CAWTHRON

Southland Estuaries

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Southland Estuaries

State of Environment Report 2001-2006

Barry Robertson

Leigh Stevens

Prepared for

Environment Southland

environment SOUTHLAND
Te Taiao Tonga

Cawthron Institute
98 Halifax Street East, Private Bag 2,
Nelson, New Zealand.
Ph. +64 3 548 2319,
Fax. + 64 3 546 9464
www.cawthron.org.nz

Reviewed by: Dr Paul Gillespie

Approved for release by: Rowan Strickland

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EXECUTIVE SUMMARY

Environment Southland has established a long-term monitoring programme to assess the condition of key estuaries in its region using the tools provided in the National Estuary Monitoring Protocol (EMP) (Robertson et al. 2002). Since 2001-2002, various physical, chemical and biological indicators of estuary condition have been used on five Southland estuaries (New River, Jacobs River, Fortrose, Waikawa and Haldane Estuaries) to assess the baseline conditions. In addition, Bluff Harbour and Awarua Bay (an estuarine embayment), have been monitored as a one-off baseline assessment. This report provides an overview of estuary condition based on the first five years of this programme. It compares the monitoring results for each of the indicators with guideline criteria and, where possible, a provisional rating is given as a guide to the current baseline condition. This baseline condition will subsequently be used to compare with future monitoring results to assess any change towards a more improved or degraded state and identify areas for management. The report also highlights gaps in our assessment and makes recommendations for improvements. A summary list of indicators, and current condition ratings are presented below. At present many of these ratings are in draft form or as yet undeveloped.

INDICATOR	REASON	RATING
Saltmarsh Habitat	Saltmarshes are highly valued and sensitive to a range of pressures.	A rating scale based on the percentage change to the saltmarsh area within the estuary was developed but needs long-term data before it can be reported (except for New River Estuary). Fortrose Estuary has the greatest percentage cover of saltmarsh. Saltmarsh area in the New River Estuary has declined by 30% since 1910, which provisionally places it in the "poor" rating. Ratings for the other estuaries in Southland will be made once estimates of historical reclamation have been undertaken.
Seagrass Habitat	Seagrasses are highly valued and sensitive to a range of pressures.	A rating scale based on the percentage change to the seagrass area within the estuary was developed but needs long-term data before it can be reported. New River Estuary has significant areas of seagrass (92 ha) but other estuaries have very little. Bluff Harbour and Awarua Bay, with their high water clarity and well-oxygenated sediments, have the largest areas of seagrass (150 and 600 ha respectively). Ratings for these estuaries will be made once estimates of historical saltmarsh cover have been undertaken.
Nuisance Macroalgal Cover	Certain types of macroalgae (*e.g.* sea lettuce, *Gracilaria* sp. and *Enteromorpha* sp.) can grow to nuisance levels in response to excessive nutrients.	Rating scale developed. Most estuaries were rated as "fair" in terms of percentage of the estuary area covered with nuisance growths. It is noted that all estuaries experienced some areas of nuisance growths, with New River Estuary reporting widespread growths but at a low density.
Soft Mud Sediment	Large areas of soft mud indicate excessive inputs of sediment and adverse impacts to habitat and biodiversity.	Rating scale developed but needs long term data before it can be reported. Preliminary rating scale proposed to indicate current condition based on the percentage of an estuary area as soft muds exceeding 5%, or increasing rapidly. Waikawa, Jacobs River, New River and Haldane Estuaries fall into the proposed category requiring an Evaluation and Response Plan As expected, Bluff Harbour and Awarua Bay, with their absence of significant freshwater inputs, were rated as undegraded.

INDICATOR	REASON	RATING
Organic and Nutrient Enrichment	Enrichment of sediments with nutrients and organic matter can indicate excessive inputs and a potential for adverse impacts to habitat and biodiversity.	Rating scale developed. Regionally, the level of total organic carbon (TOC) in estuarine sediments was rated "good". Compared with the elevated nitrogen and phosphorus concentrations measured in very eutrophic sites, the Southland estuary sites were low.
Contamination in Bottom Sediments	Enrichment of sediments with potentially toxic contaminants can indicate excessive inputs and adverse impacts to habitat and biodiversity	Rating scale developed. Regionally, the level of heavy metals (cadmium, chromium, copper, nickel, lead and zinc) in the Southland estuaries were all well below the ANZECC (2000) ISQG Low guideline criteria and therefore unlikely to cause any biological impact on organisms inhabiting the sediment. These results place the estuaries in the "very good" to "good" category with respect to heavy metal toxicity.
Condition of Bottom Dwelling Animals	Benthic communities reflect the influence of contaminants, nutrients, sedimentation, oxygen levels, and shifts in temperature or salinity.	A rating scale based on a yet-to-be established biotic index has been recommended for development. The benthic communities present at all sites were moderately diverse, with a relatively high level of variation in baseline data. The animals present were typical of moderately enriched sites with some mud, and no significant contamination, or high enrichment issues. However, New River Estuary Site B did show signs of enrichment that were most likely due to inputs from the heavily modified catchment.

A table summarising the condition of Southland's estuaries using the available data and proposed ratings is presented below.

Site / Indicator	New River	Jacobs River	Fortrose	Waikawa	Haldane	Awarua Bay	Bluff Harbour
Saltmarsh Habitat	Poor	ND	ND	ND	ND	ND	ND
Seagrass Habitat	ND	ND	ND	ND	ND	Very Good	ND
Macroalgal Cover	Fair	Fair / Poor	Fair	Fair	Fair	Fair	Fair
Soft Mud	Fair	Fair	Good	Fair	Fair	Good	Good
Organic Matter and Nutrients	Good	Good	Good	Good	Good	Good	Good
Toxic Contaminants	Very Good	Very Good	Very Good	Very Good	Very Good	Very Good	Very Good
Bottom-Living Animals	ME, OE	ME	ME	ME	ME	ME	ME

ND = Not determined
ME = Typical of moderately enriched sites with some mud
OE = Typical of organically enriched sites

Overall, the results to date indicate that estuaries draining developed catchments in Southland do not have significant problems with potentially toxic contaminants or enrichment of sediments with organic matter and nutrients. However, they do experience problems related to large areas of soft muddy sediments in their upper reaches, loss of saltmarsh habitat through reclamation, very elevated nutrient levels in the water column, and various levels of nuisance macroalgal growths.

The results also highlight important gaps in the current programme and what can be done to fill them. In particular:

- A need to develop salinity profiles for each site.
- Expand monitoring to the upper, soft mud reaches of Southland estuaries.
- Identify the main catchment drivers of estuary sediment and nutrient enrichment and establish evaluation and management plans.
- Develop nutrient load guidelines for each developed catchment.
- Establish a monitoring programme designed to identify mass loads of suspended sediment, N and P to at-risk estuaries.
- Develop a biotic index for Southland estuaries.
- Monitor other estuaries and coastal lagoons that are potentially under threat.

TABLE OF CONTENTS

EXECUTIVE SUMMARY III
1. INTRODUCTION 1
2. ESTUARY MONITORING PROGRAMME 2
3. STRUCTURE 8
4. SALTMARSH HABITAT 9
4.1. Reason 10
4.2. Method 10
4.3. Assessment Criteria and Ratings 10
4.4. Southland Estuaries – Saltmarsh Habitat Cover 11
4.5. Gaps and Recommendations 11
5. SEAGRASS HABITAT 13
5.1. Reason 13
5.2. Method 13
5.3. Assessment Criteria and Ratings 13
5.4. Southland Estuaries – Seagrass Habitat Cover 14
5.5. Gaps and Recommendations 15
6. NUISANCE MACROALGAL COVER 15
6.1. Reason 16
6.2. Indicator 16
6.3. Assessment Criteria and Ratings 16
6.4. Southland Estuaries – Nuisance Macroalgal Cover 17
6.5. Gaps and Recommendations 18
7. SOFT MUD SEDIMENT 18
7.1. Reason 18
7.2. Method 18
7.3. Assessment Criteria and Ratings 19
7.4. Southland Estuaries – Soft Mud Habitat Cover 19
7.5. Gaps and Recommendations 20
8. SEDIMENT ORGANIC CARBON AND NUTRIENTS 21
8.1. Reason 21
8.2. Method 22
8.3. Assessment Criteria and Ratings 22
8.4. Southland Estuaries - Organic Matter, TN and TP 23
8.5. Gaps and Recommendations 26
9. CONTAMINATION IN BOTTOM SEDIMENTS 27
9.1. Reason 27
9.2. Method 27
9.3. Assessment Criteria and Ratings 27
9.4. Southland Estuaries - Heavy Metals 28
9.5. Gaps and Recommendations 32
10. CONDITION OF BOTTOM DWELLING ANIMALS 33
10.1. Reason 33

10.2. Method 33
10.3. Assessment Criteria and Ratings 33
10.4. Southland Estuaries - Bottom Dwelling Animals 35
10.5. Gaps and Recommendations 38
11. CONCLUSIONS 38
12. ACKNOWLEDGEMENTS 43
13. REFERENCES 43
14. APPENDICES 46

LIST OF FIGURES

Figure 1. Location of estuaries included in the Environment Southland monitoring. 2
Figure 2. Summary of broad scale habitat types in Southland estuaries. 7
Figure 3a. Percentage of total estuary area covered in saltmarsh vegetation for Southland estuaries in 2001-2005. 12
Figure 3b. Percentage reduction in New River Estuary saltmarsh area from historical baseline (1910) to 2001. Other Southland Estuaries to be included once historical baselines established.. 12
Figure 4. Percentage of total estuary area covered in seagrass vegetation for Southland estuaries in 2001-2005 and area of seagrass in hectares. 15
Figure 5. Percentage of unvegetated tidal flats covered with potentially nuisance macroalgal species in Southland estuaries. 17
Figure 6. Percentage cover of soft mud habitat in Southland estuaries and their condition ratings. 20
Figure 7. Mean TOC concentrations in Southland estuaries compared with the proposed TOC ratings. 24
Figure 8. Mean TN concentrations in Southland estuaries compared with levels found in very enriched estuary sites. 25
Figure 9. Mean TP concentrations in Southland estuaries compared with levels found in very enriched estuary sites. 25
Figure 10. Mean cadmium concentrations and ratings in Southland estuaries. 29
Figure 11. Mean chromium concentrations and ratings in Southland estuaries. 30
Figure 12. Mean copper concentrations and ratings in Southland estuaries. 30
Figure 13. Mean nickel concentrations and ratings in Southland estuaries. 31
Figure 14. Mean lead concentrations and ratings in Southland estuaries. 31
Figure 15. Mean zinc concentrations and ratings in Southland estuaries. 32
Figure 16. Mean benthic community richness and abundance in Southland estuaries. 35
Figure 17. Mean Shannon-Weiner diversity values in Southland estuaries. 36
Figure 18. Mean number of Capitella capitata/m^2 in Southland estuaries. 36
Figure 19. Summary of the most common species found across Southland estuaries. 37

LIST OF TABLES

Table 1. Proposed long-term estuary monitoring programme – Environment Southland 3
Table 2. Summary characteristics of five estuaries included in the Environment Southland Estuary Monitoring Programme (ESEMP). Sampling sites are represented by X. 4
Table 3. Summary characteristics of Bluff Harbour (sampling sites are represented by X)..... 6
Table 4. List of reports to date from Environment Southland Estuary Monitoring Programme..... 8
Table 5. Summary list of indicators for ESEMP. 9
Table 6. Provisional assessment criteria, response and ratings for saltmarsh cover. 11
Table 7. Provisional assessment criteria, response and ratings for seagrass cover. 14
Table 8. Example of condition rating for macroalgal cover in Southland Estuaries..... 16
Table 9. Proposed rating criteria for assessing sediment TOC by site (concentrations on a dry-weight basis). 22
Table 10. Comparison of TOC, TN and TP concentrations in estuaries with varying characteristics and eutrophication symptoms..... 23
Table 11. Recommended ANZECC (2000) sediment quality guidelines for metals. 28
Table 12. Criteria and ratings for assessing sediment contaminant concentrations in Southland estuaries.... 28
Table 13. The five sensitivity to stress groupings for soft-bottomed communities developed for AMBI (from Borja et al. 2003). 34
Table 14. Summary of Southland estuary condition based on the available data and preliminary ratings proposed. 41

LIST OF APPENDICES

Appendix 1. Physical and chemical sediment properties of sites in New River, Fortrose, Jacobs River, Waikawa and Haldane Estuaries and Bluff Harbour and Awarua Bay 46
Appendix 2. Infaunal and epifaunal species abundance at sites in New River, Fortrose, Jacobs River, Waikawa and Haldane Estuaries and Bluff Harbour and Awarua Bay 47

1. INTRODUCTION

The Southland Region includes numerous estuaries and glacial-built fjords. Estuaries are semi-enclosed bodies of water where mixing takes place between the rivers and the sea. As a result, conditions within estuaries (*e.g.* salinity) are extremely variable depending on the state of the tide and the strength of the inflowing river. In addition, the river brings silt and nutrients to the estuary in varying quantities, depending on conditions in its catchment (drainage basin). Combined with the sheltered, shallow and calm conditions within estuaries, these features make them particularly specialised environments. Globally they are more productive than comparably-sized areas of forest, grassland, or agricultural land (Costanza et al. 1997) and include a vast array of different habitat types including shallow open waters, freshwater and saltmarshes, sandy beaches, mud and sand flats, rocky shores, oyster reefs, mangrove forests, river deltas, tidal pools, sea grass and kelp beds, and forested swamps. The shallow lagoons and estuaries of Southland have exceptional value as wading bird and shellfish habitat and as nursery areas for fish (Cooper 1989, Hare 1991). At least 30 species of commercial fish use New Zealand estuaries at some stage in their life cycle including, snapper, flounder, mullet, rock fish, sole, kahawai, trevally, parore, red cod and gurnard. Freshwater eels, salmon, and whitebait migrate through estuaries at least twice in their life cycle.

The economy of many coastal areas is often linked to the natural beauty and bounty of estuaries (*e.g.* Invercargill and Riverton situated on the banks of the New River and Jacobs River Estuaries respectively). When those natural resources are threatened, so too are the values of people who live and work there. More than 50% of Southland people now live in coastal areas bordering estuaries and these coastal communities are growing much faster than communities elsewhere in the region.

Unfortunately, population growth is upsetting the natural balance of estuarine ecosystems and threatening their integrity in many areas of the world. Saltmarsh areas have been drained, marshes and tidal flats have been filled with mud, channels have been dredged and re-aligned, waters polluted, and shorelines reconstructed to accommodate human housing, transportation, industry, and agriculture needs. Stresses caused by overuse of resources and unchecked land use practices have resulted in unsafe drinking and bathing water, beach and shellfish bed closings, harmful algal blooms, unproductive fisheries, loss of habitat, fish kills, and a host of other human health and natural resource problems.

As the population in Southland grows and land use practices change and intensify, the demands imposed on its natural estuary resources increase. So too does the importance of protecting these resources for all their natural, economic, and aesthetic values. Environment Southland, through its approach of inclusive, community-based planning and action at the catchment level, plays a primary role in monitoring, protecting and restoring Southland's important estuaries.

Although, estuaries come in all shapes and sizes and go by many different names, often known as bays, lagoons, harbours, inlets, fjords or sounds, the estuaries of the Southland Region

consist primarily of fjords on the western coast and shallow, well-flushed, sand-dominated estuaries on the southern coast. It is these shallow, sandy estuaries that have received the greatest attention to date, as they drain the populated and developed catchments within the region (Figure 1). These estuaries make good sediment traps, filling with sediment from both the land and the sea. Sediment from the land includes muds and clays delivered by rivers while sediments from the sea are usually clean sands pushed into the estuary by waves and tidal currents. Sediment can also come from shoreline erosion, windblown sediment and shell production/disintegration.

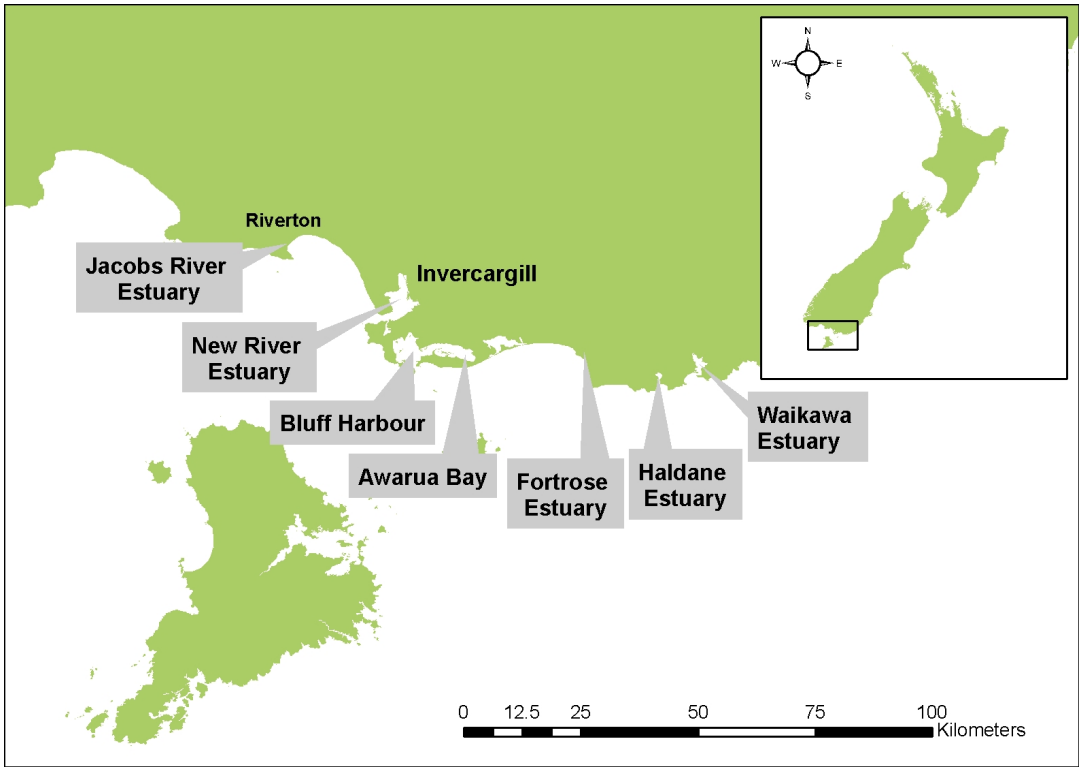


Figure 1. Location of estuaries included in the Environment Southland monitoring.

2. ESTUARY MONITORING PROGRAMME

Environment Southland has established a long-term monitoring programme to assess the condition of key estuaries in its region using the tools provided in the National Estuary Monitoring Protocol (EMP) (Robertson et al. 2002). In 2001, Environment Southland used the first of these tools, a decision matrix, to prioritise estuaries (outside of Fiordland) for monitoring, and to establish a practical timetable for monitoring over a 10-year period (Table 1).

Table 1. Proposed long-term estuary monitoring programme – Environment Southland

Proposed Estuary Monitoring 2002 to 2012 - Environment Southland													
Estuary		**2001-02**	**2002-03**	**2003-04**	**2004-05**	**2005-06**	**2006-07**	**2007-08**	**2008-09**	**2009-10**	**2010-11**	**2011-12**	**2012-13**
New River Estuary	Habitat Mapping	x					*					*	
	Fine Scale	x	x	x	x		*		*		*		*
Jacobs River Estuary	Habitat Mapping		x					*					*
	Fine Scale		x	x	x	x		*		*		*	
Fortrose Estuary	Habitat Mapping		x					*					*
	Fine Scale			x	x	x	*		*		*		*
Waikawa Estuary	Habitat Mapping			x					*				
	Fine Scale				x	x	*	*		*		*	
Haldane Estuary	Habitat Mapping				x					*			
	Fine Scale					x	*	*	*		*		*
Waituna Lagoon	Habitat Mapping										*		
	Fine Scale												
Awarua Bay (Intertidal)	Habitat Mapping			x					*				
	Fine Scale				x								
Bluff Harbour (Intertidal)	Habitat Mapping			x					*				
	Fine Scale				x								
Waiau Lagoon/	Habitat Mapping								*				
	Fine Scale									*	*	*	*
Freshwater Estuary	Habitat Mapping					*					*		
	Fine Scale						*	*	*	*		*	
Estuary State of Environment Report						*					*		

* proposed x completed

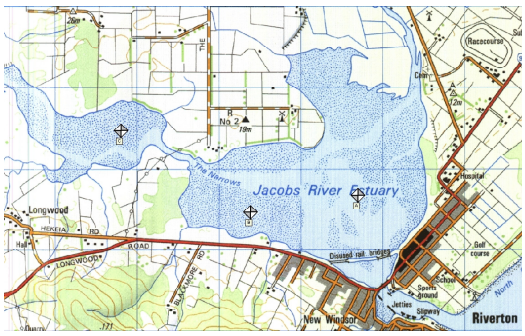
Since 2001-2002, the second set of tools, which consist of physical, chemical and biological indicators of estuary condition, have been used on priority Southland estuaries (Figure1) in a staged manner. The five Southland estuaries that are currently being monitored on a long-term basis are New River, Jacobs River, Fortrose, Waikawa and Haldane Estuaries. In addition Bluff Harbour and Awarua Bay (an estuarine embayment), have been monitored as a one-off baseline assessment. A summary of the characteristics of each of these estuaries is presented in Tables 2 and 3, and a broad-scale outline of the habitat types is shown in Figure 2. Detailed results of the monitoring at each site are presented in Appendices 1 and 2.

