Environment Waikato Technical Report 2008/51

Regional Estuary Monitoring Programme (REMP) Data Report: Benthic Macrofauna Communities and Sediments – July 2006 to April 2007

Southern Firth of Thames and Whaingaroa (Raglan) Harbour

www.ew.govt.nz
ISSN 1172-4005 (Print)
ISSN 1177-9284 (Online)

Environment Waikato
REGIONAL COUNCIL

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June 2008

Document #: 1336432

Peer reviewed by:
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Acknowledgements

The author would like to acknowledge the help of Malene Felsing, Vernon Pickett, Mark Williams, Rebecca Ireland, Hannah Jones and Catherine Beard with sampling, and the help of Lisa Tomlinson with sorting of sediment samples. The report structure was developed by Stephanie Turner.

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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 for the period July 2006 to April 2007. 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.

Five permanent sites in the southern Firth of Thames and Whaingaroa Harbour were sampled in October 2006 and April 2007. Two sites from each harbour were additionally sampled in July 2006 and January 2007. 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.

Results from the July 2006 to April 2007 monitoring period indicate that there are distinct differences in the benthic macrofauna communities between sites in the Firth of Thames, but less so in Whaingaroa Harbour. In both the Firth of Thames and Whaingaroa Habour there were only slight changes in assemblage composition over time. Overall bivalves were found to be more abundant in Whaingaroa Harbour, whereas polychaetes were more abundant in the Firth of Thames. Gastropods were also relatively more abundant in Whaingaroa Harbour. The most consistently common taxa found at sites in the southern Firth of Thames included the polychaetes *Aonides oxycephala,* capitellids and *Magelona dakini*; and the bivalves *Austrovenus stutchburyi, Nucula hartvigiana,* and *Paphies australis.* The exotic 'Asian date mussel', *Musculista senhousia*, occurred at most sites in Firth of Thames (except Te Puru), being most common at the Gun Club. For Whaingaroa Harbour, consistently common taxa included the polychaetes *Aquilaspio aucklandica, Cossura* sp. and capitellids; and the bivalves *Austrovenus stutchburyi*, *Nucula hartvigiana* and *Arthritica bifurca*. The limpet, *Notoacmea* sp. was also common in Whaingaroa Harbour.

This report presents selected sediment results from July 2006 to April 2007. The median grain size was quite consistent at all sites in both the Firth of Thames and Whaingaroa Harbour. In the Firth of Thames peaks in mud content were found at Kuranui Bay and Miranda in April 2007. Sites in Whaingaroa Harbour were generally 3-4 times muddier than those in the Firth of Thames. In Whaingaroa, the highest amount of mud occurred at Haroto Bay, which remained consistent over the one year of sampling, after steadily increasing since October 2002. The shell-hash content was also consistent over the sampling period in both estuaries.

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

A review of the monitoring program will be undertaken in 2008/2009 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), with subsequent results being published in three data reports to date (Turner & Carter, 2004; Felsing et al., 2006; Singleton & Pickett, 2006). Results of the sediment sampling up to April 2003 were reported in Gibberd and Carter (2005). The first trend report (Felsing and Singleton, 2008) brought together data from the first five years of monitoring from April 2001 to April 2006. This report presents the results from the monitoring programme from July 2006 to April 2007. The next time series analyses to determine any trends in the data will be carried out on 10 years of data in 2011.

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 are 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 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 (for example Auckland Regional Council).

[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 Methods

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

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.

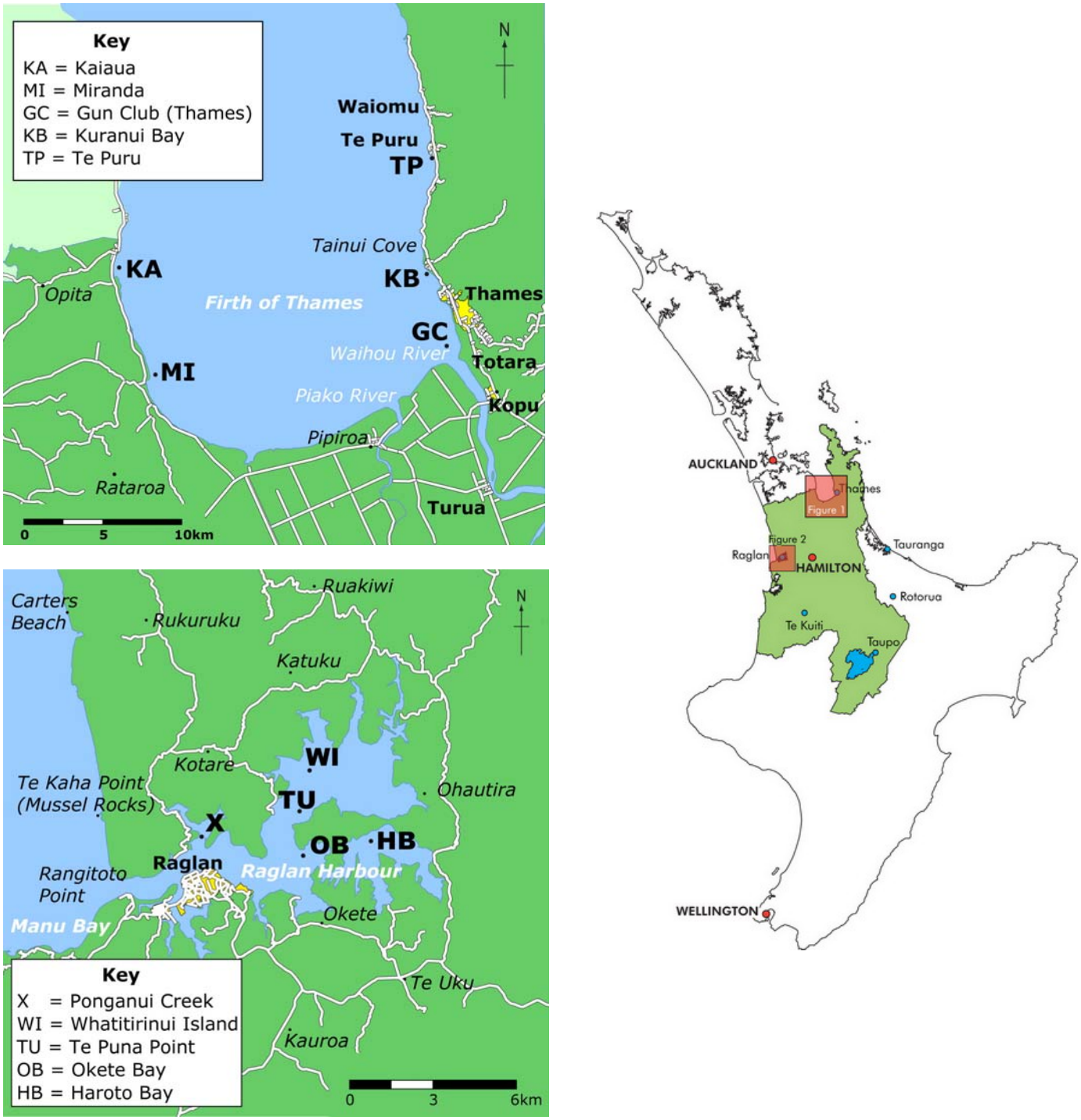

Figure 1. Location of permanent monitoring sites in the southern Firth of Thames and Raglan.

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 tap water 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, > 5 mm. 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 to 30 adult-sized individuals of *Austrovenus stutchburyi*, *Macomona liliana*, and *Paphies australis* were selected, frozen and retained for condition analysis.[4] Condition analysis work has so far been done on samples from April 2003 to April 2006.

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

Sediment grain-size, organic matter content and photosynthetic pigment concentration are known to influence the distribution and abundance of benthic macrofauna. To measure these parameters, sediment samples were collected from within the monitoring plots of each site.

[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*.

3 Results

3.1 Benthic macrofauna community structure

3.1.1 Southern Firth of Thames

Figure 2 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 2006 and April 2007. At TP and KA bivalves were found to be the most abundant taxonomic group, whereas polychaetes were the most abundant group on most sampling dates at GC, MI and KB.

Between July 2006 and April 2007, sites TP and KA showed the greatest changes in the total number of individuals and taxonomic composition. At KA there was a decrease in the total abundance from 119 individuals in October 2006 to 79 individuals in April 2007. Indicator bivalves were the most abundant taxonomic group on both sampling dates (52-66% of total abundance). In October 2006 non-indicator crustaceans at KA were mainly dominated by shrimps, whereas amphipods were the main species of non-indicator crustaceans in April 2007. The benthic community at TP was also dominated by indicator bivalves (34-65% of total individuals) on both sampling dates, and showed an increase in total number of individuals in April 2007.

At sites GC, MI and KB the total number of individuals and taxonomic composition was relatively consistent between sampling dates. At GC a small increase in the total number of individuals occurred from October 2006 to April 2007. This was mainly due to an increase in the number of non-indicator crustaceans in April 2007. Polychaetes (mainly *Aonides oxycephala*) were the most abundant group on both sampling dates (~70% of individuals).

The community at MI in July 2006 had similar abundances of polychaetes and bivalves. In October 2006 and January 2007 the total number of individuals decreased slightly, with polychaetes dominating (60-68% of individuals). Other crustaceans (mainly barnacles) and polychaetes were the most abundant groups contributing to the increase in total number of individuals at MI in April 2007. At KB there was a large decrease in the total number of individuals in January 2007 and a subsequent small

decrease in April 2007. Polychaetes were the most abundant group on all sampling dates at KB. GC had the highest number of total individuals compared to the other four sampling sites, which were similar overall.

The abundances of gastropods in the Firth of Thames were very low.

The data are included in full in Appendix 1.

3.1.2 Whaingaroa (Raglan) Harbour

Figure 3 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 2006 and April 2007.

From July 2006 to April 2007 the total number of individuals varied at TU and X, whereas HB, WI and OB showed little variation. Taxonomic composition was relatively consistent at all sites.

Polychaetes clearly dominated numerically at site OB (54-77% of individuals), whereas bivalves were more abundant at WI (41-52%), X (50-58%) and TU (61-65%). At HB bivalves were more abundant in October 2006 (50%), whereas polychaetes dominated numerically (55%) in April 2007. There was a slight increase in total abundance in April 2007 at HB. At site X there was a drop in total abundance from 148 individuals in October 2006 to 105 in April 2007, which was mainly due to a decrease in the abundance of indicator bivalves (mainly *Austrovenus stutchburyi*). At TU the total number of individuals decreased from 189 individuals in October 2006 to 140 in April 2007 (mainly due to a decrease in indicator bivalves).

The total abundance at WI increased from 165 individuals in July 2006 to 183 and195 in October 2006 and January 2007 respectively, followed by a decrease in April 2007 (156). This was mainly caused by changes in abundance of indicator bivalves. At OB the total abundance decreased overall from 119 individuals in July 2006 to 76 in April 2007.

Gastropods at sites TU (12-13%) and WI (10-15%), and crustaceans at X (8-11%) and OB (12-14%) were relatively abundant in Raglan Harbour.

The data are included in full in Appendix 2.

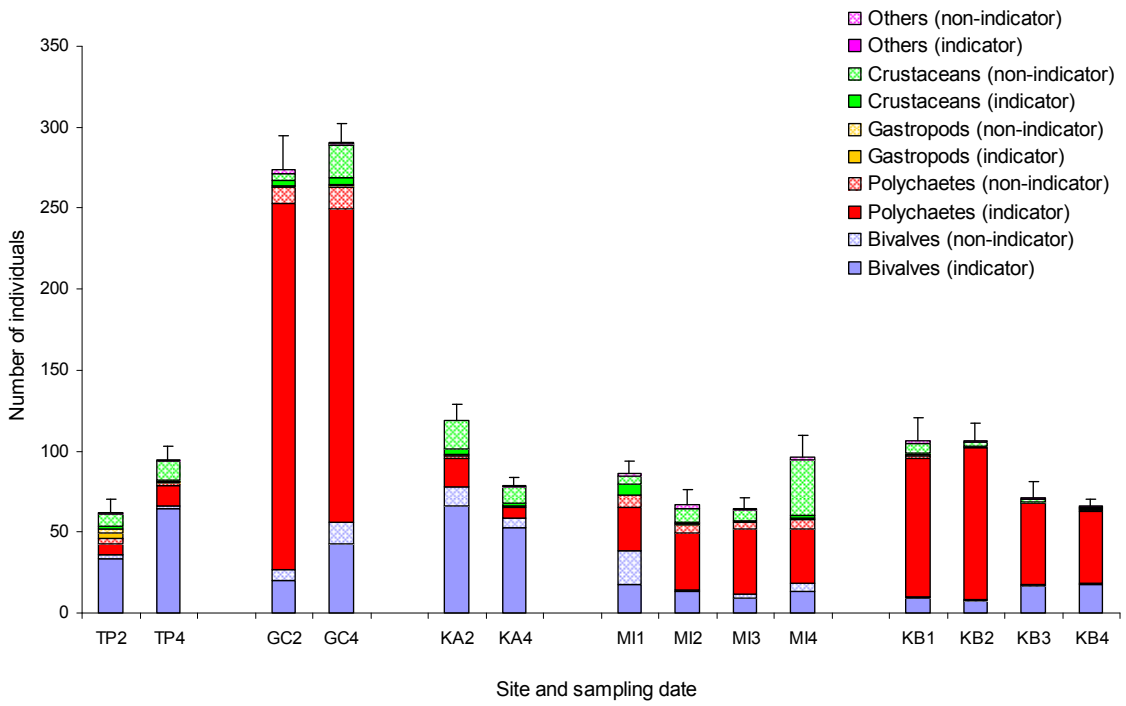

Figure 2: **Mean (± standard error) total number of individuals and major taxonomic group composition of intertidal benthic macrofauna communities at the permanent monitoring sites in the southern Firth of Thames between July 2006 and April 2007. Sampling dates: Jul 06 = 1, Oct 06 = 2, Jan 07 = 3, Apr 07 = 4.**

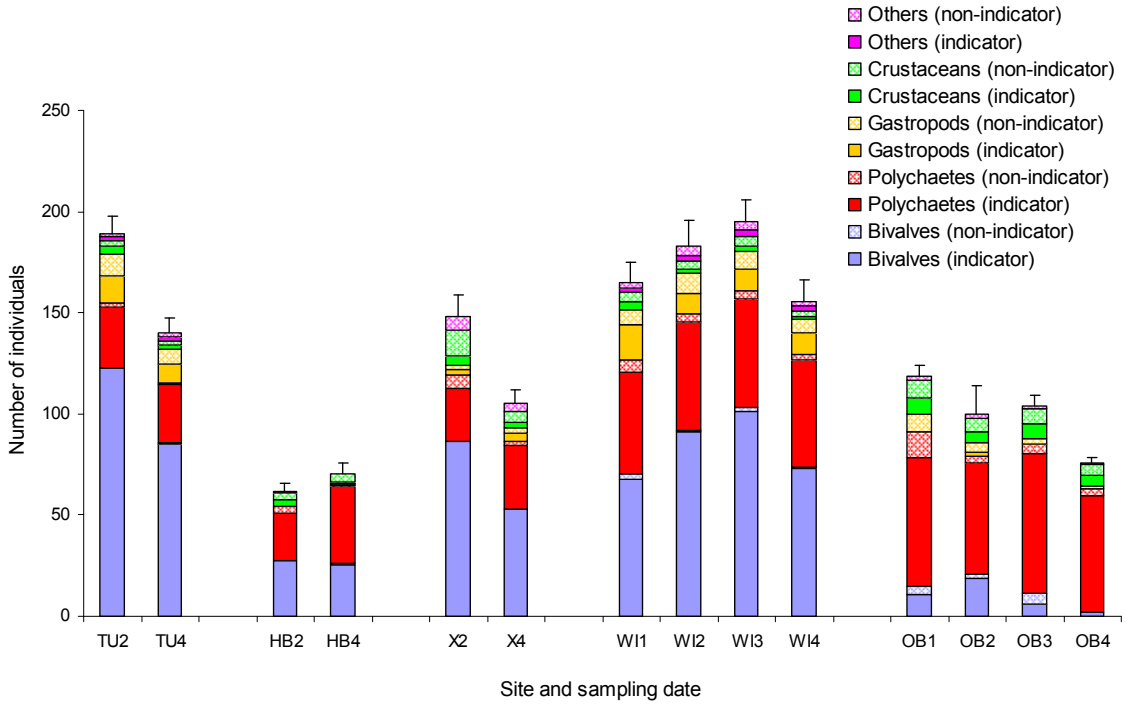

Figure 3: **Mean (± standard error) total number of individuals and major taxonomic group composition of intertidal benthic macrofauna communities at the permanent monitoring sites in Whaingaroa Harbour between July 2006 and April 2007. Sampling dates: Jul 06 = 1, Oct 06 = 2, Jan 07 = 3, Apr 07 = 4.**

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 2006 and April 2007 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. 'Misc. Other', 'Other polychaetes', 'Other bivalves', and 'Other amphipods' denote non-indicator species of these taxonomic groups.

	TP	GC	KA	MI	KB
Jul-06				Other bivalves	"Capitellidae"
				Aonides	*Magelona*
				Arthritica	*Austrovenus*
				Other polychaetes	Amphipods
				Colurostylis	*Nereidae*
Oct 06	*Paphies*	*Aonides*	*Nucula*	*Aonides*	"Capitellidae"
	Nucula	*Paphies*	"Capitellidae"	"Capitellidae"	*Magelona*
	Other crustaceans	Other polychaetes	Shrimps/Mysids	*Arthritica*	*Austrovenus*
	"Capitellidae"	"Capitellidae"	Other bivalves	*Orbinia*	*Aonides*
	Other polychaetes	Other bivalves	*Arthritica*	Other polychaetes	*Nereidae*
Jan-07				*Aquilaspio*	"Capitellidae"
				Aonides	*Arthritica*
				"Capitellidae"	*Austrovenus*
				Austrovenus	*Magelona*
				Other crustaceans	*Aonides*
Apr-07	*Austrovenus*	*Aonides*	*Nucula*	Other crustaceans	"Capitellidae"
	Paphies	*Austrovenus*	Other amphipods	*Aonides*	*Austrovenus*
	Nucula	Other polychaetes	Bivalves	"Capitellidae"	*Arthritica*
	Other crustaceans	Other bivalves	*Arthritica*	*Arthritica*	*Magelona*
	Magelona	Isopods	"Capitellidae"	*Aquilaspio*	*Macamona*

From October 2006 to April 2007 only a few changes were observed in the mean abundance of the most common taxonomic groups at TP, GC and KA. At TP the bivalve species *Paphies australis* (3-64 individuals core^{-1}) and *Nucula hartvigiana* (6-29 individuals core^{-1}) were the two most abundant species in October 2006. In April 2007 *Austrovenus stutchburyi* (3-73 individuals core^{-1}) and once more *P. australis* (6-51 individuals core^{-1}) were the most abundant taxa. At GC, the polychaete *Aonides oxycephala* was the most abundant taxa on both sampling dates (72-305 individuals core^{-1}). Although *P. australis* was the second most abundant taxa in October 2006 (2-35 individuals core^{-1}), this species of bivalve was not among the top 5 common taxa in April 2007. Non-indicator polychaetes (mainly an orbinid species) and non-indicator bivalves (including the Asian date mussel) were also common at GC on both sampling dates.

N. hartvigiana was the most common taxa (30-106 individuals core^{-1}) at KA on both sampling dates. In October 2006 capitellid polychaetes were the second most abundant taxa (5-39 individuals core^{-1}), whereas other amphipods were second highest in abundance in April 2007 (0-16 individuals core^{-1}). At MI the polychaete *A. oxycephala* was one of the two most abundant taxa (1-68 individuals core^{-1}) on all sampling dates. The bivalve, *Arthritica bifurca,* the polychaetes capitellids and

Aquilaspio aucklandica and three non-indicator taxa (bivalves, polychaetes and crustaceans) were also common. At KB, the capitellid polychaete was the most abundant taxa on all sampling dates (10-148 individuals core^{-1}). The polychaete *Magelona dakini* was consistently common on all sampling dates at KB (0-15 individuals core^{-1}).

Mean abundances of selected indicator species/taxa at each of the sites on each sampling date are shown in Figure 4.

The bivalve*, Arthritica bifurca* was most abundant at MI in July 2006 and October 2006, followed by a sharp decline in abundance in January 2007 (Figure 4a). In contrast the abundance of *A. bifurca* was lowest at KB over the first two sampling dates, followed by a sharp increase in abundance in January 2007 and a subsequent strong decline in April 2007. A substantial increase in numbers was also seen in April 2007 at GC. The majority of *A. bifurca* recorded were less than 2 mm long. In April 2007 *Austrovenus stutchburyi* showed a marked increase in abundance from previous monitoring events at TP and GC (Figure 4b). There was also a strong increase in numbers in April 2007 at KB. This was a reflection of the increase of individuals <5 mm at all three sites. The abundance of the bivalve *Macomona liliana* was highest in July 2006 and October 2006 at MI, followed by a decrease in January 2007 and slight increase in April 2007 (Figure 4c). At KA, GC and KB there was a slight increase in abundance of *M. liliana* in April 2007. The patterns in abundance of *M. liliana* can be mainly attributed to changes in abundance of individuals <5 mm.

Nucula hartvigiana was present in high numbers at KA and lower numbers at TP (Figure 4d). At KA there was a decrease in numbers from a mean abundance of 60 individuals in October 2006 to 47 individuals in April 2007. This was due to a decrease in >2mm size classes. At TP the abundance remained very consistent over the two sampling dates. Very low abundances of *N. hartvigiana* were found at GC, KB and MI. *Paphies australis* was only found in relatively high abundances at TP and GC, with few or no individuals being found at KA, MI or KB (Figure 4e). At TP and GC the numbers decreased slightly over the one year of monitoring. A mix of both <5mm and >20mm size classes were found at TP, whereas a mix of <5mm and 5-15mm size classes were found at GC on October 2006 and mainly <5mm in April 2007.

The highest abundance of the cumacean *Colurostylis lemurum* occurred at MI in July 2006, however a sharp decline followed in July 2006, with numbers slightly increasing again in April 2007(Figure 4f). At GC the numbers increased slightly and decreased slightly at TP over the one year of monitoring. The abundance at KA and KB was low.

The abundance of most polychaetes species varied over the year of monitoring reported here. The most abundant polychaete was *Aonides oxycephala* (Figure 4h). This species was clearly most abundant at GC, where there was a decrease in numbers between October 2006 and April 2007. MI, KB and TP had consistently lower numbers. Capitellid polychaetes were also found in high numbers, with the highest abundance occurring at KB (Figure 4k). An initial increase in abundance between July and October 2006 was followed by a sharp decline in January 2007. Capitellid numbers also decreased over the sampling period at KA, and remained relatively consistent at MI, TP and GC. Another spionid polychaete species, *Aquilaspio aucklandica*, was found in lower numbers (Figure 4g). *A. aucklandica* was most abundant at MI, where numbers increased sharply with a peak in January 2007, followed by a sharp decline in April 2007. The abundance at KB was consistently low.

The polydorid polychaetes ("pseudopolydora complex") were most abundant at TP, with an increase in numbers occurring between October 2006 and April 2007 (Figure 4i). The polychaetes Glycera sp. and *Magelona dakini* were most abundant at KB. The abundance of Glycera sp. at KB increased over the first three sampling periods, followed by a decline in April 2007 (Figure 4j). In contrast M. *dakini* abundance at KB declined steadily over the sampling period (Figure 4l). There was a sharp increase in

abundance at TP, and remained consistently low at the other sites. The abundance of nereid polychaetes decreased gradually at KB over the one year of sampling (Figure 4m). At MI the abundance was consistent over the first three sampling periods, followed by a strong increase in numbers in April 2007. *Orbinia papillosa* was most abundant at MI with numbers decreasing slightly in January 2007 (Figure 4n).

Note that indicator amphipods were only found in extremely low abundances so are not presented graphically in this report.

