9.8	235.5	225.7
	11	9.7	165.8	156.1
	12	10.1	176.2	166.1

Whaingaroa Harbour

Site	Sample No.	Initial tray weight	Final weight	Shell hash weight (g)
TU	1	10.0	218.1	208.1
	2	10.4	143.4	133.0
	3	9.9	197.7	187.8
	4	14.2	116.4	102.2
	5	13.9	113.6	99.7
	6	14.2	546.2	532.0
	7	13.9	159.1	145.2
	8	14.1	103.4	89.3
	9	13.8	168.9	155.1
	10	14.0	157.4	143.4
	11	13.8	180.3	166.5
	12	14.2	155.5	141.3
HB	1	9.9	319.9	310.0
	2	13.9	157.6	143.7
	3	14.2	220.2	206.0
	4	13.8	233.7	219.9
	5	14.2	207.4	193.2
	6	10.1	326.1	316.0
	7	14.2	324.8	310.6
	8	14.0	288.8	274.8
	9	13.8	328.9	315.1
	10	10.1	465.4	455.3
	11	13.9	399.8	385.9
	12	10.2	344.4	334.2
X	1	12.9	194.1	181.2
	2	14.6	253.9	239.3
	3	14.0	389.4	375.4
	4	14.4	490.3	475.9
	5	14.4	210.6	196.2
	6	14.1	398.6	384.5
	7	14.1	424.7	410.6
	8	14.2	235.7	221.5
	9	13.9	314.6	300.7
	10	13.8	313.5	299.7
	11	6.7	381.6	374.9
	12	6.7	210.9	204.2
WI	1	14.2	249.1	234.9
	2	14.2	329.9	315.7
	3	14.0	218.5	204.5
	4	13.9	105.3	91.4
	5	14.1	135.4	121.3
	6	14.1	120.1	106.0
	7	14.1	92.8	78.7
	8	13.9	172.7	158.8
	9	13.9	259.1	245.2
	10	14.2	227.6	213.4
	11	14.3	268.6	254.3
	12	13.8	281.8	268.0
OB	1	9.9	104.0	94.1
	2	10.7	104.5	93.8
	3	9.6	97.7	88.1
	4	9.7	57.4	47.7
	5	10.6	65.8	55.2
	6	10.3	69.4	59.1
	7	9.8	86.0	76.2
	8	10.1	46.7	36.6
	9	9.7	58.5	48.8
	10	10.9	52.4	41.5
	11	9.8	76.8	67.0
	12	10.1	50.2	40.1

Southern Firth of Thames

July 2003

Site	Sample No.	Initial tray weight	Final weight	Shell hash weight (g)
MI	1	10.1	184.1	174.0
	2	10.2	208.6	198.4
	3	10.0	387.2	377.2
	4	9.8	275.1	265.3
	5	9.6	231.5	221.9
	6	10.0	222.0	212.0
	7	10.0	208.8	198.8
	8	10.1	255.5	245.4
	9	10.2	232.9	222.7
	10	9.8	326.7	316.9
	11	9.8	205.7	195.9
	12	10.0	184.8	174.8
KB	1	10.1	232.4	222.3
	2	9.7	194.0	184.3
	3	10.2	262.4	252.2
	4	10.0	203.9	193.9
	5	10.0	204.2	194.2
	6	9.9	339.7	329.8
	7	9.8	241.8	232.0
	8	9.6	214.3	204.7
	9	9.9	188.4	178.5
	10	9.9	229.8	219.9
	11	9.9	155.1	145.2
	12	10.1	164.7	154.6

Whaingaroa Harbour

Site	Sample No.	Initial tray weight	Final weight	Shell hash weight (g)
WI	1	10.1	109.0	98.9
	2	9.7	213.6	203.9
	3	10.1	201.0	190.9
	4	10.1	91.2	81.1
	5	10.1	120.5	110.4
	6	10.0	178.2	168.2
	7	9.8	102.7	92.9
	8	9.7	259.6	249.9
	9	10.0	163.0	153.0
	10	10.0	205.4	195.4
	11	10.0	233.9	223.9
	12	10.0	142.8	132.8
OB	1	10.1	98.8	88.7
	2	9.7	144.6	134.9
	3	10.1	45.9	35.8
	4	10.0	56.4	46.4
	5	10.1	95.2	85.1
	6	10.0	93.2	83.2
	7	9.7	96.4	86.7
	8	9.7	93.3	83.6
	9	10.0	58.9	48.9
	10	10.0	46.2	36.2
	11	9.9	43.3	33.4
	12	10.0	94.9	84.9