Table 2. Summary characteristics of five estuaries included in the Environment Southland Estuary Monitoring Programme (ESEMP). Sampling sites are represented by X.

New River Estuary

New River Estuary is a large, shallow, barrier-enclosed estuary (<1.5m mean depth), situated at the confluence of the Oreti and Waihopai Rivers, adjacent to the city of Invercargill. It drains a primarily agricultural catchment but has a significant urban component. Of the total estuary area of 4200ha, 14% is vegetated and at low water 73% of the estuary area is exposed (Figure 2). The estuary was once the major trading port of Southland but sedimentation problems mean channels are now barely negotiable by pleasure craft. The estuary has been extensively reclaimed (26% reduction in tidal area) and receives all the treated wastewater from Invercargill. In addition to sedimentation, wastewater disposal and reclamation issues, the estuary has moderate macroalgal blooms and has been extensively sprayed for the noxious weed *Spartina townsendii*. Historically, the estuary was a major source of food for Maori and it forms part of a network of Southland estuaries with exceptional ornithological values. Today it is popular for recreational swimming, boating, shellfish gathering and fishing.

Jacobs River Estuary



Jacobs River Estuary is a medium-sized, shallow barrier-enclosed estuary (<1.5m mean depth), situated at the confluence of the Aparima and Pourakino Rivers, adjacent to the township of Riverton. It drains a primarily agricultural catchment. Of the total estuary area of 718ha, 25% is vegetated and at low water 80% of the estuary area is exposed (Figure 2). The estuary includes a fishing port located near the estuary mouth and is popular for fishing, shellfish collection (primarily cockles), duck shooting, boating, bathing and bird study. Nuisance blooms of the green macroalgae (*Enteromorpha* sp.) are common and can occupy 30% of the estuary area (Robertson 1992).

Fortrose Estuary

Fortrose Estuary is a small, shallow barrier-enclosed estuary (<1.5m mean depth), situated at the confluence of the Mataura and Titiroa Rivers, adjacent to the small community of Fortrose. It drains a primarily agricultural catchment and its estuary volume is small in relation to the size of the freshwater inflow. Of the total estuary area of 497ha, 18% is vegetated and at low water 53% of the estuary area

is exposed (Figure 2). The estuary includes a fishing port located near the estuary mouth and is popular for fishing, shellfish collection (primarily cockles), duck shooting, boating, bathing and bird study. Localised blooms of the green macroalgae (*Enteromorpha* sp.) are common near Fortrose.

Waikawa Estuary

Waikawa Estuary is a medium-sized, shallow barrier-enclosed estuary (<1.5m mean depth), situated at the confluence of the Waikawa River, adjacent to the small community of Waikawa. It drains a primarily agricultural and forested catchment. Of the total estuary area of 705ha, 6% is vegetated and at low water 83% of the estuary area is exposed (Figure 2). The estuary is popular for fishing (particularly whitebaiting), shellfish collection (primarily cockles), duck shooting, boating, bathing and bird study. Localised blooms of the green macroalgae (*Enteromorpha* sp.) are common near Waikawa.

Haldane Estuary

Haldane Estuary is a medium-sized, shallow barrier-enclosed estuary (<1.5m mean depth), situated at the confluence with the Waikopikopiko and Waipohatu Streams and Waionepu Creek. It drains a primarily agricultural and forested catchment. Of the total estuary area of 206ha, 5% is vegetated and at low water 92% of the estuary area is exposed (Figure 2). The estuary is popular for fishing, shellfish collection (primarily cockles), duck shooting, boating, bathing and bird study. Localised blooms of the red macroalgae (*Gracilaria* sp.) are common.

Table 3. Summary characteristics of Bluff Harbour (sampling sites are represented by X).

Bluff Harbour		Bluff Harbour is a natural coastal harbour 3,100 ha in area, with a tidal range of up to 3 metres. It has no major river inputs and at low tide 40% is unvegetated tidal flats and 8% is vegetated (mainly seagrass beds). The Port of Bluff is situated within the harbour. Shore stabilisation, reclamations, causeways and wharves have altered the natural shoreline features, particularly the western border. The harbour is popular for fishing, shellfish collection (primarily cockles), duck shooting, boating, and bathing. Localised blooms of the red macroalgae (*Gracilaria* sp.) are common.
Awarua Bay		Awarua Bay is a shallow, natural estuarine embayment, 2,700ha in area, whose mouth opens to Bluff Harbour. It has no major river inputs and at low tide 50% is unvegetated tidal flats and 30% is vegetated. The estuary is renowned for its high clarity water and expansive areas of seagrass (*Zostera*) beds (600ha). Mussel farming is undertaken near the mouth. The estuary is popular for fishing, duck shooting, walking, boating, and bathing. Localised blooms of the red macroalgae (*Gracilaria* sp.) are present.

Estuary sediments, and their associated physical, chemical and biological characteristics, tend to be the most sensitive to degradation (Church 1975) and are therefore the primary focus of the estuarine indicators used. They include; mapping all the habitat areas (*e.g.* saltmarsh, soft mud, seagrass, sand flats) at a broad scale, and then choosing one to three representative low-mid water sites for more detailed assessment of various indicators (*i.e.* sediment particle size, organic matter, nutrients, oxygen depletion, heavy metals and sediment macrofauna). The results have been reported annually in the reports listed in Table 4.

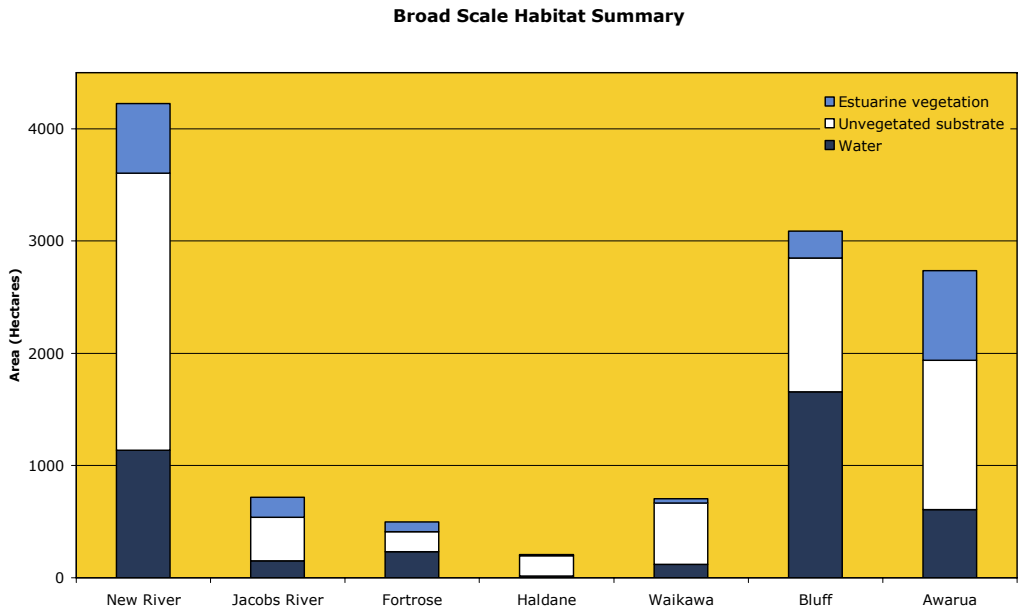


Figure 2. Summary of broad scale habitat types in Southland estuaries.

At five-yearly intervals, the results are reviewed to provide an overview State of Environment (SOE) assessment of the condition of Southland's estuaries. The purpose of the present SOE report is to provide this assessment, identify any gaps, and make recommendations for improvements to the programme. It is envisaged that this information will be used to identify areas where management is required both within the estuary and outside of it.

Table 4. List of reports to date from Environment Southland Estuary Monitoring Programme.

	Estuary	Reference
Habitat Mapping	New River Estuary 2000-1	Robertson et al. 2002
	Jacobs River Estuary 2002-3	Robertson et al. 2003a
	Fortrose Estuary 2002-3	Robertson et al. 2003b
	Waikawa Estuary 2003-4	Robertson et al. 2004a
	Bluff Harbour 2003-4	Robertson et al. 2004b
	Awarua Bay 2003-4	Robertson et al. 2004c
	Haldane Estuary 2004-5	Stevens and Asher 2005a
Fine Scale	New River Estuary 2000-1	Robertson et al. 2002
	New River, Jacobs Estuaries 2002-3	Robertson and Asher 2003
	New River, Jacobs, Fortrose Estuaries 2003-4	Robertson et al. 2004
	New River, Jacobs, Fortrose, Waikawa Estuaries 2004-5	Stevens and Asher 2005b
	Jacobs, Fortrose, Waikawa and Haldane Estuaries 2005-6	Robertson and Asher 2006

3. STRUCTURE

The SOE report is structured around the combined appraisal of the different indicators of estuarine condition (*e.g.* broad scale habitat mapping, fine scale sediment chemistry and macrofauna) collected as part of the ESEMP. For clarity, each indicator is addressed separately in the following sections, although a combined measure across all indicators should be used to derive an overall assessment of estuarine health. It is envisaged that over time a multi-parameter index will be developed to combine the assessment criteria, summarising the overall quality of each estuary.

A key component of the work undertaken for this report has been to provide a way of assessing how each estuary rates (*e.g.* very good, good, fair, poor) in relation to the key condition indicators measured. To facilitate this we have proposed assessment criteria and ratings for the individual indicators to provide guidance on the overall health status of each estuary, as well as to provide a benchmark against which future change can be assessed, and to enable the estuaries to be assessed relative to each other. Based on how an estuary scores on the assessment rating proposed, there are also recommendations made regarding the type and frequency of monitoring that may be considered appropriate.

For the criteria and ratings proposed, we have utilised existing guidelines (*e.g.* ANZECC 2000, USEPA 2004) wherever possible, or have proposed new guidelines based on both the monitoring data collected to date, and on our experience of the Southland estuaries. The guidelines proposed require further development and refinement but are intended as the first

phase in establishing thresholds of potential habitat degradation that, if exceeded, trigger appropriate actions *e.g.* development of an Evaluation and Response Plan.

In the following sections the following is identified for each condition indicator:

- why it was chosen;
- what guideline criteria can be used to assess condition, *e.g.* ANZECC (2000) sediment metal trigger limits for toxicity;
- whether a rating, *e.g.* very good, good, fair and poor, can be used;
- where the Southland estuary sites fit within these criteria and ratings (if appropriate);
- gaps in our assessment and recommendations for management or improvements to the monitoring programme.

A summary list of indicators and assessment methods is presented in Table 5. At present many of the specific criteria for rating estuaries using the specified indicators (*e.g.* very good, good, fair and poor) are preliminary or as yet undeveloped.

Table 5. Summary list of indicators for ESEMP.

Level	#	Indicator	Method
Broad Habitat	**1**	**Saltmarsh Habitat**	Broad scale mapping - estimates the change in the amount of saltmarsh habitat over time.
Broad Habitat	**2**	**Seagrass Habitat**	Broad scale mapping - estimates the change in the amount of seagrass habitat over time.
Nutrient Enrichment	**3**	**Nuisance Macroalgal Cover**	Broad scale mapping - estimates the change in the area of nuisance macroalgal growth (*e.g.* sea lettuce, *Gracilaria* sp. and *Enteromorpha* sp.) over time.
Sedimentation	**4**	**Soft Mud Sediment**	Broad scale mapping - estimates the change in the amount of soft mud habitat over time.
Organic and Nutrient Enrichment	**5**	**Organic and Nutrient Enrichment**	Replicate samples from upper 2cm sediment. AFDW converted to TOC. Total nitrogen and total phosphorus.
Contamination	**6**	**Contamination in Bottom Sediments**	Replicate samples from upper 2cm sediment. Analysed for cadmium, chromium, copper, nickel, lead and zinc.
Biodiversity	**7**	**Condition of Bottom Dwelling Animals**	Replicate core samples from upper 15cm for infauna and 0.25m^2 quadrats for epifauna. Analyse for abundance and taxa in infauna cores and epifauna quadrats.

4. SALTMARSH HABITAT

This indicator is an estimate of the change in the area (ha) of vegetated saltmarsh habitat (*e.g.* rushland, herbfield, grassland, tussockland and shrubland) bordering the edge of the unvegetated estuarine intertidal flats in Southland estuaries.

4.1. Reason

Saltmarshes are important as they play a vital role in coastal systems. They are home to a wealth of plant and animal species and are amongst the most productive habitats on earth. Marshes produce large quantities of plant detritus per hectare per year and are considered as organic factories. As a transition zone or buffer between land and sea, they improve the quality of coastal water and sediments through storage, dilution, and stabilisation of pollutants and nutrients, as terrestrial runoff and tidal waters flow through the marsh. They are important for spawning, nursery, and refuge habitat for many fish and shellfish species as well as nesting, feeding, and staging (resting) areas for birds and wildlife. Increasingly saltmarshes are being valued more highly for their aesthetic appeal, especially when found in a more natural state. Saltmarshes are sensitive to a range of pressures, including land reclamation, alteration of land management practices in catchments, regulation of freshwater and tidal flows, and invasion by weeds. Changes in saltmarshes are increasingly used as a means to monitor change in coastal environments as indicators of global warming, climate change, storm effects, sea level change, pollution, and sedimentation rates (Ward et al. 1998).

4.2. Method

The indicator proposed is the percentage cover of saltmarsh habitat (excluding habitat dominated by invasive weed pests *e.g.* Spartina). Broad scale mapping of each Southland estuary is undertaken at five yearly intervals. The area of dominant saltmarsh habitat is measured during each survey.

4.3. Assessment Criteria and Ratings

Currently, there are no published numerical criteria for assessing the condition of saltmarsh habitat based on its percentage cover. The main reason is that different types of estuaries have different percentages of natural saltmarsh cover. In such situations, it is appropriate to establish a reference or baseline condition for each estuary and use the percent change in this area as the assessment criterion. For Southland estuaries, it is proposed that the baseline be established as the historical area of saltmarsh or, if unknown, as the area measured in the first habitat mapping survey for the estuary. A provisional classification and rating is proposed in Table 3.

Table 6. Provisional assessment criteria, response and ratings for saltmarsh cover.

Rating	Saltmarsh Classification	Response
Very Good	Area of saltmarsh (ha) measured has not diminished in area from baseline, or is growing.	Keep measuring at 5 yearly intervals. No action.
Good	Area of saltmarsh (ha) measured has diminished in area by less than 5% from baseline.	Keep measuring at 5 yearly intervals. No action.
Fair	Area of saltmarsh (ha) measured has diminished in area by between 5 and 20% from baseline.	Undertake management through Evaluation and Response Plan.
Poor	Area of saltmarsh (ha) measured has diminished in area by greater than 20% from baseline.	Undertake management through Evaluation and Response Plan.

4.4. Southland Estuaries – Saltmarsh Habitat Cover

With the exception of the New River Estuary, only the presently existing saltmarsh habitat has been assessed. By using historical aerial photographs, however, it would be possible to estimate losses since around the 1940s for other estuaries. The baseline areas for each of the estuaries monitored to date, and the rating for the New River Estuary, are shown in Figure 3. The figures show that Fortrose Estuary has the greatest percentage cover of saltmarsh, and that saltmarsh area in the New River Estuary has declined by 30% since 1910, which provisionally places it in the "poor" rating. Ratings for the other estuaries in Southland will be made once estimates of historical reclamation have been undertaken.

4.5. Gaps and Recommendations

Gaps	Recommendations
Saltmarsh habitat is likely to exist in other estuaries and coastal lagoons.	Expand estuary monitoring programme to include Waituna and Waiau Lagoons and Freshwater Estuary.
An estimate of the historical saltmarsh cover would provide a useful baseline to gauge the extent of change from the natural state and identify areas for management *e.g.* restoration.	Undertake analysis of historical aerial photographs to estimate historical saltmarsh cover (ha).

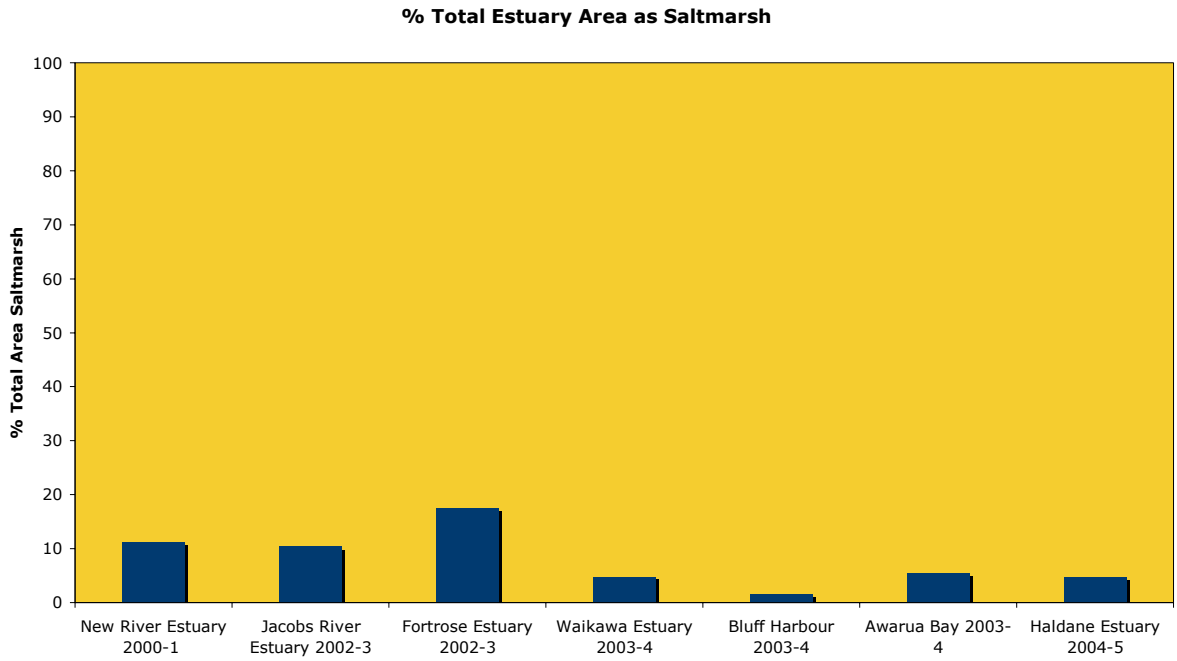


Figure 3a. Percentage of total estuary area covered in saltmarsh vegetation for Southland estuaries in 2001-2005.

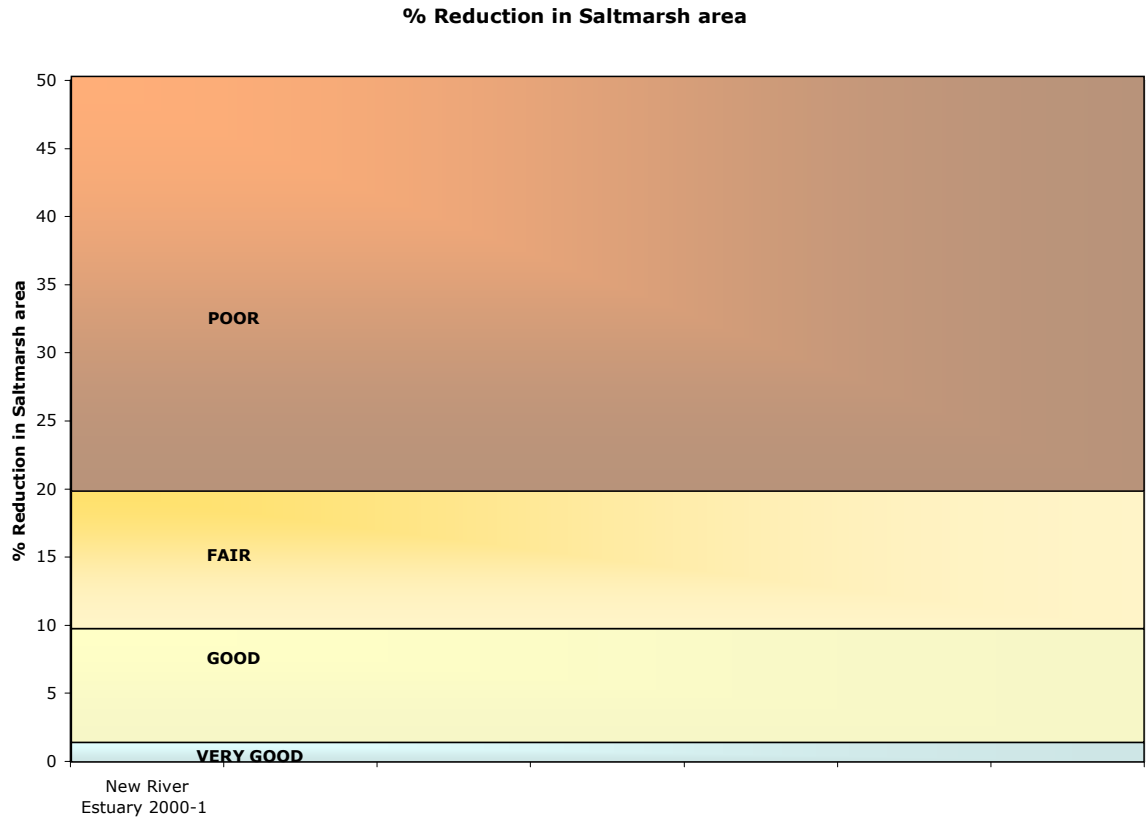


Figure 3b. Percentage reduction in New River Estuary saltmarsh area from historical baseline (1910) to 2001. Other Southland Estuaries to be included once historical baselines established.