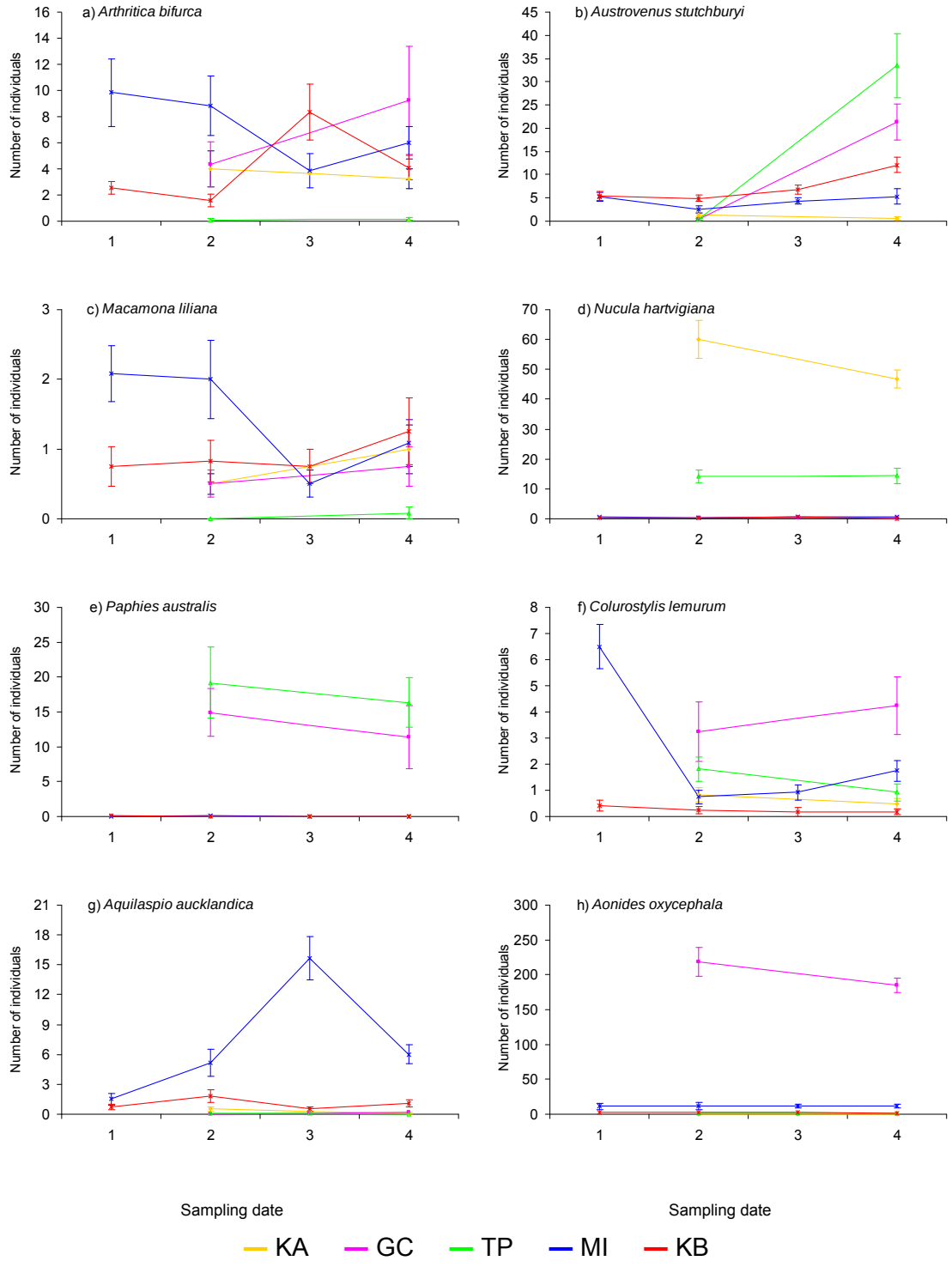

Figure 4: **The mean (± standard error) number of selected indicator species/taxa per core on each sampling date at each of the permanent monitoring sites in the southern Firth of Thames. Sampling dates: Jul 06 = 1, Oct 06 = 2, Jan 07 = 3, Apr 07 = 4. Note the different scales on the vertical axes.**

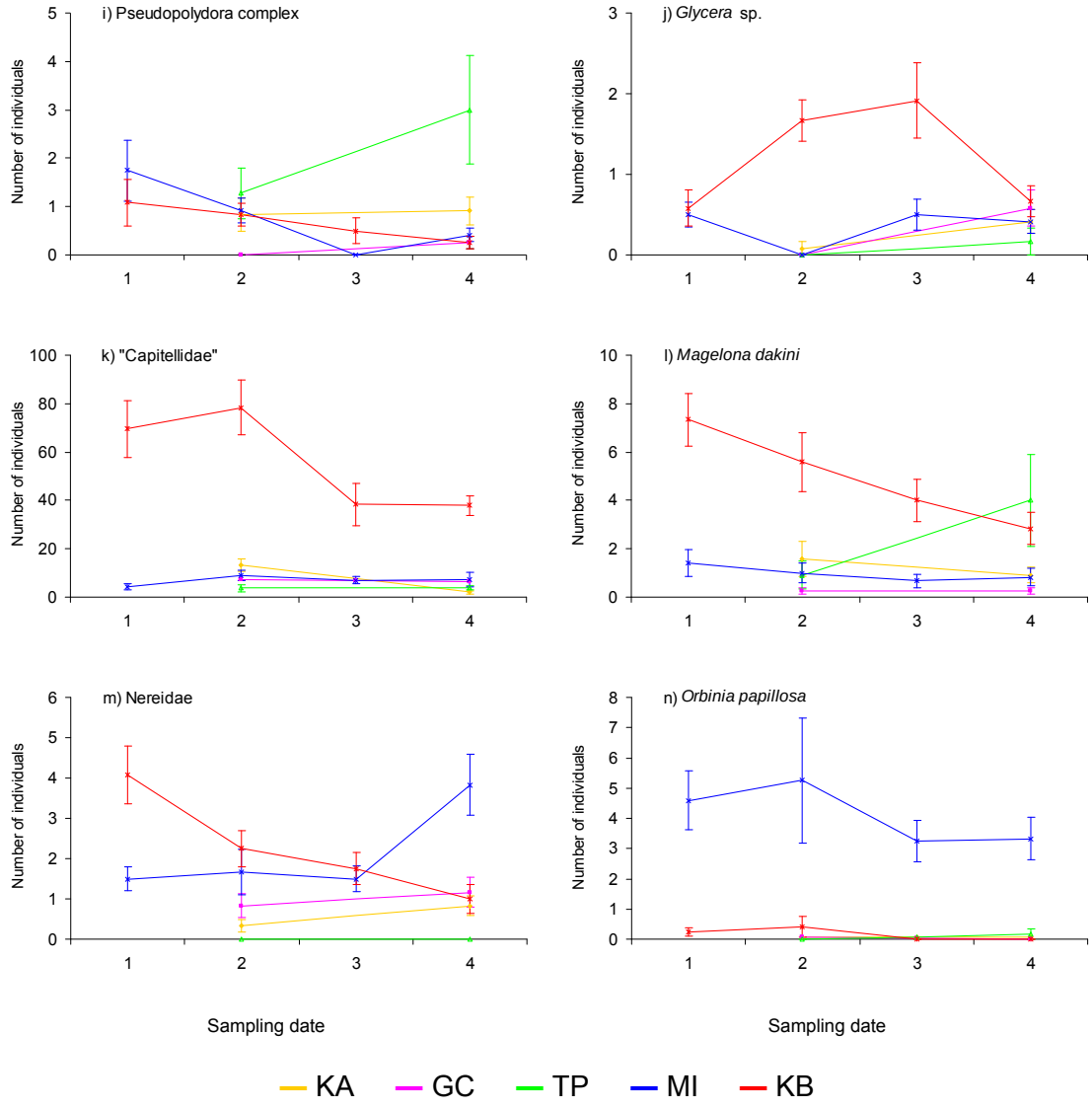

Figure 4. (cont.)

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 2006 and April 2007 are listed in Table 3.

At the sampling sites TU, X and HB, the most abundant taxa remained the same over all sampling dates. At TU, the bivalve species *Austrovenus stutchburyi* (27-98 individuals core^{-1}) and *Nucula hartvigiana* (22-73 individuals core^{-1}) were the most common taxa on both sampling dates. The limpet, *Notoacmea* sp. (2-20 individuals core^{-1}) and capitellid polychaetes (3-21 individuals core^{-1}) were also among the most common species, but in lower numbers. At X, the bivalves *A. stutchburyi* (9-58 individuals core^{-1}) and *N. hartvigiana* (6-41 individuals core^{-1}) were again the most abundant taxa on both sampling dates. The bivalve *Macamona liliana* and polychaetes *Aquilaspio aucklandica* and capitellids were frequent on both sampling dates. At HB, the bivalve *Arthritica bifurca* were the most abundant taxa on both sampling dates (0-36 individuals core^{-1}). The second most abundant taxa changed from capitellid polychaetes in October 2006 (8-28 individuals core^{-1}) to another polychaete, Nereidae, in April 2007 (9-27individuals core^{-1}). The bivalve *A. stutchburyi* and polychaete *A. aucklandica* were also abundant on both sampling dates at HB.

At sites WI and OB, the most abundant taxa changed slightly over the sampling dates. At WI *A. stutchburyi* was most abundant in July and October 2006 (9-78 individuals

core^{-1}) and N. *hartvigiana* in January and April, 2007 (7-84 individuals core^{-1}). Capitellid polychaetes were the second most abundant taxa (9-48individuals core^{-1}) on three of the four sampling dates. *Notoacmea* sp (0-71 individuals core^{-1}) and *A. aucklandica* (3-45 individuals core^{-1}) were also common taxa at WI. At OB the most abundant taxa on all four sampling dates was capitellids (8-47 individuals core^{-1}) and the second most abundant taxa was consistently Cossura sp. (0-38 individuals core^{-1}). Other abundant taxa found on at least half of the sampling dates included the amphipod taxa *phoxocephalidae* (0-15 individuals core^{-1}), non-indicator polychaetes (0-24 individuals core^{-1}), and nereid polychaetes (1-20 individuals core^{-1}).

Table 3: The five most common species/taxonomic groups on each sampling date for each permanent monitoring site in Whaingaroa Harbour. 'Misc. Other', 'Other polychaetes', 'Other bivalves', 'Other gastropods' and 'Other amphipods' denote non-indicator species of these taxonomic groups.

	TU	HB	X	WI	OB
Jul-06				*Austrovenus*	"Capitellidae"
				"Capitellidae"	*Cossura* sp.
				Nucula	Other polychaetes
				Notoacmea sp.	Other gastropods
				Aquilaspio	*Theora*
Oct-06	*Austrovenus*	*Arthritica*	*Austrovenus*	*Austrovenus*	"Capitellidae"
	Nucula	"Capitellidae"	*Nucula*	*Nucula*	*Cossura* sp.
	Notoacmea sp.	*Austrovenus*	"Capitellidae"	"Capitellidae"	*Austrovenus*
	Other gastropods	*Nereidae*	*Macamona*	*Aquilaspio*	*Aquilaspio*
	"Capitellidae"	*Aquilaspio*	*Aquilaspio*	*Notoacmea* sp.	*Nereidae*
Jan-07				*Nucula*	"Capitellidae"
				"Capitellidae"	*Cossura* sp.
				Austrovenus	*Aquilaspio*
				Aquilaspio	*Phoxocephalidae*
				Arthritica	Other amphipods
Apr-07	*Austrovenus*	*Arthritica*	*Austrovenus*	*Nucula*	"Capitellidae"
	Nucula	*Nereidae*	*Nucula*	"Capitellidae"	*Cossura* sp.
	Aquilaspio	"Capitellidae"	*Aquilaspio*	*Austrovenus*	*Nereidae*
	Notoacmea sp.	*Austrovenus*	"Capitellidae"	*Aquilaspio*	*Phoxocephalidae*
	"Capitellidae"	*Aquilaspio*	*Macamona*	*Notoacmea* sp.	Other polychaetes

The mean abundances of selected indicator species/taxa at each of the sites on each sampling date are shown in Figure 5.

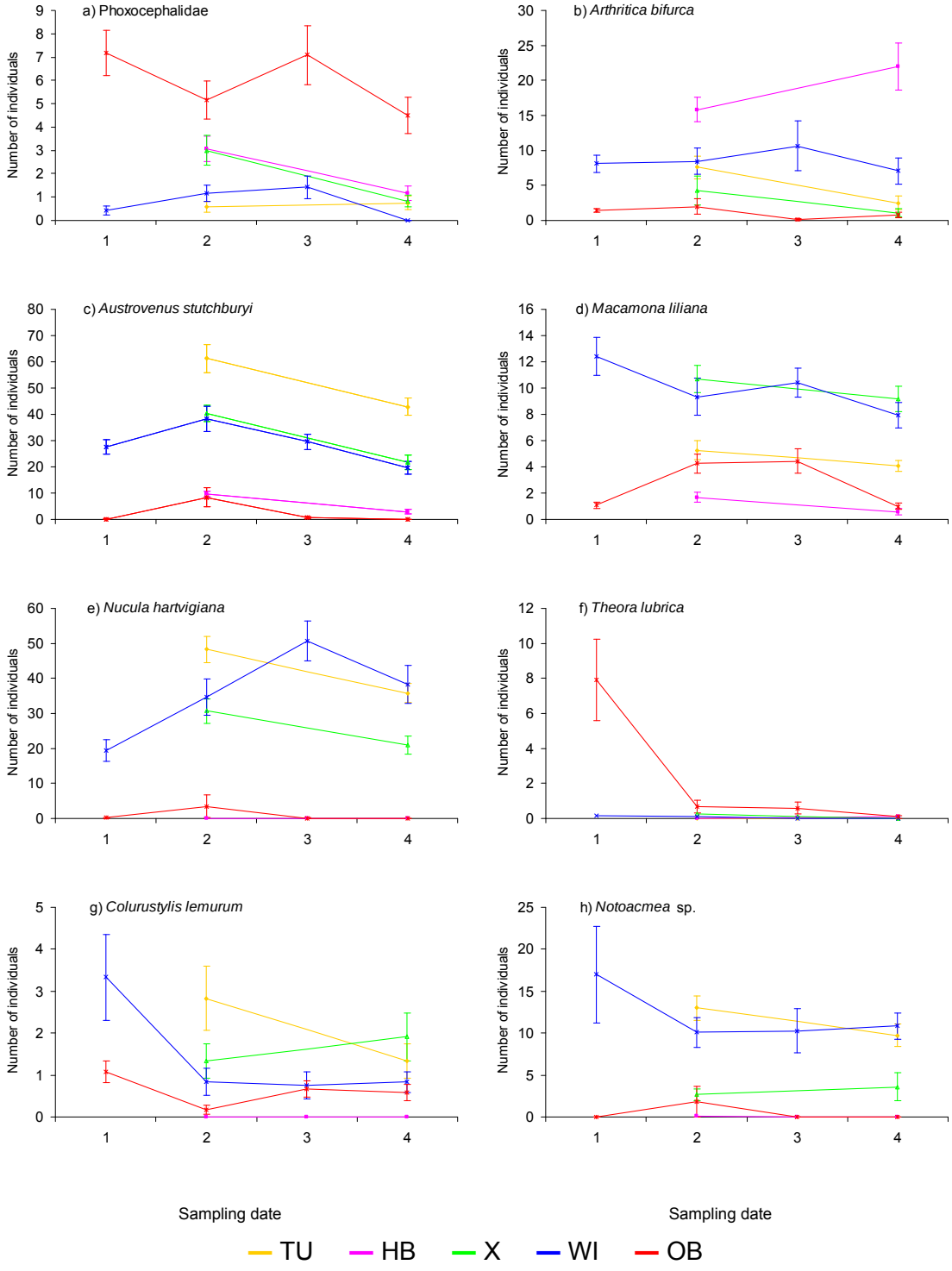

Figure 5: **The mean (± standard error) number of selected indicator species/taxa per core on each sampling date at each of the permanent monitoring sites in Whaingaroa Harbour. Sampling dates: Jul 06 = 1, Oct 06 = 2, Jan 07 = 3, Apr 07 = 4. Note the different scales on the vertical axis.**

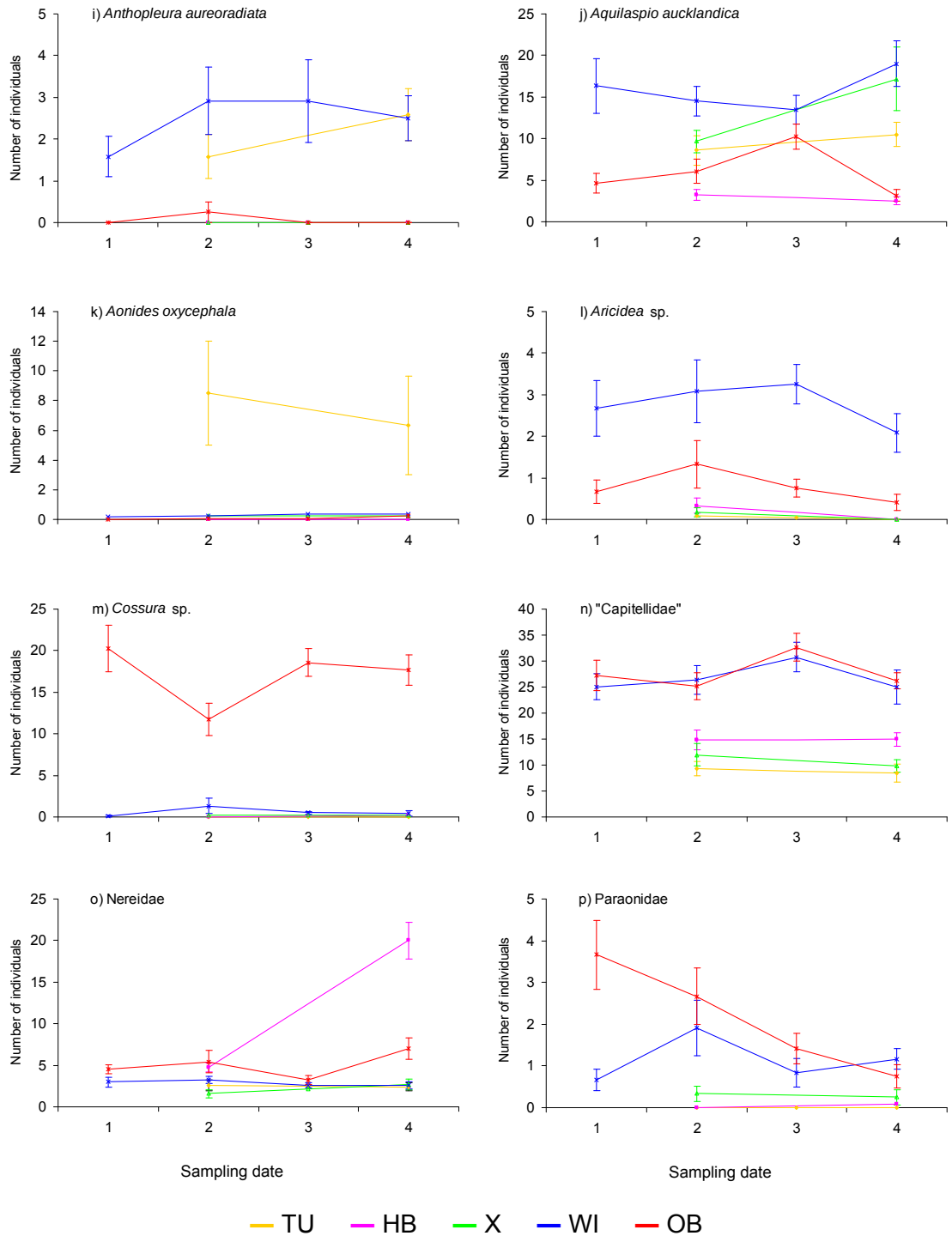

Figure 5. (cont.)

The highest abundance of phoxocephalid amphipods occurred at OB, where a decrease in numbers occurred in October 2006, followed by an increase in January 2007 (to similar numbers found in July 2006) and then another decrease in April 2007. A decline in numbers was also seen at HB and X between October 2006 and April 2007 (Figure 5a).

Abundance of indicator bivalves varied both temporally and spatially. *Arthritica bifurca* was present in highest numbers at HB which showed an increase in April 2007, and WI where numbers remained relatively consistent. The abundance at TU and X decreased in April 2007 (Figure 5b). Similar to the Firth of Thames, the majority of *A. bifurca* recorded from Raglan Harbour were <2 mm. Very high numbers of *Austrovenus stutchburyi* were found at TU, WI and X in October 2006, with a decline in abundance on subsequent sampling dates (Figure 5c). This can be mainly attributed to a decrease in abundance of individuals <5 mm. The abundance of *Macamona liliana* at site X and

TU remained consistent between October 2006 and April 2007 (Figure 5d), whereas at WI there was an overall decrease in numbers over the one year of sampling (which was a reflection of a decrease in abundance of individuals <5 mm). The abundance at OB peaked in October 2006 and January 2007, followed by a decline in April 2007 to numbers similar to that in July 2006. Once again this pattern can mainly be attributed to a decrease in abundance of individuals <5 mm. High numbers of *Nucula hartvigiana* occurred at TU, WI and X (Figure 5e). The abundance at WI increased considerably in January 2007, with a subsequent small decline in April 2007. Numbers at X and TU decreased between October 2006 and April 2007. The pattern at WI and X was mainly caused by changes in numbers of both size classes, <2 mm and >2 mm, whereas at TU it was mainly the >2 mm size class. There was a sharp decline in the abundance of *Theora lubrica* at OB in October 2006, with numbers staying very low on subsequent sampling dates (Figure 5f).

Colurostylis lemurum (cumacean) numbers were highest at WI in July 2006, followed by a sharp decline to low numbers in October 2006 to April 2007. Numbers also decreased at TU, whereas there was a slight increase at site X (Figure 5g). The abundance of the limpet *Notoacmea* sp. was highest at WI and TU (Figure 5h). After a decline in abundance at WI in October 2006, numbers remained consistent. At TU the abundance decreased in April 2007, whereas numbers slightly increased between October 2006 and April 2007 at X. The anemone *Anthopleura aureoradiata* was present in highest numbers at WI and TU (Figure 5i). At WI an initial increase in abundance in October 2006 was followed by relatively consistent numbers on subsequent sampling dates. An increase in abundance occurred at TU in April 2007.

The abundance of polychaetes also varied over time and between sites. The abundance of *Aquilaspio aucklandica* was highest at WI and X, with medium levels found at OB and TU, and lower numbers at HB (Figure 5j). Overall the abundance increased over time at sites WI, X and TU. The abundance at OB decreased in April 2007 after an increase during previous sampling dates, and remained relatively consistent at X. *Aonides oxycephala* had the highest number of individuals at TU, with abundance decreasing in April 2007 (Figure 5k). All other sites had very low levels. The polychaete *Aricidea* sp. was most abundant at WI, where numbers gradually increased between July 2006 and January 2007, followed by a decrease in April 2007. This species was present at low levels at OB, where numbers were relatively consistent apart from a slight increase in October, 2006 (Figure 5l).

Cossura sp. was either absent or found in very low abundance at all sites, except for OB where numbers of individuals ranged from the lowest average of around 12 recorded in October 2006 to the highest average of around 20 in April 2006 (Figure 5m).

Capitellid polychaetes occurred in relatively high numbers at all sites, in particular WI and OB (Figure 5n). At WI and OB numbers were overall consistent between sampling dates, with a slight peak occurring at both sites in January 2007. The abundance at all other sites was consistent, with a slight decrease in numbers at X. The abundance of nereid polychaetes increased substantially at HB and OB in April 2007 (Figure 5o), while all other sites maintained consistently low abundances of nereids. Paraonid numbers at OB declined steadily over the one year of sampling (Figure 5p).

3.3 Sediment characteristics

3.3.1 Surficial sediment grain-size

3.3.1.1 Southern Firth of Thames

The median grain size remained consistent at all sites in the Firth of Thames over the sampling period (Figure 6a). The sediment at GC had the highest median grain size, with a small decrease occurring in April 2007. The average proportion of mud was the

lowest at GC (0.4-0.8%) and TP (1.0-1.2%, Figure 6b). A decline in the proportion of mud occurred at KA, from an average of 5.1% of the sediment by volume in October 2006 to 3.0% in April 2007. In contrast, at sites MI and KB (which had similar levels of mud to KA in October 2006), there was a marked increase in the average mud content from January 2007 to April 2007 (2.6 to 20.5% at MI, 2.3 to 15.9% at KB). It should be noted, however, that due to two anomalous results from the April 2007 samples taken at MI and KB, there was a high standard error around the average mud content. If the two samples with disproportionately high amounts of mud are removed from the dataset, average mud content falls from 20.5% to 6.2% for site MI, and 15.9% down to 2.8% at site KB.