Southern Firth of Thames

October 2003

Site	Sample No.	Initial tray weight	Final weight	Shell hash weight (g)
KA	1	9.8	103.7	93.9
	2	10.1	70.5	60.4
	3	10.1	88.5	78.4
	4	9.9	68.8	58.9
	5	9.9	90.8	80.9
	6	10.3	110.7	100.4
	7	10.1	168.7	158.6
	8	9.9	166.5	156.6
	9	10.4	69.5	59.1
	10	9.8	77.3	67.5
	11	9.4	183.2	173.8
	12	10.0	120.8	110.8
GC	1	14.2	978.7	964.5
	2	13.8	876.7	862.9
	3	14.2	1395.3	1381.1
	4	28.0	1327.6	1299.6
	5	28.1	1841.8	1813.7
	6	27.7	1685.7	1658.0
	7	14.1	772.0	757.9
	8	13.8	762.4	748.6
	9	28.1	1343.2	1315.1
	10	14.3	658.8	644.5
	11	24.0	1566.8	1542.8
	12	14.1	1088.6	1074.5
TP	1	10.1	236.6	226.5
	2	9.7	99.6	89.9
	3	10.1	117.9	107.8
	4	10.0	144.1	134.1
	5	9.9	304.3	294.4
	6	9.7	686.2	676.5
	7	10.0	614.0	604.0
	8	10.0	175.0	165.0
	9	9.7	386.5	376.8
	10	9.7	49.3	39.6
	11	9.7	266.0	256.3
	12	9.7	267.4	257.7
MI	1	10.1	217.7	207.6
	2	9.7	193.1	183.4
	3	10.1	570.8	560.7
	4	10.1	236.5	226.4
	5	10.0	236.4	226.3
	6	10.1	183.8	174.0
	7	9.8	305.1	295.5
	8	9.6	229.5	219.4
	9	10.1	221.5	211.6
	10	9.9	268.2	258.3
	11	9.9	280.5	270.5
	12	10.0	335.7	326.0
KB	1	9.7	279.6	269.9
	2	9.9	198.9	189.0
	3	10.0	352.9	342.9
	4	9.8	263.0	253.2
	5	9.8	189.1	179.3
	6	10.0	237.0	227.0
	7	10.0	193.2	183.2
	8	9.7	328.3	318.6
	9	10.3	172.4	162.1
	10	9.8	220.0	210.2
	11	9.4	228.0	218.6
	12	10.0	180.1	170.1

Whaingaroa Harbour

Site	Sample No.	Initial tray weight	Final weight	Shell hash weight (g)
TU	1	9.8	369.8	360.0
	2	10.0	133.1	123.1
	3	10.0	148.9	138.9
	4	9.8	124.6	114.8
	5	9.8	94.8	85.0
	6	10.2	396.9	386.7
	7	10.1	125.2	115.1
	8	9.7	125.6	115.9
	9	10.3	71.1	60.8
	10	9.7	188.6	178.9
	11	9.4	130.9	121.5
	12	10.0	221.4	211.4
HB	1	9.7	244.9	235.2
	2	9.6	232.6	223.0
	3	10.1	172.4	162.3
	4	9.9	274.2	264.3
	5	9.9	305.2	295.3
	6	9.8	250.0	240.2
	7	9.9	235.0	225.1
	8	10.0	368.3	358.3
	9	9.7	187.8	178.1
	10	9.7	196.7	187.0
	11	9.7	160.3	150.6
	12	9.7	158.7	149.0
X	1	9.8	287.2	277.4
	2	9.7	256.7	247.0
	3	10.2	376.7	366.5
	4	10.0	182.7	172.7
	5	10.0	244.4	234.4
	6	9.7	239.3	229.6
	7	10.0	280.9	270.9
	8	10.0	277.0	267.0
	9	9.7	320.3	310.6
	10	9.7	511.3	501.6
	11	9.8	273.4	263.6
	12	9.7	430.9	421.2
WI	1	10.1	137.8	127.7
	2	9.9	343.2	333.3
	3	9.9	265.6	255.7
	4	9.9	175.1	165.2
	5	9.7	149.4	139.7
	6	9.8	78.5	68.7
	7	10.0	119.7	109.7
	8	10.0	98.9	88.9
	9	10.0	208.9	198.9
	10	10.1	222.6	212.5
	11	9.7	382.7	373.0
	12	10.1	166.5	156.4
OB	1	9.9	122.9	113.0
	2	10.0	147.7	137.7
	3	9.7	75.4	65.7
	4	9.7	70.4	60.7
	5	9.7	91.3	81.6
	6	9.7	89.9	80.2
	7	10.1	72.9	62.8
	8	10.0	54.9	44.9
	9	10.0	68.7	58.7
	10	10.0	55.6	45.6
	11	9.7	74.9	65.2
	12	9.8	68.7	58.9

Southern Firth of Thames

January 2004

Site	Sample No.	Initial tray weight	Final weight	Shell hash weight (g)
MI	1	9.7	183.5	173.8
	2	9.6	217.2	207.6
	3	10.1	223.7	213.6
	4	10.0	211.5	201.5
	5	9.9	251.3	241.4
	6	9.7	126.0	116.3
	7	10.0	179.3	169.3
	8	10.0	291.1	281.1
	9	9.7	268.9	259.2
	10	9.7	240.2	230.5
	11	9.7	283.5	273.8
	12	9.8	386.3	376.5
KB	1	9.8	301.0	291.2
	2	9.9	277.5	267.6
	3	10.0	253.5	243.5
	4	9.8	191.2	181.4
	5	9.8	221.8	212.0
	6	10.2	223.0	212.8
	7	10.0	184.4	174.4
	8	9.7	250.8	241.1
	9	10.3	220.2	209.9
	10	9.8	219.5	209.7
	11	9.4	217.0	207.6
	12	9.9	172.4	162.5