5. SEAGRASS HABITAT

This indicator is an estimate of the change in area (ha) of seagrass (*i.e.* Zostera) on intertidal substrata in Southland estuaries.

5.1. Reason

In New Zealand we have only one type of seagrass, Zostera, which grows in soft sediments in estuaries. Some species are able to tolerate brackish as well as full-strength seawater, and withstand being exposed to the air during low tide. Zostera beds can accumulate and stabilise sediments, contribute to food sources for other estuarine animals, provide nursery areas for juvenile fish and serve as an important grazing area for water fowl. In estuaries where conditions are optimal, Zostera beds can occupy considerable areas of intertidal sand flats. Though tolerant of a wide range of conditions, Zostera is vulnerable to decline. The major factors adversely affecting their growth have been identified through NIWA research as decline in water clarity and sediment quality (particularly lack of oxygen and production of sulphide which is toxic to plants). Their research suggests that Zostera tends to grow in sediments with an organic matter content of below 6% (or 3% TOC), redox potentials of 100 mV or more, and moderate porewater sulphide concentrations of less than 300 µM.

5.2. Method

The indicator proposed is the percentage cover of seagrass habitat. Broad scale mapping of each Southland estuary is undertaken at five yearly intervals. The area of dominant seagrass habitat is measured during each survey.

5.3. Assessment Criteria and Ratings

Currently, there are no published numerical criteria for assessing the condition of seagrass habitat based on its percentage cover. The main reason is that different types of estuaries have grossly different capacities to support natural seagrass cover. In such situations, it is appropriate to establish a reference or baseline condition for each estuary and use the percent change in this area as the assessment criterion. For Southland estuaries, it is proposed that the baseline be established as the historical area of seagrass or, if unknown, as the area measured in the first habitat mapping survey for the estuary. A provisional classification and rating is proposed in Table 7.

Table 7. Provisional assessment criteria, response and ratings for seagrass cover.

Rating	Seagrass Classification	Response
Very Good	Area of seagrass (ha) measured has not diminished in area from baseline, or is growing.	Keep measuring at 5 yearly intervals. No action.
Good	Area of seagrass (ha) measured has diminished in area by less than 5% from baseline.	Keep measuring at 5 yearly intervals. No action.
Fair	Area of seagrass (ha) measured has diminished in area by between 5 and 20% from baseline.	Undertake management through Evaluation and Response Plan.
Poor	Area of seagrass (ha) measured has diminished in area by greater than 20% from baseline.	Undertake management through Evaluation and Response Plan.

5.4. Southland Estuaries – Seagrass Habitat Cover

To date, only the presently existing seagrass habitat has been assessed. By using historical aerial photographs, however, it would be possible to estimate losses since around the 1940s. In the interim, the baseline areas for each of the estuaries monitored to date are shown in Figure 4. Ratings for these estuaries will be made once estimates of historical seagrass cover have been undertaken. Figure 4 shows that, of the true estuaries, the New River Estuary has significant areas of seagrass (92 ha) but other estuaries have very little. Bluff Harbour and Awarua Bay, with their high water clarity and well-oxygenated sediments, have the largest areas of seagrass (150 and 600 ha respectively). Although no rating has been proposed as yet, the high percentage of Awarua Bay with seagrass as the dominant habitat (20%) would rate very highly.

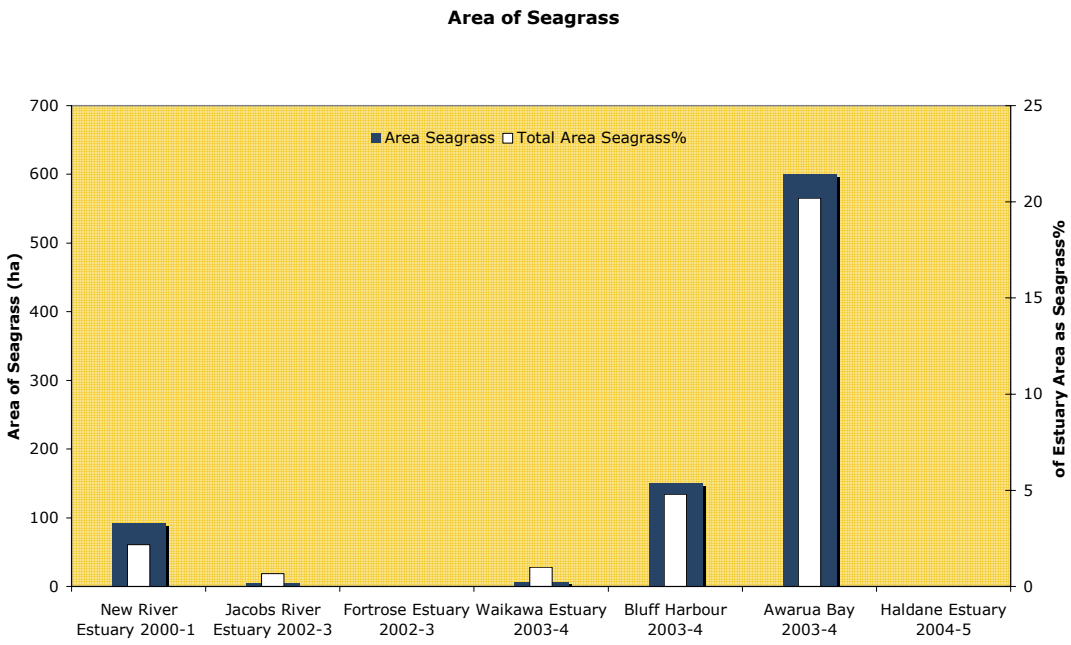


Figure 4. Percentage of total estuary area covered in seagrass vegetation for Southland estuaries in 2001-2005 and area of seagrass in hectares.

5.5. Gaps and Recommendations

Gaps	Recommendations
Seagrass habitat is likely to exist in other estuaries and coastal lagoons.	Expand estuary monitoring programme to include Waituna and Waiau Lagoons and Freshwater Estuary.
An estimate of the historical seagrass cover would provide a useful baseline to gauge the extent of change from the natural state and identify areas for management *e.g.* restoration.	Undertake analysis of historical aerial photographs to estimate historical seagrass cover (ha).

6. NUISANCE MACROALGAL COVER

This indicator is an estimate of the area (ha) of potentially nuisance causing macroalgal beds (*e.g.* sea lettuce, *Gracilaria* sp. and *Enteromorpha* sp.) on intertidal substrata in Southland estuaries.

6.1. Reason

Certain types of macroalgae (*e.g.* sea lettuce, *Gracilaria* sp. and *Enteromorpha* sp.) can grow to nuisance levels in nutrient-enriched waters and are therefore often used as an indicator of nutrient enriched waters. Such blooms can:

- deprive seagrass areas of light, causing their eventual decline;
- cause oxygen depletion leading to adverse effects on plants and animals;
- accumulate and rot on shorelines causing odour problems;
- foul motors and structures.

6.2. Indicator

Broad scale mapping of each Southland estuary is undertaken at five yearly intervals. The area of potentially nuisance causing macroalgal beds is measured during each survey.

6.3. Assessment Criteria and Ratings

Despite wide acknowledgement of the nuisance macroalgal problem, there are currently no published numerical criteria for assessing their degree of nuisance. In general, however, it is accepted that it becomes a nuisance when large areas of an estuary are covered with dense mats of macroalgae that decompose and give off an offensive odour. But the appearance of potentially nuisance causing macroalgae (*e.g.* sea lettuce, *Gracilaria* sp. and *Enteromorpha* sp.) in an estuary is also useful as an early warning indicator of nutrient-enriched waters. In order to provide a means for assessing both the presence of such macroalgae and their degree of nuisance in Southland's estuaries it is proposed that a set of condition categories be established. It is proposed these be based on parameters such as the percent cover, density, and presence of nuisance odour and extent of sediment anoxia. An example of a possible classification is presented in Table 8.

Table 8. Example of condition rating for macroalgal cover in Southland Estuaries.

Rating	Macroalgal Classification	Response
Good	Area of potentially nuisance causing macroalgal cover (ha) is zero. No nuisance odour or anoxic sediments.	Keep measuring at 5 yearly intervals. No action.
Fair	Potentially nuisance causing macroalgal cover (ha) is present in the estuary at low levels but there are no nuisance odour, anoxic sediments or adverse impacts to benthic ecology.	Keep measuring at 5 yearly intervals but undertake evaluation and response plan.
Poor	Potentially nuisance causing macroalgal cover (ha) is present in the estuary and is causing nuisance odour, anoxic sediments and adverse impacts to benthic ecology.	Monitor % cover, density, odour, sediment anoxia status annually. Undertake management through Evaluation and Response Plan.

6.4. Southland Estuaries – Nuisance Macroalgal Cover

Nuisance macroalgal cover for the seven estuaries monitored to date is shown in Figure 5. The results show that potentially nuisance causing macroalgae were present in all estuaries including Bluff Harbour and Awarua Bay. In Jacobs River Estuary blooms of *Enteromorpha* and *Gracilaria* species cover 25% of the unvegetated tidal flats, but nuisance conditions have yet to be assessed. Until its nuisance status is evaluated this estuary would be in the proposed "fair" category. In the other estuaries levels were generally low (< 5% of estuary unvegetated flats covered). This also places them in the proposed "fair" category where further studies are recommended to determine the cause and possible responses.

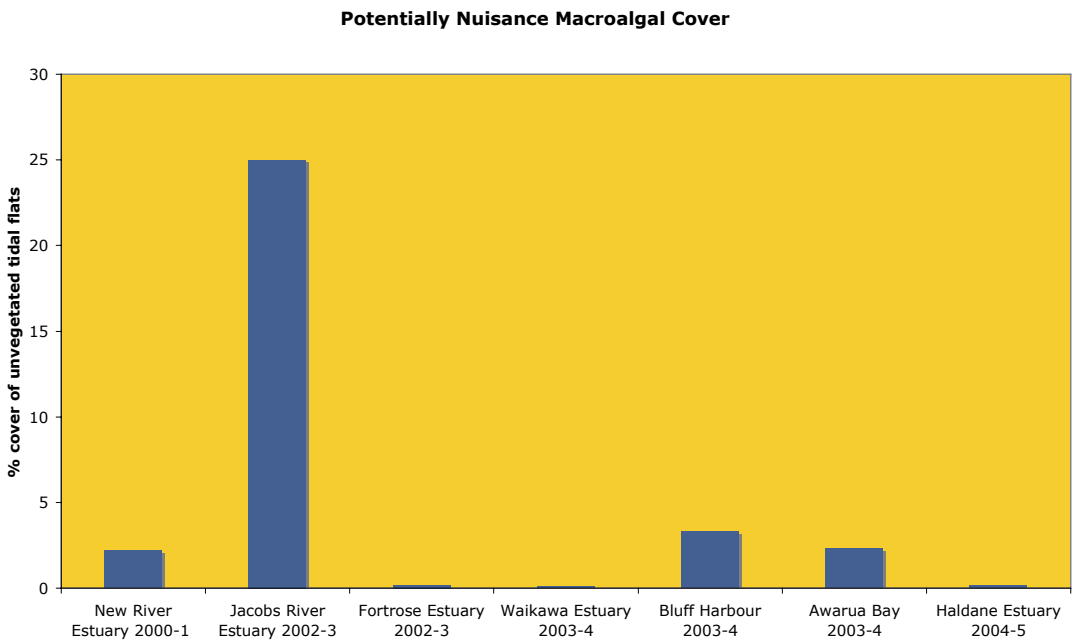


Figure 5. Percentage of unvegetated tidal flats covered with potentially nuisance macroalgal species in Southland estuaries.

The cause of these macroalgal blooms is complex and estuaries can vary in their susceptibility to the problem. Water quality monitoring indicates that the New River Estuary is oversupplied with nutrients (both nitrogen and phosphorus) and has both macroalgal blooms and elevated phytoplankton levels, but not to any gross level (Robertson 2001). Concentrations of both N and P almost always exceed levels that limit phytoplankton blooms (ANZECC 2000) and sea lettuce growth (Pederson & Borum 1997). The reason for the absence of nuisance phytoplankton blooms has been attributed to the short residence time of estuaries like New River (< 3 days) which acts to rapidly dilute nutrient inputs and flushes phytoplankton out to sea before blooms can develop. The reason for the absence of large areas of nuisance macroalgal cover, despite the abundance of nutrients, has been attributed to other limiting factors such as clarity, grazing pressure, and exposure to strong winds.

6.5. Gaps and Recommendations

Gaps	Recommendations
Nuisance macroalgal blooms may exist or have a potential to develop in other estuaries and coastal lagoons (*e.g.* Freshwater Estuary, Waituna Lagoon and Waiau Estuary).	Undertake baseline broad scale mapping of macroalgal cover in all major Southland estuaries receiving elevated nutrient loadings.
The presence of potentially nuisance macroalgae in an estuary does not necessarily indicate problems. Problems only occur when large mats decompose on the estuary floor and cause odour, sediment anoxia and ecological nuisances or cause physical fouling of structures and machinery. Currently, there is no measure of the extent of any associated nuisance effects in Southland estuaries.	Undertake monitoring of macroalgal associated nuisance effects in Southland estuaries that have elevated levels of nuisance macroalgal cover (particularly, Jacobs River and New River Estuaries).
Nutrient monitoring information and estuary sensitivity to macroalgal and phytoplankton blooms – see Section 8.	See Section 8.

7. SOFT MUD SEDIMENT

This indicator is an estimate of the change in area (ha) of intertidal soft mud habitat in Southland estuaries.

7.1. Reason

Because estuaries are a sink for sediments, their natural cycle is to slowly infill with fine muds and clays. However, NZ estuaries are very young, being formed only 6,500 years ago when rising sea level drowned coastal valleys. As a consequence, prior to European settlement, they were still dominated by sandy sediments and had low sedimentation rates (< 1 mm/year). In the last 150 years, with catchment clearance, wetland drainage, and land development for agriculture and settlements, many began to infill rapidly. Today, average sedimentation rates in our estuaries are typically 10 times or more higher than before humans arrived. For example, research in some North Island estuaries and the New River Estuary in Southland has shown that sedimentation rates in their upper reaches have averaged as much as 20 mm/yr over the last 50 years (Blakely 1973, Thoms 1981, Mead & Moores 2004). Today, many of our estuaries, including the New River have infilled to the extent that they are largely intertidal and much of their beds are exposed at low tide. Elevated sedimentation has been shown to decrease water clarity, reduce the variety of estuary habitats and lower the diversity of plants and animals.

7.2. Method

The indicator proposed is the percentage of estuary areas as soft muds. Broad scale mapping of each Southland estuary is undertaken at five yearly intervals. The area of soft and very soft

mud habitat is measured during each survey. This indicator does not identify the full extent of where mud is settling in the estuary as it ignores the area covered by firm mud/sand deposits.

7.3. Assessment Criteria and Ratings

The rate of sedimentation and the area of muddy sediments are the most direct measures for assessing whether or not an estuary is moving too fast towards muddiness. Currently, the monitoring programme only assesses the latter of these two measures (*i.e.* the area of soft mud habitat). As such, we can identify estuaries with large areas of soft muds and can measure changes in area of muds over time. This provides us with a coarse indication of which estuaries should be targeted for more intensive sedimentation investigations and management. In terms of a rating or classification, therefore, it is recommended that a combined scale be developed. For example, if the percentage of an estuary area as soft muds exceeds 5%, or is increasing rapidly, then the estuary is a candidate for more intensive sedimentation studies (*e.g.* Figure 6). If these studies show that the rate of sedimentation exceeds a certain level (*e.g.* 5mm/yr in the upper estuary), then an Evaluation and Response Plan should be undertaken to determine causes and possible management options.

7.4. Southland Estuaries – Soft Mud Habitat Cover

The current percentage of each estuary covered in soft sediment is shown in Figure 6. It shows that the Waikawa Estuary has the highest percentage cover with soft mud sediments at 35% (242ha). Jacobs River, New River and Haldane estuaries were more in the medium range at 14% (121ha), 10% (400ha) and 8% (17ha) respectively. As expected, Bluff Harbour and Awarua Bay, with their absence of significant freshwater inputs, had very little soft mud. Based on these results, and using the classification rating described in Section 7.3, the Waikawa, Jacobs River, New River and Haldane estuaries would fall into the proposed category requiring an Evaluation and Response Plan assessing the need for more intensive sedimentation studies and possible management action.

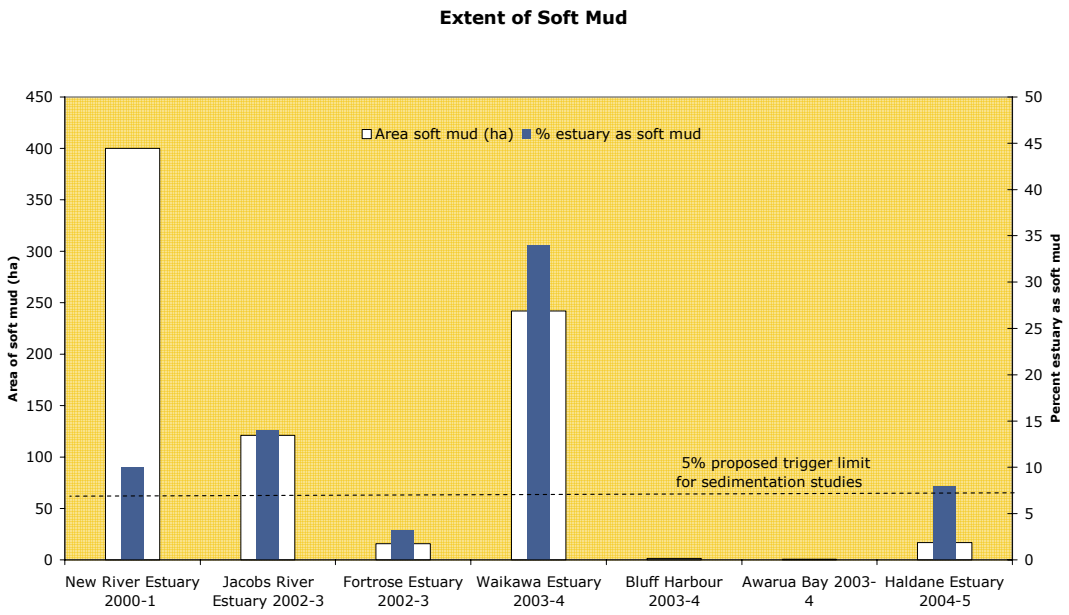


Figure 6. Percentage cover of soft mud habitat in Southland estuaries and their condition ratings.

7.5. Gaps and Recommendations

Gaps	Recommendations
Expand Monitoring to Include Sedimentation Rates Currently there is no monitoring of the sedimentation rate in the upper reaches of Southland estuaries. These areas are the most impacted in terms of sedimentation and enrichment.	Establish a sedimentation rate monitoring programme for representative sites in upper reaches of targeted Southland estuaries.
Identify Main Subcatchment Drivers of Estuary Sedimentation Sedimentation problems are prevalent in Southland estuaries with developed catchments. Sediment runoff from terrestrial or catchment sources are almost certainly the cause. Identifying where the main inputs come from (*i.e.* subcatchments or particular land uses) would provide direction for effective management actions.	Undertake management through Evaluation and Response Plan. A desktop assessment to estimate sediment loads on a subcatchment basis for Oreti, Waihopai, Aparima and Waikawa Catchments is recommended as a first step.
Identify Estuary Sediment Load Guidelines for Each Developed Catchment Low water clarity and expansion of muddy sediments are becoming increasingly more prevalent in Southland estuaries. It would be useful if we could predetermine which estuaries are more prone to such problems and under what circumstances (*e.g.* sediment loadings) the problems would begin to appear. Once available, this information would provide a defensible set of sediment load guidelines for each of the rivers draining developed catchments in Southland.	Develop a simple estuary response model that predicts estuary sediment concentrations based on sediment loads and inputs this to a sedimentation submodel which predicts where fine sediments will settle out and at what rate.