3.3.1.2 Whaingaroa (Raglan) Harbour

Median grain size remained consistent at all sites during the study period, except for WI, where a decrease in grain size occurred in October 2006, followed by an increase in January 2007 (similar to previous values in July 2006) and then another smaller decrease in April 2007 (Figure 7a).

The highest mean mud content occurred at HB (30.1-31.6%, Figure 7b), where the proportion of mud has been consistently increasing since October 2002, when an average amount of 12.6% was recorded (Felsing et al, 2006). Mud content at Site OB declined between July 2006 (14.4%) and April 2007 (10.2%). A similar pattern was seen at WI, while sites X and TU had consistently low levels of mud. The proportion of mud at HB and OB in Raglan was much higher than values observed for Firth of Thames sampling sites.

3.3.2 Shell hash

3.3.2.1 Southern Firth of Thames

The greatest amounts of mean dry weight of shell-hash were found at GC, where shell hash content ranged from 808 g.core^{-1} in October 2006 to 766 g.core^{-1} in April 2007 (Figure 6c), which is at least twice that measured at all other sites in both Firth of Thames and Raglan. All other Firth of Thames sites had consistently low amounts of shell material with the least being found at KA (69-83 g.core^{-1}) and TP (92-101 g.core^{-1}).

The data are included in full in Appendix 3.

3.3.2.2 Whaingaroa (Raglan) Harbour

In Raglan Harbour, the greatest amount of shell-hash was found at X and the least at OB (Figure 7c). At TU there was a decrease in shell-hash from 129 g.core^{-1} in October 2006 to 91 g.core^{-1} in April 2007. The amount of shell-hash at X, HB, WI and OB was relatively consistent over the study period.

The data are included in full in Appendix 3.

3.3.3 Sediment organic matter content

3.3.3.1 Southern Firth of Thames

There was an overall and steady increase in mean total organic carbon levels over the study period at MI (from 0.282 g 100 g^{-1} in July 2006 to 0.998 g 100 g^{-1} in April 2007) and KB (from 0.358 g 100 g^{-1} in July 2006 to 1.016 g 100 g^{-1} in April 2007), with levels peaking sharply at both sites in April 2007 (Figure 6d). A smaller increase was observed between October 2006 and April 2007 at KA and TP (which had the lowest levels). In contrast a decrease in total organic carbon occurred at GC (from 0.576 g 100 g^{-1} in October 2006 to 0.300 g 100 g^{-1} in April 2007).

The mean total nitrogen content of the sediments at MI, KB and TP (although levels in October 2006 were below the 0.05 detection limit) peaked in April 2007, whereas those at GC and KA remained relatively consistent over the study period (Figure 6e).

The data are included in full in Appendix 4.

3.3.3.2 Whaingaroa (Raglan) Harbour

The mean levels of total organic carbon peaked in April 2007 at HB (0.814 g 100 g^{-1}), WI (0.568 g 100 g^{-1}), TU (0.568 g 100 g^{-1}), and X (0.492 g 100 g^{-1}) In contrast, total organic carbon levels decreased over the sampling period at OB from 0.772 g 100 g^{-1} in July 2006 to 0.442 g 100 g^{-1} in April 2007 (Figure 7d).

Levels of total nitrogen increased markedly at site WI in April 2007, from 0.074 g 100 g^{-1} in July 2006 to 0.118 g 100 g^{-1} in April 2007 (Figure 7e). It should be noted the standard error was high in April 2007 (0.06), and that the increase in nitrogen from January to April 2007 is probably not statistically significant. Conversely, nitrogen levels at OB declined from 0.122 g 100 g^{-1} in July 2006 to 0.06 g 100 g^{-1} in April 2007. Total nitrogen levels also declined at X, TU and HB over the sampling period, though only slightly.

The data are included in full in Appendix 4.

3.3.4 Sediment photosynthetic pigment concentration

3.3.4.1 Southern Firth of Thames

Mean chlorophyll-*a* levels were highest at MI in October 2006 (22.12 mg kg^{-1}) and KB in January 2007 (21.14 mg kg^{-1}), with levels decreasing at both sites in April 2007, although not to the previous low levels observed in July 2006 (Figure 6f). Chlorophyll-*a* levels decreased between October 2006 and April 2007 at GC and TP (with the lowest levels occurring at this site) while levels varied only slightly at KA.

Similar to chlorophyll-*a* levels, phaeophytin levels peaked in October 2006 at MI (20.54 mg kg^{-1}) from low levels in July 2006 (1.74 mg kg^{-1}) (Figure 6g). Low phaeophytin levels were also observed at KB in July 2006 (1.46 mg kg^{-1}), with levels peaking in January 2007 (17.06 mg kg^{-1}) and subsequent decrease in April 2007 (9.26 mg kg^{-1}). Levels increased at GC from 4.26 mg kg^{-1} in October 2006 to 8.4 mg kg^{-1} in April 2007, whereas at KA there was a decrease from 11.56 mg kg^{-1} in October 2006 to 5.6 mg kg^{-1} in April 2007. Phaeophytin levels were consistently the lowest at TP.

The data are included in full in Appendix 5.

3.3.4.2 Whaingaroa (Raglan) Harbour

Mean chlorophyll-*a* concentrations in Raglan Harbour declined at all 5 sites in April 2007 (Figure 7f). The greatest decrease in levels occurred at TU with a decline from 26.46 mg kg^{-1} in October 2006 to 11.6 mg kg^{-1} in April 2007.

The trend observed for the phaeophytin levels was very similar to that seen for chlorophyll-*a* concentrations. At WI and OB phaeophytin levels peaked in January 2007, and then like at sites TU, HB and X declined markedly in April 2007 (Figure 7g).

The data are included in full in Appendix 5.

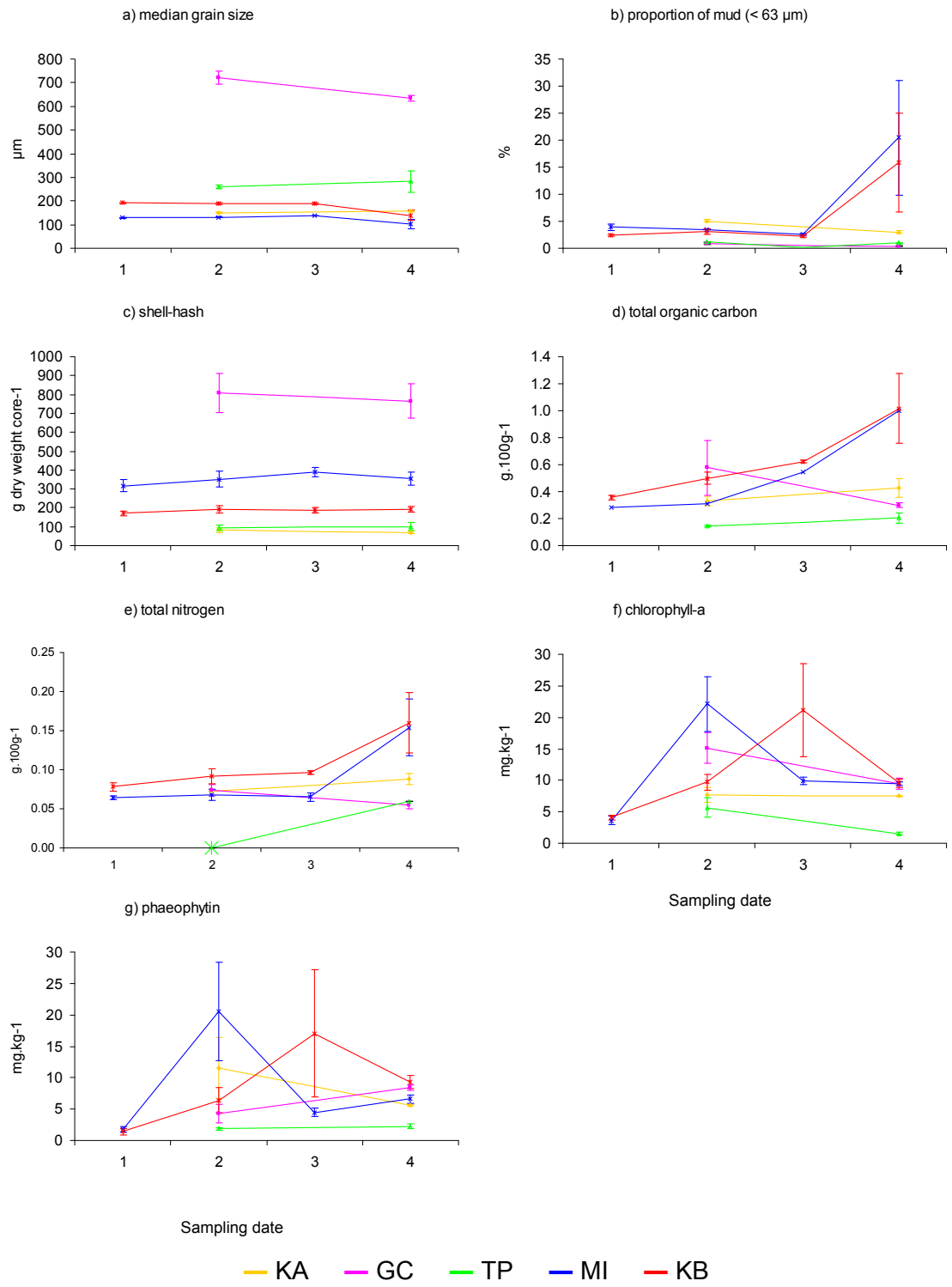

Figure 6: **Mean (± standard error) a) median grain-size, b) proportion of mud (< 63 µm), c) shell-hash dry weight, d) total organic carbon content, e) total nitrogen content ✳ = < 0.05) chlorophyll-*a* concentration and g) phaeophytin concentration of the sediment at the permanent monitoring sites in the southern Firth of Thames between July 2006 and April 2007. Sampling dates: Jul 06 = 1, Oct 06 = 2, Jan 07 = 3, Apr 07 = 4. Note the different scales on the vertical axis.**

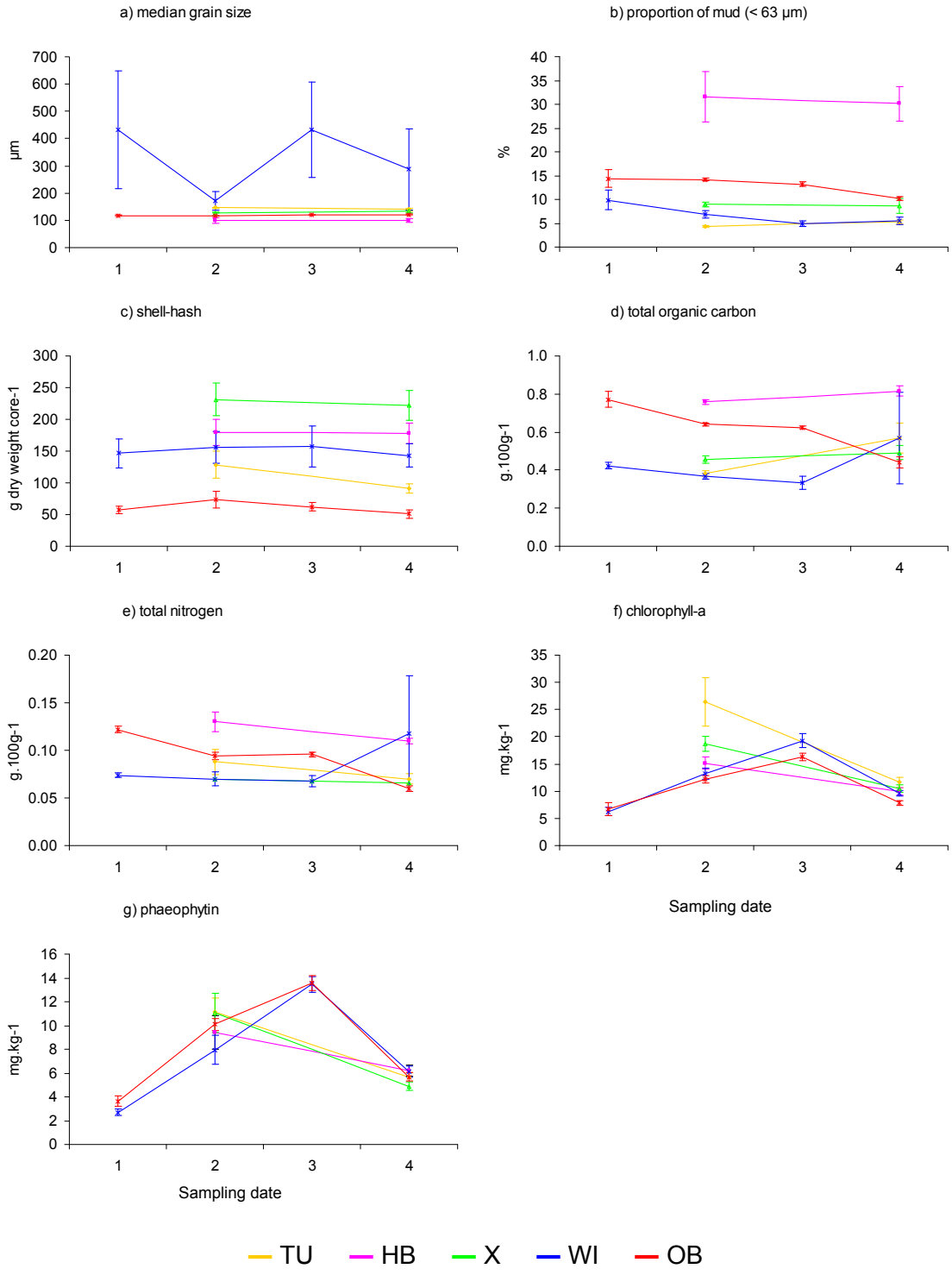

Figure 7: **Mean (± standard error) a) median grain-size, b) proportion of mud (< 63 µm), c) shell-hash dry weight, d) total organic carbon content, e) total nitrogen content, f) chlorophyll-*a* concentration and g) phaeophytin concentration of the sediment at the permanent monitoring sites in Whaingaroa Harbour between July 2006 and April 2007. Sampling dates: Jul 06 = 1, Oct 06 = 2, Jan 07 = 3, Apr 07 = 4. Note the different scales on the vertical axis.**

4 Discussion

This report documents the data from July 2006 to April 2007 of the monitoring programme. Detailed discussion and analysis of trends or patterns of change over time in the benthic macrofaunal communities and sediment characteristics are 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 will continue as outlined in Turner (2001). Monitoring will 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 4 and Table 5). However, a review of the monitoring program is being undertaken in 2008/2009 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.

Table 4: Past and planned 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/July/Oct	Apr/Oct	Apr/July/Oct	Apr/Oct
2002	Apr/Oct	Jan/Apr/July/Oct	Apr/Oct	Jan/Apr/July/Oct	Apr/Oct
2003	Apr/Oct	Jan/Apr/July/Oct	Apr/Oct	Jan/Apr/July/Oct	Apr/Oct
2004	Apr/Oct	Jan/Apr/July/Oct	Apr/Oct	Jan/Apr/July/Oct	Apr/Oct
2005	Apr/Oct	Jan/Apr/July/Oct	Apr/Oct	Jan/Apr/July/Oct	Apr/Oct
2006	Apr/Oct	Jan/Apr/July/Oct	Apr/Oct	Jan/Apr/July/Oct	Apr/Oct
2007	Apr/Oct	Jan/Apr/July/Oct	Apr/Oct	Jan/Apr/July/Oct	Apr/Oct
2008	Apr/Oct	Jan/Apr/July/Oct	Apr/Oct	Jan/Apr/July/Oct	Apr/Oct
2009	under review	under review	under review	under review	under review

Table 5: Past and planned future 3- and 6-monthly sampling schedule at the five permanent monitoring sites in Whaingaroa Harbour.

	HB	WI	TU	OB	X
2001	Apr/Oct	Apr/July/Oct	Apr/Oct	Apr/July/Oct	Oct
2002	Apr/Oct	Jan/Apr/July/Oct	Apr/Oct	Jan/Apr/July/Oct	Apr/Oct
2003	Apr/Oct	Jan/Apr/July/Oct	Apr/Oct	Jan/Apr/July/Oct	Apr/Oct
2004	Apr/Oct	Jan/Apr/July/Oct	Apr/Oct	Jan/Apr/July/Oct	Apr/Oct
2005	Apr/Oct	Jan/Apr/July/Oct	Apr/Oct	Jan/Apr/July/Oct	Apr/Oct
2006	Apr/Oct	Jan/Apr/July/Oct	Apr/Oct	Jan/Apr/July/Oct	Apr/Oct
2007	Apr/Oct	Jan/Apr/July/Oct	Apr/Oct	Jan/Apr/July/Oct	*Apr/Oct*
2008	Apr/Oct	Jan/Apr/July/Oct	Apr/Oct	Jan/Apr/July/Oct	*Apr/Oct*
2009	under review	under review	under review	under review	under review

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. Some non-indicator species occur in high numbers, for example the non-indicator gastropod species *Cominella glandiformis* is more common in Firth of Thames samples than the indicator gastropod *Cominella adspersa.* Conversely, some indicator species are either absent at some of the monitoring sites, or found in very low numbers. As such, it is recommended that all macroinvertebrate fauna be identified to the lowest taxonomic level possible (indicator and non-indicator) to provide a comprehensive description of the macrofaunal communities. This may also be useful in identifying potential incursions of introduced species such as *Musculista senhousia (*the asian mussel).

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.

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

KA October 2006

	INDICATOR SPECIES		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*		1	6	1	3	2	2	3	4	2	6	0	2	32	2.7
	BIVALVES	**SIZE**														
BAB<2	*Arthritica bifurca*	<2	10	0	5	1	3	9	0	0	1	14	2	2	47	3.9
BAB>2		>2	0	0	0	0	0	1	0	0	0	0	0	0	1	0.1
		Total	10	0	5	1	3	10	0	0	1	14	2	2	48	4.0
BAS<5	*Austrovenus stutchburyi*	<5	3	0	0	0	1	0	0	1	3	1	0	3	12	1.0
BAS>5		>5	1	0	0	1	1	0	0	0	0	0	0	0	3	0.3
BAS-COND		Cond.analysis	0	0	0	1	0	0	0	0	0	0	0	0	1	0.1
		Total	4	0	0	2	2	0	0	1	3	1	0	3	16	1.3
BML<5	*Macamona liliana*	<5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BML5-15		5-15	1	1	0	0	0	0	0	0	0	1	0	1	4	0.3
BML>15		>15	0	0	0	0	0	0	1	0	0	0	1	0	2	0.2
BML-COND		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	1	1	0	0	0	0	1	0	0	1	1	1	6	0.5
BNH<2	*Nucula hartvigiana*	<2	0	0	0	1	1	0	0	1	1	2	0	1	7	0.6
BNH>2		>2	81	56	65	52	29	49	86	105	44	39	68	39	713	59.4
		Total	81	56	65	53	30	49	86	106	45	41	68	40	720	60.0
BPA<5	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA5-15		5-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA>15		>15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA-COND		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	0	0	0	0	0.0
BTHL<5	*Theora lubrica*	<5	1	2	0	0	0	0	0	0	0	0	1	0	4	0.3
BTHL>5		>5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	1	2	0	0	0	0	0	0	0	0	1	0	4	0.3
	CUMACEANS															
CCL	*Colurostylis lemurum*		3	1	0	0	1	0	1	2	1	0	0	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	0	0	0	0	0	0	0	0	0	0.0
	POLYCHAETES															
PAA	*Aquilaspio aucklandica*		0	0	0	1	0	0	2	0	1	1	1	0	6	0.5
PAGL	*Aglaophamus* sp.		0	1	0	0	0	0	0	0	0	0	0	0	1	0.1
PAO	*Aonides oxycephala*		0	1	0	0	0	0	0	0	0	0	0	0	1	0.1
PAR	*Aricidea* sp.		0	0	1	0	0	1	0	1	0	0	0	0	3	0.3
PBOC	Pseudopolydora complex		2	4	1	0	1	0	0	0	1	0	0	1	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.		1	0	0	0	0	0	0	0	0	1	1	0	3	0.3
PGLY	*Glycera* sp.		0	0	0	0	1	0	0	0	0	0	0	0	1	0.1
PHF	"Capitellidae"		5	8	15	10	20	13	10	9	10	39	14	6	159	13.3
PMD	*Magelona dakini*		0	9	1	2	0	0	1	1	0	2	2	1	19	1.6
PNIC	Nereidae		1	0	0	0	0	0	0	1	0	1	0	1	4	0.3
POP	*Orbinia papillosa*		1	0	0	0	0	0	0	0	0	0	0	0	1	0.1
PPAR	Paraonidae		0	0	0	0	0	0	0	0	1	0	0	0	1	0.1
	NON INDICATOR SPECIES															
CAMPH	Amphipods		1	0	0	2	3	3	2	1	0	10	0	1	23	1.9
CCRAB	Crabs		0	4	1	2	1	0	0	0	1	2	3	2	16	1.3
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
CISO	Isopods		1	0	0	1	1	1	2	0	0	0	3	1	10	0.8
COST	Ostracods		0	0	0	0	0	0	0	0	0	1	0	0	1	0.1
CSHR	Shrimps/Mysids		1	0	6	1	114	1	1	5	0	0	19	0	148	12.3
COTH	Other Crustaceans		2	0	0	0	3	0	0	2	1	0	1	1	10	0.8
BOTH	Bivalves		8	14	10	12	21	11	11	5	13	13	11	16	145	12.1
GOTH	Gastropods		1	0	1	1	5	0	0	0	0	0	0	0	8	0.7
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	0	1	1	0	0	0	0	0	0	0	0	2	0.2
POTH	Polychaetes		2	2	1	0	0	1	1	2	2	3	1	1	16	1.3
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
OFLAT	Flatworms		0	0	0	1	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		1	1	0	0	0	0	0	0	1	0	0	0	3	0.3
	TOTAL		**128**	**110**	**109**	**93**	**209**	**92**	**121**	**140**	**83**	**136**	**128**	**80**	**1429**	**119.1**

KA April 2007

	INDICATOR SPECIES		CORE NUMBER												TOTAL	MEAN
			1	2	3	4	5	6	7	8	9	10	11	12		
	AMPHIPODS															
ACOR	*Corophiidae*		0	0	0	2	0	0	0	0	0	0	0	0	**2**	**0.2**
APHOX	*Phoxocephalidae*		0	1	0	0	0	3	0	0	0	0	0	0	**4**	**0.3**
	BIVALVES	**SIZE**														
BAB<2	*Arthritica bifurca*	<2	5	7	4	1	4	0	0	5	4	7	1	1	**39**	**3.3**
BAB>2		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	5	7	4	1	4	0	0	5	4	7	1	1	**39**	**3.3**
BAS<5	*Austrovenus stutchburyi*	<5	0	1	0	0	1	0	0	0	0	0	3	0	**5**	**0.4**
BAS>5		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BAS-COND		Cond.analysis	0	0	0	0	0	0	0	1	0	0	1	0	**2**	**0.2**
		Total	0	1	0	0	1	0	0	1	0	0	4	0	**7**	**0.6**
BML<5	*Macamona liliana*	<5	0	2	1	0	0	2	1	0	3	0	0	0	**9**	**0.8**
BML5-15		5-15	0	0	0	0	0	1	0	0	0	0	0	0	**1**	**0.1**
BML>15		>15	0	0	0	0	0	0	1	1	0	0	0	0	**2**	**0.2**
BML-COND		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	2	1	0	0	3	2	1	3	0	0	0	**12**	**1.0**
BNH<2	*Nucula hartvigiana*	<2	0	0	0	0	0	0	1	0	0	0	0	0	**1**	**0.1**
BNH>2		>2	31	49	31	43	51	56	39	71	44	52	45	48	**560**	**46.7**
		Total	31	49	31	43	51	56	40	71	44	52	45	48	**561**	**46.8**
BPA<5	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BPA5-15		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BPA>15		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BPA-COND		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	0	0	0	**0**	**0.0**
BTHL<5	*Theora lubrica*	<5	0	0	0	1	1	2	2	1	1	1	0	3	**12**	**1.0**
BTHL>5		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	1	1	2	2	1	1	1	0	3	**12**	**1.0**
	CUMACEANS															
CCL	*Colurostylis lemurum*		0	1	1	0	1	1	0	0	0	0	2	0	**6**	**0.5**
	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	1	0	0	0	1	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	1	0	0	0	0	0	**1**	**0.1**
PAGL	*Aglaophamus* sp.		0	0	0	0	1	0	2	1	0	1	0	0	**5**	**0.4**
PAO	*Aonides oxycephala*		0	0	0	0	0	0	1	0	1	0	0	0	**2**	**0.2**
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PBOC	Pseudopolydora complex		1	2	1	0	3	1	0	0	0	0	2	1	**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	1	2	1	1	0	0	0	0	0	**5**	**0.4**
PGLY	*Glycera* sp.		1	0	1	0	1	0	1	0	0	1	0	0	**5**	**0.4**
PHF	"Capitellidae"		3	1	0	1	4	1	8	4	0	1	2	0	**25**	**2.1**
PMD	*Magelona dakini*		0	1	1	0	0	2	0	3	0	0	1	3	**11**	**0.9**
PNIC	Nereidae		0	2	1	0	1	0	2	1	0	0	2	1	**10**	**0.8**
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	4	6	7	9	10	6	3	6	5	16	15	**87**	**7.3**
CCRAB	Crabs		0	0	0	0	1	0	1	0	1	0	1	0	**4**	**0.3**
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CISO	Isopods		0	1	1	0	0	0	5	4	2	2	0	1	**16**	**1.3**
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	1	0	0	2	0	0	3	0	8	0	0	**14**	**1.2**
BOTH	Bivalves		14	3	6	6	8	2	8	4	4	8	9	1	**73**	**6.1**
GOTH	Gastropods		0	0	2	0	1	2	2	0	1	0	0	0	**8**	**0.7**
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	0	2	0	0	0	1	0	1	0	0	0	**4**	**0.3**
POTH	Polychaetes		1	1	0	0	0	1	1	1	1	0	1	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	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	9	0	0	0	1	0	4	0	**14**	**1.2**
	TOTAL		**56**	**77**	**59**	**63**	**101**	**85**	**84**	**104**	**70**	**86**	**90**	**74**	**949**	**79.1**