Whaingaroa Harbour

Site	Sample No.	Initial tray weight	Final weight	Shell hash weight (g)
WI	1	9.7	180.6	170.9
	2	9.9	212.0	202.1
	3	10.1	248.9	238.8
	4	9.8	136.5	126.7
	5	9.8	132.8	123.0
	6	10.2	146.1	135.9
	7	10.2	146.5	136.3
	8	9.7	168.2	158.5
	9	10.3	138.0	127.7
	10	9.7	111.0	101.3
	11	9.4	279.5	270.1
	12	10.0	222.4	212.4
OB	1	9.9	129.4	119.5
	2	9.7	157.7	148.0
	3	10.2	92.5	82.3
	4	9.9	91.3	81.4
	5	10.0	77.2	67.2
	6	9.7	75.1	65.4
	7	10.1	71.7	61.6
	8	10.0	83.1	73.1
	9	9.8	93.2	83.4
	10	9.7	57.3	47.6
	11	9.8	53.0	43.2
	12	9.7	66.5	56.8

Southern Firth of Thames

April 2004

Site	Sample No.	Initial tray weight	Final weight	Shell hash weight (g)
KA	1	9.8	117.7	107.9
	2	10.2	47.3	37.1
	3	10.1	116.5	106.4
	4	9.8	41.3	31.5
	5	9.8	77.3	67.5
	6	10.2	101.1	90.9
	7	10.0	128.0	118.0
	8	9.8	77.1	67.3
	9	10.4	83.8	73.4
	10	9.8	41.8	32.0
	11	9.5	68.5	59.0
	12	10.0	59.1	49.1
GC	1	14.2	652.9	638.7
	2	14.0	1306.9	1292.9
	3	14.2	988.9	974.7
	4	13.8	724.5	710.7
	5	14.1	861.9	847.8
	6	13.8	625.6	611.8
	7	14.0	445.7	431.7
	8	13.8	1000.3	986.5
	9	14.2	1083.3	1069.1
	10	14.2	1310.8	1296.6
	11	13.9	539.3	525.4
	12	14.0	401.9	387.9
TP	1	9.9	149.9	140.0
	2	10.1	132.7	122.6
	3	10.0	62.1	52.1
	4	10.1	84.1	74.0
	5	9.7	34.2	24.5
	6	10.1	125.3	115.2
	7	9.8	288.7	278.9
	8	9.8	102.6	92.8
	9	9.9	77.3	67.4
	10	9.7	252.8	243.1
	11	10.1	289.5	279.4
	12	10.0	85.4	75.4
MI	1	9.8	153.2	143.4
	2	10.1	136.5	126.4
	3	10.1	160.8	150.7
	4	9.8	188.3	178.5
	5	9.8	284.7	274.9
	6	10.2	219.4	209.2
	7	10.1	87.0	76.9
	8	9.7	181.8	172.1
	9	10.3	161.0	150.7
	10	9.8	400.0	390.2
	11	9.5	162.7	153.2
	12	10.0	224.7	214.7
KB	1	no sample		
	2	9.8	150.3	140.5
	3	10.2	204.3	194.1
	4	9.9	177.0	167.1
	5	10.1	160.5	150.4
	6	10.0	170.0	160.0
	7	9.7	148.1	138.4
	8	9.7	143.6	133.9
	9	9.9	174.1	164.2
	10	9.9	186.2	176.3
	11	9.9	127.4	117.5
	12	9.9	147.5	137.6