Measure Sediment Loads to Southland Estuaries Having clear water and non-muddy sediments is generally highly valued. The clarity level of Southland estuaries is not currently measured. The presence of large and expanding areas of soft muddy sediments is a strong indicator that overlying water clarity in estuaries is low. The major driver of low clarity and muddy sediments is suspended sediment in rivers, particularly during floods. If suspended sediments, turbidity and/or clarity were measured in the major river inflows to Southland's developed estuaries, this would provide an early warning of the potential for low clarity and increased sedimentation in the estuaries as well as a more direct means of assessing the success of catchment management actions to reduce sediment loads to estuaries. Instead, broad-scale changes in the area of soft sediment are used to identify problem areas and the success of management actions. This stance has primarily been taken because of the relatively high cost of water sampling. However, because change in the area of soft sediment is an indirect response to reductions in catchment sediment loads it is difficult to use it as the only measure of management success. A more direct measure, such as sediment concentrations of major inputs, would provide a more effective means of identifying problem areas and tracking success of catchment management practices.	Establish a suspended solids monitoring programme designed to identify mass loads of TSS to New River, Jacobs River and Waikawa Estuaries during periods of maximum input *i.e.* floods.

8. SEDIMENT ORGANIC CARBON AND NUTRIENTS

These indicators provide information on organic matter and nutrient concentrations in estuary bottom (including intertidal) sediments.

8.1. Reason

Estuarine sediments, rich in organic matter, contain a reservoir of nutrients which reflect past inputs. The decomposition of this organic matter imposes an oxygen demand on the sediments and bottom water due to the respiration of aerobic organisms and the oxidation of reduced compounds produced by anaerobic metabolism. It also releases inorganic forms of nitrogen and phosphorus to the surrounding sediments and water column which can then be available to fuel algal growth. The amount of organic matter and nutrients found in sediments is an indicator of the potential for stress to estuarine communities. High levels of organic matter in estuarine sediments can result in significant changes in benthic community structure as a result of associated toxicity effects (*e.g.* sediment anoxia and production of toxic sulphide). Sediment organic matter is derived from plant and animal detritus, bacteria or plankton formed *in situ*, or derived from natural (*e.g.* forest litter), and anthropogenic (*e.g.* farm runoff, municipal and industrial wastewater) sources in catchments.

8.2. Method

Total organic carbon (TOC), total nitrogen and total phosphorus are commonly-used indicators to assess organic matter and nutrient levels, *e.g.* National Estuary Monitoring Protocol indicators (Robertson et al. 2002) and TOC is a US national coastal condition indicator (USEPA 2004). They form part of a range of indicators used to assess overall estuary condition.

8.3. Assessment Criteria and Ratings

Currently, there is no New Zealand rating criteria for TOC or nutrients in estuary sediments. In the future, it is recommended that a multi-indicator estuary condition index be developed for Southland estuaries that includes TOC, TP and TN. In the interim, it is recommended that current estuary concentrations be compared with the US rating criteria for TOC (Table 9), and highly enriched sites in other estuaries for TOC, TN and TP (Table 10), to determine their current extent of sediment enrichment. However, it is recognised that such comparisons be treated as a coarse indicator only, and that other factors, such as habitat type should be included in the final assessment. A proposed rating criterion for TOC is shown in Table 9 and is a modified version of the US rating criteria (USEPA 2004).

Table 9. Proposed rating criteria for assessing sediment TOC by site (concentrations on a dry-weight basis).

Rating	TOC Criteria	Response
Good	less than 2%.	Keep measuring at 5 yearly intervals. No action.
Fair	between 2% and 5%.	Undertake management through Evaluation and Response Plan.
Poor	greater than 5%.	Undertake management through Evaluation and Response Plan.

No rating criteria are proposed for sediment TN or TP as yet. However, both indicators are useful in assessing the potential for adverse impacts to sediment biota through sediment deoxygenation and toxicity. They are less useful in assessing eutrophication problems such as macro-algal blooms and water column oxygen depletion because these problems are driven more by nutrients in the water column. Table 10, for example, shows how estuaries differ in their response to sediment nutrient and organic matter concentrations. The well-flushed (residence time 2-3 days), shallow (< 2m mean depth), sandy estuaries that are typical of those monitored in Southland, are more likely to have low sediment TN and TOC concentrations but could still experience extensive macroalgal bloom problems. This problem occurs when the rate of nutrient supply (particularly nitrogen) to the algae is high enough to trigger excessive growth, either through high N concentrations in the water column or high rates of delivery (*i.e.* fast currents). In such situations, measuring water column nutrient concentrations is important if an early warning indicator of macroalgal blooms is required.

Table 10. Comparison of TOC, TN and TP concentrations in estuaries with varying characteristics and eutrophication symptoms.

Estuary	Characteristics	Eutrophication Symptoms	TN%	TP%	TOC%
Neuse River (Nth Carolina [1]	Muddy (>40%mud) and relatively deep (mean depth 3.5m).	Eutrophic. Highly enriched and experiences algal blooms, oxygen depletion, fish kills, etc.	>0.5	NA	>5
Waimea Estuary Site near wastewater outfall (Nelson) [2]	Shallow (<2m), well flushed estuary but had localized point source enrichment near this muddy (83% mud) site.	Eutrophic Site. Severe localized areas of sediment algal blooms and anoxia.	0.4	0.1	4.7
Otamatea Arm 2001 (Kaipara Harbour) [3]	Relatively deep (>3m), muddy (56% mud) estuarine arm.	Experiences algal blooms.	0.1	0.05	3.7
Avon-Heathcote Estuary 1970 (Christchurch) [4]	Shallow (mean depth 1.4m), well flushed and predominantly sandy sediments (>90% sand)	Eutrophic, with extensive macroalgal blooms and sediment anoxia.	NA	0.02-0.05	0.5-3.5
Avon-Heathcote Estuary 2001 (Christchurch) [3]	Shallow (mean depth 1.4m), well flushed and predominantly sandy sediments (>90% sand)	Moderate macroalgal blooms and sediment anoxia.	0.04	0.03	0.5 plus
Waimea Estuary Site 2001 (Nelson) [3]	Shallow (<1.5m), well flushed estuary – 25% mud	No eutrophication symptoms – minor growth of macroalgae in poorly flushed areas.	0.05	0.04	1
New River Estuary Site near wastewater outfall [5]	Shallow (mean depth 1-1.5m), well flushed estuary, sandy sediments (>90% sand).	Moderate growth of macro-algae and moderate sediment anoxia (RPD layer 1-5cm deep).	0.05	NA	3-6

[1] Luettich et al. (1999), [2] Gillespie & MacKenzie (1990), [3] Robertson et al. (2002), [4] Knox & Kilner (1973), [5] Robertson & Stevens (2006)
NA=Not Assessed
NOTE: Southland estuary sediment TOC levels are currently assessed using a Loss on Ignition methodology to give % Ash Free Dry Weight that is then converted to % TOC by dividing it by 1.9 (Schumacher 2002).

Additionally, the ratio of TOC:TN can be used to indicate the likely source of the organic matter. Ratios greater than 20 generally indicate terrestrial sources of organic matter whereas values in the 4 and 10 range indicate marine algae as the likely source (Meyers 1994). The ratio of TN:TP can be used as a guide to which nutrient is in shortest supply and therefore most likely to be limiting to algal growth. Balanced growth is estimated to occur at a ratio of 7.2:1 by weight. If the ratio falls below this then nitrogen is likely to be the limiting nutrient.

8.4. Southland Estuaries - Organic Matter, TN and TP

Regionally, the level of TOC was relatively low (< 2%) in estuarine sediments, which would place it in the "good" category (Figure 7). Very occasionally, a clump of macroalgae was included in a sample which accounts for the occasional elevated result. TN and TP concentrations are shown in Figures 8 and 9 and were generally low compared with the

elevated TN and TP concentrations measured in very eutrophic sites (*e.g.* the enriched site in the Waimea Estuary 1971).

TOC:TN ratios for Southland estuaries ranged from 14 to 186 with a mean of 35 which clearly suggests that terrestrial sources are likely to be the major inputs of organic matter to Southland estuaries. Sediment TN:TP ratios were also low (< 2) which reinforces past studies (Robertson 2001) confirming nitrogen as the likely nutrient limiting algal growth in the estuaries. In combination, these results would tend to indicate terrestrial based sources of nitrogen should be targeted to address algal bloom issues.

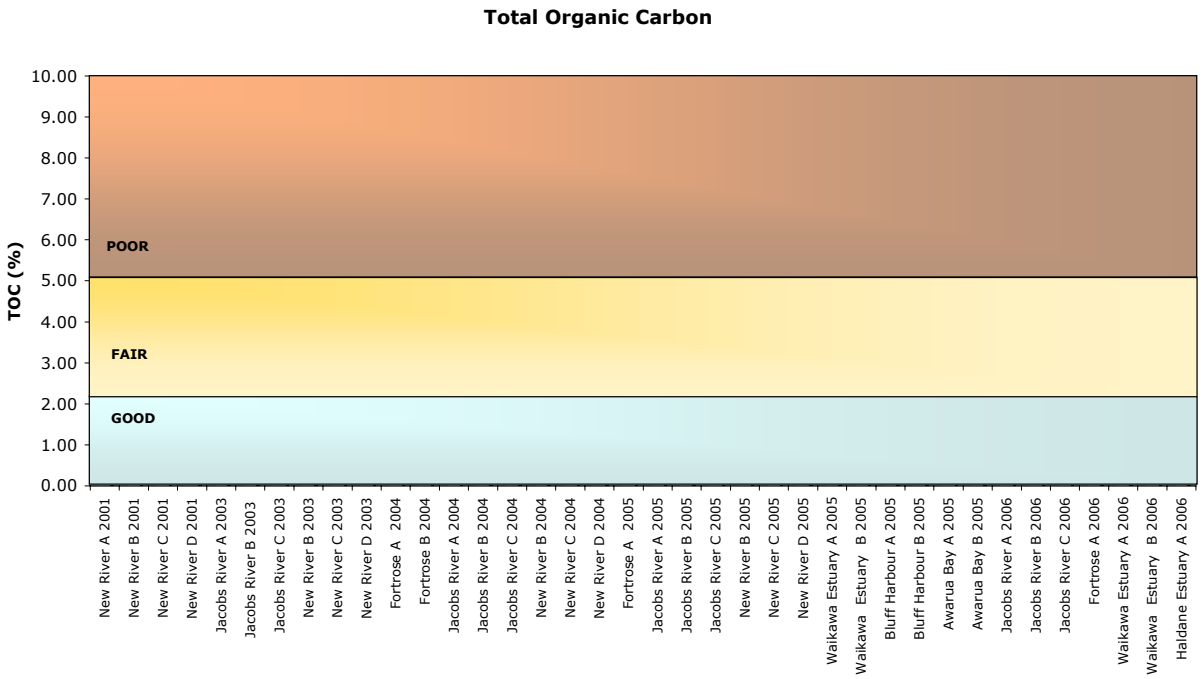


Figure 7. Mean TOC concentrations in Southland estuaries compared with the proposed TOC ratings.

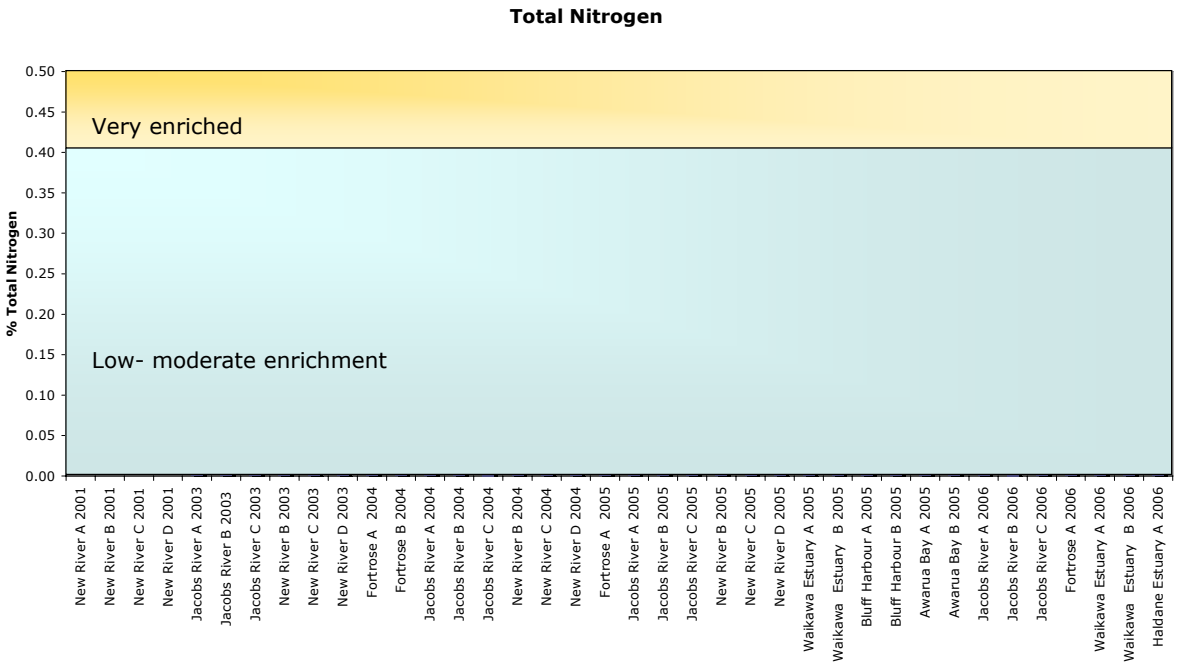


Figure 8. Mean TN concentrations in Southland estuaries compared with levels found in very enriched estuary sites.

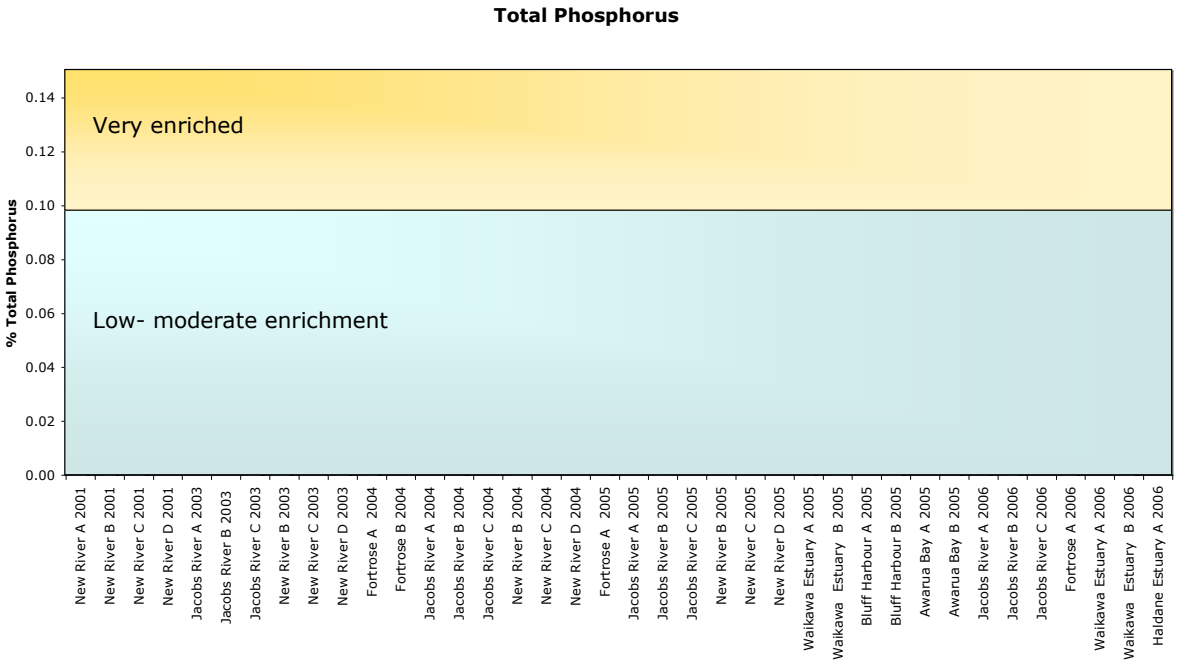


Figure 9. Mean TP concentrations in Southland estuaries compared with levels found in very enriched estuary sites.

8.5. Gaps and Recommendations

Gaps	Recommendations
Expand SOE Monitoring to Upper Estuary Sites Currently there is no monitoring of the upper, soft mud reaches of Southland estuaries. These areas are the most impacted in terms of sedimentation and enrichment. Robertson (1997) measured 1.4 to 4.7% TOC in the upper reaches of Southland estuaries in 1996-7.	Establish a monitoring programme for representative soft mud sites in upper reaches of Southland estuaries and include TOC, TN and TP as indicators.
Identify Main Subcatchment Drivers of Estuary Nutrient Enrichment Macroalgal bloom problems are prevalent in Jacobs River Estuary and to a lesser extent New River Estuary and Waikawa Estuary. Excess nutrients in the water column from terrestrial or catchment sources are almost certainly the cause. However, the primary catchment drivers of nutrient enrichment of Southland estuaries have not been clearly identified on a site specific basis and targeted for management. For example, where are the subcatchments that contribute the bulk of the nutrients and what management is in place to reduce their input.	Undertake management through Evaluation and Response Plan. A desktop assessment to estimate nutrient loads on a subcatchment basis for Oreti, Waihopai, Aparima and Waikawa Catchments is recommended as a first step.
Identify Estuary Nutrient Load Guidelines for Each Developed Catchment Macroalgal bloom problems are becoming increasingly more prevalent in Southland estuaries. It would be useful if we could predetermine which estuaries are more prone to such problems and under what circumstances (*e.g.* nutrient loadings) the problems would begin to appear. Once available, this information would provide a defensible set of nutrient load guidelines for each of the Southland estuaries draining Southland catchments.	Develop a simple estuary response model that predicts estuary nutrient concentrations based on nutrient loads and input this to a macroalgal growth submodel which predicts growth of relevant nuisance macroalgal species.
Measure Nutrient Loads for Each Developed Catchment The nutrient levels of Southland estuaries are currently not measured. If they were, the results would provide an early warning of the potential for nuisance macroalgal blooms and sediment anoxia in the estuaries as well as a more direct means of assessing the success of catchment management actions to reduce nutrient loads to estuaries. Instead, changes in the area of nuisance macroalgal cover and sediment organic matter concentrations are used to identify problem areas and success of management actions. This stance has primarily been taken because of the relatively high cost of water sampling. However, because change in the area of macroalgal blooms is an indirect response to reductions in catchment nutrient loads it is difficult to use it as the only measure of management success. A more direct measure, such as nutrient concentrations of major inputs, would provide a more effective means of identifying problem areas and tracking success of catchment management practices.	Establish a nutrient monitoring programme designed to identify mass loads of N and P to New River, Jacobs River and Waikawa Estuaries.

9. CONTAMINATION IN BOTTOM SEDIMENTS

This indicator provides information on the concentration of key contaminants in coastal bottom (including intertidal) sediments

9.1. Reason

Sediments polluted with heavy metals and other toxins are a starting point for contamination throughout the food chain, potentially damaging marine life and affecting human health. Pollutants from industrial discharges, burning of fossil fuels, and runoff from farms and urban and suburban areas are carried to coastal waters by rivers, rainfall, and wind, where they accumulate on the bottom. In some instances, small organisms can incorporate these contaminants into their bodies, and when they are eaten by other organisms, the contaminants may then move up the food chain (bioaccumulation). They can also impact on plant and animal communities (*i.e.* biodiversity values of seabed assemblages) by affecting the ability of sensitive species to survive. Areas with contaminated sediments may also be unsafe for swimming and other recreation.

9.2. Method

The USA approach is to monitor four major classes of contaminants that can harm fish and other aquatic organisms and can adversely affect human health if ingested while consuming fish or shellfish. The four classes are: pesticides, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), and heavy metals. The National Estuary Monitoring Protocol (Robertson et al. 2002) uses heavy metals (cadmium, copper, chromium, nickel, lead and zinc) as a low-cost preliminary assessment for toxic contamination. If low levels are found, then monitoring for the other classes of contaminants is considered unjustified. Initial screening of Southland's most at risk estuary (New River Estuary) for organochlorine pesticides and polychlorinated biphenyls (PCBs) showed very low levels of contamination, which confirmed this assumption (Scobie et al. 1998).

9.3. Assessment Criteria and Ratings

The ANZECC (2000) guidelines for heavy metals (Table 11), allow definition of three levels of ecological impact from sediment-associated toxicants:

1. if the lower sediment quality guideline (ISQG-Low) for a particular contaminant is not exceeded, the chemical is unlikely to cause any biological impact on organisms inhabiting that sediment;
2. if the upper sediment quality guideline (ISQG-High) is exceeded then it is probable that the chemical will have a biological impact (the upper value is included mainly to provide managers with indicative values for highly contaminated sediments);

3. chemical concentrations that fall between the two guideline levels may be toxic and further investigation is recommended to determine whether they pose a threat.

The guidelines are designed as a preliminary screening tool for identifying key contaminants and key areas of concern.

Table 11. Recommended ANZECC (2000) sediment quality guidelines for metals.