GC October 2006

	INDICATOR SPECIES		CORE NUMBER												TOTAL	MEAN
			1	2	3	4	5	6	7	8	9	10	11	12		
	AMPHIPODS															
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	1	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<2	*Arthritica bifurca*	<2	11	3	1	0	1	1	18	3	1	1	0	11	51	4.3
BAB>2		>2	0	0	0	0	0	0	0	0	0	0	0	1	1	0.1
		Total	11	3	1	0	1	1	18	3	1	1	0	12	52	4.3
BAS<5	*Austrovenus stutchburyi*	<5	1	0	0	1	0	0	0	0	0	1	1	0	4	0.3
BAS>5		>5	0	0	1	0	0	0	0	0	0	0	0	0	1	0.1
BAS-COND		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	0	0	1	1	0	5	0.4
BML<5	*Macamona liliana*	<5	0	0	0	1	0	0	1	0	0	0	0	0	2	0.2
BML5-15		5-15	0	0	0	0	0	0	0	0	1	1	0	0	2	0.2
BML>15		>15	0	0	0	1	1	0	0	0	0	0	0	0	2	0.2
BML-COND		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	0	0	0	2	1	0	1	0	1	1	0	0	6	0.5
BNH<2	*Nucula hartvigiana*	<2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BNH>2		>2	0	0	0	0	0	0	0	0	0	1	2	1	4	0.3
		Total	0	0	0	0	0	0	0	0	0	1	2	1	4	0.3
BPA<5	*Paphies australis*	<5	11	17	5	11	12	8	5	3	10	4	2	2	90	7.5
BPA5-15		5-15	5	15	13	12	23	15	0	0	5	0	0	0	88	7.3
BPA>15		>15	0	0	0	0	0	0	1	0	0	0	0	0	1	0.1
BPA-COND		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	16	32	18	23	35	23	6	3	15	4	2	2	179	14.9
BTHL<5	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BTHL>5		>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*		5	13	0	1	5	2	8	0	0	3	1	1	39	3.3
	GASTROPODS															
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
GNHE	*Notoacmea* sp.		0	2	0	0	1	0	0	0	0	0	0	0	3	0.3
	OTHER															
OAN	*Anthopleura aureoradiata*		0	1	0	0	0	0	0	0	0	0	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*		284	115	215	72	286	227	226	256	178	270	183	305	2617	218.1
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"		12	1	0	0	1	12	23	10	2	12	9	7	89	7.4
PMD	*Magelona dakini*		1	0	0	0	0	0	1	1	0	0	0	0	3	0.3
PNIC	Nereidae		0	3	0	0	1	0	1	2	1	2	0	0	10	0.8
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	0	0	0	2	0	1	0	0	0	0	1	4	0.3
CCRAB	Crabs		0	2	5	3	1	0	0	2	3	0	0	0	16	1.3
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
CISO	Isopods		2	7	2	4	0	2	0	2	0	1	0	2	22	1.8
COST	Ostracods		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
CSHR	Shrimps/Mysids		0	0	0	2	0	0	0	0	0	0	0	0	2	0.2
COTH	Other Crustaceans		0	1	0	3	0	0	0	0	1	2	0	6	13	1.1
BOTH	Bivalves		4	16	4	2	6	9	6	3	2	8	7	5	72	6.0
GOTH	Gastropods		0	1	0	0	0	1	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	0	0	0	0	0	0	0	0.0
ONEM	Nemerteans		0	0	4	0	2	3	2	1	0	1	0	2	15	1.3
POTH	Polychaetes		13	7	9	1	10	12	7	7	16	6	8	23	119	9.9
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	1	1	1	1	2	0	1	0	1	1	9	0.8
	TOTAL		349	204	261	115	353	293	302	290	222	313	214	368	3284	273.7

GC April 2007

	INDICATOR SPECIES		CORE NUMBER												TOTAL	MEAN
			1	2	3	4	5	6	7	8	9	10	11	12		
	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<2	*Arthritica bifurca*	<2	4	14	5	0	1	2	0	47	28	5	2	3	111	9.3
BAB>2		>2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	4	14	5	0	1	2	0	47	28	5	2	3	111	9.3
BAS<5	*Austrovenus stutchburyi*	<5	7	22	10	14	8	11	15	32	19	35	30	52	255	21.3
BAS>5		>5	0	0	0	0	0	0	0	0	0	1	0	0	1	0.1
BAS-COND		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	7	22	10	14	8	11	15	32	19	36	30	52	256	21.3
BML<5	*Macamona liliana*	<5	0	1	0	1	1	0	0	0	0	0	2	3	8	0.7
BML5-15		5-15	0	0	0	0	0	0	0	0	1	0	0	0	1	0.1
BML>15		>15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BML-COND		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	0	1	0	1	1	0	0	0	1	0	2	3	9	0.8
BNH<2	*Nucula hartvigiana*	<2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BNH>2		>2	1	2	0	0	0	0	0	0	0	0	0	1	4	0.3
		Total	1	2	0	0	0	0	0	0	0	0	0	1	4	0.3
BPA<5	*Paphies australis*	<5	12	19	57	7	9	2	7	4	5	2	0	1	125	10.4
BPA5-15		5-15	1	1	1	1	1	1	0	0	3	2	0	0	11	0.9
BPA>15		>15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA-COND		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	13	20	58	8	10	3	7	4	8	4	0	1	136	11.3
BTHL<5	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BTHL>5		>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	2	2	2	1	2	8	6	8	5	13	51	4.3
	GASTROPODS															
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
GNHE	*Notoacmea* sp.		1	1	0	0	0	1	0	0	1	1	0	0	5	0.4
	OTHER															
OAN	*Anthopleura aureoradiata*		0	0	1	2	0	0	0	0	0	0	0	2	5	0.4
	POLYCHAETES															
PAA	*Aquilaspio aucklandica*		1	0	0	0	0	0	0	0	0	0	1	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*		184	139	195	175	179	234	247	135	184	218	140	190	2220	185.0
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	1	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	1	1	0	0	0	0	0	2	1	2	0	7	0.6
PHF	"Capitellidae"		5	7	4	5	6	9	3	4	2	1	11	18	75	6.3
PMD	*Magelona dakini*		0	0	0	0	1	0	1	0	1	0	0	0	3	0.3
PNIC	Nereidae		0	1	0	0	0	1	2	2	4	2	0	2	14	1.2
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	1	1	2	1	0	0	0	1	0	6	0.5
CCRAB	Crabs		0	1	0	0	0	1	0	0	0	1	0	2	5	0.4
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
CISO	Isopods		6	6	23	4	16	23	9	2	10	34	14	3	150	12.5
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		43	8	1	1	17	1	1	1	0	3	3	0	79	6.6
BOTH	Bivalves		3	13	9	3	3	4	3	12	14	18	10	62	154	12.8
GOTH	Gastropods		1	3	1	2	1	1	0	0	1	0	1	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	1	0	0	0	0	1	0	1	3	1	0	7	0.6
POTH	Polychaetes		18	5	8	27	12	13	5	12	9	12	29	16	166	13.8
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
OFLAT	Flatworms		0	0	1	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	1	1	2	2	1	0	0	1	1	1	0	10	0.8
	TOTAL		287	248	320	247	260	308	298	259	293	349	253	368	3490	290.8

TP October 2006

INDICATOR SPECIES		CORE NUMBER												TOTAL	MEAN
		1	2	3	4	5	6	7	8	9	10	11	12		
AMPHIPODS															
Corophiidae		0	0	1	0	0	0	0	0	0	0	0	0	1	0.1
Phoxocephalidae		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BIVALVES	**SIZE**														
Arthritica bifurca	<2	0	0	0	0	0	0	0	1	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	0	0	0	0	0	1	0	0	0	0	1	0.1
Austrovenus stutchburyi	<5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
	>5	0	0	1	0	0	0	0	1	0	0	0	0	2	0.2
	Cond.analysis	0	0	0	0	0	1	0	0	0	2	0	0	3	0.3
	Total	0	0	1	0	0	1	0	1	0	2	0	0	5	0.5
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
	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	0	0	0	0	0.0
Nucula hartvigiana	<2	0	1	2	0	0	0	0	0	0	0	0	0	3	0.3
	>2	8	13	8	11	6	24	14	29	16	13	10	0	152	13.8
	Total	8	14	10	11	6	24	14	29	16	13	10	0	155	14.1
Paphies australis	<5	0	2	57	17	2	0	0	0	0	1	0	0	79	7.2
	5-15	0	0	3	0	0	0	0	0	0	0	0	0	3	0.3
	>15	3	0	0	0	1	0	1	1	0	0	0	0	6	0.5
	Cond.analysis	18	4	4	11	0	22	18	14	4	9	19	12	135	12.3
	Total	21	6	64	28	3	22	19	15	4	10	19	12	223	20.3
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															
Colurostylis lemurum		2	6	1	2	2	1	2	1	1	2	0	0	20	1.8
GASTROPODS															
Cominella adspera		0	0	1	0	0	1	0	0	0	0	0	0	2	0.2
Notoacmea sp.		1	6	3	1	1	3	2	6	1	7	0	0	31	2.8
OTHER															
Anthopleura aureoradiata		0	0	0	1	0	0	0	0	0	0	0	0	1	0.1
POLYCHAETES															
Aquilaspio aucklandica		0	0	0	0	0	0	0	0	1	0	0	0	1	0.1
Aglaophamus sp.		0	0	0	0	0	0	1	1	0	0	0	0	2	0.2
Aonides oxycephala		4	0	3	3	0	1	0	1	1	1	0	0	14	1.3
Aricidea sp.		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Pseudopolydora complex		1	0	0	1	2	0	2	1	6	1	0	0	14	1.3
Cossura sp.		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Euchone sp.		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Goniada sp.		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Glycera sp.		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
"Capitellidae"		1	6	11	3	14	1	0	0	2	1	2	0	41	3.7
Magelona dakini		0	3	1	0	6	0	0	0	0	0	0	0	10	0.9
Nereidae		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Orbinia papillosa		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Paraonidae		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
NON INDICATOR SPECIES															
Amphipods		0	0	1	0	0	0	0	2	0	0	0	0	3	0.3
Crabs		0	0	0	0	1	0	2	0	0	0	0	0	3	0.3
Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Isopods		1	3	0	0	2	1	0	3	0	6	0	0	16	1.5
Ostracods		0	1	0	0	0	1	0	1	0	1	0	0	4	0.4
Shrimps/Mysids		1	0	0	0	0	0	0	0	0	0	0	0	1	0.1
Other Crustaceans		0	6	6	1	0	0	4	19	14	0	4	0	54	4.9
Bivalves		0	0	6	6	2	0	1	0	4	1	0	0	20	1.8
Gastropods		0	3	4	7	1	1	1	6	5	0	1	0	29	2.6
Fellaster zealandiae		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Holuthurians		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Nemerteans		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Polychaetes		0	3	12	15	6	0	0	0	0	1	0	0	37	3.4
Oligochaetes		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Flatworms		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Edwardsia		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Misc. Other		0	1	0	1	0	0	1	0	0	3	0	0	6	0.5
TOTAL		**40**	**58**	**125**	**80**	**46**	**57**	**49**	**87**	**55**	**49**	**36**	**12**	**694**	**57.8**

TP April 2007

	INDICATOR SPECIES		CORE NUMBER												TOTAL	MEAN
			1	2	3	4	5	6	7	8	9	10	11	12		
	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<2	*Arthritica bifurca*	<2	0	0	0	1	0	0	1	0	0	0	0	0	**2**	**0.2**
BAB>2		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	1	0	0	1	0	0	0	0	0	**2**	**0.2**
BAS<5	*Austrovenus stutchburyi*	<5	20	37	50	39	40	13	7	72	31	73	6	3	**391**	**32.6**
BAS>5		>5	2	0	0	0	2	3	3	1	0	0	0	0	**11**	**0.9**
BAS-COND		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	22	37	50	39	42	16	10	73	31	73	6	3	**402**	**33.5**
BML<5	*Macamona liliana*	<5	0	0	0	0	0	0	0	0	0	1	0	0	**1**	**0.1**
BML5-15		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BML>15		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BML-COND		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**
BNH<2	*Nucula hartvigiana*	<2	1	1	4	2	1	1	0	2	5	10	0	0	**27**	**2.3**
BNH>2		>2	22	9	5	2	16	31	22	4	3	7	22	3	**146**	**12.2**
		Total	23	10	9	4	17	32	22	6	8	17	22	3	**173**	**14.4**
BPA<5	*Paphies australis*	<5	0	3	11	51	2	2	0	3	11	3	0	0	**86**	**7.2**
BPA5-15		5-15	0	0	0	0	0	2	0	0	1	0	0	0	**3**	**0.3**
BPA>15		>15	2	0	0	0	1	2	0	1	0	0	1	0	**7**	**0.6**
BPA-COND		Cond.analysis	22	6	3	0	8	10	8	3	1	3	18	18	**100**	**8.3**
		Total	24	9	14	51	11	16	8	7	13	6	19	18	**196**	**16.3**
BTHL<5	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BTHL>5		>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	2	4	1	0	0	0	1	1	0	1	**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	1	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*		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*		1	1	6	1	3	1	0	1	0	1	0	0	**15**	**1.3**
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PBOC	Pseudopolydora complex		4	0	0	1	0	3	3	3	0	4	4	14	**36**	**3.0**
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	1	1	0	0	0	0	0	0	0	0	**2**	**0.2**
PGLY	*Glycera* sp.		0	0	0	0	0	0	2	0	0	0	0	0	**2**	**0.2**
PHF	"Capitellidae"		4	3	1	1	10	5	3	5	3	2	4	6	**47**	**3.9**
PMD	*Magelona dakini*		1	0	6	8	4	0	0	1	23	5	0	0	**48**	**4.0**
PNIC	Nereidae		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
POP	*Orbinia papillosa*		0	0	0	2	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		2	1	1	0	0	0	0	0	0	0	0	0	**4**	**0.3**
CCRAB	Crabs		0	0	0	0	0	0	0	0	0	1	0	0	**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	2	0	0	2	1	0	2	0	0	**7**	**0.6**
COST	Ostracods		0	0	0	0	0	0	0	0	1	0	0	0	**1**	**0.1**
CSHR	Shrimps/Mysids		0	0	0	0	0	0	0	2	0	1	0	0	**3**	**0.3**
COTH	Other Crustaceans		4	0	0	0	14	21	8	20	0	37	16	1	**121**	**10.1**
BOTH	Bivalves		0	0	2	6	2	2	0	2	4	2	0	0	**20**	**1.7**
GOTH	Gastropods		0	0	0	3	1	1	0	1	2	0	0	0	**8**	**0.7**
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	0	1	2	0	1	0	0	1	1	0	0	**6**	**0.5**
POTH	Polychaetes		0	3	6	0	1	1	1	3	0	1	1	0	**17**	**1.4**
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	1	0	0	0	1	0	0	2	0	0	**4**	**0.3**
	TOTAL		**85**	**65**	**100**	**126**	**106**	**99**	**61**	**125**	**88**	**157**	**73**	**46**	**1131**	**94.3**

MI July 2006

	INDICATOR SPECIES		CORE NUMBER												TOTAL	MEAN
			1	2	3	4	5	6	7	8	9	10	11	12		
	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<2	*Arthritica bifurca*	<2	8	7	25	8	7	1	0	4	10	7	9	28	**114**	**9.5**
BAB>2		>2	0	0	1	0	0	0	0	1	0	0	0	2	**4**	**0.3**
		Total	8	7	26	8	7	1	0	5	10	7	9	30	**118**	**9.8**
BAS<5	*Austrovenus stutchburyi*	<5	2	1	0	4	3	0	0	3	2	3	1	3	**22**	**1.8**
BAS>5		>5	1	10	3	3	5	1	0	5	3	2	3	4	**40**	**3.3**
BAS-COND		Cond.analysis	0	0	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
		Total	3	11	4	7	8	1	0	8	5	5	4	7	**63**	**5.3**
BML<5	*Macamona liliana*	<5	1	0	0	1	0	0	0	1	3	1	2	1	**10**	**0.8**
BML5-15		5-15	0	0	0	0	0	1	1	2	1	2	0	1	**8**	**0.7**
BML>15		>15	1	1	1	0	0	0	1	0	0	0	2	0	**6**	**0.5**
BML-COND		Cond.analysis	0	0	0	0	0	0	0	1	0	0	0	0	**1**	**0.1**
		Total	2	1	1	1	0	1	2	4	4	3	4	2	**25**	**2.1**
BNH<2	*Nucula hartvigiana*	<2	0	2	0	0	0	0	0	1	0	2	0	0	**5**	**0.4**
BNH>2		>2	0	1	1	1	0	0	0	0	0	0	0	1	**4**	**0.3**
		Total	0	3	1	1	0	0	0	1	0	2	0	1	**9**	**0.8**
BPA<5	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BPA5-15		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BPA>15		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BPA-COND		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	0	0	0	**0**	**0.0**
BTHL<5	*Theora lubrica*	<5	0	0	0	0	1	0	0	0	0	0	0	0	**1**	**0.1**
BTHL>5		>5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	0	1	0	0	0	0	0	0	0	**1**	**0.1**
	CUMACEANS															
CCL	*Colurostylis lemurum*		11	6	4	5	6	6	8	4	8	1	8	11	**78**	**6.5**
	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	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*		0	1	3	7	0	0	1	1	1	1	0	3	**18**	**1.5**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		3	1	5	9	1	4	17	4	11	4	53	22	**134**	**11.2**
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PBOC	Pseudopolydora complex		1	1	0	2	0	7	0	2	0	5	1	2	**21**	**1.8**
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	1	0	1	1	0	1	0	1	1	0	0	**6**	**0.5**
PHF	"Capitellidae"		4	2	1	8	1	3	1	1	13	12	2	2	**50**	**4.2**
PMD	*Magelona dakini*		0	0	4	3	0	0	1	0	5	4	0	0	**17**	**1.4**
PNIC	Nereidae		2	0	3	1	2	2	1	1	1	0	2	3	**18**	**1.5**
POP	*Orbinia papillosa*		3	6	2	2	3	2	4	5	8	13	1	6	**55**	**4.6**
PPAR	Paraonidae		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
	NON INDICATOR SPECIES															
CAMPH	Amphipods		1	2	1	0	1	1	1	3	1	0	5	2	**18**	**1.5**
CCRAB	Crabs		1	3	1	0	0	0	0	0	2	0	0	1	**8**	**0.7**
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	1	0	2	1	**7**	**0.6**
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	1	3	0	3	3	3	13	**26**	**2.2**
BOTH	Bivalves		27	24	23	23	18	8	11	21	27	33	11	21	**247**	**20.6**
GOTH	Gastropods		0	0	0	0	0	1	0	0	0	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	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
ONEM	Nemerteans		1	0	1	1	0	0	0	1	2	2	0	1	**9**	**0.8**
POTH	Polychaetes		7	4	5	16	4	5	9	1	5	14	7	11	**88**	**7.3**
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	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		5	0	0	0	0	5	0	0	0	0	0	0	**10**	**0.8**
	TOTAL		**80**	**75**	**85**	**95**	**53**	**48**	**62**	**62**	**108**	**111**	**113**	**139**	**1031**	**85.9**

MI October 2006

	INDICATOR SPECIES		CORE NUMBER												TOTAL	MEAN
			1	2	3	4	5	6	7	8	9	10	11	12		
	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	0	0	0	0	0	0	0	**1**	**0.1**
	BIVALVES	**SIZE**														
BAB<2	*Arthritica bifurca*	<2	1	9	3	10	6	4	3	11	19	5	29	6	**106**	**8.8**
BAB>2		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	1	9	3	10	6	4	3	11	19	5	29	6	**106**	**8.8**
BAS<5	*Austrovenus stutchburyi*	<5	0	0	0	0	0	1	0	1	1	3	0	0	**6**	**0.5**
BAS>5		>5	1	1	5	5	0	2	1	1	4	4	0	0	**24**	**2.0**
BAS-COND		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	1	1	5	5	0	3	1	2	5	7	0	0	**30**	**2.5**
BML<5	*Macamona liliana*	<5	2	3	0	0	0	0	0	1	2	2	3	0	**13**	**1.1**
BML5-15		5-15	0	1	0	0	1	0	0	0	2	1	0	0	**5**	**0.4**
BML>15		>15	0	1	0	1	1	0	0	0	2	0	0	1	**6**	**0.5**
BML-COND		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	2	5	0	1	2	0	0	1	6	3	3	1	**24**	**2.0**
BNH<2	*Nucula hartvigiana*	<2	0	0	0	0	0	0	1	1	0	0	0	0	**2**	**0.2**
BNH>2		>2	0	0	0	0	1	0	0	0	0	0	0	0	**1**	**0.1**
		Total	0	0	0	0	1	0	1	1	0	0	0	0	**3**	**0.3**
BPA<5	*Paphies australis*	<5	1	0	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
BPA5-15		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BPA>15		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BPA-COND		Cond.analysis	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**
BTHL<5	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BTHL>5		>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	2	2	2	0	0	1	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	1	0	0	0	0	1	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*		1	2	8	6	6	2	1	2	5	7	4	18	**62**	**5.2**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		4	2	8	6	2	1	7	9	4	9	23	68	**143**	**11.9**
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PBOC	Pseudopolydora complex		0	0	2	1	0	1	0	0	2	2	1	2	**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	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	10	21	25	4	13	5	4	4	9	5	6	**109**	**9.1**
PMD	*Magelona dakini*		0	4	1	2	2	0	0	0	3	0	0	0	**12**	**1.0**
PNIC	Nereidae		7	2	0	2	1	1	2	1	3	0	1	0	**20**	**1.7**
POP	*Orbinia papillosa*		6	0	1	3	5	27	2	5	6	2	5	1	**63**	**5.3**
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	2	4	2	1	3	1	7	4	4	**31**	**2.6**
CCRAB	Crabs		1	0	1	1	1	0	0	3	0	0	1	2	**10**	**0.8**
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CISO	Isopods		2	0	0	2	1	0	0	0	0	3	1	5	**14**	**1.2**
COST	Ostracods		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CSHR	Shrimps/Mysids		0	0	4	0	9	1	1	1	0	0	0	0	**16**	**1.3**
COTH	Other Crustaceans		0	2	0	0	0	5	0	4	2	1	7	13	**34**	**2.8**
BOTH	Bivalves		2	0	0	0	4	0	1	2	0	0	0	0	**9**	**0.8**
GOTH	Gastropods		0	0	0	1	1	2	0	0	0	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	3	3	0	0	1	2	0	1	3	4	4	**21**	**1.8**
POTH	Polychaetes		3	4	8	10	6	1	2	2	2	1	10	14	**63**	**5.3**
OOLIG	Oligochaetes		1	1	0	1	0	0	0	0	0	0	0	0	**3**	**0.3**
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	0	0	0	0	0	1	0	1	**3**	**0.3**
	TOTAL		**37**	**48**	**66**	**78**	**57**	**67**	**31**	**51**	**63**	**61**	**100**	**145**	**804**	**67.0**