Whaingaroa Harbour

Site	Sample No.	Initial tray weight	Final weight	Shell hash weight (g)
TU	1	14.2	668.8	654.6
	2	13.9	203.3	189.4
	3	14.2	102.4	88.2
	4	13.9	161.4	147.5
	5	14.2	98.7	84.5
	6	13.8	162.0	148.2
	7	14.0	528.0	514.0
	8	13.8	119.3	105.5
	9	14.2	114.5	100.3
	10	14.3	309.8	295.5
	11	14.0	93.9	79.9
	12	14.1	312.8	298.7
HB	1	10.1	232.0	221.9
	2	9.7	250.5	240.8
	3	10.1	201.4	191.3
	4	9.9	158.7	148.8
	5	10.0	212.8	202.8
	6	9.9	316.8	306.9
	7	9.7	362.6	352.9
	8	9.7	314.1	304.4
	9	9.9	171.3	161.4
	10	10.0	218.4	208.4
	11	9.9	401.3	391.4
	12	10.0	304.7	294.7
X	1	9.8	67.8	58.0
	2	10.0	105.4	95.4
	3	10.2	159.5	149.3
	4	9.8	392.7	382.9
	5	9.9	129.3	119.4
	6	10.2	226.5	216.3
	7	20.1	676.6	656.5
	8	9.7	386.3	376.6
	9	10.3	211.7	201.4
	10	9.7	114.3	104.6
	11	9.5	528.6	519.1
	12	10.0	522.5	512.5
WI	1	9.9	88.9	79.0
	2	10.0	138.6	128.6
	3	10.0	261.7	251.7
	4	9.8	104.7	94.9
	5	9.8	142.7	132.9
	6	10.1	134.8	124.7
	7	10.0	151.5	141.5
	8	9.7	204.0	194.3
	9	10.3	158.9	148.6
	10	9.8	168.7	158.9
	11	9.4	205.7	196.3
	12	10.0	161.5	151.5
OB	1	9.7	88.8	79.1
	2	9.7	72.1	62.4
	3	10.1	38.5	28.4
	4	9.9	73.1	63.2
	5	10.0	69.6	59.6
	6	9.7	45.8	36.1
	7	10.0	85.5	75.5
	8	10.0	74.4	64.4
	9	9.7	18.5	8.8
	10	9.7	38.7	29.0
	11	9.7	57.9	48.2
	12	9.7	90.2	80.5

Appendix 5 – Sediment organic matter content

Southern Firth of Thames

July 2002

	Total Organic Carbon g/100g dry wt	Dry Matter g/100g as rcvd	Total Nitrogen g/100g dry wt
MI	0.23	71.4	0.17
	0.21	72.4	0.15
	0.32	70.3	0.16
	0.27	72.8	0.15
	0.26	69.9	0.15
KB	0.48	63	0.2
	0.37	65.3	0.23
	0.27	71.4	0.18
	0.26	66	0.23
	0.28	68.1	0.19

October 2002

	Total Organic Carbon g/100g dry wt	Dry Matter g/100g as rcvd	Total Nitrogen g/100g dry wt
KA	0.51	51	0.14
	0.68	48.9	0.17
	0.41	60.5	0.12
	0.44	57.3	0.11
	0.65	53.6	0.17
GC	0.49	61.4	0.1
	0.39	62.1	0.08
	0.64	56.3	0.08
	0.41	64.9	0.08
	0.41	66.3	0.13
TP	0.15	61.9	0.08
	0.12	66.9	< 0.05
	0.21	63.7	0.07
	0.24	60.9	0.08
	0.12	64.4	0.05
MI	0.16	68.7	0.13
	0.18	72.8	0.1
	0.17	66.7	0.11
	0.17	70.1	0.08
	0.18	67.7	0.08
KB	0.87	44.1	0.17
	0.34	64.7	0.11
	0.41	59.8	0.11
	0.99	50.2	0.26
	0.54	57.5	0.17

January 2003

	Total Organic Carbon g/100g dry wt	Dry Matter g/100g as rcvd	Total Nitrogen g/100g dry wt
MI	0.15	72	< 0.05
	0.12	75.1	< 0.05
	0.17	69.3	< 0.05
	0.18	66.7	0.05
	0.19	68.1	< 0.05
KB	0.3	66.5	0.06
	0.3	65.1	0.07
	0.32	66.5	0.08
	0.3	61.1	0.07
	0.37	60.7	0.09

Whaingaroa Harbour

July 2002

	Total Organic Carbon g/100g dry wt	Dry Matter g/100g as rcvd	Total Nitrogen g/100g dry wt
WI	0.34	69.1	0.12
	0.42	67.2	0.13
	0.39	70.8	0.13
	0.37	66.7	0.09
	0.45	68.9	0.13
OB	0.59	61.1	0.09
	0.57	61.4	0.09
	0.49	67.9	0.08
	0.95	61.7	0.11
	0.63	60.6	0.11

October 2002

	Total Organic Carbon g/100g dry wt	Dry Matter g/100g as rcvd	Total Nitrogen g/100g dry wt
TU	0.45	69.1	0.14
	0.45	70.3	0.13
	0.4	71.8	0.12
	0.4	74.2	0.12
	0.61	69.7	0.13
HB	0.82	61.5	0.2
	0.86	59.8	0.24
	0.9	55.5	0.28
	0.94	57.1	0.3
	0.94	55.7	0.09
X	0.36	74	0.07
	0.36	76.4	0.06
	0.62	69.5	0.11
	0.43	70.5	0.09
	0.36	74.3	0.07
WI	0.47	64.4	0.13
	0.47	67.7	0.12
	0.83	66.2	0.09
	0.54	64.8	0.13
	0.42	67.1	0.15
OB	0.47	63.4	0.09
	0.41	70.8	0.08
	0.4	68.5	0.09
	0.47	68.9	0.09
	0.5	69.5	0.09

January 2003

	Total Organic Carbon g/100g dry wt	Dry Matter g/100g as rcvd	Total Nitrogen g/100g dry wt
WI	0.42	67.8	0.08
	0.36	70.5	0.07
	0.45	65.3	0.1
	0.43	66.2	0.08
	0.39	65.9	0.08
OB	0.53	67.3	0.08
	0.47	65.6	0.08
	0.5	66.4	0.09
	0.45	68.3	0.08
	0.55	63.5	0.09