Contaminant (mg/kg dry wt.)	ISQG-Low	ISQG-High
Cadmium	1.5	10
Chromium	80	370
Copper	65	270
Lead	50	220
Nickel	21	52
Zinc	200	410

A list of provisional contaminant ratings for assessing Southland's estuaries is outlined in Table 12. Final ratings should take into consideration natural concentrations based on catchment geology.

Table 12. Criteria and ratings for assessing sediment contaminant concentrations in Southland estuaries.

Rating	Criteria	Response
Very Good	No concentrations exceed 0.2 x ISQG-Low	Continue monitoring at 5 yearly intervals once baseline established
Good	No ISQG-Low concentrations are exceeded.	Continue monitoring at 5 yearly intervals once baseline established
Fair	No ISQG-High concentrations are exceeded.	Monitor at 2 yearly intervals. Undertake evaluation and response plan.
Poor	An ISQG-High concentration is exceeded for one or more sites.	Monitor at 2 yearly intervals. Undertake evaluation and response plan.

9.4. Southland Estuaries - Heavy Metals

Regionally, the level of heavy metals (cadmium, chromium, copper, nickel, lead and zinc) in the Southland estuaries were all well below the ANZECC (2000) ISQG Low guideline criteria and are therefore unlikely to cause any biological impact on organisms inhabiting the sediment

(Figures 10 to 15). These results place the estuaries in the "very good" to "good" category with respect to heavy metal toxicity. The elevated levels of cadmium in 2004 reflect a higher than usual detection limit due to changes in the analytical method being used.

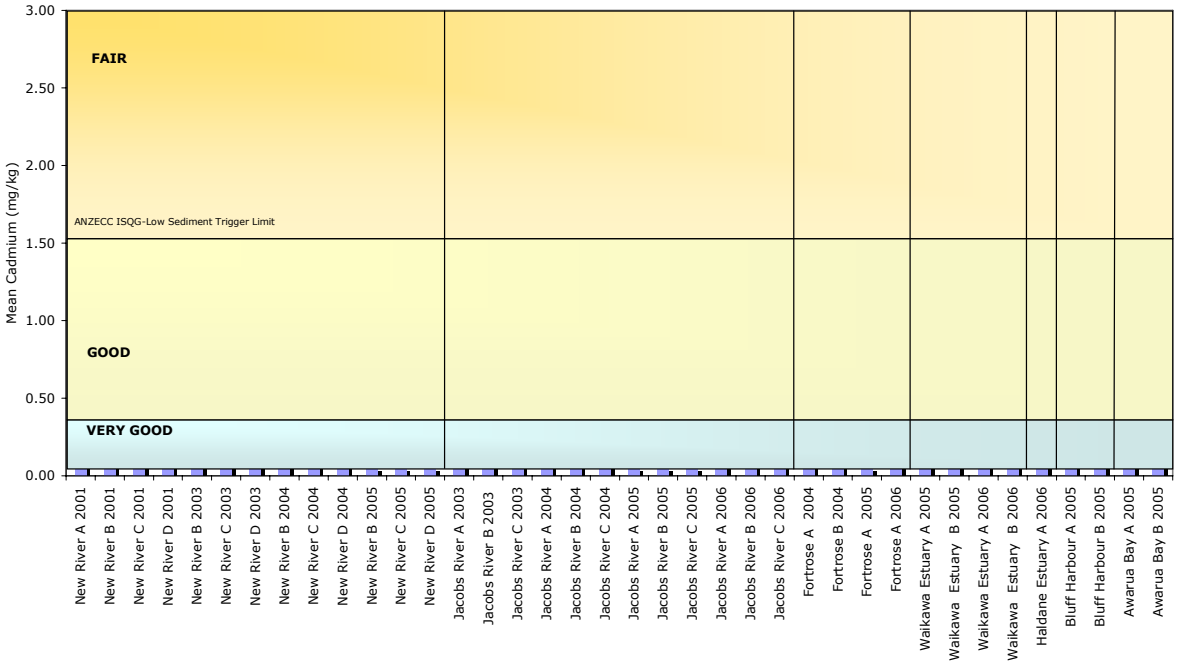


Figure 10. Mean cadmium concentrations and ratings in Southland estuaries.

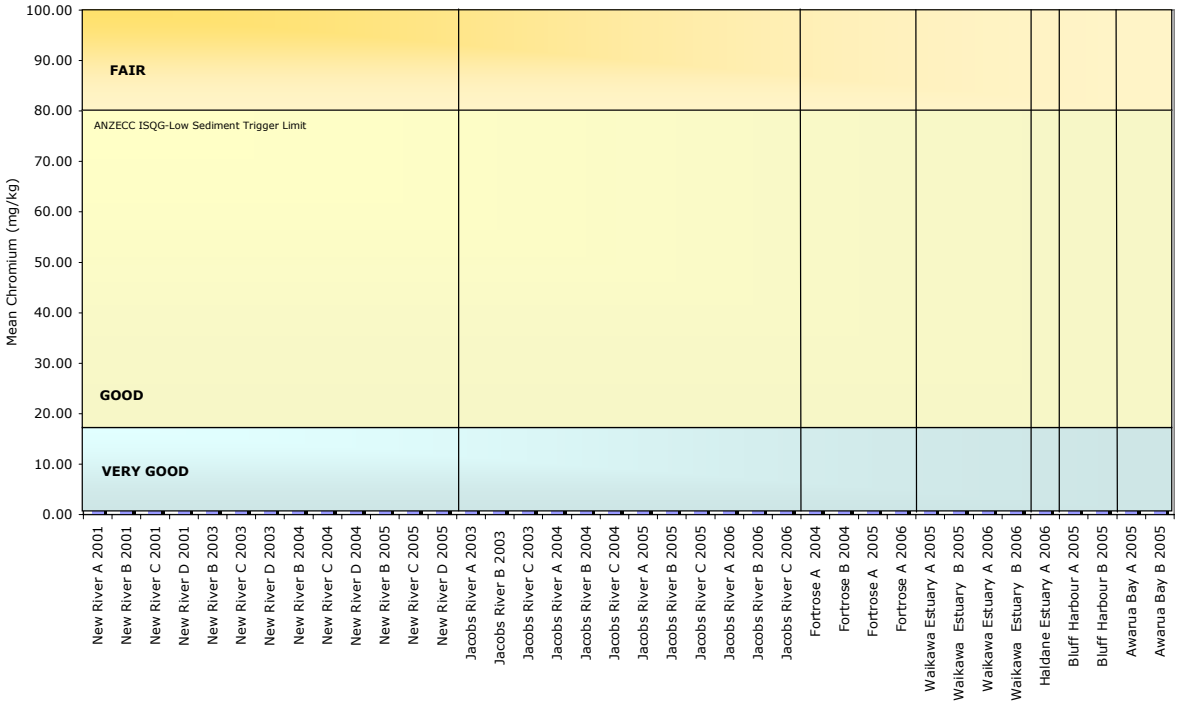


Figure 11. Mean chromium concentrations and ratings in Southland estuaries.

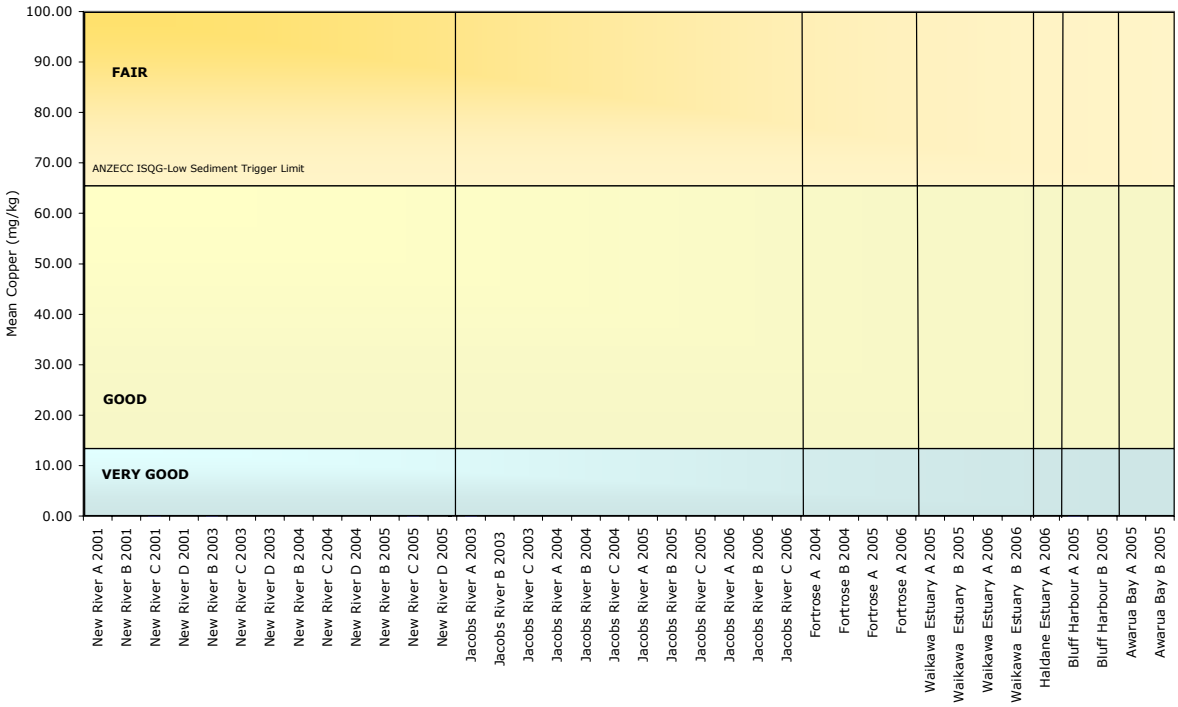


Figure 12. Mean copper concentrations and ratings in Southland estuaries.

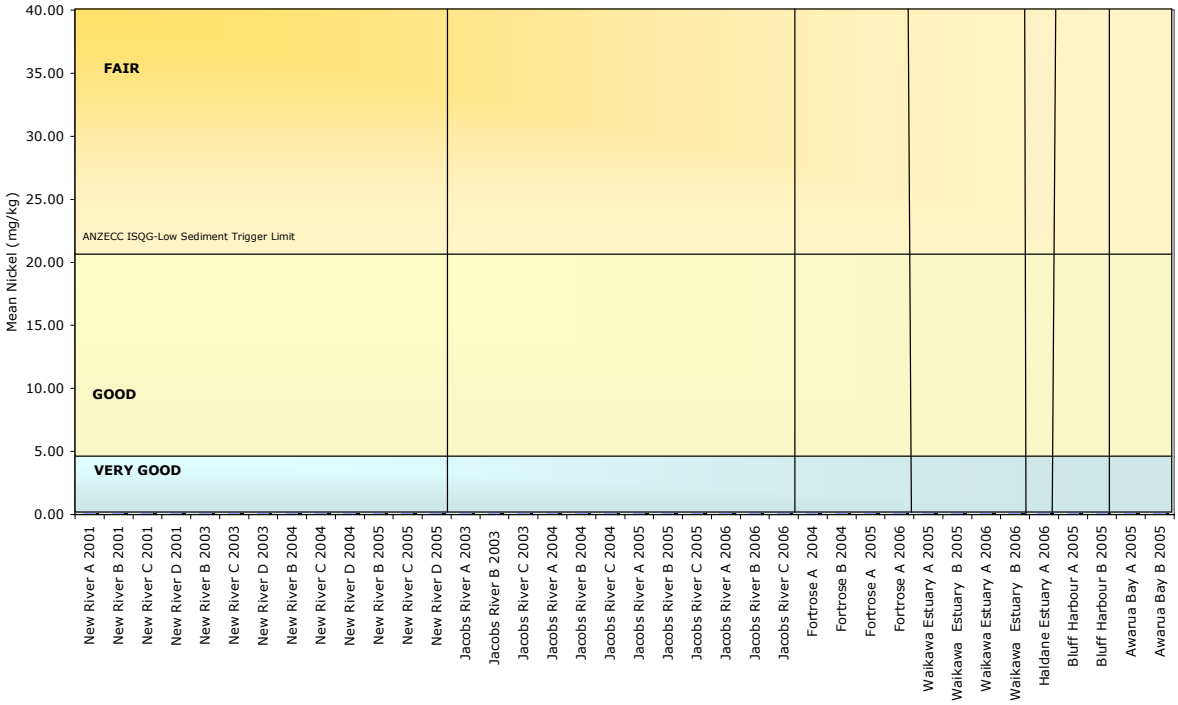


Figure 13. Mean nickel concentrations and ratings in Southland estuaries.

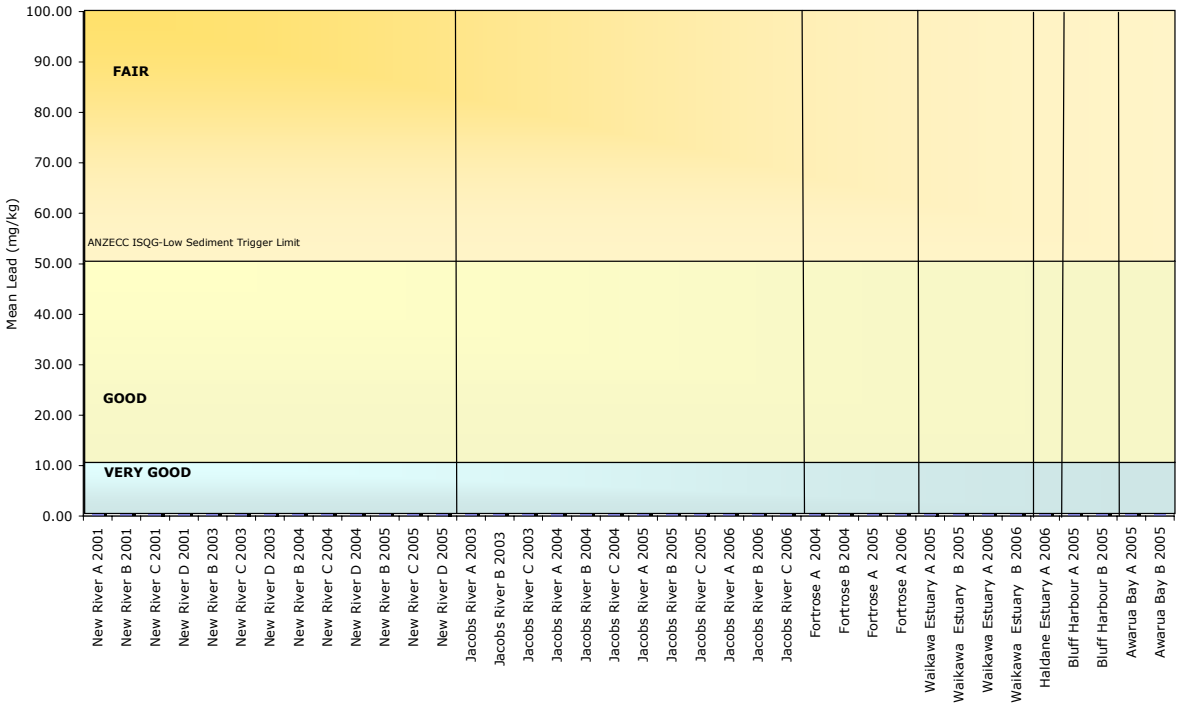


Figure 14. Mean lead concentrations and ratings in Southland estuaries.

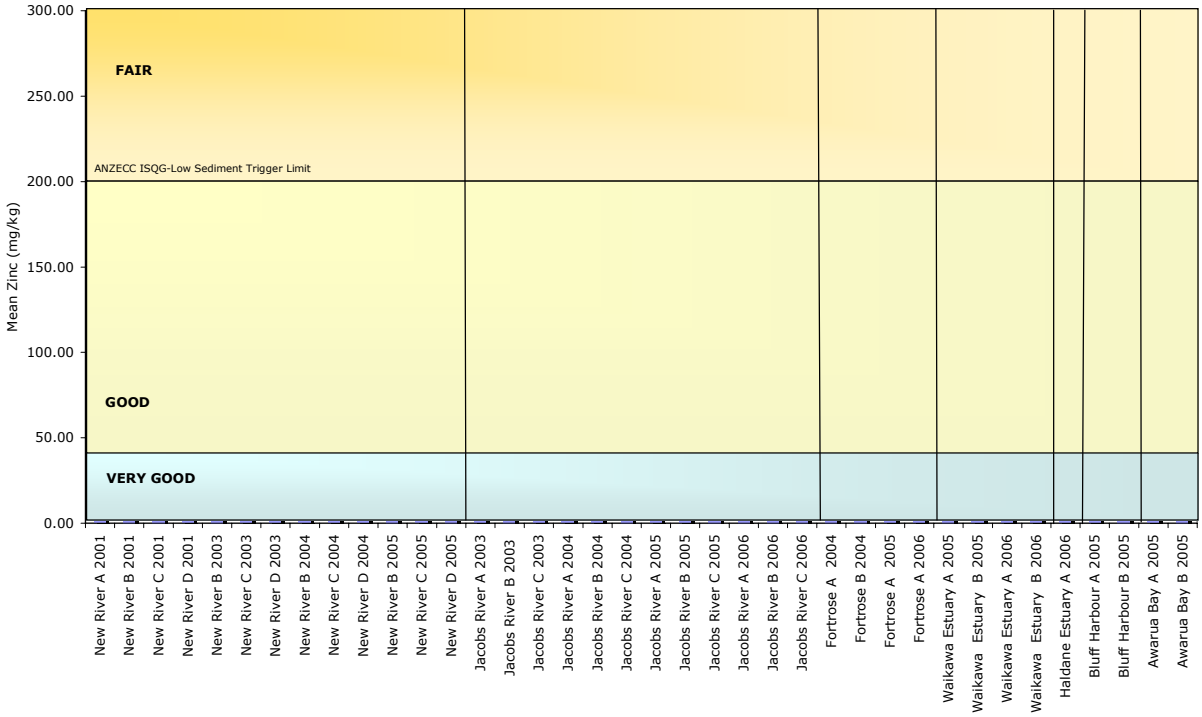


Figure 15. Mean zinc concentrations and ratings in Southland estuaries.

9.5. Gaps and Recommendations

Gaps	Recommendations
Expand SOE Monitoring to Upper Estuary Sites Currently there is no monitoring of the upper, soft mud reaches of Southland estuaries. These areas are likely to be the most impacted in terms of sedimentation and enrichment as contaminants tend to be associated with fine sediments. Robertson (1995) measured heavy metals in the muddy upper reaches of Southland estuaries in 1995. Metal concentrations in the upper New River Estuary sites were 4-6 times higher than measured at the mid estuary sites. Nickel concentrations exceeded the ISQG Low guideline criteria in both the Waihopai and Oreti Arms of the New River Estuary.	Establish a long term monitoring programme for representative soft mud sites in upper reaches of the New River Estuary and include pesticides, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), and heavy metals as indicators.
Sample Replication Because of the high cost of chemical analyses, sample replication should be kept at a minimum. Analyses to determine appropriate sample size (Nigel Keeley, Cawthron Institute) indicated that some parameters needed a large number of replicates to be reasonably sure of detecting a change whereas others required much fewer. However, investing in such high precision is only considered necessary when sample results approach guideline limits.	A staged approach to sample replication is recommended. For the first year of baseline monitoring at each site, take 10 replicates. Subsequently, if the sample mean is <80% of guideline limit take 3 replicates at each site. If the sample mean is greater than 80% of guideline limit then increase sample replication to 10.

10. CONDITION OF BOTTOM DWELLING ANIMALS

This indicator describes the presence of worms, shellfish, snails, and shrimp-like animals in bottom sediments ("benthic communities").

10.1. Reason

Benthic communities reflect the influence of contaminants, oxygen levels, physical changes in habitat, and shifts in temperature or salinity. They are good integrators of a range of effects, and although they can have complex responses to disturbance, are generally a good indicator because nutrients, organic matter and contaminants accumulate in bottom sediments and lack of oxygen is most severe there. Also, these animals also have a lifespan ranging from several months to years, so their response reflects exposure to these stresses over a long period, and they are fairly immobile, so their condition strongly reflects conditions at the site where they were collected. Increases in disturbance or pollution levels are often associated with a shift from communities dominated by larger long-lived organisms to ones dominated by smaller shorter-lived organisms. As there are a number of different environmental factors operating in combination, a lot of variation is expected in baseline measures of benthic diversity and abundance.

10.2. Method

The key indicators proposed for benthic communities in replicate core samples collected from specific habitats are: abundance (number of individuals), richness (number of taxa), Shannon-Weiner diversity (which takes into account both the number of species and the evenness of the species), and *Capitella capitata* abundance (a pollution tolerant species indicating enriched conditions).

10.3. Assessment Criteria and Ratings

Assessment criteria can be calculated by comparing the number and kinds of animals found in a sampling site with those that would be expected in an undisturbed area of similar character (a reference site), or by assessing the change in baseline conditions at a particular site over time. This comparison has generally been accomplished with the aid of a range of univariate and multivariate statistical analyses undertaken on whole or partial data sets. In order to simplify the process, and improve the ability to categorise sites into pollution categories, there has been a move to group benthic species based on their tolerance to different levels of environmental stress, *e.g.* see Table 13.