MI January 2007

	INDICATOR SPECIES		CORE NUMBER												TOTAL	MEAN
			1	2	3	4	5	6	7	8	9	10	11	12		
	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<2	*Arthritica bifurca*	<2	0	3	0	13	2	11	0	2	1	2	7	4	45	3.8
BAB>2		>2	0	0	0	1	0	0	0	0	0	0	0	0	1	0.1
		Total	0	3	0	14	2	11	0	2	1	2	7	4	46	3.8
BAS<5	*Austrovenus stutchburyi*	<5	1	2	1	3	0	4	1	4	2	5	2	3	28	2.3
BAS>5		>5	1	0	4	8	5	1	1	0	2	1	0	1	24	2.0
BAS-COND		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	2	2	5	11	5	5	2	4	4	6	2	4	52	4.3
BML<5	*Macamona liliana*	<5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BML5-15		5-15	0	1	1	0	0	0	0	0	1	0	1	0	4	0.3
BML>15		>15	0	1	0	1	0	0	0	0	0	0	0	0	2	0.2
BML-COND		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	0	2	1	1	0	0	0	0	1	0	1	0	6	0.5
BNH<2	*Nucula hartvigiana*	<2	0	0	0	2	0	0	0	0	2	1	0	2	7	0.6
BNH>2		>2	0	0	0	0	0	0	0	0	0	0	0	2	2	0.2
		Total	0	0	0	2	0	0	0	0	2	1	0	4	9	0.8
BPA<5	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA5-15		5-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA>15		>15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA-COND		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	0	0	0	0	0.0
BTHL<5	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BTHL>5		>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	0	0	2	1	1	0	0	2	3	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	0	0	0	0	0	0	0	0.0
	POLYCHAETES															
PAA	*Aquilaspio aucklandica*		17	10	24	19	10	29	12	27	14	8	7	11	188	15.7
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PAO	*Aonides oxycephala*		8	4	13	13	4	5	31	7	16	7	20	9	137	11.4
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	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	2	0	1	1	0	0	0	0	1	1	0	6	0.5
PHF	"Capitellidae"		3	3	16	17	7	1	9	3	5	7	5	7	83	6.9
PMD	*Magelona dakini*		0	1	2	1	0	0	0	0	0	3	0	1	8	0.7
PNIC	Nereidae		1	2	1	2	2	1	0	1	0	4	2	2	18	1.5
POP	*Orbinia papillosa*		1	5	1	3	4	2	1	2	7	8	3	2	39	3.3
PPAR	Paraonidae		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
	NON INDICATOR SPECIES															
CAMPH	Amphipods		0	1	0	0	1	3	1	2	0	1	0	0	9	0.8
CCRAB	Crabs		0	1	2	4	0	1	0	1	1	0	0	0	10	0.8
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
CISO	Isopods		0	0	0	2	0	1	0	2	1	3	0	0	9	0.8
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	1	0	0	0	0	0	0	1	0.1
COTH	Other Crustaceans		0	3	0	3	0	3	0	3	36	0	0	2	50	4.2
BOTH	Bivalves		3	3	3	0	4	2	0	2	3	3	1	7	31	2.6
GOTH	Gastropods		0	0	0	0	1	0	1	0	2	1	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	1	4	1	1	0	0	0	1	0	0	3	11	0.9
POTH	Polychaetes		1	0	11	8	1	0	9	2	14	0	0	0	46	3.8
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		37	44	83	102	43	67	67	59	108	55	52	59	776	64.7

MI April 2007

	INDICATOR SPECIES		CORE NUMBER												TOTAL	MEAN
			1	2	3	4	5	6	7	8	9	10	11	12		
	AMPHIPODS															
ACOR	*Corophiidae*		0	0	0	0	0	0	0	1	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<2	*Arthritica bifurca*	<2	6	3	2	2	0	6	10	13	2	10	8	9	71	5.9
BAB>2		>2	0	0	0	0	0	0	0	0	0	0	0	1	1	0.1
		Total	6	3	2	2	0	6	10	13	2	10	8	10	72	6.0
BAS<5	*Austrovenus stutchburyi*	<5	5	0	4	1	0	6	2	1	2	10	2	0	33	2.8
BAS>5		>5	1	1	3	1	2	0	0	0	8	10	4	0	30	2.5
BAS-COND		Cond.analysis	0	0	0	0	0	0	0	1	0	0	0	0	1	0.1
		Total	6	1	7	2	2	6	2	2	10	20	6	0	64	5.3
BML<5	*Macamona liliana*	<5	0	2	1	0	1	0	1	0	2	1	1	0	9	0.8
BML5-15		5-15	0	0	1	0	2	0	0	0	0	0	0	0	3	0.3
BML>15		>15	0	0	1	0	0	0	0	0	0	0	0	0	1	0.1
BML-COND		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	0	2	3	0	3	0	1	0	2	1	1	0	13	1.1
BNH<2	*Nucula hartvigiana*	<2	1	1	0	0	0	1	0	0	0	0	1	1	5	0.4
BNH>2		>2	0	2	0	0	1	0	0	0	0	0	0	0	3	0.3
		Total	1	3	0	0	1	1	0	0	0	0	1	1	8	0.7
BPA<5	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA5-15		5-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA>15		>15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA-COND		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	0	0	0	0	0.0
BTHL<5	*Theora lubrica*	<5	0	0	1	1	0	0	0	0	0	0	0	0	2	0.2
BTHL>5		>5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	0	0	1	1	0	0	0	0	0	0	0	0	2	0.2
	CUMACEANS															
CCL	*Colurostylis lemurum*		2	2	0	0	3	4	3	2	3	1	0	1	21	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*		1	0	0	0	0	0	1	0	0	0	0	0	2	0.2
	POLYCHAETES															
PAA	*Aquilaspio aucklandica*		6	12	8	10	3	6	10	5	5	3	2	2	72	6.0
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PAO	*Aonides oxycephala*		17	27	13	23	13	16	8	6	4	6	9	1	143	11.9
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PBOC	Pseudopolydora complex		0	1	0	1	0	0	1	0	1	0	0	1	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.		1	0	0	1	1	0	1	0	0	0	1	0	5	0.4
PHF	"Capitellidae"		1	1	5	3	5	12	1	0	34	19	5	0	86	7.2
PMD	*Magelona dakini*		0	0	0	0	1	3	0	0	3	2	1	0	10	0.8
PNIC	Nereidae		3	3	2	1	3	2	8	4	7	5	8	0	46	3.8
POP	*Orbinia papillosa*		1	4	1	2	6	7	5	7	3	0	3	1	40	3.3
PPAR	Paraonidae		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
	NON INDICATOR SPECIES															
CAMPH	Amphipods		10	0	4	4	10	3	4	6	18	3	8	1	71	5.9
CCRAB	Crabs		0	0	0	0	0	1	0	0	1	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	2	0	4	1	0	0	0	8	0	1	16	1.3
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	1	0	0	0	0	0	0	1	0.1
COTH	Other Crustaceans		1	1	1	2	103	26	6	130	1	9	35	5	320	26.7
BOTH	Bivalves		2	1	1	6	13	14	3	1	6	4	6	2	59	4.9
GOTH	Gastropods		0	0	0	0	1	0	0	0	1	0	0	2	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		1	4	1	1	1	3	0	0	5	0	1	0	17	1.4
POTH	Polychaetes		4	4	3	4	9	13	3	5	11	4	10	2	72	6.0
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		63	69	54	63	182	125	67	182	117	95	105	30	1152	96.0

KB July 2006

	INDICATOR SPECIES		CORE NUMBER												TOTAL	MEAN
			1	2	3	4	5	6	7	8	9	10	11	12		
	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	0	0	2	1	0	1	0	5	0.4
	BIVALVES	**SIZE**														
BAB<2	*Arthritica bifurca*	<2	3	4	1	3	1	6	3	3	4	2	1	0	31	2.6
BAB>2		>2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	3	4	1	3	1	6	3	3	4	2	1	0	31	2.6
BAS<5	*Austrovenus stutchburyi*	<5	0	0	0	1	0	2	2	0	1	4	0	0	10	0.8
BAS>5		>5	2	5	2	2	1	9	3	3	7	4	3	5	46	3.8
BAS-COND		Cond.analysis	0	0	0	1	1	1	1	1	0	0	1	3	9	0.8
		Total	2	5	2	4	2	12	6	4	8	8	4	8	65	5.4
BML<5	*Macamona liliana*	<5	0	1	0	0	0	0	2	0	1	0	1	0	5	0.4
BML5-15		5-15	0	1	0	0	0	2	0	0	0	0	0	0	3	0.3
BML>15		>15	0	0	0	0	0	0	0	0	1	0	0	0	1	0.1
BML-COND		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	0	2	0	0	0	2	2	0	2	0	1	0	9	0.8
BNH<2	*Nucula hartvigiana*	<2	0	0	0	0	0	1	0	0	0	0	0	0	1	0.1
BNH>2		>2	0	1	0	0	0	0	1	0	0	0	2	0	4	0.3
		Total	0	1	0	0	0	1	1	0	0	0	2	0	5	0.4
BPA<5	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	1	0	0	1	0.1
BPA5-15		5-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA>15		>15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA-COND		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
BTHL<5	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BTHL>5		>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	2	1	1	0	0	0	0	0	0	5	0.4
	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	1	0	0	0	0	1	0	3	0.3
	POLYCHAETES															
PAA	*Aquilaspio aucklandica*		3	1	0	0	0	0	1	1	0	2	0	1	9	0.8
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PAO	*Aonides oxycephala*		0	0	15	6	2	2	1	0	2	0	0	0	28	2.3
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PBOC	Pseudopolydora complex		0	0	3	5	1	3	0	0	1	0	0	0	13	1.1
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	1	0	2	0	2	0	0	1	0	0	0	7	0.6
PHF	"Capitellidae"		35	128	103	61	21	59	55	71	148	92	35	26	834	69.5
PMD	*Magelona dakini*		7	13	5	1	8	8	7	8	8	14	2	7	88	7.3
PNIC	Nereidae		7	5	2	6	3	6	9	3	2	1	2	3	49	4.1
POP	*Orbinia papillosa*		0	0	0	1	0	1	1	0	0	0	0	0	3	0.3
PPAR	Paraonidae		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
	NON INDICATOR SPECIES															
CAMPH	Amphipods		2	2	9	2	7	3	3	7	7	6	3	0	51	4.3
CCRAB	Crabs		0	0	1	1	1	2	3	1	0	0	1	1	11	0.9
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	0	0	0	0	0	0	0	0	0	0	0	0	0.0
COTH	Other Crustaceans		0	0	0	0	0	2	0	1	1	0	0	0	4	0.3
BOTH	Bivalves		1	1	0	0	0	3	0	0	0	0	0	0	5	0.4
GOTH	Gastropods		1	0	0	0	1	2	0	0	1	2	2	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		1	0	4	0	2	1	1	2	3	9	0	0	23	1.9
POTH	Polychaetes		1	0	2	3	1	3	0	1	3	2	2	1	19	1.6
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	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		65	164	148	98	51	120	93	105	192	139	57	47	1279	106.6

KB October 2006

	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<2	*Arthritica bifurca*	<2	1	1	0	1	4	4	5	1	0	0	0	2	19	1.6
BAB>2		>2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	1	1	0	1	4	4	5	1	0	0	0	2	19	1.6
BAS<5	*Austrovenus stutchburyi*	<5	0	0	0	0	1	0	0	0	0	0	2	0	3	0.3
BAS>5		>5	7	0	7	4	5	5	4	3	3	7	4	7	56	4.7
BAS-COND		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	7	0	7	4	6	5	4	3	3	7	6	7	59	4.9
BML<5	*Macamona liliana*	<5	0	0	0	0	1	0	0	0	0	0	2	3	6	0.5
BML5-15		5-15	0	0	0	2	0	0	0	1	0	0	0	0	3	0.3
BML>15		>15	0	0	0	0	0	0	0	0	1	0	0	0	1	0.1
BML-COND		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	0	0	0	2	1	0	0	1	1	0	2	3	10	0.8
BNH<2	*Nucula hartvigiana*	<2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BNH>2		>2	0	0	1	0	0	0	0	0	0	0	0	1	2	0.2
		Total	0	0	1	0	0	0	0	0	0	0	0	1	2	0.2
BPA<5	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA5-15		5-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA>15		>15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA-COND		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	0	0	0	0	0.0
BTHL<5	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BTHL>5		>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	1	0	0	0	1	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	1	0	0	0	0	0	1	0.1
	POLYCHAETES															
PAA	*Aquilaspio aucklandica*		6	1	1	0	3	2	0	1	0	1	1	6	22	1.8
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PAO	*Aonides oxycephala*		0	6	14	1	5	1	1	0	1	0	0	0	29	2.4
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PBOC	Pseudopolydora complex		2	0	1	0	1	2	1	0	2	0	0	1	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.		2	2	2	1	3	1	2	1	1	3	2	0	20	1.7
PHF	"Capitellidae"		19	96	46	123	66	95	28	83	90	147	105	41	939	78.3
PMD	*Magelona dakini*		3	4	3	9	0	3	3	6	6	11	15	4	67	5.6
PNIC	Nereidae		1	3	2	0	1	3	5	4	3	0	2	3	27	2.3
POP	*Orbinia papillosa*		0	0	4	0	1	0	0	0	0	0	0	0	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	1	0	0	0	0	1	0.1
CCRAB	Crabs		2	2	1	2	0	4	4	1	1	3	0	1	21	1.8
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
CISO	Isopods		0	0	1	0	0	1	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	0	2	0	0	0	0	1	0	0	3	0.3
COTH	Other Crustaceans		0	0	0	1	0	0	0	1	0	0	1	0	3	0.3
BOTH	Bivalves		2	1	1	0	0	0	3	3	0	0	1	1	12	1.0
GOTH	Gastropods		3	1	0	0	0	0	1	0	1	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	0	1	0	2	1	1	0	2	0	0	8	0.7
POTH	Polychaetes		0	1	2	0	0	1	0	0	4	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		**49**	**118**	**87**	**145**	**93**	**124**	**60**	**107**	**113**	**176**	**136**	**70**	**1278**	**106.5**

KB January 2007

	INDICATOR SPECIES		CORE NUMBER												TOTAL	MEAN
			1	2	3	4	5	6	7	8	9	10	11	12		
	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<2	*Arthritica bifurca*	<2	0	1	3	6	21	20	16	11	9	1	4	8	100	8.3
BAB>2		>2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	0	1	3	6	21	20	16	11	9	1	4	8	100	8.3
BAS<5	*Austrovenus stutchburyi*	<5	0	0	0	0	0	1	1	0	1	0	0	0	3	0.3
BAS>5		>5	7	7	2	6	8	3	12	10	2	9	2	10	78	6.5
BAS-COND		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	7	7	2	6	8	4	13	10	3	9	2	10	81	6.8
BML<5	*Macamona liliana*	<5	0	0	0	0	0	0	0	1	0	1	0	0	2	0.2
BML5-15		5-15	0	1	0	1	0	1	2	1	0	0	0	0	6	0.5
BML>15		>15	0	0	0	1	0	0	0	0	0	0	0	0	1	0.1
BML-COND		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	0	1	0	2	0	1	2	2	0	1	0	0	9	0.8
BNH<2	*Nucula hartvigiana*	<2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BNH>2		>2	0	3	0	0	0	0	1	0	1	0	0	1	6	0.5
		Total	0	3	0	0	0	0	1	0	1	0	0	1	6	0.5
BPA<5	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA5-15		5-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA>15		>15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA-COND		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	0	0	0	0	0.0
BTHL<5	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BTHL>5		>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	2	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.		1	0	0	0	0	0	0	0	0	0	0	0	1	0.1
	OTHER															
OAN	*Anthopleura aureoradiata*		0	2	1	1	1	1	0	0	0	0	0	0	6	0.5
	POLYCHAETES															
PAA	*Aquilaspio aucklandica*		0	1	0	0	1	1	0	0	1	0	2	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*		1	1	29	0	2	0	0	3	1	0	1	0	38	3.2
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PBOC	Pseudopolydora complex		0	0	0	1	0	0	1	3	0	1	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.		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PGLY	*Glycera* sp.		0	3	1	0	3	1	4	4	2	4	0	1	23	1.9
PHF	"Capitellidae"		10	16	36	13	45	33	73	13	100	79	11	32	461	38.4
PMD	*Magelona dakini*		4	5	0	0	2	2	10	4	6	6	2	7	48	4.0
PNIC	Nereidae		2	1	0	0	2	2	3	4	1	1	1	4	21	1.8
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	0	1	0	0	1	0	0	0	1	4	0.3
CCRAB	Crabs		0	0	0	0	1	1	1	0	0	0	0	1	4	0.3
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
CISO	Isopods		2	1	0	1	0	1	0	0	0	0	0	1	6	0.5
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	0	0	0	0	1	0.1
COTH	Other Crustaceans		1	1	2	2	0	1	3	0	0	0	0	0	10	0.8
BOTH	Bivalves		0	2	0	0	1	4	0	2	1	3	0	1	14	1.2
GOTH	Gastropods		0	0	0	0	1	1	1	1	0	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	1	1	0	0	0	0	0	0	0	1	3	0.3
POTH	Polychaetes		0	0	0	1	1	0	0	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	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
	TOTAL		28	46	76	34	90	73	128	58	125	105	25	68	856	71.3

KB April 2007

	INDICATOR SPECIES		CORE NUMBER												TOTAL	MEAN
			1	2	3	4	5	6	7	8	9	10	11	12		
	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	0	0	1	2	0.2
	BIVALVES	**SIZE**														
BAB<2	*Arthritica bifurca*	<2	4	1	1	9	5	8	7	8	1	3	0	2	49	4.1
BAB>2		>2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	4	1	1	9	5	8	7	8	1	3	0	2	49	4.1
BAS<5	*Austrovenus stutchburyi*	<5	7	9	5	11	4	19	14	7	10	5	8	9	108	9.0
BAS>5		>5	1	3	1	0	2	6	4	4	3	3	2	8	37	3.1
BAS-COND		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	8	12	6	11	6	25	18	11	13	8	10	17	145	12.1
BML<5	*Macamona liliana*	<5	0	0	0	0	0	5	1	0	0	0	1	1	8	0.7
BML5-15		5-15	0	0	1	2	0	1	0	1	0	1	1	0	7	0.6
BML>15		>15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BML-COND		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	0	0	1	2	0	6	1	1	0	1	2	1	15	1.3
BNH<2	*Nucula hartvigiana*	<2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BNH>2		>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<5	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA5-15		5-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA>15		>15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA-COND		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	0	0	0	0	0.0
BTHL<5	*Theora lubrica*	<5	0	0	2	0	0	0	0	0	0	1	0	0	3	0.3
BTHL>5		>5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	0	0	2	0	0	0	0	0	0	1	0	0	3	0.3
	CUMACEANS															
CCL	*Colurostylis lemurum*		0	0	0	0	0	0	0	1	0	0	1	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	0	0	3	1	0	2	0	0	0	0	6	0.5
	POLYCHAETES															
PAA	*Aquilaspio aucklandica*		0	1	0	4	1	1	2	1	1	0	2	0	13	1.1
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PAO	*Aonides oxycephala*		1	0	0	3	1	1	0	0	2	0	1	1	10	0.8
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PBOC	Pseudopolydora complex		1	0	0	1	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	1	2	0	1	1	1	0	0	1	0	8	0.7
PHF	"Capitellidae"		32	54	58	12	29	26	35	49	35	58	31	37	456	38.0
PMD	*Magelona dakini*		5	7	3	0	2	0	3	1	1	6	2	4	34	2.8
PNIC	Nereidae		1	0	0	1	0	4	1	1	0	1	0	3	12	1.0
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	0	0	0	0	0	0	0	0	0	1	0.1
CCRAB	Crabs		0	0	0	0	0	1	1	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	0	0	2	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		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
COTH	Other Crustaceans		0	1	1	0	1	3	0	0	0	0	0	0	6	0.5
BOTH	Bivalves		3	1	1	0	0	0	1	0	0	0	2	0	8	0.7
GOTH	Gastropods		0	0	0	0	0	2	0	1	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	1	0	1	2	1	0	0	0	0	0	0	5	0.4
POTH	Polychaetes		0	0	0	4	2	0	0	0	0	0	0	0	6	0.5
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	1	0	0	0	1	0	0	1	0	0	0	3	0.3
	TOTAL		**57**	**79**	**75**	**50**	**52**	**83**	**70**	**77**	**57**	**78**	**52**	**67**	**797**	**66.4**

Appendix 2 - Whaingaroa Harbour species/taxonomic group abundances

TU October 2006

			CORE NUMBER												TOTAL	MEAN
			1	2	3	4	5	6	7	8	9	10	11	12		
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
APHOX	*Phoxocephalidae*		0	0	1	0	1	2	2	0	0	1	0	0	7	0.6
		SIZE														
BAB<2	*Arthritica bifurca*	<2	1	0	15	13	2	12	6	3	2	13	10	12	89	7.4
BAB>2		>2	0	0	0	0	0	0	0	0	0	1	1	0	2	0.2
		Total	1	0	15	13	2	12	6	3	2	14	11	12	91	7.6
BAS<5	*Austrovenus stutchburyi*	<5	12	22	48	35	23	7	69	45	30	30	25	30	376	31.3
BAS>5		>5	29	30	15	22	20	23	29	30	44	50	31	36	359	29.9
BAS-COND		Cond.analysis	0	0	0	0	0	0	0	0	1	0	1	3	5	0.4
		Total	41	52	63	57	43	30	98	75	74	80	56	66	735	61.3
BML<5	*Macamona liliana*	<5	6	0	2	0	1	1	2	1	0	3	2	1	19	1.6
BML5-15		5-15	2	0	0	1	1	0	0	2	6	0	1	0	13	1.1
BML>15		>15	3	2	4	4	4	1	2	3	2	2	1	3	31	2.6
BML-COND		Cond.analysis	0	3	0	0	0	0	0	0	0	0	0	0	3	0.3
		Total	11	2	6	5	6	2	4	6	8	5	4	4	63	5.3
BNH<2	*Nucula hartvigiana*	<2	3	3	10	3	3	3	4	7	5	4	8	9	62	5.2
BNH>2		>2	50	70	48	45	29	36	47	33	42	52	48	17	517	43.1
		Total	53	73	58	48	32	39	51	40	47	56	56	26	579	48.3
BPA<5	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA5-15		5-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA>15		>15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA-COND		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	0	0	0	0	0.0
BTHL<5	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BTHL>5		>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
CCL	*Colurostylis lemurum*		1	6	0	7	0	4	3	3	1	7	2	0	34	2.8
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
GNHE	*Notoacmea* sp.		14	15	19	20	13	8	5	12	8	20	14	8	156	13.0
OAN	*Anthopleura aureoradiata*		2	0	1	0	0	0	1	2	1	6	2	4	19	1.6
PAA	*Aquilaspio aucklandica*		5	7	5	23	6	4	11	5	4	8	6	19	103	8.6
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	1	0	0	0	1	0.1
PAO	*Aonides oxycephala*		31	18	0	17	1	30	5	0	0	0	0	0	102	8.5
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	0	0	0	0	1	1	0.1
PBOC	Pseudopolydora complex		0	0	0	1	1	0	0	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.		0	0	0	0	0	0	1	2	0	2	2	1	8	0.7
PHF	"Capitellidae"		11	5	18	12	9	3	8	12	3	14	6	11	112	9.3
PMD	*Magelona dakini*		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PNIC	Nereidae		0	0	5	4	1	5	1	1	2	4	2	6	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	0	0	0	0	0	0	0	0	0	0	0	0.0
CAMPH	Amphipods		1	1	0	1	0	1	0	0	1	4	1	0	10	0.8
CCRAB	Crabs		2	0	5	1	2	0	0	1	1	0	3	3	18	1.5
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	0	1	0	0	1	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	0	1	0	0	0	0	0	0	1	0.1
COTH	Other Crustaceans		3	2	0	0	0	1	0	0	0	0	0	0	6	0.5
BOTH	Bivalves		2	0	1	0	0	1	1	0	1	0	1	0	7	0.6
GOTH	Gastropods		9	16	16	7	15	4	6	15	8	19	16	5	136	11.3
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	3	0	0	1	0	1	0	0	1	0	0	8	0.7
POTH	Polychaetes		2	0	1	5	1	1	3	3	1	1	1	5	24	2.0
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	1	0	0	0	1	0	1	1	0	4	8	0.7
			191	200	215	222	134	148	208	181	164	243	184	176	2266	188.8