Southern Firth of Thames

Whaingaroa Harbour

April 2003

	Total Organic Carbon g/100g dry wt	Dry Matter g/100g as rcvd	Total Nitrogen g/100g dry wt
KA	0.26	62.1	0.06
	0.23	69.2	0.06
	0.35	64.5	0.07
	0.37	63	0.07
	0.27	68.8	0.07
GC	0.64	56.1	0.11
	0.49	57.2	0.09
	0.33	63.4	0.07
	0.44	58.4	0.1
	0.37	66.5	0.08
TP	0.3	60.5	0.06
	0.63	60.9	0.17
	0.14	64.7	< 0.05
	0.14	63.3	< 0.05
	0.61	65.5	0.15
MI	0.38	58.4	0.07
	1.97	71	0.47
	0.26	67.1	0.05
	0.31	63.9	0.07
	0.29	66.1	0.06
KB	0.42	60.9	0.08
	0.42	60.9	0.09
	0.37	62.9	0.08
	0.37	61.8	0.08
	0.36	63	0.08

	Total Organic Carbon g/100g dry wt	Dry Matter g/100g as rcvd	Total Nitrogen g/100g dry wt
TU	0.34	71.4	0.07
	0.26	71.6	0.07
	0.34	70.8	0.07
	0.28	73.2	0.08
	0.32	72.3	0.08
HB	0.66	56.1	0.11
	0.59	57.1	0.11
	0.65	55.2	0.12
	0.66	56.1	0.11
	0.59	55.7	0.11
X	0.26	73.3	0.06
	0.35	71.6	0.07
	0.25	73.9	0.06
	0.25	75.1	0.05
	0.38	70.6	0.09
WI	0.35	63	0.07
	0.46	60.3	0.08
	0.45	68.9	0.07
	1.97	61.4	0.16
	0.38	70.5	0.07
OB	0.48	60.5	0.08
	0.52	62.6	0.09
	0.54	61.9	0.09
	0.49	60.7	0.08
	0.54	57.9	0.09

July 2003

	Total Organic Carbon g/100g dry wt	Dry Matter g/100g as rcvd	Total Nitrogen g/100g dry wt
MI	0.64	71.1	0.06
	0.17	72.7	< 0.05
	0.17	73.8	0.05
	0.26	70.5	0.07
	0.27	67.5	0.08
KB	0.36	64.3	0.09
	0.43	65.3	0.09
	0.38	67.3	0.08
	0.35	64.2	0.08
	0.33	66.2	0.11

	Total Organic Carbon g/100g dry wt	Dry Matter g/100g as rcvd	Total Nitrogen g/100g dry wt
WI	0.49	66.7	0.1
	0.51	66.9	0.1
	0.36	71.3	0.07
	0.42	67.2	0.08
	0.49	68.2	0.1
OB	0.59	61.1	0.09
	0.57	61.4	0.09
	0.49	67.9	0.08
	0.95	61.7	0.11
	0.63	60.6	0.11

Southern Firth of Thames

Whaingaroa Harbour

October 2003

Southern Firth of Thames

	Total Organic Carbon g/100g dry wt	Dry Matter g/100g as rcvd	Total Nitrogen g/100g dry wt
KA	0.2	73.9	0.06
	0.32	71.6	0.1
	0.24	72.1	0.08
	0.22	74.4	0.06
	0.19	74.7	0.07
GC	0.25	66.6	0.07
	0.3	64.5	0.07
	0.43	66.5	0.08
	0.22	68.2	0.07
	0.22	65	0.06
TP	0.15	67.7	< 0.05
	0.14	67	< 0.05
	0.16	68.6	0.05
	0.13	69.9	< 0.05
	0.23	68.6	0.07
MI	0.41	63.7	0.09
	0.16	73.9	< 0.05
	0.16	76.1	< 0.05
	0.15	75.1	< 0.05
	0.17	76.5	< 0.05
KB	0.34	69.1	0.08
	0.37	69.5	0.08
	0.44	65.1	0.11
	0.26	71.4	0.06
	0.35	67.7	0.08

Whaingaroa Harbour

	Total Organic Carbon g/100g dry wt	Dry Matter g/100g as rcvd	Total Nitrogen g/100g dry wt
TU	0.55	67.5	0.11
	0.65	68.6	0.1
	0.42	71.6	0.08
	0.55	63	0.11
	0.47	70.4	0.09
HB	1	55.3	0.2
	0.91	55.9	0.16
	0.8	56.8	0.16
	0.74	58.9	0.11
	0.78	56	0.12
X	0.38	69.4	0.07
	0.46	66.5	0.09
	0.43	70.2	0.09
	0.37	72.4	0.07
	0.51	69.3	0.09
WI	0.51	66.4	0.09
	0.39	72.1	0.07
	0.52	65.7	0.09
	0.44	67.2	0.07
	0.49	68	0.08
OB	0.7	61.8	0.11
	0.68	61.1	0.1
	0.69	61.6	0.1
	0.67	62.8	0.11
	0.63	60.1	0.1