Table 13. The five sensitivity to stress groupings for soft-bottomed communities developed for AMBI (from Borja et al. 2003).

Group	Sensitivity to increasing stress
V	Species very sensitive to organic enrichment and present under unpolluted conditions. Includes specialist carnivores and some deposit feeding tubicolous species.
IV	Species indifferent to enrichment, always present in low densities. Includes suspension feeders, less selective carnivores and scavengers.
III	Species tolerant to excess organic matter enrichment. May occur under normal conditions, but populations stimulated by organic enrichment. Surface deposit-feeding species as tubicolous spionids
II	Second order opportunistic species. Mainly small sized polychaetes, subsurface deposit feeders such as cirratulids.
I	First order opportunistic species. Deposit feeders that proliferate in reduced sediments *e.g. Capitella capitata.*

Subsequently, various biotic indexes have been developed based around this species sensitivity data. For example, the AZTI's Marine Biotic Index (AMBI) (Borja et al. 2000, 2003), places sites into unpolluted, slightly polluted, moderately polluted, heavily polluted, and extremely polluted categories and is used on many European estuaries. Such indices use a combination of simple measures such as benthic community diversity, but take a much greater account of species sensitivities to pollution and disturbance, incorporating aspects such as feeding types, biomass, and taxonomic groupings to classify individual species into sensitivity groupings. The primary advantage of such approaches is that they provide a much more useful and easy to understand measure of environmental quality that is directly relevant to resource management.

However, despite the many and obvious advantages of using indices for measuring and assessing community composition, there are no existing stress sensitivity ratings or biotic indices for NZ estuaries. Because it is considered to be a relatively straightforward task to apply the same principles used to derive the overseas species sensitivity ratings to Southland estuary species, it is recommended that a biotic index be developed for Southland estuaries. This would provide a powerful tool to distinguish areas of degraded and undegraded habitat. Poor conditions would result when benthic communities have lower than expected diversity, are populated by more than the expected amount of pollution-tolerant species, or contain fewer than the expected amount of pollution-sensitive species.

In the interim, existing monitoring results provide a baseline measure of the animals present and the extent of variation at individual sites over time. To demonstrate this, the number of species and their abundance, as well as a commonly used diversity index are used. Another measure that has been included, and is based on the same principles as the biotic index outlined above, is capitellid densities. *Capitella capitata* is a polychaete species able to tolerate high levels of enrichment and disturbance. It is widely used as an indicator of degraded conditions and, when present in densities > 1000/m2, is generally indicative of organically enriched conditions (ANZECC 2000).

10.4. Southland Estuaries - Bottom Dwelling Animals

Benthic communities in Southland estuaries vary considerably between sites, estuaries and years (Figure 16). While some obvious differences can be attributed to the composition of the habitat at specific sites (*e.g.* Haldane, Awarua Bay), salinity data are required to fully interpret the results. Overall, mean species richness per core ranged from 4.7 (Haldane and Awarua Bay) to 19.4 (Waikawa), while mean abundance ranged from 8 (Awarua Bay) to 445.9 (Fortrose).

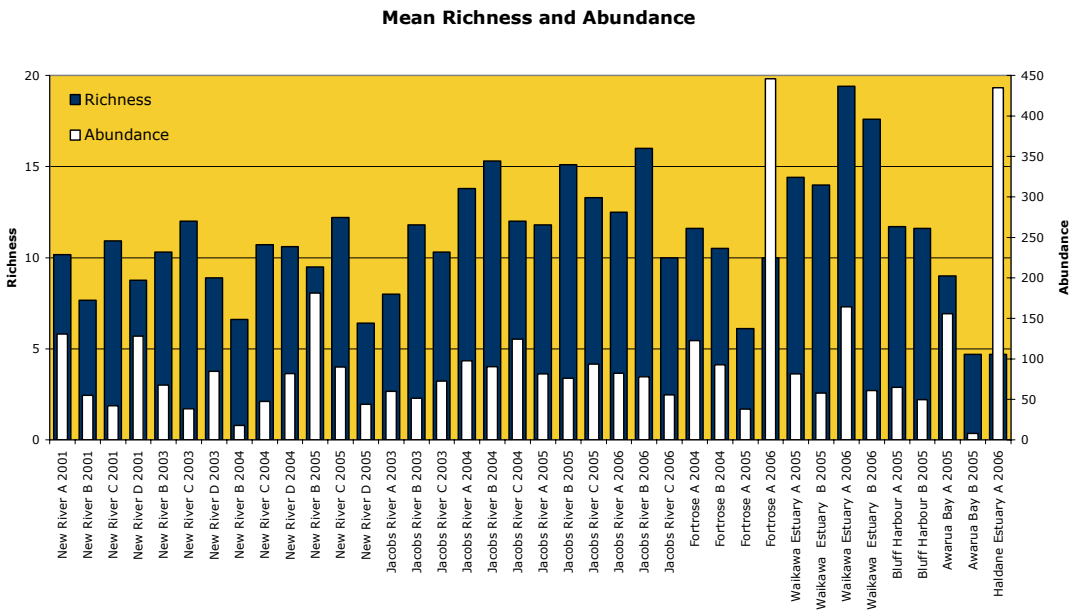


Figure 16. Mean benthic community richness and abundance in Southland estuaries.

Species richness is generally low to moderate, which is to be expected as sampling sites are located in predominantly sandy intertidal areas subjected to relatively harsh physical changes (*e.g.* regular tidal exposure, variable salinity, large scale short-term temperature changes *etc.*). The international literature generally reports higher estuary values than recorded in Southland, although many of these results are from physically different estuaries (*e.g.* retention periods > 3 days, a relatively small intertidal area, and muddy sediments).

Shannon-Weiner diversity values again highlight the variation between estuaries, between sites within estuaries, and over time (Figure 17). There are currently no relevant thresholds for defining NZ estuaries in relation to Shannon-Weiner diversity. However, a level of greater than 2.5 is generally regarded as indicative of a high diversity community or a healthy environment (Magurran 1988). As most of the Southland estuaries are less than this value, there is reason to suggest that the communities are indicative of more moderate, and in some cases, low diversity.

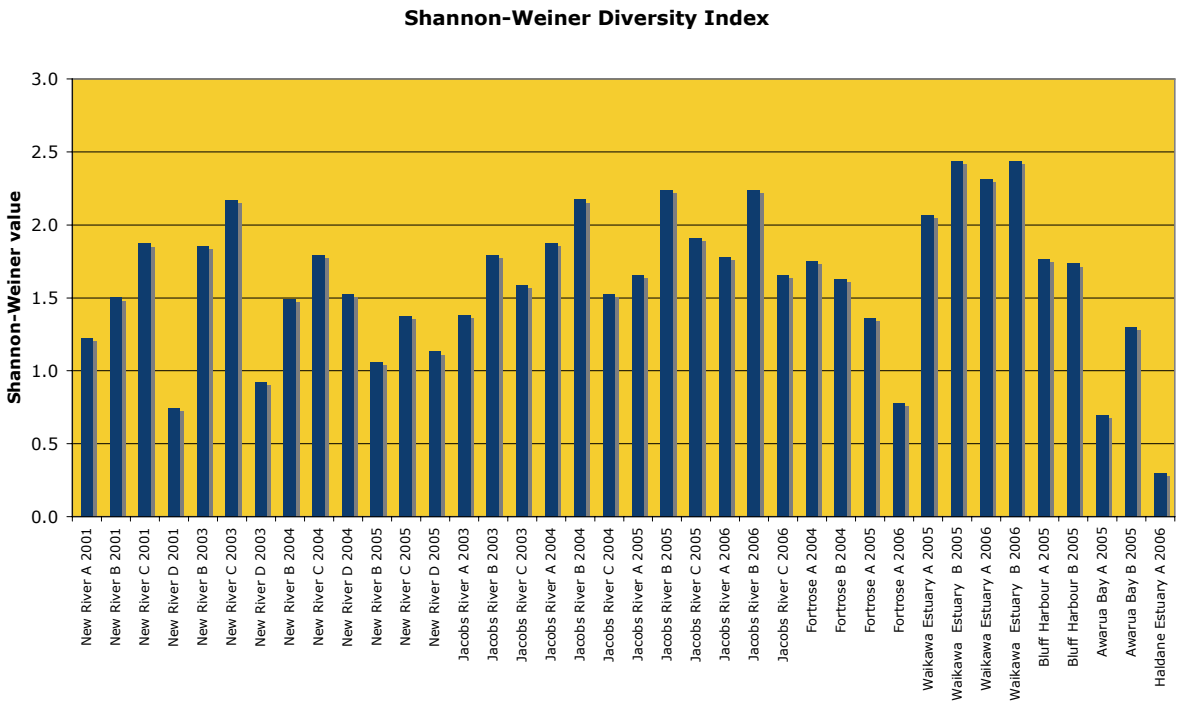


Figure 17. Mean Shannon-Weiner diversity values in Southland estuaries.

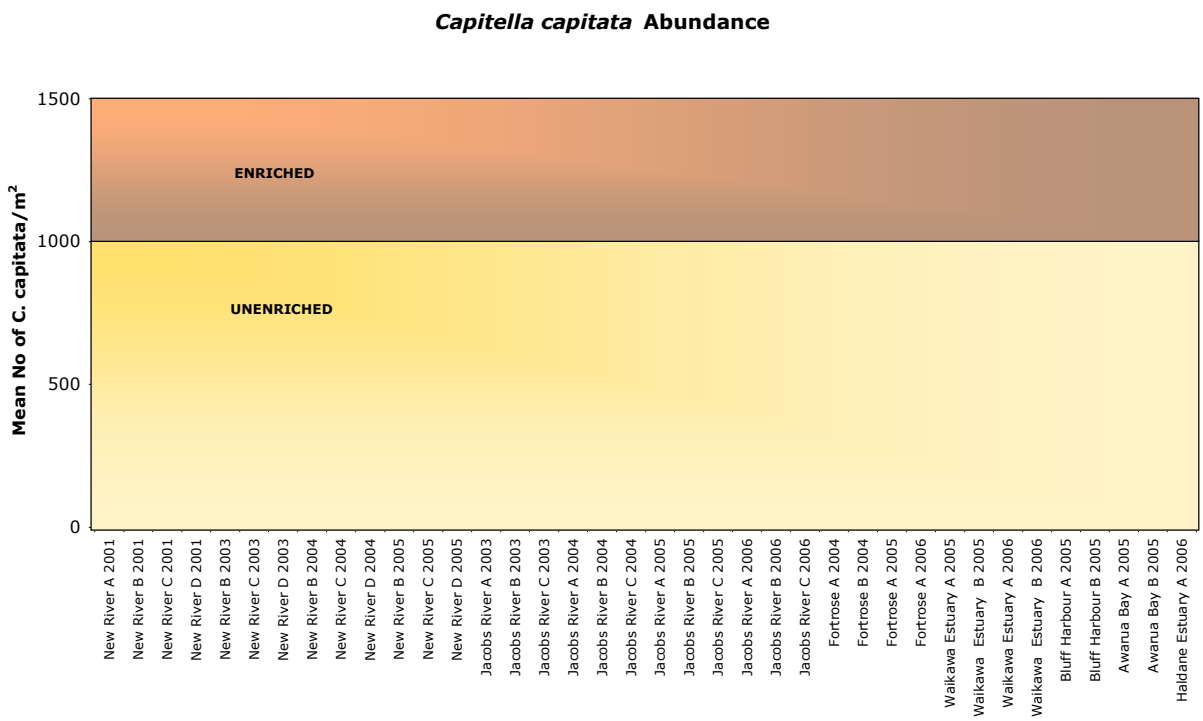
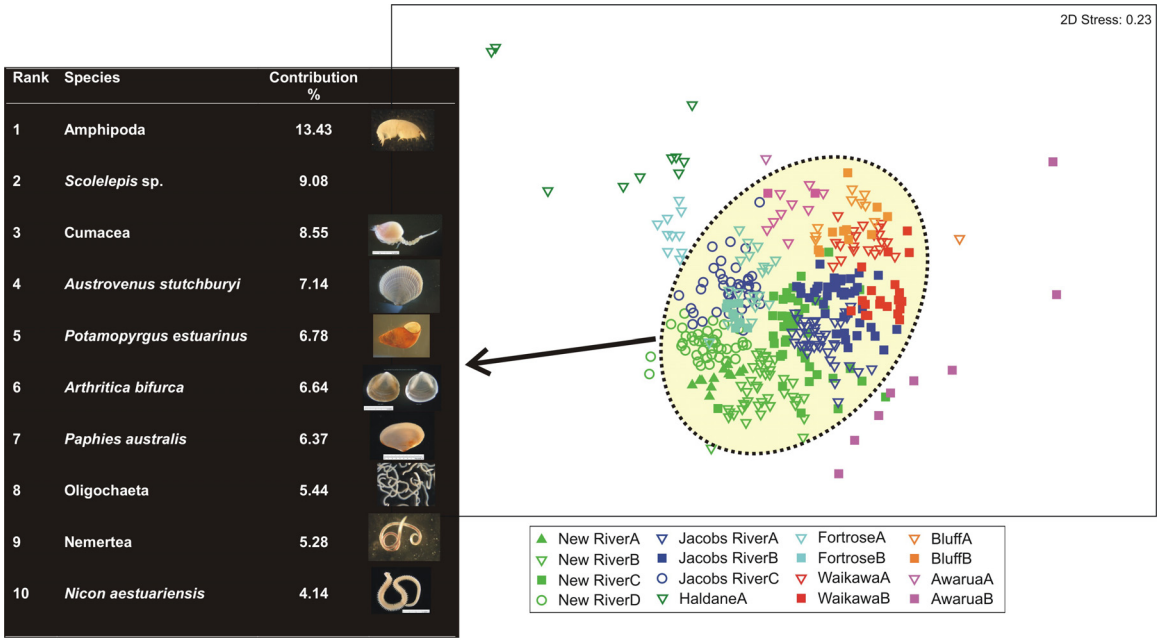


Figure 18. Mean number of *Capitella capitata*/m^2 in Southland estuaries.

As a direct indication of the likely state of organic enrichment of sites, the abundance of the polychaete *Capitella capitata* provides a potentially useful indicator of problem areas, but needs to be interpreted in conjunction with other indicators. As evident in Figure 18, the general absence of this pollution tolerant indicator shows that very few of the estuary sites monitored have very high levels of organic enrichment. The highest value is reported from New River Estuary Site B. Although inputs are variable over time, this site is likely to reflect combined inputs from the heavily modified Waihopai catchment, and the ICC wastewater outfall.

Although there is significant variation in the communities across all the Southland estuaries, there is also a common general species assemblage present (Figure 19).



Rank	Species	Contribution %
1	Amphipoda	13.43
2	*Scolelepis* sp.	9.08
3	Cumacea	8.55
4	*Austrovenus stutchburyi*	7.14
5	*Potamopyrgus estuarinus*	6.78
6	*Arthritica bifurca*	6.64
7	*Paphies australis*	6.37
8	Oligochaeta	5.44
9	Nemertea	5.28
10	*Nicon aestuariensis*	4.14

Figure 19. Summary of the most common species found across Southland estuaries.

Figure 19 shows the summary results of a multi-dimensional analysis which groups sites according to species composition and summarises the ten most common species across all sites. It also provides insight into which of the sites are "outliers" - in this case Haldane and Awarua Bay Site B - due to differences in the assemblages present.

Overall, the benthic communities present across Southland indicate that moderately diverse ecological systems are found at all sites, with a relatively high level of variation in baseline data. The animals present are typical of moderately enriched sites with some mud, and no significant contamination, or high enrichment issues. However, New River Estuary Site B does show signs of enrichment that are most likely due to inputs from the heavily modified catchment.

10.5. Gaps and Recommendations

Gaps	Recommendations
Define salinity measures at monitoring sites Salinity is probably the single most important influence on community structure. To enable a comparison of estuary monitoring results across sites, which may better optimise sampling locations and frequency, and enable a greater ability to detect change, information is needed on the salinity regime at each site.	Undertake salinity monitoring under representative flow conditions on a single occasion to characrterise the general salinity regime at each sampling location.
Sample Replication The results confirm the common finding of biological communities as being highly variable, and requiring a lot of sample replication to enable the reliable detection of change. Studies undertaken elsewhere in NZ (*e.g.* Pridmore 1990, Robertson et al. 2002, Schwarz et al. 2004) recommend 10 or more replicates per site are required to reliably detect change.	No reduction in replicate numbers is proposed from the 10 replicates per site specified in the EMP However, once a biotic index is developed, some reduction in sample replication is expected.
Multi-variate statistical analyses Following the collection of salinity data it will be possible to undertake a rigorous analysis of the patterns in community composition, and to assess changes over time and by location. This will facilitate the development of thresholds against which future change can be measured.	Undertake multi-variate statistical analysis of existing data following the collection of salinity data.
Biotic indices The adaptation and use of existing indices for use within specific estuary habitats (*e.g.* low salinity muds, moderate salinity mud/sands, high salinity sands) provides a cost effective way of establishing defensible thresholds for assessing estuary condition. It will greatly improve the public understanding of biological data and will maximise the value of existing information.	Develop biotic indices for use within individual habitats within Southland estuaries to provide a summary measure of biological health relevant to the habitats present.

11. CONCLUSIONS

Southland's estuaries are diverse and highly valued. However, for a number of years, those draining developed catchments (*e.g.* New River, Jacobs River, Fortrose, Waikawa and Haldane estuaries) have been identified as having existing, or being at risk from, problems as follows:

- Loss of habitat (*e.g.* saltmarsh, seagrass)
- Nuisance macroalgal blooms
- Expansion of muddy sediments
- Nutrient and organic matter enrichment
- Localised areas of heavy metal contamination

- Adverse impacts to aquatic ecology

The Environment Southland Estuary Monitoring Programme (ESEMP) was set up in 2001 to collect long-term ecological information on the condition of these estuaries. The monitoring focuses on the whole estuary at a broad scale and the dominant, tidal flat habitat at a fine scale. In general, the programme ignores the muddy, brackish upper reaches of estuaries and any localised problem areas. The results of the monitoring to date provides a feel for the baseline or existing estuary conditions against which future change will be measured. In relation to each of the key problem areas the findings were as follows:

Saltmarsh Habitat

- A rating scale based on the percentage change to the saltmarsh area within the estuary was developed but needs long-term data before it can be reported (except for New River Estuary).
- Fortrose estuary has the greatest percentage cover of saltmarsh. Saltmarsh area in the New River Estuary has declined by 30% since 1910, which provisionally places it in the "poor" rating. Ratings for the other estuaries in Southland will be made once estimates of historical saltmarsh cover have been undertaken.

Seagrass Habitat

- A rating scale based on the percentage change to the seagrass area within the estuary was developed but needs long-term data before it can be reported.
- New River Estuary has significant areas of seagrass (92 ha) but other estuaries have very little. Bluff Harbour and Awarua Bay, with their high water clarity and well-oxygenated sediments, have the largest areas of seagrass (150 and 600 ha respectively). Ratings for these estuaries in Southland will be made once estimates of historical reclamation have been undertaken.

Nuisance Macroalgal Cover

- A rating scale based on the percentage change to the macroalgal area within the estuary was developed.
- Most estuaries were rated as "fair" in terms of percentage of the estuary area covered with nuisance growths. It is noted that all estuaries experienced some areas of nuisance growths, with New River Estuary reporting widespread growths but at a low density.

Soft Mud Habitat Expansion

- A rating scale based on the percentage change to the soft mud area within the estuary was developed but needs long-term data before it can be reported.
- A preliminary rating scale was proposed to provide an indication of current condition based on the percentage of an estuary area as soft muds exceeding 5%, or increasing rapidly. Estuaries exceeding this threshold are candidates for more intensive

sedimentation studies. Using this classification rating, Waikawa, Jacobs River, New River and Haldane Estuaries fall into the proposed category requiring an Evaluation and Response Plan assessing the need for more intensive sedimentation studies and possible management action.

- Bluff Harbour and Awarua Bay, with their absence of significant freshwater inputs, were rated as undegraded by soft mud.

Nutrient and Organic Enrichment

- A rating scale based on the concentration of total organic carbon (TOC) within the estuary sediments was developed.
- Regionally, the level of TOC in estuarine sediments was relatively low (< 2%) with estuaries rated as "good".
- Compared with the elevated nitrogen and phosphorus concentrations measured in very eutrophic sites, the Southland estuary sites were low.
- Concentrations of both N and P almost always exceed levels that limit phytoplankton blooms (ANZECC 2000) and sea lettuce growth (Pederson & Borum 1997) in New River Estuary.

Contamination in Bottom Sediments

- A rating scale based on the concentration of heavy metals within the estuary sediments was developed.
- Regionally, the level of heavy metals (cadmium, chromium, copper, nickel, lead and zinc) in the Southland estuaries were all well below the ANZECC (2000) ISQG Low guideline criteria and therefore unlikely to cause any biological impact on organisms inhabiting the sediment. These results place the estuaries in the "very good" to "good" category with respect to heavy metal toxicity.