TU April 2007

	INDICATOR SPECIES		CORE NUMBER												TOTAL	MEAN
			1	2	3	4	5	6	7	8	9	10	11	12		
	AMPHIPODS															
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
APHOX	*Phoxocephalidae*		0	3	0	0	0	1	2	0	1	0	1	1	9	0.8
	BIVALVES	**SIZE**														
BAB<2	*Arthritica bifurca*	<2	12	1	2	0	4	1	2	1	1	1	1	4	30	2.5
BAB>2		>2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	12	1	2	0	4	1	2	1	1	1	1	4	30	2.5
BAS<5	*Austrovenus stutchburyi*	<5	18	10	8	1	9	24	10	10	7	4	8	25	134	11.2
BAS>5		>5	41	41	27	25	38	28	27	35	26	34	16	31	369	30.8
BAS-COND		Cond.analysis	0	1	0	1	1	3	1	0	0	0	5	0	12	1.0
		Total	59	52	35	27	48	55	38	45	33	38	29	56	515	42.9
BML<5	*Macamona liliana*	<5	0	0	2	0	1	1	0	1	3	1	3	0	12	1.0
BML5-15		5-15	0	0	1	1	0	0	2	0	1	1	0	0	6	0.5
BML>15		>15	4	2	3	2	5	2	2	1	2	2	1	4	30	2.5
BML-COND		Cond.analysis	0	0	0	1	0	0	0	0	0	0	0	0	1	0.1
		Total	4	2	6	4	6	3	4	2	6	4	4	4	49	4.1
BNH<2	*Nucula hartvigiana*	<2	3	5	6	3	6	3	5	5	4	5	3	8	56	4.7
BNH>2		>2	40	27	35	25	28	46	26	17	46	18	31	34	373	31.1
		Total	43	32	41	28	34	49	31	22	50	23	34	42	429	35.8
BPA<5	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA5-15		5-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA>15		>15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA-COND		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	0	0	0	0	0.0
BTHL<5	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BTHL>5		>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	1	3	0	3	0	0	4	0	0	2	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.		12	12	18	13	4	11	5	14	5	11	10	2	117	9.8
	OTHER															
OAN	*Anthopleura aureoradiata*		5	4	5	1	5	5	1	2	0	3	0	0	31	2.6
	POLYCHAETES															
PAA	*Aquilaspio aucklandica*		24	10	10	7	8	11	6	9	9	16	5	11	126	10.5
PAGL	*Aglaophamus* sp.		0	0	0	1	0	0	0	0	0	0	0	0	1	0.1
PAO	*Aonides oxycephala*		1	4	3	13	0	0	0	0	15	39	1	0	76	6.3
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PBOC	Pseudopolydora complex		0	2	0	0	1	0	0	1	2	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.		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PGLY	*Glycera* sp.		1	1	0	0	1	0	2	0	1	0	0	0	6	0.5
PHF	"Capitellidae"		21	9	7	2	3	11	9	13	5	3	3	15	101	8.4
PMD	*Magelona dakini*		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PNIC	Nereidae		4	0	2	1	2	2	4	0	2	3	6	3	29	2.4
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		0	0	1	1	1	1	0	1	0	2	1	0	8	0.7
CCRAB	Crabs		0	0	1	0	1	1	1	2	0	2	0	1	9	0.8
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
CISO	Isopods		1	1	0	1	0	0	0	0	0	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		1	0	0	0	0	0	0	0	0	0	0	0	1	0.1
BOTH	Bivalves		0	0	1	0	2	1	1	0	0	0	0	0	5	0.4
GOTH	Gastropods		9	4	14	10	3	7	4	12	8	4	9	2	86	7.2
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		0	1	1	0	0	0	0	1	1	0	0	1	5	0.4
POTH	Polychaetes		0	0	3	1	1	0	1	0	0	0	1	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	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		2	1	2	1	1	1	2	2	2	0	1	0	15	1.3
	TOTAL		200	141	153	114	125	163	113	127	145	149	106	144	1680	140.0

HB October 2006

			CORE NUMBER												TOTAL	MEAN
			1	2	3	4	5	6	7	8	9	10	11	12		
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
APHOX	*Phoxocephalidae*		4	3	0	4	1	1	6	2	5	2	4	5	37	3.1
		SIZE														
BAB<2	*Arthritica bifurca*	<2	8	23	11	20	18	11	11	10	10	20	23	25	190	15.8
BAB>2		>2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	8	23	11	20	18	11	11	10	10	20	23	25	190	15.8
BAS<5	*Austrovenus stutchburyi*	<5	10	8	7	11	6	0	5	9	4	9	6	15	90	7.5
BAS>5		>5	0	6	5	0	4	6	1	1	0	1	1	0	25	2.1
BAS-COND		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	10	14	12	11	10	6	6	10	4	10	7	15	115	9.6
BML<5	*Macamona liliana*	<5	2	0	2	4	3	2	1	0	0	1	1	1	17	1.4
BML5-15		5-15	0	0	0	0	0	0	0	1	0	0	0	0	1	0.1
BML>15		>15	1	0	1	0	0	0	0	0	0	0	0	0	2	0.2
BML-COND		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	3	0	3	4	3	2	1	1	0	1	1	1	20	1.7
BNH<2	*Nucula hartvigiana*	<2	0	0	0	0	1	0	0	0	0	0	0	0	1	0.1
BNH>2		>2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	0	0	0	0	1	0	0	0	0	0	0	0	1	0.1
BPA<5	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA5-15		5-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA>15		>15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA-COND		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	0	0	0	0	0.0
BTHL<5	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BTHL>5		>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
CCL	*Colurostylis lemurum*		0	0	0	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.		0	0	1	0	0	0	0	0	0	0	0	0	1	0.1
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PAA	*Aquilaspio aucklandica*		0	2	4	3	8	6	2	3	3	1	4	3	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	2	0	1	0	1	0	0	0	0	0	0	4	0.3
PBOC	Pseudopolydora complex		0	1	1	1	1	0	1	2	0	0	1	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	1	0	1	0	0	1	0	0	1	0	0	4	0.3
PHF	"Capitellidae"		9	12	8	28	23	20	16	15	9	8	10	19	177	14.8
PMD	*Magelona dakini*		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PNIC	Nereidae		4	6	6	5	8	2	6	3	6	6	4	1	57	4.8
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
CAMPH	Amphipods		1	3	0	0	1	6	0	0	4	1	2	2	20	1.7
CCRAB	Crabs		0	3	0	0	2	2	0	2	1	1	1	1	13	1.1
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	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	1	0	0	0	0	1	0.1
COTH	Other Crustaceans		0	2	0	0	4	0	0	0	0	0	0	0	6	0.5
BOTH	Bivalves		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
GOTH	Gastropods		0	0	0	1	0	1	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	0	3	0	0	0	0	3	0.3
ONEM	Nemerteans		0	1	0	0	0	0	1	3	0	0	1	0	6	0.5
POTH	Polychaetes		1	4	1	4	4	2	2	2	4	2	6	1	33	2.8
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	1	0	1	0.1
OFLAT	Flatworms		0	0	0	0	0	0	0	0	0	0	1	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
			40	77	47	83	84	60	53	57	46	53	66	73	739	61.6

HB April 2007

	INDICATOR SPECIES		CORE NUMBER												TOTAL	MEAN
			1	2	3	4	5	6	7	8	9	10	11	12		
	AMPHIPODS															
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
APHOX	*Phoxocephalidae*		0	0	1	1	3	3	2	0	0	2	1	1	14	1.2
	BIVALVES	**SIZE**														
BAB<2	*Arthritica bifurca*	<2	36	22	26	16	6	34	0	23	19	32	36	14	264	22.0
BAB>2		>2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	36	22	26	16	6	34	0	23	19	32	36	14	264	22.0
BAS<5	*Austrovenus stutchburyi*	<5	5	3	0	0	0	5	2	3	5	0	0	2	25	2.1
BAS>5		>5	2	0	1	0	0	2	0	0	4	1	0	0	10	0.8
BAS-COND		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	7	3	1	0	0	7	2	3	9	1	0	2	35	2.9
BML<5	*Macamona liliana*	<5	1	0	2	1	0	0	0	2	0	1	0	0	7	0.6
BML5-15		5-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BML>15		>15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BML-COND		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	1	0	2	1	0	0	0	2	0	1	0	0	7	0.6
BNH<2	*Nucula hartvigiana*	<2	0	0	0	0	0	0	0	0	1	0	0	0	1	0.1
BNH>2		>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
BPA<5	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA5-15		5-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA>15		>15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA-COND		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	0	0	0	0	0.0
BTHL<5	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	1	1	0.1
BTHL>5		>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	1	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.		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	2	1	3	4	5	2	1	0	5	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	0	0	0	0	0	0.0
PBOC	Pseudopolydora complex		1	0	0	1	0	2	0	0	2	1	1	0	8	0.7
PCOS	*Cossura* sp.		0	0	1	0	0	0	0	0	1	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.		1	0	0	0	0	0	0	0	0	0	0	0	1	0.1
PHF	"Capitellidae"		17	12	21	11	9	14	23	17	16	12	17	10	179	14.9
PMD	*Magelona dakini*		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PNIC	Nereidae		13	30	16	9	12	31	13	16	27	23	23	27	240	20.0
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	1	1	0.1
	NON INDICATOR SPECIES															
CAMPH	Amphipods		5	1	2	3	1	0	2	1	2	8	1	3	29	2.4
CCRAB	Crabs		0	1	3	0	0	2	1	1	3	1	1	0	13	1.1
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	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	1	0	0	0	0	0	0	0	1	0.1
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	0	0	0	1	0	0	0	2	0.2
GOTH	Gastropods		0	0	0	0	0	0	0	1	1	0	2	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	0	0	1	1	0	0	0	2	0.2
POTH	Polychaetes		0	3	1	0	0	1	0	0	1	3	0	1	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		**83**	**75**	**77**	**44**	**33**	**97**	**47**	**70**	**86**	**85**	**82**	**65**	**844**	**70.3**

X October 2006

			CORE NUMBER												TOTAL	MEAN
			1	2	3	4	5	6	7	8	9	10	11	12		
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
APHOX	*Phoxocephalidae*		6	5	1	0	1	4	4	5	5	0	4	1	36	3.0
		SIZE														
BAB<2	*Arthritica bifurca*	<2	2	0	10	0	1	3	2	4	0	0	4	25	51	4.3
BAB>2		>2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	2	0	10	0	1	3	2	4	0	0	4	25	51	4.3
BAS<5	*Austrovenus stutchburyi*	<5	35	22	13	26	33	16	31	19	14	26	15	25	275	22.9
BAS>5		>5	10	16	9	27	18	9	12	8	10	10	8	12	149	12.4
BAS-COND		Cond.analysis	5	4	4	2	7	6	7	7	4	0	7	6	59	4.9
		Total	50	42	26	55	58	31	50	34	28	36	30	43	483	40.3
BML<5	*Macomona liliana*	<5	17	6	10	9	7	7	3	12	9	6	5	8	99	8.3
BML5-15		5-15	0	1	0	0	0	1	0	0	1	0	1	0	4	0.3
BML>15		>15	3	1	1	2	0	2	1	1	2	4	3	1	21	1.8
BML-COND		Cond.analysis	0	0	0	0	1	0	2	1	0	0	0	0	4	0.3
		Total	20	8	11	11	8	10	6	14	12	10	9	9	128	10.7
BNH<2	*Nucula hartvigiana*	<2	11	6	1	10	24	11	8	6	8	9	6	16	116	9.7
BNH>2		>2	14	14	5	18	17	32	32	35	19	21	15	30	252	21.0
		Total	25	20	6	28	41	43	40	41	27	30	21	46	368	30.7
BPA<5	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA5-15		5-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA>15		>15	1	0	0	0	0	0	0	0	0	0	0	0	1	0.1
BPA-COND		Cond.analysis	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
BTHL<5	*Theora lubrica*	<5	0	0	0	0	0	0	1	0	0	0	0	1	2	0.2
BTHL>5		>5	0	0	0	0	0	0	0	0	0	0	0	1	1	0.1
		Total	0	0	0	0	0	0	1	0	0	0	0	2	3	0.3
			0													
CCL	*Colurostylis lemurum*		1	0	0	2	3	4	0	3	2	1	0	0	16	1.3
GCA	*Cominella adspera*		0	0	0	0	0	0	1	1	0	0	0	0	2	0.2
GNHE	*Notoacmea* sp.		1	4	0	6	6	3	1	1	1	3	0	6	32	2.7
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PAA	*Aquilaspio aucklandica*		12	11	4	21	6	10	11	9	7	14	7	4	116	9.7
PAGL	*Aglaophamus* sp.		0	0	0	0	1	0	0	0	0	0	0	0	1	0.1
PAO	*Aonides oxycephala*		0	0	0	1	1	0	0	1	0	0	0	0	3	0.3
PAR	*Aricidea* sp.		0	0	1	1	0	0	0	0	0	0	0	0	2	0.2
PBOC	Pseudopolydora complex		0	1	1	1	1	0	0	0	1	1	1	0	7	0.6
PCOS	*Cossura* sp.		0	0	1	0	1	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	1	1	1	0	0	0	0	0	3	0.3
PGLY	*Glycera* sp.		0	0	1	1	0	3	2	2	1	2	2	1	15	1.3
PHF	"Capitellidae"		7	4	7	11	12	11	17	17	6	11	8	32	143	11.9
PMD	*Magelona dakini*		1	0	0	0	0	0	0	0	0	0	0	0	1	0.1
PNIC	Nereidae		1	3	5	4	1	0	1	1	0	1	2	0	19	1.6
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PPAR	Paraonidae		0	2	1	0	0	0	0	0	0	0	0	1	4	0.3
CAMPH	Amphipods		8	10	4	2	10	7	2	7	8	2	2	3	65	5.4
CCRAB	Crabs		1	0	2	0	0	1	2	1	0	0	0	2	9	0.8
CCUM	Cumaceans		0	0	0	0	0	2	0	0	0	0	0	0	2	0.2
CISO	Isopods		0	0	0	0	0	0	0	1	1	0	0	2	4	0.3
COST	Ostracods		0	0	0	2	3	0	0	0	1	0	0	1	7	0.6
CSHR	Shrimps/Mysids		0	0	1	0	0	0	0	0	0	0	0	0	1	0.1
COTH	Other Crustaceans		4	3	5	11	5	6	10	2	2	5	10	4	67	5.6
BOTH	Bivalves		0	0	0	0	0	0	0	0	0	0	0	1	1	0.1
GOTH	Gastropods		1	0	1	2	0	1	3	4	1	4	2	3	22	1.8
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	2	0	0	3	0	0	0	5	0.4
ONEM	Nemerteans		1	1	1	1	3	0	2	0	4	3	1	1	18	1.5
POTH	Polychaetes		5	5	6	10	13	5	2	11	5	2	6	12	82	6.8
OOLIG	Oligochaetes		0	0	0	0	0	1	43	0	0	1	1	3	49	4.1
OFLAT	Flatworms		0	0	0	0	0	0	1	0	0	0	0	0	1	0.1
OEDW	*Edwardsia*		1	0	0	0	1	0	0	1	1	0	0	1	5	0.4
OTHER	Misc. Other		1	0	0	2	0	0	0	0	1	2	0	0	6	0.5
			149	119	95	172	177	148	202	160	117	128	110	203	1780	148.3

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	INDICATOR SPECIES		CORE NUMBER												TOTAL	MEAN
			1	2	3	4	5	6	7	8	9	10	11	12		
	AMPHIPODS															
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
APHOX	*Phoxocephalidae*		0	1	1	0	0	1	1	0	3	1	1	1	**10**	**0.8**
	BIVALVES	**SIZE**														
BAB<2	*Arthritica bifurca*	<2	0	0	0	1	0	1	3	0	7	1	0	0	**13**	**1.1**
BAB>2		>2	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	0	0	0	1	0	1	3	0	7	1	0	0	**13**	**1.1**
BAS<5	*Austrovenus stutchburyi*	<5	5	8	4	13	7	5	7	8	5	1	11	8	**82**	**6.8**
BAS>5		>5	4	2	8	15	20	7	18	2	9	14	20	11	**130**	**10.8**
BAS-COND		Cond.analysis	0	4	0	2	6	7	2	3	3	1	8	13	**49**	**4.1**
		Total	9	14	12	30	33	19	27	13	17	16	39	32	**261**	**21.8**
BML<5	*Macamona liliana*	<5	6	5	5	6	3	9	8	4	5	5	13	8	**77**	**6.4**
BML5-15		5-15	0	0	0	3	1	0	0	0	0	0	0	0	**4**	**0.3**
BML>15		>15	2	2	0	3	1	2	2	2	1	3	2	2	**22**	**1.8**
BML-COND		Cond.analysis	1	0	0	0	2	1	1	0	0	0	1	1	**7**	**0.6**
		Total	9	7	5	12	7	12	11	6	6	8	16	11	**110**	**9.2**
BNH<2	*Nucula hartvigiana*	<2	1	5	1	2	7	2	4	3	4	4	10	6	**49**	**4.1**
BNH>2		>2	14	14	6	8	23	28	18	16	32	11	7	26	**203**	**16.9**
		Total	15	19	7	10	30	30	22	19	36	15	17	32	**252**	**21.0**
BPA<5	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BPA5-15		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BPA>15		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BPA-COND		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	0	0	0	**0**	**0.0**
BTHL<5	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BTHL>5		>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	2	0	0	2	3	1	0	6	0	5	2	**23**	**1.9**
	GASTROPODS															
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GNHE	*Notoacmea* sp.		3	2	21	5	2	0	0	0	1	6	1	2	**43**	**3.6**
	OTHER															
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
	POLYCHAETES															
PAA	*Aquilaspio aucklandica*		7	4	50	26	19	33	10	10	12	7	11	17	**206**	**17.2**
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	1	0	1	0	1	0	0	0	**3**	**0.3**
PAR	*Aricidea* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PBOC	Pseudopolydora complex		0	1	2	1	1	1	0	0	0	0	0	1	**7**	**0.6**
PCOS	*Cossura* sp.		1	0	0	1	0	0	0	0	0	1	0	0	**3**	**0.3**
PEUC	*Euchone* sp.		0	0	0	0	1	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.		0	1	1	0	1	2	1	0	0	1	0	0	**7**	**0.6**
PHF	"Capitellidae"		11	12	2	11	10	14	6	14	13	14	6	5	**118**	**9.8**
PMD	*Magelona dakini*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PNIC	Nereidae		3	3	8	3	1	5	2	0	4	2	1	0	**32**	**2.7**
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PPAR	Paraonidae		0	0	0	2	0	1	0	0	0	0	0	0	**3**	**0.3**
	NON INDICATOR SPECIES															
CAMPH	Amphipods		2	1	3	1	2	1	0	0	4	0	11	6	**31**	**2.6**
CCRAB	Crabs		0	2	1	0	2	1	1	2	0	2	0	2	**13**	**1.1**
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
CISO	Isopods		3	0	0	1	0	0	0	1	0	1	0	1	**7**	**0.6**
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	2	2	4	4	0	2	1	0	1	**18**	**1.5**
BOTH	Bivalves		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
GOTH	Gastropods		1	2	4	3	2	2	2	2	1	2	4	5	**30**	**2.5**
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	2	0	0	1	0	**3**	**0.3**
ONEM	Nemerteans		0	1	2	3	2	1	3	0	0	2	2	2	**18**	**1.5**
POTH	Polychaetes		1	0	0	4	3	3	2	3	6	1	0	2	**25**	**2.1**
OOLIG	Oligochaetes		4	1	0	0	2	9	1	3	0	0	0	1	**21**	**1.8**
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	1	0	0	1	0	0	1	0	0	1	0	**5**	**0.4**
	TOTAL		**72**	**76**	**119**	**116**	**124**	**143**	**98**	**76**	**119**	**81**	**116**	**123**	**1263**	**105.3**

WI July 2006

			CORE NUMBER												TOTAL	MEAN
			1	2	3	4	5	6	7	8	9	10	11	12		
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
APHOX	*Phoxocephalidae*		0	0	1	0	1	0	2	0	0	0	0	1	5	0.4
		SIZE														
BAB<2	*Arthritica bifurca*	<2	12	2	3	7	8	14	4	8	5	7	11	16	97	8.1
BAB>2		>2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	12	2	3	7	8	14	4	8	5	7	11	16	97	8.1
BAS<5	*Austrovenus stutchburyi*	<5	15	26	13	12	25	6	18	9	8	16	11	9	168	14.0
BAS>5		>5	9	15	7	10	22	14	7	14	5	8	20	10	141	11.8
BAS-COND		Cond.analysis	0	1	0	6	1	4	1	5	2	0	0	1	21	1.8
		Total	24	42	20	28	48	24	26	28	15	24	31	20	330	27.5
BML<5	*Macamona liliana*	<5	5	10	4	6	15	8	11	1	8	10	6	3	87	7.3
BML5-15		5-15	2	4	3	0	3	2	3	1	2	3	0	2	25	2.1
BML>15		>15	4	2	1	6	3	3	5	2	2	4	2	3	37	3.1
BML-COND		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	11	16	8	12	21	13	19	4	12	17	8	8	149	12.4
BNH<2	*Nucula hartvigiana*	<2	9	2	16	2	4	4	4	4	5	5	1	5	61	5.1
BNH>2		>2	21	1	22	11	8	10	4	26	14	17	13	25	172	14.3
		Total	30	3	38	13	12	14	8	30	19	22	14	30	233	19.4
BPA<5	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA5-15		5-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA>15		>15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA-COND		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	0	0	0	0	0.0
BTHL<5	*Theora lubrica*	<5	0	2	0	0	0	0	0	0	0	0	0	0	2	0.2
BTHL>5		>5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	0	2	0	0	0	0	0	0	0	0	0	0	2	0.2
CCL	*Colurostylis lemurum*		6	2	0	1	9	2	3	3	1	11	2	0	40	3.3
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
GNHE	*Notoacmea* sp.		6	1	27	22	1	7	0	30	17	18	4	71	204	17.0
OAN	*Anthopleura aureoradiata*		3	1	6	1	0	0	2	1	1	0	2	2	19	1.6
PAA	*Aquilaspio aucklandica*		8	8	31	15	6	12	20	15	45	13	8	15	196	16.3
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	1	0	0	0	0	0	0	1	2	0.2
PAR	*Aricidea* sp.		3	2	8	1	3	5	0	1	5	1	2	1	32	2.7
PBOC	Pseudopolydora complex		0	1	0	1	1	1	1	1	1	1	0	0	8	0.7
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	1	0	0	0	0	1	0.1
PGLY	*Glycera* sp.		2	4	0	1	0	0	1	1	1	3	3	0	16	1.3
PHF	"Capitellidae"		23	34	17	28	22	23	29	22	48	21	16	18	301	25.1
PMD	*Magelona dakini*		1	0	0	0	0	0	0	0	0	0	0	0	1	0.1
PNIC	Nereidae		4	2	2	1	0	4	6	2	5	1	6	3	36	3.0
POP	*Orbinia papillosa*		0	2	0	0	0	0	0	0	0	0	0	0	2	0.2
PPAR	Paraonidae		0	2	0	2	2	0	0	1	0	1	0	0	8	0.7
CAMPH	Amphipods		1	0	5	3	4	1	1	6	7	6	1	5	40	3.3
CCRAB	Crabs		0	1	1	1	1	0	0	1	2	3	3	4	17	1.4
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	1	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	1	0	0	0	0	0	0	0	1	0.1
COTH	Other Crustaceans		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BOTH	Bivalves		3	7	2	4	6	2	1	0	2	1	2	1	31	2.6
GOTH	Gastropods		4	2	14	4	2	3	4	15	17	5	4	19	93	7.8
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	1	0	0	0	0	0	1	0.1
ONEM	Nemerteans		1	3	3	0	2	0	0	1	1	2	0	1	14	1.2
POTH	Polychaetes		10	4	12	6	10	2	4	2	6	6	6	10	78	6.5
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		1	0	5	2	0	0	1	3	2	1	0	4	19	1.6
			153	141	203	154	161	127	134	177	212	164	123	230	1979	164.9