January 2004

Southern Firth of Thames

	Total Organic Carbon g/100g dry wt	Dry Matter g/100g as rcvd	Total Nitrogen g/100g dry wt
MI	0.27	73.1	0.06
	0.19	75.2	< 0.05
	0.23	72.6	0.05
	0.25	71.8	0.05
	0.22	75.8	0.06
KB	0.27	67.8	0.08
	0.25	68.3	0.07
	0.27	69.2	0.07
	0.29	68	0.07
	0.26	67	0.07

Whaingaroa Harbour

	Total Organic Carbon g/100g dry wt	Dry Matter g/100g as rcvd	Total Nitrogen g/100g dry wt
WI	0.77	63.4	0.12
	0.53	66.7	0.08
	0.45	70.1	0.1
	0.42	66.6	0.08
	0.8	66.6	0.1
OB	0.63	63	0.1
	0.61	63.1	0.09
	0.63	63.1	0.1
	0.66	61	0.1
	0.69	60.8	0.09

Southern Firth of Thames

Whaingaroa Harbour

April 2004

	Total Organic Carbon g/100g dry wt	Dry Matter g/100g as rcvd	Total Nitrogen g/100g dry wt
KA	0.17	71.9	0.05
	0.21	69.2	0.06
	0.23	70.6	< 0.05
	0.21	68.6	0.06
	0.19	72.4	0.06
GC	0.38	66.5	0.07
	0.29	64.1	0.07
	2.36	70.5	0.07
	0.37	62.1	0.08
	0.68	65.6	0.09
TP	0.16	66.4	< 0.05
	0.16	66.3	< 0.05
	0.14	66.1	< 0.05
	0.1	69	< 0.05
	0.15	66.6	< 0.05
MI	0.67	49.4	0.14
	0.36	62.1	0.08
	0.42	59.4	0.08
	0.54	52.6	0.11
	0.36	63.5	0.08
KB	0.42	62.2	0.1
	0.37	63.5	0.09
	0.44	57.9	0.09
	0.31	61.5	0.08
	0.37	61.3	0.09

	Total Organic Carbon g/100g dry wt	Dry Matter g/100g as rcvd	Total Nitrogen g/100g dry wt
TU	0.56	69.7	0.09
	0.48	72.5	0.07
	0.42	72.7	0.07
	0.49	71	0.08
	0.51	71.2	0.08
HB	0.73	57.7	0.11
	0.75	55.8	0.12
	0.78	55.1	0.13
	0.71	57.9	0.12
	0.79	61.4	0.11
X	0.55	68.6	0.09
	0.62	65.5	0.12
	0.47	70.7	0.08
	0.46	71.4	0.08
	0.5	71.9	0.08
WI	0.41	72.8	0.07
	0.43	67.3	0.09
	0.37	69.1	0.08
	0.39	69	0.07
	1.01	69.2	0.17
OB	0.49	66.4	0.08
	0.5	66.2	0.08
	0.58	65.2	0.09
	0.68	60.5	0.1
	0.51	65.6	0.08

Appendix 6 – Sediment photosynthetic pigment concentration

Southern Firth of Thames

July 2002

	Chlorophyll-*a* mg.kg^{-1}	Pheophytin mg.kg^{-1}
MI	2.22	1.55
	1.73	0.73
	2.04	1.15
	2.17	1.63
	2.20	2.09
KB	2.98	0.97
	1.97	1.15
	2.47	1.09
	3.15	1.18
	2.65	0.58

October 2002

	Chlorophyll-*a* mg.kg^{-1}	Pheophytin mg.kg^{-1}
KA	3.10	3.30
	2.90	5.00
	3.40	4.90
	2.60	4.30
	2.80	3.20
GC	7.70	2.50
	7.80	2.90
	8.70	2.10
	7.30	1.90
	5.90	2.20
TP	1.00	1.30
	0.50	0.90
	0.60	0.90
	0.80	1.00
	0.50	0.40
MI	3.40	0.70
	3.30	1.20
	4.40	0.90
	3.20	1.50
	4.00	1.20
KB	5.50	5.30
	4.20	5.40
	5.30	3.00
	6.90	5.60
	5.10	6.40

January 2003

	Chlorophyll-*a* mg.kg^{-1}	Pheophytin mg.kg^{-1}
MI	3.30	0.40
	3.10	0.40
	2.20	0.80
	2.20	0.70
	2.10	0.50
KB	3.20	0.70
	3.10	2.40
	2.60	2.70
	3.90	3.40
	3.70	1.20

Whaingaroa Harbour

July 2002

	Chlorophyll-*a* mg.kg^{-1}	Pheophytin mg.kg^{-1}
WI	5.10	2.98
	4.49	3.14
	5.21	3.31
	5.52	2.98
	5.64	3.67
OB	3.49	3.07
	3.21	3.48
	3.11	3.41
	3.06	2.68
	4.07	3.75