Condition of Bottom-Dwelling Animals

- A rating scale based on a yet-to-be established biotic index has been recommended for development.
- The benthic communities present at all sites were moderately diverse, with a relatively high level of variation in baseline data. The animals present were typical of moderately enriched sites with some mud, and no significant contamination, or high enrichment issues. However, New River Estuary Site B did show signs of enrichment that was most likely due to inputs from the heavily modified catchment.

Summary

A table summarising the condition of Southlands estuaries using the available data and proposed ratings is presented in Table 14. Overall, the results to date indicate that estuaries draining developed catchments in Southland do not have significant problems with potentially toxic contaminants or enrichment of sediments with organic matter and nutrients. However, some experience problems related to large areas of soft muddy sediments in their upper

reaches, loss of saltmarsh habitat through reclamation, very elevated nutrient levels in the water column, and various levels of nuisance macroalgal growths.

Table 14. Summary of Southland estuary condition based on the available data and preliminary ratings proposed.

Site / Indicator	New River	Jacobs River	Fortrose	Waikawa	Haldane	Awarua Bay	Bluff Harbour
Saltmarsh Habitat	Poor	ND	ND	ND	ND	ND	ND
Seagrass Habitat	ND	ND	ND	ND	ND	Very Good	ND
Macroalgal Cover	Fair	Fair / Poor	Fair	Fair	Fair	Fair	Fair
Soft Mud	Fair	Fair	Good	Fair	Fair	Good	Good
Organic Matter and Nutrients	Good	Good	Good	Good	Good	Good	Good
Toxic Contaminants	Very Good	Very Good	Very Good	Very Good	Very Good	Very Good	Very Good
Bottom-Living Animals	ME, OE	ME	ME	ME	ME	ME	ME

ND = Not determined
ME = Typical of moderately enriched sites with some mud
OE = Typical of organically enriched sites

The results also highlight important gaps in the current programme and what can be done to fill them. In particular:

- The main driver of benthic community composition is almost certainly salinity. Each site has yet to have its salinity profile measured. A recommendation to monitor salinity at all sites on a one-off basis over a tidal period is suggested.
- Currently there is no monitoring of the upper, soft mud reaches of Southland estuaries. These areas are likely to be the most impacted in terms of sedimentation and enrichment as contaminants tend to be associated with fine sediments. It is recommended that the SOE monitoring programme be expanded to include upper estuary, brackish sites. Monitoring should focus on sedimentation, nutrients and contaminants and less so on the composition of the benthic mud community.
- Sedimentation problems (*e.g.* expansion of muddy sediments, and loss of high value habitat and biodiversity) and nutrient enrichment problems (*e.g.* macroalgal bloom

problems) are prevalent in Southland estuaries. Several areas need to be tackled in order to address these issues.

- Excess sediment and nutrients from terrestrial or catchment sources are almost certainly the cause. However, the primary catchment drivers of sediment and nutrient enrichment of Southland estuaries have not been clearly identified on a site-specific basis and targeted for management. It is recommended that the main catchment drivers of estuary sediment and nutrient enrichment be identified and evaluation and management plans developed.
- It would be useful if we could predetermine which estuaries are more prone to such problems and under what circumstances (*e.g.* nutrient loadings) the problems would begin to appear. Once available, this information would provide a defensible set of nutrient load guidelines for each of the Southland estuaries draining Southland catchments. It is recommended that nutrient load guidelines for each developed catchment be developed using a simple estuary response model.
- The nutrient and sediment levels of Southland estuaries or their main inputs are currently not measured. If they were, the results would provide an early warning of the potential for sedimentation, nuisance macroalgal blooms, and sediment anoxia in the estuaries as well as a more direct means of assessing the success of catchment management actions to reduce nutrient and sediment loads to estuaries. It is recommended that a monitoring programme designed to identify mass loads of suspended sediment, N and P to New River, Jacobs River and Waikawa Estuaries be established.

- Currently, there is no index for categorising the condition of Southland's estuaries based on the community composition of bottom-dwelling animals. The presence of a species or a group of species is one of the most commonly used parameters to detect estuarine pollution, especially organic pollution (Borja et al. 2000). Biotic indices have been developed in some countries which are capable of distinguishing different levels of ecological quality and classifying coastal areas as very good, good, moderate, poor or bad. At present, no such index has been developed for NZ soft-bottomed communities. In order to maximize the value of the benthic community monitoring data, it is recommended that a sediment biotic index for Southland estuaries be developed once salinity profiles for each site are available.
- Finally, other estuaries exist in Southland that have not yet been monitored as part of the SOE programme. It is recommended that other estuaries and coastal lagoons that are potentially under threat from human activities be investigated and added to the programme (*e.g.* Freshwater Estuary, Waituna Lagoon and Waiau Estuary).

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14. APPENDICES

Appendix 1. Physical and chemical sediment properties of sites in New River, Fortrose, Jacobs River, Waikawa and Haldane Estuaries and Bluff Harbour and Awarua Bay

Summary of Broad Scale Habitat Mapping of Southland estuary sites 2001-2006

ESTUARINE VEGETATION	New River		Jacobs River		Fortrose		Haldane		Waikawa		Bluff		Awarua	
Class Dominant species	Ha	%	Ha	%	Ha	%	Ha	%	Ha	%	Ha	%	Ha	%
Estuarine Shrubland			**1.0**	**0.1**	**6.0**	**1.2**	**0.6**	**0.3**	**2.6**	**0.4**	**0.4**	**0.0**	**45.5**	**1.5**
Lupininus arboreus (Tree lupin)							0.2	0.1						
Plagianthus divaricatus (Saltmarsh ribbonwood)					6.0	1.2	0.4	0.2	2.6	0.4	0.4	0.0	45.5	1.5
Ulex europeaus			1.0	0.1										
Tussockland	**14.9**	**0.4**	**8.2**	**1.1**	**5.7**	**1.1**	**0.0**	**0.0**	**3.6**	**0.5**				
Phormium tenax, "New Zealand flax"			8.2	1.1	2.2	0.4	0.0	0.0	3.5	0.5				
Puccinella stricta, "Salt grass"	14.9	0.4			3.5	0.7			0.1	0.0				
Grassland	**17.1**	**0.4**	**7.9**	**1.1**	**27.5**	**5.5**	**0.2**	**0.1**	**16.9**	**2.4**	**18.8**	**0.6**	**0.7**	**0.0**
Ammophila arenaria (Marram grass)	2.6	0.1			1.7	0.3			14.1	2.0	10.0	0.3	0.5	0.0
Festuca arundinacea (Tall fescue)	14.4	0.3	7.9	1.1	25.8	5.2	0.2	0.1	1.9	0.3	8.9	0.3	0.2	0.0
Unidentified grass									0.9	0.1				
Sedgeland	**4.3**	**0.1**	**1.5**	**0.2**					**0.0**	**0.0**				
Isolepis cernua, "Slender clubrush"									0.0	0.0				
Schoenoplectus pungens	4.3	0.1	1.5	0.2										
Rushland	**318.9**	**7.6**	**57.3**	**7.9**	**47.4**	**9.5**	**8.4**	**4.1**	**9.3**	**1.3**	**22.8**	**0.7**	**93.5**	**3.1**
Isolepis nodosa (Knobby clubrush)											0.7	0.0	18.6	0.6
Leptocarpus similis (Jointed wirerush)	318.9	7.6	57.3	7.9	47.4	9.5	8.4	4.1	9.3	1.3	22.1	0.7	74.9	2.5
Reedland	**112.3**	**2.7**												
Spartina angliica	112.3	2.7												
Herbfield	**3.1**	**0.1**			**0.9**	**0.2**	**0.2**	**0.1**	**1.0**	**0.1**	**3.5**	**0.1**	**23.4**	**0.8**
Cotula coronopifolia (Bachelor's button)	0.5	0.1										0.0	1.7	0.1
Samolus repens (Primrose)	2.4				0.2	0.0	0.2	0.1	0.7	0.1	0.2	0.0	13.4	0.5
Sarcocornia quinqueflora (Glasswort)	0.2	<0.01							0.2	0.0	0.3	0.0	2.4	0.1
Selliera radicans (Remuremu)					0.6	0.1			0.1	0.0	3.1	0.1	6.0	0.2
Introduced Weeds									**0.5**	**0.1**	**0.6**	**0.0**	**2.5**	**0.1**
Seagrass Meadow	**93.6**	**2.2**	**4.8**	**0.7**					**6.7**	**0.9**	**150.7**	**4.8**	**600.2**	**20.2**
Zostera sp (Eelgrass)	93.6	2.2	4.8	0.7					6.7	0.9	150.7	4.8	600.2	20.2
Macroalgal Bed	**54.3**	**1.3**	**98.0**	**13.7**	**0.4**	**0.1**	**0.3**	**0.2**	**0.6**	**0.1**	**40.8**	**1.3**	**31.4**	**1.1**
Enteromorpha sp	2.6	0.1	24.8	3.5	0.0	0.0								
Gracilaria chilensis	51.5	1.2	73.3	10.2	0.4	0.1	0.3	0.2	0.6	0.1	40.8	1.3	31.4	1.1

UNVEGETATED SUBSTRATA														
Bridge											0.33	0.01	1.14	0.04
Wharf											19.25	0.62		
Rock Wall man-made											3.01	0.10		
Rock field	20.12	0.48	0.36	0.05			0.26	0.13	6.46	0.92	33.68	1.09		
Boulder field							0.09	0.04	1.60	0.23	30.06	0.97		
Cobble field			4.39	0.61	0.07	0.01	0.27	0.13	3.12	0.44	30.84	1.00	8.59	0.28
Gravel field			6.73	0.94	8.16	1.64	1.07	0.52			200.35	6.49	371.84	12.04
Shell bank	14.31	0.34							3.15	0.45	3.63	0.12	0.80	0.03
Firm Shell/Sand			4.27	0.60										
Mobile sand	471.78	11.17			8.90	1.79			29.50	4.18				
Firm sand	1321.25	31.27	138.83	19.35	18.19	3.66	82.22	39.95	72.84	10.33	2.68	0.09		
Firm mud/sand	241.61	5.72	110.43	15.39	126.27	25.38	78.38	38.08	185.19	26.27	869.43	28.15	950.77	30.78
Soft mud/sand	241.41	5.71	62.60	8.72	15.81	3.18	16.58	8.06	49.86	7.07	1.26	0.04	0.81	0.03
Very soft mud	158.16	3.74	59.11	8.24			16.58	8.06	192.24	27.27	0.25	0.01		

OVERALL SUMMARY														
Water (subtidal)	1138.0	26.9	152.2	21.2	232.1	46.7	16.6	8.1	119.9	17.0	1656.1	53.6	605.8	22.1
Unvegetated Substratum	2468.6	58.4	386.7	53.9	177.4	35.7	179.4	87.2	544.0	77.2	1194.8	38.7	1333.9	48.7
Estuarine Vegetation	618.4	14.6	178.7	24.9	87.9	17.7	9.8	4.8	41.2	5.8	237.6	7.7	797.2	29.1
Grand Total	**4225**	**100**	**718**	**100**	**497**	**100**	**206**	**100**	**705**	**100**	**3088**	**100**	**2737**	**100**

Results of sediment chemical analyses for Southland estuary sites 2001-2006

Date	Estuary	Site	Rep	AFDW % w/w	Mud (<63µm)	Sands mm & >63	Gravel (>2mm)	Cd mg/kg	Cr mg/kg	Cu mg/kg	Ni mg/kg	Pb mg/kg	Zn mg/kg	TN g/kg (dr	TP mg/kg
12/2/01	New River	A	01	0.6	2.8	97.2	0.05	0.1	8.9	3.8	0.5	4.3	17	<250	252
12/2/01	New River	A	02	1.4	3.3	96.5	0.2	0.1	8.4	3.6	1.3	4.6	16	<250	253
12/2/01	New River	A	03	0.6	1.9	98	0.1	0.1	7.9	3.2	2.3	4.2	14	<250	243
12/2/01	New River	A	04	0.6	1.7	97.9	0.4	0.1	6.9	3	1.4	3.9	13	<250	232
12/2/01	New River	A	05	0.6	1.5	97.9	0.7	0.1	7.8	3.2	2.6	4.2	14	<250	234
12/2/01	New River	A	06	0.7	1.6	98.3	0.1	0.1	7.5	3.4	0.5	4.2	14	<250	234
12/2/01	New River	A	07	0.6	1.7	97.5	0.8	0.1	7.6	3.4	1.1	5.1	15	<250	248
12/2/01	New River	A	08	0.5	1.9	98	0.5	0.1	9.5	3.8	1.2	5.1	17	<250	292
12/2/01	New River	A	09	0.8	2.2	97.7	0.2	0.1	15	4.7	1.2	7.3	22	<250	432
12/2/01	New River	A	10	0.4	1.7	98.2	0.1	0.1	7.6	3.3	0.5	4.5	15	<250	254
12/2/01	New River	A	11	0.8	2.8	97	0.2	0.1	8.4	3.5	0.5	4.3	15	<250	235
12/2/01	New River	A	12	0.5	1.8	97.9	0.2	0.1	7.8	3.1	0.5	3.9	14	<250	208
13/2/01	New River	B	01	0.5	1.5	98.5	0.05	0.1	8.1	3.6	0.5	4.9	15	<250	216
13/2/01	New River	B	02	0.6	1.7	98.2	0.05	0.1	8.7	3.6	0.5	5	16	<250	254
13/2/01	New River	B	03	0.8	1.2	98.7	0.05	0.1	8	3.6	0.5	3.8	16	<250	216
13/2/01	New River	B	04	0.5	1	98.9	0.05	0.1	8.8	3.9	0.5	4.1	17	<250	216
13/2/01	New River	B	05	0.4	0.8	99.2	0.05	0.1	8.1	3.6	0.5	3.5	16	<250	215
13/2/01	New River	B	06	0.8	1.1	98.9	0.05	0.1	7.9	3.6	0.5	3.8	16	<250	206
13/2/01	New River	B	07	0.3	1.2	98.8	0.05	0.1	8	3.6	0.5	4.4	15	<250	224
13/2/01	New River	B	08	0.7	1.1	98.9	0.05	0.1	8.5	3.6	0.5	4.7	15	<250	212
13/2/01	New River	B	09	0.7	1.2	98.8	0.05	0.1	8.6	3.4	1.8	4.1	15	<250	215
13/2/01	New River	B	10	0.4	0.9	99	0.05	0.1	8.6	3.5	0.5	3.8	15	<250	208
13/2/01	New River	B	11	0.5	0.9	99.1	0.05	0.1	8.5	3.4	0.5	4.3	14	<250	195
13/2/01	New River	B	12	0.7	1.3	98.7	0.05	0.1	9	3.5	1.3	4.6	15	<250	214
14/2/01	New River	C	01	0.6	3	96.9	0.2	0.1	15	4.7	1.1	7	21	<250	374
14/2/01	New River	C	02	0.5	2	97.6	0.4	0.1	15	4.4	0.5	5.7	19	<250	355
14/2/01	New River	C	03	0.7	2.3	97.8	0.05	0.1	15	4.5	1.5	6.5	19	<250	370
14/2/01	New River	C	04	6.2	1.7	98.3	0.05	0.1	16	4.9	0.5	6.2	21	<250	380
14/2/01	New River	C	05	0.8	2.4	97.6	0.05	0.1	15	4.7	0.5	6.2	20	<250	356
14/2/01	New River	C	06	0.8	2.3	97.7	0.05	0.1	15	4.4	0.5	5.7	19	<250	343
14/2/01	New River	C	07	0.3	1.5	98.5	0.05	0.1	15	4.5	0.5	6.2	20	<250	365
14/2/01	New River	C	08	1	2.3	96.4	1.3	0.1	15	4.6	0.5	5.5	20	<250	356
14/2/01	New River	C	09	0.7	2.1	97.9	0.05	0.1	15	4.7	0.5	5.9	21	<250	382
14/2/01	New River	C	10	1	2	97.6	0.4	0.1	14	4.5	0.5	5.7	20	<250	368
14/2/01	New River	C	11	0.5	2.4	97.5	0.05	0.1	14	4.4	0.5	5.4	20	<250	358
14/2/01	New River	C	12	0.5	2.1	97.8	0.05	0.1	15	4.5	0.5	5.5	20	<250	373
15/2/01	New River	D	01	0.7	1.2	98.3	0.5	0.1	11	3.5	0.5	4.4	18	<250	239
15/2/01	New River	D	02	0.5	1.1	98.6	0.3	0.1	12	3.8	0.5	5.7	17	<250	225
15/2/01	New River	D	03	0.6	1.4	98	0.7	0.1	12	3.4	0.5	5.1	16	<250	229
15/2/01	New River	D	04	0.6	1.4	98	0.6	0.1	16	3.6	0.5	5.6	18	<250	221
15/2/01	New River	D	06	0.6	1.3	98.2	0.5	0.1	12	3.5	0.5	5.8	17	<250	214
15/2/01	New River	D	07	0.4	1.2	98.4	0.4	0.1	13	3.7	0.5	5.4	18	<250	212
15/2/01	New River	D	08	0.3	1.2	98.1	0.7	0.1	14	3.7	0.5	5.8	18	<250	282
15/2/01	New River	D	10	0.9	1.4	97.7	1	0.1	12	3.9	0.5	4.5	18	<250	234
15/2/01	New River	D	11	0.3	1.2	97.7	1.1	0.1	11	3.5	0.5	4.9	17	<250	226
15/2/01	New River	D	12	0.3	0.9	98.9	0.2	0.1	11	3.6	0.5	4.7	17	<250	235
15/2/01	New River	D	05	0.6	0.9	98.4	0.6	0.1	12	3.6	0.5	5.7	18	<250	254
15/2/01	New River	D	09	0.5	1.2	98.5	0.2	0.1	12	3.4	0.5	5.3	17	<250	217