WI October 2006

			CORE NUMBER												TOTAL	MEAN
			1	2	3	4	5	6	7	8	9	10	11	12		
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
APHOX	*Phoxocephalidae*		0	2	0	3	0	2	1	0	1	3	0	2	14	1.2
		SIZE														
BAB<2	*Arthritica bifurca*	<2	6	5	0	2	19	7	5	18	4	16	12	6	100	8.3
BAB>2		>2	0	0	0	0	1	0	0	0	0	0	0	0	1	0.1
		Total	6	5	0	2	20	7	5	18	4	16	12	6	101	8.4
BAS<5	*Austrovenus stutchburyi*	<5	73	34	34	5	19	20	19	22	16	21	17	27	307	25.6
BAS>5		>5	5	7	2	0	8	6	17	20	16	17	3	19	120	10.0
BAS-COND		Cond.analysis	0	2	2	4	3	1	3	9	3	3	2	1	33	2.8
		Total	78	43	38	9	30	27	39	51	35	41	22	47	460	38.3
BML<5	*Macamona liliana*	<5	6	4	7	4	11	13	6	0	6	13	1	6	77	6.4
BML5-15		5-15	0	1	0	0	2	0	1	0	3	2	0	2	11	0.9
BML>15		>15	3	2	0	0	2	2	3	1	3	3	5	0	24	2.0
BML-COND		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	9	7	7	4	15	15	10	1	12	18	6	8	112	9.3
BNH<2	*Nucula hartvigiana*	<2	17	23	16	0	17	17	13	11	9	16	6	7	152	12.7
BNH>2		>2	39	49	3	0	10	21	15	34	29	9	32	23	264	22.0
		Total	56	72	19	0	27	38	28	45	38	25	38	30	416	34.7
BPA<5	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA5-15		5-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA>15		>15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA-COND		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	0	0	0	0	0.0
BTHL<5	*Theora lubrica*	<5	0	0	1	0	0	0	0	0	0	0	0	0	1	0.1
BTHL>5		>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
CCL	*Colurostylis lemurum*		0	3	0	0	2	2	0	1	2	0	0	0	10	0.8
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
GNHE	*Notoacmea* sp.		19	3	8	0	18	12	8	13	10	10	17	3	121	10.1
OAN	*Anthopleura aureoradiata*		8	3	8	0	1	0	1	3	2	3	5	1	35	2.9
PAA	*Aquilaspio aucklandica*		20	17	23	5	14	10	12	8	26	14	10	15	174	14.5
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PAO	*Aonides oxycephala*		2	0	0	0	0	0	0	0	0	1	0	0	3	0.3
PAR	*Aricidea* sp.		5	4	10	1	3	3	1	3	1	3	3	0	37	3.1
PBOC	Pseudopolydora complex		0	2	5	0	5	0	0	1	0	2	1	0	16	1.3
PCOS	*Cossura* sp.		0	0	1	11	0	2	0	1	1	0	0	0	16	1.3
PEUC	*Euchone* sp.		0	0	0	2	0	0	0	0	0	0	0	0	2	0.2
PGE	*Goniada* sp.		0	0	1	0	0	0	0	0	0	0	0	0	1	0.1
PGLY	*Glycera* sp.		0	1	1	2	0	2	4	0	1	0	0	1	12	1.0
PHF	"Capitellidae"		30	16	47	29	39	30	18	18	22	30	19	19	317	26.4
PMD	*Magelona dakini*		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PNIC	Nereidae		3	3	4	3	5	4	1	0	3	5	4	4	39	3.3
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PPAR	Paraonidae		1	1	7	6	2	0	1	0	1	3	0	1	23	1.9
CAMPH	Amphipods		0	0	2	5	7	1	4	0	0	2	2	0	23	1.9
CCRAB	Crabs		3	0	2	0	3	0	1	1	0	5	1	0	16	1.3
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
CISO	Isopods		0	0	1	2	2	0	1	0	1	0	0	0	7	0.6
COST	Ostracods		0	0	0	0	0	0	0	0	0	1	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	1	0	0	0	0	0	0	0	0	0	1	0.1
BOTH	Bivalves		0	0	1	4	0	2	1	0	1	4	1	1	15	1.3
GOTH	Gastropods		32	2	8	8	20	12	5	8	3	10	4	5	117	9.8
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		1	1	1	2	0	0	0	0	1	1	2	1	10	0.8
POTH	Polychaetes		6	6	5	6	9	1	1	3	1	3	6	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		6	2	5	1	4	1	1	3	1	2	15	1	42	3.5
			285	193	206	105	226	171	143	178	167	202	169	147	2192	182.7

WI January 2007

	INDICATOR SPECIES		CORE NUMBER												TOTAL	MEAN
			1	2	3	4	5	6	7	8	9	10	11	12		
	AMPHIPODS															
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
APHOX	*Phoxocephalidae*		3	0	0	1	0	5	3	1	3	1	0	0	**17**	**1.4**
	BIVALVES	**SIZE**														
BAB<2	*Arthritica bifurca*	<2	10	12	4	45	6	0	1	3	2	14	14	16	**127**	**10.6**
BAB>2		>2	1	0	0	0	0	0	0	0	0	0	0	0	**1**	**0.1**
		Total	11	12	4	45	6	0	1	3	2	14	14	16	**128**	**10.7**
BAS<5	*Austrovenus stutchburyi*	<5	21	11	31	16	28	20	20	34	12	11	14	23	**241**	**20.1**
BAS>5		>5	4	7	2	4	1	5	10	7	7	11	15	27	**100**	**8.3**
BAS-COND		Cond.analysis	0	0	0	2	1	1	0	3	1	1	3	1	**13**	**1.1**
		Total	25	18	33	22	30	26	30	44	20	23	32	51	**354**	**29.5**
BML<5	*Macamona liliana*	<5	9	10	1	8	3	4	4	6	11	4	3	6	**69**	**5.8**
BML5-15		5-15	2	3	0	1	2	2	1	1	1	0	1	1	**15**	**1.3**
BML>15		>15	3	5	3	0	4	4	2	6	2	4	4	4	**41**	**3.4**
BML-COND		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
		Total	14	18	4	9	9	10	7	13	14	8	8	11	**125**	**10.4**
BNH<2	*Nucula hartvigiana*	<2	49	12	45	18	29	27	23	36	24	18	26	16	**323**	**26.9**
BNH>2		>2	12	1	20	9	28	42	33	48	27	16	14	36	**286**	**23.8**
		Total	61	13	65	27	57	69	56	84	51	34	40	52	**609**	**50.8**
BPA<5	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BPA5-15		5-15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BPA>15		>15	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BPA-COND		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	0	0	0	**0**	**0.0**
BTHL<5	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
BTHL>5		>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	0	2	0	0	0	0	0	2	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.		8	6	7	4	0	21	19	30	6	15	0	7	**123**	**10.3**
	OTHER															
OAN	*Anthopleura aureoradiata*		6	0	11	1	0	3	1	2	0	3	7	1	**35**	**2.9**
	POLYCHAETES															
PAA	*Aquilaspio aucklandica*		13	3	26	15	19	17	9	15	11	7	16	11	**162**	**13.5**
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PAO	*Aonides oxycephala*		0	0	2	0	0	0	0	2	0	0	0	0	**4**	**0.3**
PAR	*Aricidea* sp.		2	6	6	3	4	4	4	1	3	1	3	2	**39**	**3.3**
PBOC	Pseudopolydora complex		2	2	2	1	3	1	3	0	0	0	1	0	**15**	**1.3**
PCOS	*Cossura* sp.		0	1	1	1	0	0	0	2	0	0	1	0	**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	1	0	0	0	0	0	0	0	0	0	**1**	**0.1**
PGLY	*Glycera* sp.		0	0	1	1	1	0	2	1	0	0	0	1	**7**	**0.6**
PHF	"Capitellidae"		35	33	42	45	44	25	13	34	24	24	24	26	**369**	**30.8**
PMD	*Magelona dakini*		0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0**
PNIC	Nereidae		4	4	1	4	2	2	3	2	4	2	1	2	**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	3	2	3	1	0	0	0	1	0	0	**10**	**0.8**
	NON INDICATOR SPECIES															
CAMPH	Amphipods		6	0	0	1	2	2	1	2	7	1	2	2	**26**	**2.2**
CCRAB	Crabs		3	0	5	0	2	3	2	0	1	0	5	0	**21**	**1.8**
CCUM	Cumaceans		0	0	0	0	0	0	1	0	0	0	0	0	**1**	**0.1**
CISO	Isopods		3	0	0	0	1	1	0	0	2	1	0	1	**9**	**0.8**
COST	Ostracods		2	0	0	0	0	0	1	0	0	0	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	0	0	1	0	0	0	1	0	0	0	0	**2**	**0.2**
BOTH	Bivalves		7	3	2	1	0	0	2	5	2	0	1	1	**24**	**2.0**
GOTH	Gastropods		19	4	6	6	8	9	18	10	3	11	10	6	**110**	**9.2**
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		0	0	2	0	0	1	1	0	2	0	1	0	**7**	**0.6**
POTH	Polychaetes		6	4	9	5	3	4	1	3	1	2	8	4	**50**	**4.2**
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	1	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	3	1	6	8	2	3	0	2	9	2	**40**	**3.3**
	TOTAL		**236**	**130**	**236**	**198**	**200**	**212**	**180**	**258**	**156**	**152**	**184**	**196**	**2338**	**194.8**

WI April 2007

	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	2	2	0.2
APHOX	*Phoxocephalidae*		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
	BIVALVES	**SIZE**														
BAB<2	*Arthritica bifurca*	<2	1	15	3	0	5	14	13	1	6	0	17	9	84	7.0
BAB>2		>2	0	1	0	0	0	0	0	0	0	0	0	0	1	0.1
		Total	1	16	3	0	5	14	13	1	6	0	17	9	85	7.1
BAS<5	*Austrovenus stutchburyi*	<5	4	4	6	16	4	14	13	12	19	7	2	6	107	8.9
BAS>5		>5	4	6	5	9	12	4	12	9	7	15	30	5	118	9.8
BAS-COND		Cond.analysis	0	2	0	1	0	3	3	0	0	0	2	0	11	0.9
		Total	8	12	11	26	16	21	28	21	26	22	34	11	236	19.7
BML<5	*Macamona liliana*	<5	3	6	8	2	2	2	3	4	2	0	11	1	44	3.7
BML5-15		5-15	1	0	0	0	6	1	1	2	2	1	3	4	21	1.8
BML>15		>15	3	1	2	2	1	2	2	2	6	1	1	2	25	2.1
BML-COND		Cond.analysis	1	0	2	2	0	0	0	0	0	0	0	0	5	0.4
		Total	8	7	12	6	9	5	6	8	10	2	15	7	95	7.9
BNH<2	*Nucula hartvigiana*	<2	18	4	6	20	12	10	12	15	11	8	11	5	132	11.0
BNH>2		>2	21	9	16	32	40	17	49	33	54	38	15	2	326	27.2
		Total	39	13	22	52	52	27	61	48	65	46	26	7	458	38.2
BPA<5	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA5-15		5-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA>15		>15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA-COND		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	0	0	0	0	0.0
BTHL<5	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BTHL>5		>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	2	2	0	1	1	1	2	0	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.		6	4	5	14	12	6	7	16	15	16	21	8	130	10.8
	OTHER															
OAN	*Anthopleura aureoradiata*		0	0	1	2	4	3	5	1	2	2	5	5	30	2.5
	POLYCHAETES															
PAA	*Aquilaspio aucklandica*		9	24	14	9	24	9	38	22	7	26	28	18	228	19.0
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PAO	*Aonides oxycephala*		3	0	0	0	1	0	0	0	0	0	0	0	4	0.3
PAR	*Aricidea* sp.		2	2	3	0	3	2	2	3	0	1	1	6	25	2.1
PBOC	Pseudopolydora complex		1	0	2	0	1	0	0	0	1	0	1	2	8	0.7
PCOS	*Cossura* sp.		0	1	0	0	0	4	0	0	0	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.		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PGLY	*Glycera* sp.		1	2	0	2	3	1	2	1	4	0	1	0	17	1.4
PHF	"Capitellidae"		18	36	25	16	18	19	32	21	9	18	43	45	300	25.0
PMD	*Magelona dakini*		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PNIC	Nereidae		3	1	2	2	1	2	3	2	2	6	5	2	31	2.6
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PPAR	Paraonidae		1	2	0	0	1	0	2	2	1	1	2	2	14	1.2
	NON INDICATOR SPECIES															
CAMPH	Amphipods		0	2	0	0	0	0	3	3	0	1	0	0	9	0.8
CCRAB	Crabs		0	0	0	1	2	0	1	0	1	2	5	0	12	1.0
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
CISO	Isopods		0	0	0	2	1	0	0	2	0	0	2	0	7	0.6
COST	Ostracods		0	0	0	0	0	0	2	0	1	0	0	0	3	0.3
CSHR	Shrimps/Mysids		0	0	0	0	0	0	1	0	0	0	0	0	1	0.1
COTH	Other Crustaceans		0	1	0	1	0	0	1	1	0	0	0	0	4	0.3
BOTH	Bivalves		2	0	2	3	1	1	1	1	0	1	2	0	14	1.2
GOTH	Gastropods		5	7	5	7	3	3	11	5	6	11	9	11	83	6.9
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	3	1	1	0	0	0	0	0	0	1	0	6	0.5
POTH	Polychaetes		6	3	3	1	0	2	2	2	5	2	1	2	29	2.4
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	1	1	0.1
OEDW	*Edwardsia*		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
OTHER	Misc. Other		2	0	3	0	0	1	1	2	4	4	1	2	20	1.7
	TOTAL		115	137	114	147	159	120	223	163	166	163	220	140	1867	155.6

OB July 2006

			CORE NUMBER												TOTAL	MEAN
			1	2	3	4	5	6	7	8	9	10	11	12		
ACOR	*Corophiidae*		0	0	3	0	0	0	0	0	0	0	0	0	3	0.3
APHOX	*Phoxocephalidae*		5	7	7	3	2	9	12	9	4	8	13	7	86	7.2
		SIZE														
BAB<2	*Arthritica bifurca*	<2	3	2	2	2	0	1	1	3	0	1	1	1	17	1.4
BAB>2		>2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	3	2	2	2	0	1	1	3	0	1	1	1	17	1.4
BAS<5	*Austrovenus stutchburyi*	<5	0	0	1	0	0	0	0	1	0	0	0	0	2	0.2
BAS>5		>5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BAS-COND		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	0	0	0	2	0.2
BML<5	*Macamona liliana*	<5	1	1	1	1	1	0	0	0	2	2	1	2	12	1.0
BML5-15		5-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BML>15		>15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BML-COND		Cond.analysis	0	1	0	0	0	0	0	0	0	0	0	0	1	0.1
		Total	1	2	1	1	1	0	0	0	2	2	1	2	13	1.1
BNH<2	*Nucula hartvigiana*	<2	0	0	0	0	1	1	0	0	0	0	0	0	2	0.2
BNH>2		>2	0	0	0	0	0	0	0	0	0	0	0	1	1	0.1
		Total	0	0	0	0	1	1	0	0	0	0	0	1	3	0.3
BPA<5	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA5-15		5-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA>15		>15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA-COND		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	0	0	0	0	0.0
BTHL<5	*Theora lubrica*	<5	2	2	0	3	1	8	3	9	22	6	4	14	74	6.2
BTHL>5		>5	0	1	0	0	1	1	2	0	7	4	3	2	21	1.8
		Total	2	3	0	3	2	9	5	9	29	10	7	16	95	7.9
CCL	*Colurostylis lemurum*		1	3	1	2	1	2	1	1	1	0	0	0	13	1.1
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
OAN	*Anthopleura aureoradiata*		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PAA	*Aquilaspio aucklandica*		12	1	4	0	9	1	8	4	3	10	1	3	56	4.7
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	1	1	0	2	3	0	0	0	8	0.7
PBOC	Polydorids *(Boccardia syrtis)*		0	0	1	0	0	3	0	0	1	2	1	1	9	0.8
PCOS	*Cossura* sp.		20	9	9	14	34	25	25	38	20	14	9	26	243	20.3
PEUC	*Euchone* sp.		4	0	3	1	1	0	0	2	0	0	0	0	11	0.9
PGE	*Goniada* sp.		0	2	0	0	0	0	0	0	0	0	0	0	2	0.2
PGLY	*Glycera* sp.		1	0	1	2	1	0	0	1	0	0	2	1	9	0.8
PHF	Capitellidae *(Heteromastus filiformis)*		40	17	30	16	49	27	26	23	29	14	24	32	327	27.3
PMD	*Magelona dakini*		0	0	2	1	0	0	1	1	0	1	2	0	8	0.7
PNIC	Nereidae		5	5	5	3	2	7	2	3	6	8	4	4	54	4.5
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PPAR	Paraonidae		9	3	1	6	8	2	2	3	2	2	6	0	44	3.7
CAMPH	Amphipods		0	0	4	6	3	4	4	3	1	2	5	3	35	2.9
CCRAB	Crabs		0	0	0	1	0	0	1	4	0	0	4	0	10	0.8
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
CISO	Isopods		1	0	0	1	0	1	0	0	0	14	0	0	17	1.4
COST	Ostracods		7	0	4	4	1	2	0	1	2	2	1	1	25	2.1
CSHR	Shrimps/Mysids		0	1	1	0	0	4	0	2	2	0	3	0	13	1.1
COTH	Other Crustaceans		0	0	0	0	0	0	2	1	0	0	0	0	3	0.3
BOTH	Bivalves		17	1	13	3	1	2	3	1	0	1	0	1	43	3.6
GOTH	Gastropods		8	21	9	13	8	7	13	4	7	3	4	3	100	8.3
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	1	2	0	4	2	2	1	1	0	1	0	16	1.3
POTH	Polychaetes		15	16	24	21	10	10	5	10	13	3	7	18	152	12.7
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		1	1	0	0	0	2	1	1	2	1	1	0	10	0.8
			155	95	128	103	139	122	114	128	128	98	97	120	1427	118.9

OB October 2006

			CORE NUMBER												TOTAL	MEAN
			1	2	3	4	5	6	7	8	9	10	11	12		
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
APHOX	*Phoxocephalidae*		3	8	4	0	8	11	4	6	4	5	4	5	62	5.2
		SIZE														
BAB<2	*Arthritica bifurca*	<2	0	0	0	14	1	0	3	1	0	2	3	0	24	2.0
BAB>2		>2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	0	0	0	14	1	0	3	1	0	2	3	0	24	2.0
BAS<5	*Austrovenus stutchburyi*	<5	6	5	4	34	3	1	4	1	10	3	5	14	90	7.5
BAS>5		>5	0	0	0	11	0	0	0	0	0	0	0	0	11	0.9
BAS-COND		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	6	5	4	45	3	1	4	1	10	3	5	14	101	8.4
BML<5	*Macamona liliana*	<5	0	1	6	3	7	3	3	4	2	4	1	3	37	3.1
BML5-15		5-15	0	0	0	1	0	0	1	1	0	0	0	0	3	0.3
BML>15		>15	1	0	0	4	1	0	1	0	1	0	0	1	9	0.8
BML-COND		Cond.analysis	0	0	1	0	0	1	0	0	0	0	0	0	2	0.2
		Total	1	1	7	8	8	4	5	5	3	4	1	4	51	4.3
BNH<2	*Nucula hartvigiana*	<2	0	0	0	20	0	0	0	1	0	0	0	0	21	1.8
BNH>2		>2	0	0	0	19	0	0	0	0	0	0	0	1	20	1.7
		Total	0	0	0	39	0	0	0	1	0	0	0	1	41	3.4
BPA<5	*Paphies australis*	<5	1	0	0	0	0	0	0	0	0	0	0	0	1	0.1
BPA5-15		5-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA>15		>15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA-COND		Cond.analysis	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
BTHL<5	*Theora lubrica*	<5	0	0	0	0	0	1	2	0	0	4	0	0	7	0.6
BTHL>5		>5	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	4	0	0	8	0.7
CCL	*Colurostylis lemurum*		0	1	0	0	1	0	0	0	0	0	0	0	2	0.2
GCA	*Cominella adspera*		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
GNHE	*Notoacmea* sp.		0	0	0	22	0	0	0	0	0	0	0	0	22	1.8
OAN	*Anthopleura aureoradiata*		0	0	0	3	0	0	0	0	0	0	0	0	3	0.3
PAA	*Aquilaspio aucklandica*		4	4	4	21	8	8	3	7	3	2	5	4	73	6.1
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PAO	*Aonides oxycephala*		0	0	0	1	0	0	0	0	0	0	0	0	1	0.1
PAR	*Aricidea* sp.		2	2	1	7	0	1	0	0	0	0	1	2	16	1.3
PBOC	Polydorids *(Boccardia syrtis)*		2	1	0	6	0	0	0	0	0	2	1	0	12	1.0
PCOS	*Cossura* sp.		6	14	8	0	8	19	19	9	13	24	12	9	141	11.8
PEUC	*Euchone* sp.		5	0	1	0	0	0	0	0	0	0	0	3	9	0.8
PGE	*Goniada* sp.		0	1	0	0	0	1	0	0	0	0	0	0	2	0.2
PGLY	*Glycera* sp.		0	2	0	2	0	0	0	1	1	0	0	0	6	0.5
PHF	Capitellidae *(Heteromastus filiformis)*		27	43	25	35	26	31	28	17	20	8	25	17	302	25.2
PMD	*Magelona dakini*		0	0	0	0	0	0	0	0	0	0	1	0	1	0.1
PNIC	Nereidae		7	1	3	4	2	7	4	4	4	19	5	5	65	5.4
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	1	0	1	0.1
PPAR	Paraonidae		5	8	1	1	2	2	2	1	1	4	5	0	32	2.7
CAMPH	Amphipods		3	2	1	1	9	0	6	2	0	6	0	0	30	2.5
CCRAB	Crabs		1	2	2	1	0	1	3	1	4	3	3	1	22	1.8
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	0	0	0	0	1	1	3	0.3
COST	Ostracods		1	4	2	0	2	0	0	0	1	0	1	0	11	0.9
CSHR	Shrimps/Mysids		0	4	0	0	3	2	0	2	0	1	0	0	12	1.0
COTH	Other Crustaceans		0	0	0	0	0	0	0	0	0	0	2	0	2	0.2
BOTH	Bivalves		3	3	1	3	3	2	2	1	2	1	2	1	24	2.0
GOTH	Gastropods		4	4	2	16	7	3	9	3	0	1	5	5	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		1	0	1	3	1	1	0	1	0	0	0	1	9	0.8
POTH	Polychaetes		4	4	4	7	1	0	0	4	1	4	3	5	37	3.1
OOLIG	Oligochaetes		0	0	0	0	0	0	0	0	0	0	1	0	1	0.1
OFLAT	Flatworms		0	0	0	0	0	0	1	0	1	0	0	0	2	0.2
OEDW	*Edwardsia*		1	0	0	0	0	0	0	0	0	0	0	0	1	0.1
OTHER	Misc. Other		1	1	0	4	1	1	0	1	0	0	2	1	12	1.0
			88	115	71	244	94	96	95	68	69	93	89	79	1201	100.1