October 2002

	Chlorophyll-*a* mg.kg^{-1}	Pheophytin mg.kg^{-1}
TU	14.10	4.50
	12.20	5.60
	19.30	3.20
	20.50	2.80
	14.40	3.50
HB	7.30	3.60
	6.90	3.60
	7.30	3.00
	7.20	3.90
	7.90	3.10
X	no sample	no sample
	no sample	no sample
	no sample	no sample
	no sample	no sample
	no sample	no sample
WI	7.90	3.40
	12.70	3.00
	6.80	3.10
	6.30	2.80
	6.40	3.40
OB	5.20	1.80
	5.10	2.90
	5.10	1.60
	6.40	2.70
	6.10	2.00

January 2003

	Chlorophyll-*a* mg.kg^{-1}	Pheophytin mg.kg^{-1}
WI	8.20	3.00
	8.00	5.90
	7.40	5.00
	4.00	9.80
	7.30	4.10
OB	6.10	4.20
	5.60	4.50
	4.80	3.50
	5.50	4.00
	3.20	3.70

Southern Firth of Thames

Whaingaroa Harbour

April 2003

	Chlorophyll-*a* mg.kg^{-1}	Pheophytin mg.kg^{-1}
KA	2.50	2.30
	2.00	5.00
	2.00	2.50
	2.10	1.60
	2.00	2.00
GC	7.10	4.00
	8.20	6.00
	6.30	4.30
	5.30	4.00
	6.80	4.00
TP	0.30	0.90
	0.60	1.00
	0.40	0.90
	0.50	1.40
	0.80	1.50
MI	4.50	3.10
	4.40	2.30
	4.60	2.60
	4.50	1.80
	3.70	1.60
KB	2.90	5.20
	3.70	4.90
	2.50	4.60
	2.70	5.50
	3.80	2.10

	Chlorophyll-*a* mg.kg^{-1}	Pheophytin mg.kg^{-1}
TU	15.90	6.90
	18.40	2.70
	11.10	5.90
	14.90	4.40
	15.40	3.40
HB	7.90	3.50
	6.70	3.90
	8.00	4.90
	7.60	3.70
	8.00	4.80
X	10.00	4.80
	12.70	2.80
	13.50	2.10
	13.60	3.10
	10.60	6.20
WI	8.40	5.00
	7.30	9.00
	9.70	5.50
	5.70	6.50
	6.70	5.50
OB	5.50	6.00
	5.80	5.10
	5.80	5.40
	4.90	4.40
	5.60	5.10

July 2003

	Chlorophyll-*a* mg.kg^{-1}	Pheophytin mg.kg^{-1}
MI	7.60	5.70
	8.30	1.60
	4.60	1.80
	8.40	6.10
	6.30	3.30
KB	3.20	1.50
	2.60	1.70
	4.20	1.70
	5.00	2.10
	3.20	1.70

	Chlorophyll-*a* mg.kg^{-1}	Pheophytin mg.kg^{-1}
WI	13.30	3.50
	7.60	6.70
	6.90	4.90
	7.20	4.60
	9.90	5.70
OB	13.20	6.30
	14.90	6.20
	13.20	7.10
	10.00	7.00
	10.20	6.30

Southern Firth of Thames

Whaingaroa Harbour

October 2003

	Chlorophyll-*a* mg.kg^{-1}	Pheophytin mg.kg^{-1}
KA	3.80	2.50
	4.60	1.20
	3.30	2.50
	3.50	2.40
	2.80	3.10
GC	NA	NA
	6.20	4.20
	5.40	1.50
	7.80	1.30
	9.60	1.20
TP	0.80	1.60
	0.40	0.60
	0.50	0.90
	0.50	1.20
	0.50	0.90
MI	3.90	1.30
	4.40	1.60
	3.50	1.10
	4.50	1.50
	4.10	1.60
KB	4.60	2.20
	3.20	1.20
	4.20	2.10
	2.80	1.20
	4.00	1.50

	Chlorophyll-*a* mg.kg^{-1}	Pheophytin mg.kg^{-1}
TU	9.20	7.10
	10.40	7.00
	10.30	7.50
	14.70	6.70
	8.20	8.10
HB	7.70	5.20
	7.70	3.50
	6.90	5.00
	5.40	4.20
	8.60	4.70
X	9.70	5.20
	15.80	1.60
	12.00	9.10
	10.10	5.30
	13.70	5.20
WI	6.30	3.80
	7.70	6.00
	5.50	3.10
	6.70	6.20
	6.70	5.70
OB	7.90	5.40
	8.50	6.40
	8.60	5.40
	8.50	7.10
	6.50	6.30

January 2004

	Chlorophyll-*a* mg.kg^{-1}	Pheophytin mg.kg^{-1}
MI	5.50	1.30
	4.80	1.50
	4.80	1.50
	3.60	1.50
	5.30	1.70
KB	4.50	1.40
	6.70	1.70
	6.00	1.10
	4.30	1.60
	4.70	1.20