OB January 2007

	INDICATOR SPECIES		CORE NUMBER												TOTAL	MEAN
			1	2	3	4	5	6	7	8	9	10	11	12		
	AMPHIPODS															
ACOR	*Corophiidae*		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
APHOX	*Phoxocephalidae*		7	2	2	9	4	10	7	15	5	8	14	2	85	7.1
	BIVALVES	**SIZE**														
BAB<2	*Arthritica bifurca*	<2	1	0	0	0	1	0	0	0	0	0	0	0	2	0.2
BAB>2		>2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	1	0	0	0	1	0	0	0	0	0	0	0	2	0.2
BAS<5	*Austrovenus stutchburyi*	<5	2	0	0	0	2	1	0	2	1	0	0	0	8	0.7
BAS>5		>5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BAS-COND		Cond.analysis	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	2	0	0	0	2	1	0	2	1	0	0	0	8	0.7
BML<5	*Macamona liliana*	<5	3	5	8	9	5	5	3	2	0	9	1	1	51	4.3
BML5-15		5-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BML>15		>15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BML-COND		Cond.analysis	0	0	0	1	0	0	0	1	0	0	0	0	2	0.2
		Total	3	5	8	10	5	5	3	3	0	9	1	1	53	4.4
BNH<2	*Nucula hartvigiana*	<2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BNH>2		>2	0	0	1	0	0	0	0	0	0	0	0	0	1	0.1
		Total	0	0	1	0	0	0	0	0	0	0	0	0	1	0.1
BPA<5	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA5-15		5-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA>15		>15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA-COND		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	0	0	0	0	0.0
BTHL<5	*Theora lubrica*	<5	0	0	0	0	0	0	1	1	0	3	0	1	6	0.5
BTHL>5		>5	0	0	0	0	0	0	0	0	0	1	0	0	1	0.1
		Total	0	0	0	0	0	0	1	1	0	4	0	1	7	0.6
	CUMACEANS															
CCL	*Colurostylis lemurum*		0	0	1	0	1	0	1	1	0	1	2	1	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	0	0	0	0	0	0.0
	POLYCHAETES															
PAA	*Aquilaspio aucklandica*		13	3	7	7	9	18	14	7	19	11	12	3	123	10.3
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	1	0	1	0.1
PAR	*Aricidea* sp.		0	1	2	1	1	0	0	1	0	2	0	1	9	0.8
PBOC	Pseudopolydora complex		0	1	0	1	0	0	0	0	1	0	0	1	4	0.3
PCOS	*Cossura* sp.		11	16	11	19	13	21	22	22	13	22	27	26	223	18.6
PEUC	*Euchone* sp.		3	4	1	0	0	1	0	0	0	0	0	0	9	0.8
PGE	*Goniada* sp.		0	2	0	0	0	0	0	0	0	0	0	0	2	0.2
PGLY	*Glycera* sp.		1	0	1	1	2	0	2	0	2	0	2	0	11	0.9
PHF	"Capitellidae"		32	25	28	35	35	47	45	21	43	32	32	17	392	32.7
PMD	*Magelona dakini*		0	0	0	1	0	0	0	1	0	0	0	1	3	0.3
PNIC	Nereidae		1	5	4	3	8	3	2	3	2	4	2	2	39	3.3
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PPAR	Paraonidae		1	2	2	0	3	2	1	0	0	3	3	0	17	1.4
	NON INDICATOR SPECIES															
CAMPH	Amphipods		9	5	2	1	19	2	2	3	5	10	1	7	66	5.5
CCRAB	Crabs		1	0	0	0	0	2	1	1	1	0	0	3	9	0.8
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
CISO	Isopods		1	0	1	0	1	0	0	0	2	0	0	0	5	0.4
COST	Ostracods		0	1	0	1	0	0	2	0	0	0	0	0	4	0.3
CSHR	Shrimps/Mysids		0	0	0	0	0	1	0	0	0	0	0	0	1	0.1
COTH	Other Crustaceans		0	0	0	0	0	0	0	0	0	0	1	0	1	0.1
BOTH	Bivalves		0	8	9	5	0	5	6	1	14	10	3	3	64	5.3
GOTH	Gastropods		5	0	3	1	2	5	4	0	2	3	2	2	29	2.4
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	2	3	0	3	0	0	1	2	1	0	12	1.0
POTH	Polychaetes		7	11	7	4	8	3	8	0	1	1	2	2	54	4.5
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		1	0	1	0	1	0	1	0	0	1	1	0	6	0.5
	TOTAL		99	91	93	102	115	129	122	82	112	123	107	73	1248	104.0

OB April 2007

	INDICATOR SPECIES		CORE NUMBER												TOTAL	MEAN
			1	2	3	4	5	6	7	8	9	10	11	12		
	AMPHIPODS															
ACOR	*Corophiidae*		1	0	0	0	0	0	0	0	0	0	0	0	1	0.1
APHOX	*Phoxocephalidae*		2	5	7	9	0	7	7	2	3	6	2	4	54	4.5
	BIVALVES	**SIZE**														
BAB<2	*Arthritica bifurca*	<2	1	0	0	1	0	1	2	0	0	0	0	4	9	0.8
BAB>2		>2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
		Total	1	0	0	1	0	1	2	0	0	0	0	4	9	0.8
BAS<5	*Austrovenus stutchburyi*	<5	0	0	0	1	0	0	0	0	0	0	0	0	1	0.1
BAS>5		>5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BAS-COND		Cond.analysis	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
BML<5	*Macamona liliana*	<5	1	0	1	1	0	1	0	1	0	0	0	1	6	0.5
BML5-15		5-15	0	0	0	0	0	1	0	0	0	0	0	0	1	0.1
BML>15		>15	1	1	0	0	0	0	0	0	0	2	0	0	4	0.3
BML-COND		Cond.analysis	0	0	0	0	0	0	1	0	0	0	0	0	1	0.1
		Total	2	1	1	1	0	2	1	1	0	2	0	1	12	1.0
BNH<2	*Nucula hartvigiana*	<2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BNH>2		>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<5	*Paphies australis*	<5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA5-15		5-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA>15		>15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BPA-COND		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	0	0	0	0	0.0
BTHL<5	*Theora lubrica*	<5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
BTHL>5		>5	0	1	0	0	0	0	0	0	0	0	0	0	1	0.1
		Total	0	1	0	0	0	0	0	0	0	0	0	0	1	0.1
	CUMACEANS															
CCL	*Colurostylis lemurum*		2	0	1	1	0	0	0	1	0	0	1	1	7	0.6
	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	0	0	0	0	0	0.0
	POLYCHAETES															
PAA	*Aquilaspio aucklandica*		4	2	5	6	3	2	0	6	1	1	7	1	38	3.2
PAGL	*Aglaophamus* sp.		0	0	0	0	0	0	1	0	0	0	0	0	1	0.1
PAO	*Aonides oxycephala*		0	2	0	0	0	0	0	0	0	1	0	0	3	0.3
PAR	*Aricidea* sp.		2	0	0	1	1	1	0	0	0	0	0	0	5	0.4
PBOC	Pseudopolydora complex		0	0	0	2	0	1	1	0	0	0	0	1	5	0.4
PCOS	*Cossura* sp.		31	17	20	13	21	10	14	27	13	12	20	14	212	17.7
PEUC	*Euchone* sp.		0	0	0	0	0	1	0	0	0	4	0	0	5	0.4
PGE	*Goniada* sp.		0	0	0	3	0	0	0	0	0	0	0	0	3	0.3
PGLY	*Glycera* sp.		1	2	0	0	1	1	2	1	0	1	1	2	12	1.0
PHF	"Capitellidae"		35	19	29	29	32	21	27	28	26	28	17	24	315	26.3
PMD	*Magelona dakini*		0	0	0	0	0	0	0	0	0	0	1	1	2	0.2
PNIC	Nereidae		6	3	8	8	6	8	4	5	2	9	20	5	84	7.0
POP	*Orbinia papillosa*		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PPAR	Paraonidae		0	2	2	2	0	1	0	0	0	0	0	2	9	0.8
	NON INDICATOR SPECIES															
CAMPH	Amphipods		1	2	1	0	3	0	3	4	5	8	1	1	29	2.4
CCRAB	Crabs		2	0	1	1	0	3	1	2	1	0	0	0	11	0.9
CCUM	Cumaceans		0	0	0	0	0	0	0	0	0	0	1	0	1	0.1
CISO	Isopods		0	0	1	0	0	0	0	0	1	1	0	2	5	0.4
COST	Ostracods		0	2	2	0	1	1	1	1	0	1	2	2	13	1.1
CSHR	Shrimps/Mysids		0	0	1	3	0	0	0	0	0	0	0	0	4	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	1	0	0	0	0	0	0	0	0	2	0.2
GOTH	Gastropods		0	1	1	0	2	3	0	1	2	2	0	2	14	1.2
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		0	0	1	0	0	0	2	0	0	0	0	1	4	0.3
POTH	Polychaetes		0	8	6	2	2	3	3	3	2	5	3	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	1	0	0	0	1	2	1	0	0	0	0	5	0.4
	TOTAL		91	68	87	84	72	67	71	83	56	81	76	70	906	75.5

Appendix 3 – Dry weight shell-hash

Southern Firth of Thames

July 2006

Site	Sample No.	Shell hash weight (g)
MI	1	446.8
	2	242.0
	3	200.3
	4	156.9
	5	205.7
	6	436.7
	7	416.5
	8	247.8
	9	337.6
	10	247.9
	11	370.1
	12	494.4
KB	1	112.0
	2	197.5
	3	154.1
	4	274.9
	5	176.6
	6	163.4
	7	213.4
	8	175.7
	9	172.1
	10	158.4
	11	140.3
	12	130.0

Whaingaroa Harbour

Site	Sample No.	Shell hash weight (g)
WI	1	289.4
	2	138.7
	3	289.5
	4	229.3
	5	163.8
	6	69.5
	7	97.7
	8	81.0
	9	125.6
	10	78.3
	11	78.7
	12	117.8
OB	1	98.9
	2	66.3
	3	87.3
	4	67.6
	5	67.4
	6	54.9
	7	41.8
	8	41.8
	9	34.1
	10	31.8
	11	56.6
	12	40.2

Southern Firth of Thames

October 2006

Site	Sample No.	Shell hash weight (g)
KA	1	56.0
	2	48.1
	3	77.7
	4	62.7
	5	48.3
	6	58.7
	7	86.0
	8	40.7
	9	133.4
	10	74.3
	11	111.1
	12	196.9
GC	1	618.7
	2	1166.8
	3	969.4
	4	1473.1
	5	775.8
	6	684.1
	7	613.6
	8	617.3
	9	1342.1
	10	425.3
	11	388.1
	12	620.0
TP	1	40.5
	2	68.7
	3	125.5
	4	99.4
	5	93.0
	6	56.9
	7	44.1
	8	72.3
	9	96.9
	10	152.0
	11	42.7
	12	213.7
MI	1	592.4
	2	311.6
	3	200.6
	4	189.7
	5	166.9
	6	423.7
	7	517.5
	8	405.6
	9	260.8
	10	298.3
	11	523.9
	12	332.1
KB	1	140.1
	2	132.7
	3	313.9
	4	241.8
	5	238.7
	6	178.3
	7	265.6
	8	188.7
	9	211.0
	10	147.4
	11	133.2
	12	111.5

Whaingaroa Harbour

Site	Sample No.	Shell hash weight (g)
TU	1	120.5
	2	98.5
	3	114.0
	4	185.5
	5	65.0
	6	100.6
	7	132.9
	8	68.0
	9	77.6
	10	162.3
	11	80.9
	12	336.4
HB	1	142.4
	2	189.5
	3	256.0
	4	254.8
	5	317.0
	6	81.1
	7	146.1
	8	169.1
	9	197.6
	10	107.3
	11	105.9
	12	183.5
X	1	156
	2	271.4
	3	269.4
	4	311.3
	5	185.9
	6	219
	7	181.2
	8	221.7
	9	183.3
	10	160.5
	11	150.3
	12	467.3
WI	1	178.8
	2	276.0
	3	332.6
	4	60.2
	5	108.2
	6	70.9
	7	87.6
	8	157.1
	9	91.8
	10	122.1
	11	238.9
	12	148.0
OB	1	92.5
	2	49.8
	3	61.7
	4	210.9
	5	73.5
	6	47.2
	7	74.5
	8	40.1
	9	44.1
	10	41.5
	11	58.3
	12	83.3

Southern Firth of Thames

January 2007

Site	Sample No.	Shell hash weight (g)
MI	1	346.5
	2	506.8
	3	292.6
	4	342.6
	5	423.6
	6	287.6
	7	335.6
	8	487.1
	9	338.4
	10	387.6
	11	359.9
	12	541.1
KB	1	214.2
	2	243.1
	3	242.9
	4	276.5
	5	140.8
	6	140.9
	7	138.9
	8	190.8
	9	185.3
	10	147.6
	11	169.7
	12	149.0

Whaingaroa Harbour

Site	Sample No.	Shell hash weight (g)
WI	1	134.8
	2	112.3
	3	367.4
	4	185.7
	5	67.1
	6	124.1
	7	60.7
	8	100.6
	9	64.7
	10	398.6
	11	150.2
	12	126.9
OB	1	97.2
	2	75.2
	3	82.3
	4	58.9
	5	100.5
	6	60.8
	7	32.2
	8	59.8
	9	56.2
	10	51.2
	11	37.0
	12	37.7

Southern Firth of Thames

April 2007

Site	Sample No.	Shell hash weight (g)
KA	1	50.6
	2	53.1
	3	111.8
	4	63.2
	5	122.1
	6	44.8
	7	62.7
	8	90.2
	9	47.2
	10	58.4
	11	69.7
	12	56.5
GC	1	599.7
	2	566.8
	3	1041.7
	4	324.7
	5	647.4
	6	781.3
	7	635.2
	8	1109.2
	9	904.0
	10	1471.7
	11	634.9
	12	472.8
TP	1	61.7
	2	46.7
	3	71.0
	4	80.6
	5	58.6
	6	57.8
	7	122.2
	8	121.8
	9	176.1
	10	285.7
	11	82.0
	12	44.0
MI	1	319.4
	2	257.5
	3	150.5
	4	348.1
	5	439.8
	6	464.4
	7	465.2
	8	507.3
	9	206.6
	10	282.1
	11	344.9
	12	463.6
KB	1	187.7
	2	158.8
	3	134.5
	4	192.0
	5	287.3
	6	235.7
	7	200.9
	8	161.7
	9	292.0
	10	125.5
	11	153.4
	12	184.0

Whaingaroa Harbour

Site	Sample No.	Shell hash weight (g)
TU	1	142.0
	2	53.4
	3	96.5
	4	96.5
	5	85.9
	6	76.3
	7	96.2
	8	67.5
	9	73.2
	10	114.8
	11	84.1
	12	110.2
HB	1	150.7
	2	111.5
	3	111.1
	4	230.8
	5	130.8
	6	238.5
	7	169.9
	8	292.2
	9	157.2
	10	213.0
	11	154.5
	12	180.6
X	1	160.9
	2	176.6
	3	370.6
	4	333.6
	5	206.2
	6	135.2
	7	242.4
	8	173.2
	9	333.4
	10	189
	11	136.7
	12	207.7
WI	1	246.4
	2	215.0
	3	112.9
	4	62.4
	5	137.9
	6	58.4
	7	127.3
	8	128.4
	9	99.6
	10	113.1
	11	249.4
	12	165.6
OB	1	28.2
	2	41.4
	3	32.5
	4	53.3
	5	35.9
	6	30.3
	7	37.0
	8	70.5
	9	36.3
	10	93.1
	11	67.0
	12	84.0

Appendix 4 – Sediment organic matter content

Southern Firth of Thames

July 2006

	Total Organic Carbon g/100g dry wt	Dry Matter g/100g as rcvd	Total Nitrogen g/100g dry wt
MI	0.26	64.6	0.06
	0.31	61.5	0.07
	0.28	63.3	0.06
	0.26	65.2	0.06
	0.3	61.4	0.07
KB	0.39	62.9	0.07
	0.39	63.6	0.09
	0.34	66.4	0.08
	0.37	61.1	0.09
	0.3	65.6	0.06

October 2006

	Total Organic Carbon g/100g dry wt	Dry Matter g/100g as rcvd	Total Nitrogen g/100g dry wt
KA	0.37	67.6	0.09
	0.28	66.3	0.06
	0.31	64.1	0.06
	0.26	68.5	< 0.05
	0.45	53.9	0.08
GC	0.32	63.7	0.06
	0.36	59.5	0.07
	1.38	63.2	0.08
	0.45	58.3	0.1
	0.37	61.4	0.06
TP	0.13	68.7	< 0.05
	0.14	67.4	< 0.05
	0.15	67.2	< 0.05
	0.14	68.1	< 0.05
	0.16	67.4	< 0.05
MI	0.31	67.7	0.06
	0.3	67.9	0.08
	0.33	59.9	0.09
	0.3	64.6	0.05
	0.31	64.9	0.06
KB	0.4	63.5	0.07
	0.46	56.9	0.08
	0.43	60.2	0.08
	0.6	54	0.11
	0.61	54.3	0.12

January 2007

	Total Organic Carbon g/100g dry wt	Dry Matter g/100g as rcvd	Total Nitrogen g/100g dry wt
MI	0.23	70.6	< 0.05
	0.2	68	< 0.05
	0.2	66.2	< 0.05
	1.78	72.9	0.06
	0.3	61.3	0.07
KB	0.64	64.5	0.1
	0.59	59.2	0.09
	0.63	62.9	0.1
	0.63	62.3	0.09
	0.63	59.4	0.1

Whaingaroa Harbour

	Total Organic Carbon g/100g dry wt	Dry Matter g/100g as rcvd	Total Nitrogen g/100g dry wt
WI	0.43	66.6	0.07
	0.39	73	0.07
	0.37	70.6	0.07
	0.47	62.7	0.08
	0.46	58.8	0.08
OB	0.64	59.7	0.11
	0.76	55.8	0.13
	0.79	57.1	0.12
	0.77	53.2	0.12
	0.9	49.8	0.13

	Total Organic Carbon g/100g dry wt	Dry Matter g/100g as rcvd	Total Nitrogen g/100g dry wt
TU	0.4	70.9	0.08
	0.41	75.9	0.14
	0.33	72	0.08
	0.39	72.3	0.07
	0.38	75.8	0.07
HB	0.71	58.3	0.17
	0.77	58.4	0.12
	0.78	60.6	0.12
	0.76	60	0.12
	0.77	54.4	0.12
X	0.48	62.3	0.08
	0.49	68.6	0.06
	0.39	67.4	0.06
	0.49	67.1	0.08
	0.43	68.5	0.07
WI	0.35	67.9	0.05
	0.36	67.5	0.07
	0.34	71.1	0.08
	0.42	68.5	0.09
	0.36	60.8	0.06
OB	0.65	62.2	0.1
	0.63	62	0.1
	0.66	58	0.1
	0.63	62.2	0.09
	0.63	62.8	0.08

	Total Organic Carbon g/100g dry wt	Dry Matter g/100g as rcvd	Total Nitrogen g/100g dry wt
WI	0.4	66.6	0.07
	0.4	70.4	0.09
	0.31	72	0.06
	0.22	74.4	0.06
	0.34	71.3	0.06
OB	0.64	64.5	0.1
	0.59	59.2	0.09
	0.63	62.9	0.1
	0.63	62.3	0.09
	0.63	59.4	0.1

Southern Firth of Thames

April 2007

	Total Organic Carbon g/100g dry wt	Dry Matter g/100g as rcvd	Total Nitrogen g/100g dry wt
KA	0.46	54.4	0.09
	0.35	61.9	0.07
	0.34	63.1	0.07
	0.31	63.2	0.05
	0.68	65.5	0.16
GC	0.29	59.5	< 0.05
	0.35	67.9	0.06
	0.26	64	< 0.05
	0.34	64.1	0.05
	0.26	64.6	< 0.05
TP	0.18	68.6	< 0.05
	0.14	69.7	< 0.05
	0.15	71.6	< 0.05
	0.36	64.8	0.06
	0.19	68.3	< 0.05
MI	0.55	55.4	0.09
	0.31	70.8	0.05
	1.51	38.5	0.22
	1.54	33.9	0.24
	1.08	48.3	0.17
KB	0.4	64.5	0.08
	0.91	38.8	0.13
	1.81	31.2	0.29
	0.59	51.8	0.1
	1.37	39.9	0.2

Whaingaroa Harbour

	Total Organic Carbon g/100g dry wt	Dry Matter g/100g as rcvd	Total Nitrogen g/100g dry wt
TU	0.86	71.2	0.07
	0.43	67.2	0.05
	0.5	69.8	0.08
	0.45	67	0.07
	0.6	61.8	0.08
HB	0.72	55.2	0.1
	0.8	56.8	0.11
	0.83	47.7	0.12
	0.88	51.2	0.11
	0.84	58.3	0.11
X	0.38	69.1	0.05
	0.6	62.9	0.08
	0.53	64.5	0.07
	0.44	70.1	0.06
	0.51	64.8	0.07
WI	0.39	62.3	0.06
	1.52	58.3	0.3
	0.35	64.5	0.06
	0.28	68.5	< 0.05
	0.3	65.9	0.05
OB	0.49	64.5	0.07
	0.45	61.8	0.06
	0.44	63.7	0.06
	0.5	65.7	0.06
	0.33	70.3	0.05

Appendix 5 – Sediment photosynthetic pigment concentration

Southern Firth of Thames

July 2006

	Chlorophyll-*a* $mg.kg^{-1}$	Pheophytin $mg.kg^{-1}$
MI	2.60	1.50
	2.30	1.30
	2.80	0.60
	4.70	1.90
	5.70	3.40
KB	4.10	1.70
	3.10	0.60
	4.70	3.10
	3.30	1.20
	5.20	0.70

October 2006

	Chlorophyll-*a* $mg.kg^{-1}$	Pheophytin $mg.kg^{-1}$
KA	4.80	4.80
	9.30	19.20
	11.50	18.70
	6.60	9.20
	6.50	5.90
GC	17.80	6.70
	8.20	8.90
	13.50	1.80
	13.60	2.00
	22.50	1.90
TP	5.30	2.60
	6.90	1.70
	1.50	1.20
	10.60	2.30
	4.00	1.50
MI	37.70	44.70
	19.70	7.80
	13.20	9.40
	15.00	6.80
	25.00	34.00
KB	14.40	10.40
	7.30	2.10
	7.90	4.50
	10.70	11.90
	8.10	3.20

Whaingaroa Harbour

	Chlorophyll-*a* $mg.g^{-1}$	Pheophytin $mg.g^{-1}$
WI	8.80	3.10
	4.70	2.00
	5.20	2.30
	7.50	3.50
	5.10	2.50
OB	7.50	4.70
	3.00	2.20
	6.30	3.00
	10.40	4.30
	6.20	4.00

October 2006

	Chlorophyll-*a* $mg.kg^{-1}$	Pheophytin $mg.kg^{-1}$
TU	26.30	14.30
	16.40	8.60
	39.70	8.30
	17.20	11.80
	32.70	12.80
HB	17.00	4.80
	14.70	9.70
	12.70	9.20
	13.40	9.80
	18.10	13.70
X	23.80	13.0
	19.10	12.7
	17.00	8.4
	17.30	6.2
	16.10	15.0
WI	14.60	6.90
	10.40	8.50
	16.20	4.10
	13.30	8.50
	11.50	11.80
OB	12.30	10.10
	12.40	12.00
	9.80	9.10
	12.60	9.20
	13.70	10.00

January 2007

	Chlorophyll-*a* $mg.kg^{-1}$	Pheophytin $mg.kg^{-1}$
MI	11.20	6.90
	7.80	4.40
	11.30	4.70
	9.80	3.40
	9.40	3.00
KB	10.40	4.30
	10.80	5.40
	17.80	10.50
	16.60	7.70
	50.10	57.40

	Chlorophyll-*a* $mg.kg^{-1}$	Pheophytin $mg.kg^{-1}$
WI	17.00	13.90
	16.70	15.00
	20.90	13.20
	23.60	14.20
	18.30	11.00
OB	15.50	12.80
	15.40	12.40
	17.10	13.50
	15.10	13.20
	18.40	15.90

Southern Firth of Thames

Whaingaroa Harbour

April 2007

	Chlorophyll-*a* $mg.kg^{-1}$	Pheophytin $mg.kg^{-1}$
KA	7.60	5.80
	7.50	5.80
	7.00	5.30
	7.70	5.60
	7.60	5.50
GC	9.50	7.80
	6.30	9.10
	11.60	9.60
	8.80	7.10
	11.00	8.40
TP	1.60	1.70
	0.90	3.80
	1.40	2.40
	2.30	1.60
	1.50	1.90
MI	10.20	9.00
	8.90	5.00
	8.90	6.70
	9.50	5.80
	9.80	6.70
KB	12.00	12.50
	9.60	8.00
	9.30	10.40
	8.70	6.50
	8.20	8.90

	Chlorophyll-*a* $mg.kg^{-1}$	Pheophytin $mg.kg^{-1}$
TU	8.90	4.40
	11.70	5.60
	12.80	6.10
	14.20	6.60
	10.40	5.50
HB	12.10	5.40
	9.70	7.10
	10.00	7.20
	10.20	6.30
	8.00	5.00
X	8.30	4.20
	9.60	4.30
	12.00	4.90
	10.90	4.80
	11.60	6.20
WI	10.60	6.60
	8.90	6.30
	7.80	4.20
	10.60	6.90
	10.00	6.60
OB	8.90	6.80
	7.80	5.90
	8.60	5.40
	7.20	5.40
	6.80	4.90

Appendix 6 – 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[5] 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 16% (2 out of 12 samples) 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 16% 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 (correctly identified) 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.

[5] 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.