	Chlorophyll-*a* mg.kg^{-1}	Pheophytin mg.kg^{-1}
WI	7.10	7.00
	7.00	6.10
	6.20	5.50
	8.20	5.20
	6.00	5.40
OB	6.70	4.80
	8.60	4.20
	4.80	4.10
	6.80	5.70
	7.40	4.40

Southern Firth of Thames

April 2004

	Chlorophyll-*a* mg.kg^{-1}	*Pheophytin* mg.kg^{-1}
KA	7.40	5.30
	11.20	9.30
	9.60	5.70
	12.00	15.20
	8.60	5.90
GC	14.40	2.00
	16.00	0.10
	58.10	0.50
	20.00	1.40
	15.80	1.30
TP	0.90	0.80
	1.10	0.80
	0.90	1.00
	3.90	7.00
	2.00	2.00
MI	9.80	< 0.1
	9.40	7.20
	8.10	3.70
	8.10	2.50
	7.20	5.80
KB	14.60	6.90
	18.60	17.40
	10.80	3.50
	14.80	7.60
	19.00	16.90

Whaingaroa Harbour

	Chlorophyll-*a* mg.kg^{-1}	Pheophytin mg.kg^{-1}
TU	25.80	6.40
	27.40	4.80
	26.20	3.30
	28.20	6.90
	25.70	11.10
HB	18.90	7.60
	19.10	10.80
	19.80	5.90
	19.30	9.10
	19.20	6.10
X	28.00	4.80
	23.90	3.80
	19.60	6.50
	21.00	8.90
	22.90	3.90
WI	14.80	8.50
	13.00	5.70
	15.00	2.00
	13.50	8.20
	13.00	1.80
OB	12.20	7.90
	13.80	6.40
	13.80	8.20
	16.00	5.10
	15.00	5.80

Appendix 7 – QA/QC procedures

Each sample is sieved and preserved in the field, returned to the laboratory, and analysed for indicator species. All non-indicator species are classified into major taxonomic groups (amphipods, bivalves, crabs, cumaceans, gastropods, isopods, ostracods, polychaetes, shrimps and "other") and enumerated. The laboratory analysis of samples for benthic communities involves two processes:

- Sample sorting.
- Species identification and enumeration.

A subsequent step is the input and storage of data into corporate databases. There are also quality control procedures in place for this step.

Quality control of sample sorting[10] is essential to ensure the value of all subsequent steps in the sample analysis process. Re-sorting of samples is employed for quality control of sorting. As a minimum re-sorting effort, a random selection of 10% of the samples from each site is completely re-sorted. Re-sorting is conducted by an experienced sorter other than the original sorter.

Percent sorting efficiency is:

$$\frac{\text{\# organisms originally sorted}}{\text{\# organisms originally sorted + \# organisms found in re-sort}} \times 100$$

Minimum acceptable sorting efficiency is 95%. If sorting efficiency is greater than 95%, no action is required. Sorting efficiencies below 95% require re-sorting of all samples from the site concerned. Note that samples that are completely re-sorted after falling below 95% are assumed to have achieved 95% efficiency. Any organisms found in the re-sort should be added to the original sorted sample for later identification and enumeration. Once all quality control criteria for sample sorting have been met, the sample debris (shell-hash) can be dried and weighed.

The goal of species identification and enumeration is species or species group level identification and an accurate count of each indicator species, and identification and an accurate count of remaining taxonomic groups. Quality control is provided by complete re-identification and re-enumeration of a random selection of 10% of the samples from each site. This includes examination of any material left-over from each sorted sample. Re-identification and re-enumeration is conducted by an experienced identifier other than the original identifier.

Percent identification and enumeration efficiency is:

$$\frac{\text{\# organisms in re count – number of errors}}{\text{\# organisms in re count}} \times 100$$

Note that the number of errors is based upon the difference between the original count and the re-count.

Minimum acceptable identification and enumeration efficiency is 90%. If identification and enumeration efficiency is greater than 90%, no action is required. Identification and enumeration efficiencies below 90% require that the type of error (see below) is identified and samples re-analysed for this error. Laboratory data sheets should be amended accordingly.

[10] Sorting is the separation of biological material from sediment, shell-hash, and other non-living biological material retained by a 500 µm sieve.

The following are examples of potential errors in species identification and enumeration:

- Counting errors (e.g., counting 11 individuals of a species/species group as 10 or 12; including dead bivalves in a count; including headless polychaete parts in a count).
- Identification errors (e.g., identifying species X as species Y).
- Unrecorded species errors (e.g., not identifying species X when it is present).
- Recording errors (e.g., recording species X as species Y on a data sheet).
- Specimens overlooked in the original analysis (e.g., missed organisms in the left-over sample).

A standard processing form is used for tracking each sample. It includes the details of each sample, the name of the sorter and identifier responsible, time required for sorting and species identification and enumeration, and any additional comments. These need to be completed at each stage of the laboratory analysis of all the samples.