Results of sediment chemical analyses for Southland estuary sites 2001-2006

Date	Estuary	Site	Rep	AFDW % w/w	Mud (<63µm)	Sands mm & >63	Gravel (>2mm)	Cd mg/kg	Cr mg/kg	Cu mg/kg	Ni mg/kg	Pb mg/kg	Zn mg/kg	TN g/kg (dr	TP mg/kg
17/2/03	Jacobs River	A	01	1.8	1.3	98.6	0.2	0.5	14	25	8.6	11	75	110	458
17/2/03	Jacobs River	A	02	2.1	1.2	98.6	0.2	0.4	14	21	7.6	13	65	110	506
17/2/03	Jacobs River	A	03	2.1	1	98.9	0.1	0.5	15	24	8.9	11	74	130	518
17/2/03	Jacobs River	A	04	2.1	1.3	98.6	0.1	0.4	15	24	8.5	17	73	130	522
17/2/03	Jacobs River	A	05	2.7	1.2	98.4	0.4	0.5	14	24	8.2	13	72	130	508
17/2/03	Jacobs River	A	06	1.7	0.8	99	0.2	0.5	15	25	8.1	11	75	140	496
17/2/03	Jacobs River	A	07	2.1	1.1	98.7	0.2	0.5	16	25	8.8	14	76	120	494
17/2/03	Jacobs River	A	08	0.72	0.7	99	0.3	0.5	14	24	8.9	11	72	100	464
17/2/03	Jacobs River	A	09	0.84	0.7	99.1	0.2	0.5	15	24	8.2	9.8	74	95	481
17/2/03	Jacobs River	A	10	0.74	1	98.7	0.3	0.5	15	24	7.8	10	75	140	500
20/2/03	Jacobs River	B	01	0.7	3.2	95.4	1.3	0.1	11	4.6	3.5	4.2	13	170	170
20/2/03	Jacobs River	B	02	0.63	2.5	96.6	0.9	0.2	13	5.5	4.2	5.1	17	150	203
20/2/03	Jacobs River	B	03	0.73	3.5	96.3	0.2	0.2	12	7.1	4.6	5.6	19	140	184
20/2/03	Jacobs River	B	04	0.97	3.2	96.4	0.4	0.3	13	7.9	5.4	9.3	21	130	230
20/2/03	Jacobs River	B	06	0.94	2.7	95.7	1.6	0.2	12	9.1	4.5	5.9	24	160	259
20/2/03	Jacobs River	B	08	0.81	2.6	96.5	0.9	0.3	11	4.5	5.5	7.8	13	120	175
20/2/03	Jacobs River	B	09	0.86	2.5	96.6	0.9	0.1	12	4.7	3.9	5.3	14	160	178
20/2/03	Jacobs River	B	10	0.91	2.8	96.7	0.5	0.1	11	4.7	3.6	5.2	14	120	186
20/2/03	Jacobs River	B	11	0.72	2.6	97.3	0.1	0.2	12	6.1	4.3	5	17	160	195
20/2/03	Jacobs River	B	12	0.98	2.7	97	0.3	0.2	12	7.7	4.9	5.6	21	160	254
18/2/03	Jacobs River	C	01	0.99	2.8	96.6	0.6	0.1	10	5.5	3.5	4.8	18	200	263
18/2/03	Jacobs River	C	02	1.4	4.6	94.9	0.5	0.1	11	5.9	4.8	4	18	220	280
18/2/03	Jacobs River	C	03	1.3	5	94.3	0.7	0.1	14	6.4	4.2	5.7	19	210	255
18/2/03	Jacobs River	C	04	1.4	4.8	93.6	1.6	0.2	10	6	3.5	5.3	17	290	355
18/2/03	Jacobs River	C	05	1.3	4.1	94.4	1.5	0.1	10	5.4	3.7	5	17	210	301
18/2/03	Jacobs River	C	07	1.2	3.7	95.6	0.7	0.1	10	5.2	3.9	4.6	17	240	310
18/2/03	Jacobs River	C	08	1.3	3.4	96	0.5	0.1	11	5.6	3.8	4.7	18	210	239
18/2/03	Jacobs River	C	09	1.3	4.2	95.1	0.7	0.1	9.2	5.1	3.7	4.1	17	210	295
18/2/03	Jacobs River	C	10	1.3	3.4	96.2	0.4	0.1	10	5.4	4.4	4.7	18	230	258
18/2/03	Jacobs River	C	12	1.2	3.5	95.8	0.8	0.1	9.1	5.2	3.2	4.3	15	200	208
21/2/03	New River	B	01	0.87	1.1	98.9	0.1	0.1	7.7	3.4	3.1	3.6	13	140	209
21/2/03	New River	B	02	0.75	0.9	99.1	0.05	0.1	7.9	3.5	3.4	3.7	14	130	203
21/2/03	New River	B	03	0.79	1	99	0.05	0.1	6.9	3	2.7	3.6	12	150	214
21/2/03	New River	B	05	0.75	0.8	99.1	0.1	0.1	8.4	3.2	3.1	3.7	13	140	196
21/2/03	New River	B	06	0.8	1	99	0.05	0.1	7	3.1	3.2	3.7	12	140	200
21/2/03	New River	B	07	0.82	1	99	0.05	0.1	8.1	3.3	2.8	3.7	13	140	207
21/2/03	New River	B	08	0.75	0.9	99.1	0.05	0.1	7.5	3.2	3	3.6	13	140	203
21/2/03	New River	B	09	0.73	0.9	99	0.05	0.1	7.3	2.9	2.4	3.1	12	160	195
21/2/03	New River	B	10	0.68	0.9	99.1	0.05	0.1	7	3.1	3.1	2.9	12	130	210
21/2/03	New River	B	11	0.7	1	98.9	0.05	0.2	6.3	2.9	2.7	3.5	12	130	210
18/2/03	New River	C	01	0.93	2.8	97.2	0.05	0.2	15	4.3	3.9	6.6	18	110	385
18/2/03	New River	C	03	0.94	2.7	97.3	0.05	0.2	15	4.4	4	10	18	120	357
18/2/03	New River	C	04	0.94	2.6	97.4	0.05	0.2	17	4.8	4.3	11	20	120	422
18/2/03	New River	C	05	0.91	2.6	97.4	0.05	0.1	16	4.4	5.4	9	19	120	376
18/2/03	New River	C	06	0.98	2.3	97.6	0.1	0.2	17	4.6	3.7	10	20	100	394
18/2/03	New River	C	07	0.88	2.5	97.5	0.05	0.1	16	4.8	4.2	6.3	20	140	394
18/2/03	New River	C	08	0.81	2.4	97.6	0.05	0.1	15	4.6	3.8	6.5	20	120	398
18/2/03	New River	C	09	0.83	2.3	97.6	0.1	0.3	16	4.7	4.2	6.6	20	130	390
18/2/03	New River	C	10	0.81	2.3	97.6	0.05	0.2	16	4.7	4.5	6.4	20	120	380
18/2/03	New River	C	12	1	3.2	96.6	0.2	0.2	16	4.9	4.8	9.7	21	140	433
17/2/03	New River	D	01	0.67	1.4	95.7	2.9	0.3	9.2	3.3	4.1	8.1	15	160	233
17/2/03	New River	D	02	0.66	1.4	98.2	0.4	0.1	11	3.6	3.7	8.9	16	160	236
17/2/03	New River	D	04	0.74	1.1	98.7	0.2	0.1	11	3.6	4.2	4.9	15	130	248
17/2/03	New River	D	07	0.78	1.1	98.7	0.2	0.1	9.6	3.2	3.6	0.5	14	130	217
17/2/03	New River	D	08	0.81	1.5	97.6	0.9	0.1	9.9	3.2	3.7	4.6	15	140	228
17/2/03	New River	D	10	0.88	1.2	97.9	0.9	0.1	10	3.4	4	5.1	15	100	218
17/2/03	New River	D	11	0.73	1.3	98.1	0.6	0.1	11	3.7	3.7	5	16	120	215
17/2/03	New River	D	12	0.7	1.2	98.5	0.3	0.1	10	3.4	3.9	4.9	14	120	232
17/2/03	New River	D	05	0.77	1.2	98	0.8	0.1	9.4	3.5	3.9	4.7	15	120	250
17/2/03	New River	D	09	0.84	1.3	98	0.8	0.1	10	3.3	3.7	4.9	15	94	232

Results of sediment chemical analyses for Southland estuary sites 2001-2006

Date	Estuary	Site	Rep	AFDW % w/w	Mud (<63µm)	Sands mm & >63	Gravel (>2mm)	Cd mg/kg	Cr mg/kg	Cu mg/kg	Ni mg/kg	Pb mg/kg	Zn mg/kg	TN g/kg (dr	TP mg/kg
9/2/04	Fortrose	A	01	0.77	2.3	78	19.7	1	4.6	2.2	2.1	3.1	48	180	158
9/2/04	Fortrose	A	02	0.67	1.7	76.2	22.2	1	4.5	1.8	2	2.9	35	170	153
9/2/04	Fortrose	A	04	0.83	2.7	74	23.4	1	4.2	1.9	2	2.8	49	160	158
9/2/04	Fortrose	A	05	0.72	1.7	77.7	20.5	1	4	1.9	1.9	2.7	44	160	153
9/2/04	Fortrose	A	06	0.67	2.1	74.4	23.5	1	4.4	2	1.9	3.1	34	180	157
9/2/04	Fortrose	A	07	0.76	2.4	86.6	11	1	4.6	2.1	2	3	48	200	155
9/2/04	Fortrose	A	09	0.89	4.4	84.5	11.1	1	4.9	2.5	2	3.5	57	180	151
9/2/04	Fortrose	A	10	0.7	1.4	78.3	20.4	1	4.5	1.8	1.9	2.9	37	150	163
9/2/04	Fortrose	A	11	0.54	1.7	79.5	18.8	1	4.9	2.1	2.1	3.2	33	170	175
9/2/04	Fortrose	A	12	0.55	1.6	81.1	17.3	1	5.2	1.9	1.9	3.4	45	170	138
9/2/04	Fortrose	B	01	0.9	2	96.3	1.6	1	4.1	1.5	1.4	2.6	33	180	172
9/2/04	Fortrose	B	02	0.79	1.7	96.2	2.1	1	4.1	1.6	1.6	2.7	34	210	193
9/2/04	Fortrose	B	03	0.77	1	95.7	3.4	1	3.7	1.5	1.5	2.4	28	210	187
9/2/04	Fortrose	B	04	0.74	1.5	95.7	2.9	1	4.4	1.8	1.7	2.8	33	230	212
9/2/04	Fortrose	B	05	1	2.8	96.4	0.7	2	4.1	1.7	1.7	2.8	33	320	218
9/2/04	Fortrose	B	06	0.7	2.5	95	2.5	1	3.9	1.7	1.7	2.8	36	230	210
9/2/04	Fortrose	B	07	0.49	2.5	94.4	3.1	1	3.7	1.8	1.7	2.5	40	220	216
9/2/04	Fortrose	B	08	0.44	1.7	95	3.3	1	3.7	1.5	1.5	2.3	43	190	197
9/2/04	Fortrose	B	09	0.98	4.1	91.7	4.2	1	4	1.8	1.6	2.8	37	230	231
9/2/04	Fortrose	B	10	0.93	3	89	8.1	1	3.7	2.3	1.7	2.6	48	210	195
9/2/04	Jacobs River	A	01	1.5	1.7	97	1.3	1	11	24	3	12	100	160	471
9/2/04	Jacobs River	A	02	2	0.6	99.3	0.1	1	10	23	2.9	11	76	160	455
9/2/04	Jacobs River	A	03	2.1	0.9	97.7	1.5	1	11	23	2.8	11	85	170	466
9/2/04	Jacobs River	A	04	1.9	0.6	99.4	0.05	1	11	23	2.9	11	78	120	499
9/2/04	Jacobs River	A	05	2.2	0.7	99.3	0.1	1	10	24	3.1	11	81	150	472
9/2/04	Jacobs River	A	06	2.2	0.5	99.1	0.4	1	10	23	2.9	11	83	160	461
9/2/04	Jacobs River	A	08	2.2	0.8	98.6	0.6	1	9.8	23	2.8	11	86	140	447
9/2/04	Jacobs River	A	10	2.2	0.6	99.2	0.1	1	9.9	23	2.9	11	85	130	450
9/2/04	Jacobs River	A	11	2.1	0.8	99	0.2	1	10	23	2.9	11	83	140	452
9/2/04	Jacobs River	A	12	2.2	0.6	99.3	0.1	1	10	23	2.8	11	74	160	464
9/2/04	Jacobs River	B	01	0.82	4.5	94.9	0.6	1	6.6	4.6	1.5	5.1	40	250	190
9/2/04	Jacobs River	B	02	0.95	3.9	93.3	2.8	1	7.2	5.7	1.6	5.7	47	250	186
9/2/04	Jacobs River	B	03	0.99	3.5	96.3	0.1	1	6.7	5.9	1.5	5.4	43	250	198
9/2/04	Jacobs River	B	06	1.1	3.8	95.5	0.7	1	7.4	8.3	1.8	6.6	62	270	231
9/2/04	Jacobs River	B	07	1.3	4	95.2	0.8	1	7.6	7.2	1.9	6.3	61	280	215
9/2/04	Jacobs River	B	08	1	3.8	95.8	0.4	1	6.2	4.5	1.4	4.9	45	250	186
9/2/04	Jacobs River	B	09	0.91	3.6	93.8	2.7	1	5.9	3.7	1.5	4.6	45	210	166
9/2/04	Jacobs River	B	10	0.94	2.9	95.6	1.5	1	6.5	4.2	1.8	5	41	270	193
9/2/04	Jacobs River	B	11	1.1	4.4	95.2	0.5	1	7.6	5.6	1.6	5.8	61	250	187
9/2/04	Jacobs River	B	12	1.4	4.5	95.1	0.4	1	7.6	8.3	1.8	6.3	62	240	229
9/2/04	Jacobs River	C	01	1.6	6.6	92.6	0.6	1	6.7	4.7	1.5	4.6	45	280	274
9/2/04	Jacobs River	C	02	1.5	5.3	94.1	0.5	1	7.1	4.8	1.5	4.7	54	270	272
9/2/04	Jacobs River	C	03	1.7	8.5	91.3	0.2	2	7.2	5.5	1.8	4.8	58	290	286
9/2/04	Jacobs River	C	04	1.5	7.7	91.5	0.8	1	7.3	5.6	1.8	5.2	53	250	277
9/2/04	Jacobs River	C	05	1.2	4.9	94	1.1	1	7.2	4.7	1.8	5	51	230	312
9/2/04	Jacobs River	C	06	1.4	7.3	92.4	0.3	1	7.9	5.3	1.5	5.2	51	230	277
9/2/04	Jacobs River	C	07	1.6	6.8	91	2.2	1	9	5.4	1.6	5.8	57	260	264
9/2/04	Jacobs River	C	08	1.5	6.4	92.8	0.9	1	6.7	5	1.7	4.7	53	240	266
9/2/04	Jacobs River	C	10	1.7	5.2	94.1	0.7	1	6.7	4.5	1.5	4.7	47	290	256
9/2/04	Jacobs River	C	12	1.6	4.8	94.4	0.8	1	5.8	3.6	1.4	4	47	150	181
9/2/04	New River	B	02	0.88	0.8	99.2	0.05	1	5.7	2.6	1.5	4.2	41	110	199
9/2/04	New River	B	03	0.91	0.7	99.3	0.1	1	5.7	2.6		4.1	47	140	200
9/2/04	New River	B	04	0.91	0.8	99.2	0.05	1	5.2	2.4	1.1	3.6	48	160	207
9/2/04	New River	B	06	0.87	0.7	99.2	0.1	1	5.6	2.5	1	4	53	120	205
9/2/04	New River	B	07	0.94	0.7	99.2	0.1	1	5.4	2.4	1	3.7	49	130	216
9/2/04	New River	B	08	0.85	0.7	99.3	0.1	1	5.4	2.4	1.1	3.8	45	110	216
9/2/04	New River	B	09	0.83	0.8	98.9	0.2	1	5.4	2.5	1.1	3.9	47	120	209
9/2/04	New River	B	10	0.82	0.8	99.2	0.05	1	5.3	2.5	1.1	3.8	44	140	199
9/2/04	New River	B	11	0.75	0.8	99.2	0.1	1	5.4	2.5	1.1	3.9	49	130	218
9/2/04	New River	B	12	0.75	0.7	99.3	0.05	1	5.5	2.4	1.1	3.9	48	120	214
9/2/04	New River	C	01	1	2.4	97.6	0.05	1	9	3.9	1.7	6.2	58	140	395
9/2/04	New River	C	02	1.1	3.2	96.7	0.1	1	9.6	3.8	1.9	6.4	58	170	410
9/2/04	New River	C	03	1.1	2.8	94.7	2.5	1	9.6	3.9	1.7	6.5	54	160	395
9/2/04	New River	C	04	0.89	2.7	97.3	0.05	1	9.7	3.8		6.4	45	160	415
9/2/04	New River	C	06	0.79	1.5	96.7	1.8	1	9.6	3.9	1.7	6.4	51	170	349

Results of sediment chemical analyses for Southland estuary sites 2001-2006

Date	Estuary	Site	Rep	AFDW % w/w	Mud (<63µm)	Sands mm & >63	Gravel (>2mm)	Cd mg/kg	Cr mg/kg	Cu mg/kg	Ni mg/kg	Pb mg/kg	Zn mg/kg	TN g/kg (dr	TP mg/kg
9/2/04	New River	C	07	0.98	2.6	97.4	0.05	1	9.7	3.9	1.7	6.6	53	180	384
9/2/04	New River	C	08	1.1	2.1	97.8	0.1	1	10	4.1	1.7	6.8	61	140	420
9/2/04	New River	C	09	1.1	2.4	97.5	0.1	1	10	3.9	1.9	6.9	54	150	419
9/2/04	New River	C	10	1.1	2.1	97.7	0.2	1	10	3.9	1.8	6.4	57	200	393
9/2/04	New River	C	11	1.2	3.2	96.8	0.05	1	9.3	3.8	2.2	6.2	53	170	389
9/2/04	New River	D	01	0.62	0.9	98.7	0.3	1	6.5	2.6	1.4	4.6	59	180	228
9/2/04	New River	D	02	0.77	0.9	98.9	0.2	1	6.5	2.6	1.4	4.6	58	160	229
9/2/04	New River	D	03	0.81	1	98.5	0.5	1	6.6	2.5	1.3	4.8	67	150	228
9/2/04	New River	D	04	0.84	0.7	98.9	0.4	1	6.3	2.9	1.5	4.5	67	160	212
9/2/04	New River	D	05	0.83	0.8	99	0.2	1	6.6	2.6	1.4	4.7	60	160	221
9/2/04	New River	D	07	0.85	0.7	99.1	0.2	1	6.4	2.5	1.5	4.5	52	150	220
9/2/04	New River	D	08	0.79	0.7	98.8	0.6	1	6.7	2.4	1.5	4.4	52	150	239
9/2/04	New River	D	09	0.9	0.8	97.5	1.7	1	7.1	2.7	1.6	5	66	160	244
9/2/04	New River	D	10	0.95	0.7	99.2	0.1	1	6.6	2.6	1.2	4.6	47	160	263
9/2/04	New River	D	12	0.87	0.8	99	0.2	1	6.2	2.5	1.4	4.4	44	150	242

Results of sediment chemical analyses for Southland estuary sites 2001-2006

Date	Estuary	Site	Rep	AFDW % w/w	Mud (<63µm)	Sands (63µm & >63	Gravel (>2mm)	Cd mg/kg	Cr mg/kg	Cu mg/kg	Ni mg/kg	Pb mg/kg	Zn mg/kg	TN g/kg (dr	TP mg/kg
10/1/05	Fortrose	A	01	0.23	1	79.2	19.8	0.05	5.4	1.9	3	2.1	13	120	179
10/1/05	Fortrose	A	02	0.23	1.6	86.6	11.8	0.05	4.7	2.1	3	2	14	110	178
10/1/05	Fortrose	A	03	0.36	1.1	86.8	12.1	0.05	5.1	2.1	3	2.2	17	130	172
10/1/05	Fortrose	A	04	0.39	0.9	78.2	20.9	0.05	4.7	1.9	3	1.9	16	130	154
10/1/05	Fortrose	A	05	0.36	1	83	16	0.05	5	2	3	2.1	21	130	159
10/1/05	Fortrose	A	06	0.47	1	87.2	11.8	0.05	4.6	2.2	3	2.2	21	130	155
10/1/05	Fortrose	A	07	0.35	0.8	83.8	15.4	0.05	4.9	2	3	2	14	130	160
10/1/05	Fortrose	A	08	0.4	0.9	94.9	4.3	0.05	5.1	1.9	3	2	15	120	159
10/1/05	Fortrose	A	09	0.37	0.4	87.3	12.2	0.05	5.1	1.8	3	2	12	93	173
10/1/05	Fortrose	A	10	0.43	0.7	88.9	10.4	0.05	4.6	1.8	3	2	13	98	167
9/1/05	Jacobs River	A	01	1.4	3	96.5	0.5	0.05	9.5	24	12	3.2	52	260	502
9/1/05	Jacobs River	A	02	1.4	3.9	93.2	2.9	0.05	9.6	25	12	3.3	55	270	513
9/1/05	Jacobs River	A	03	1.9	4.4	95.4	0.2	0.05	9.9	23	12	3.3	54	250	507
9/1/05	Jacobs River	A	04	2.4	7.4	92.6	0.05	0.05	9.7	24	12	3.5	52	220	523
9/1/05	Jacobs River	A	05	1.9	7.3	92.3	0.4	0.05	10	23	12	3.1	53	240	448
9/1/05	Jacobs River	A	06	2.1	4.4	95.5	0.1	0.05	11	25	12	3.3	51	380	496
9/1/05	Jacobs River	A	07	2.2	5.6	94.4	0.05	0.05	10	23	12	3.2	54	230	552
9/1/05	Jacobs River	A	08	2	5.5	94.5	0.05	0.05	9.7	24	11	3.2	48	290	493
9/1/05	Jacobs River	A	09	2	4.1	95.8	0.2	0.05	9.8	23	12	3.1	52	220	521
9/1/05	Jacobs River	A	10	2	3.2	96.7	0.1	0.05	9.5	23	12	3	52	190	522
8/1/05	Jacobs River	B	01	0.95	6.1	92.9	0.9	0.05	8.1	5.3	6	1.7	15	230	219
8/1/05	Jacobs River	B	02	1	5.8	93.8	0.5	0.05	7.8	6	6	1.6	17	240	225
8/1/05	Jacobs River	B	03	1.1	5.3	94.3	0.4	0.05	8.2	7.1	6	1.8	18	280	242
8/1/05	Jacobs River	B	04	1	3.9	96	0.1	0.05	8.8	7.6	7	2	21	270	254
8/1/05	Jacobs River	B	05	1.2	5.3	94.1	0.6	0.05	9.7	9	8	2	23	260	327
8/1/05	Jacobs River	B	06	1.3	6.2	93.3	0.5	0.05	8.3	9.4	7	2.2	27	240	292
8/1/05	Jacobs River	B	07	1.1	6.5	92	1.5	0.05	7.6	6	6	1.7	18	300	226
8/1/05	Jacobs River	B	08	0.88	7	92.4	0.6	0.05	8.3	5.2	6	1.8	16	270	223
8/1/05	Jacobs River	B	09	0.87	8.2	90	1.8	0.05	7.6	5	6	1.8	15	260	207
8/1/05	Jacobs River	B	10	1.3	8.1	91.3	0.6	0.05	7.7	5.5	6	1.9	22	270	269
9/1/05	Jacobs River	C	01	1.6	12.2	87.2	0.6	0.05	7.2	5.8	5	1.7	19	390	381
9/1/05	Jacobs River	C	02	1.5	9.9	89.6	0.5	0.05	8.1	6	6	1.8	21	410	370
9/1/05	Jacobs River	C	03	1.6	8.1	91.3	0.5	0.05	8	5.6	5	1.8	20	340	314
9/1/05	Jacobs River	C	04	1	8.8	90.7	0.4	0.05	9	6.2	6	2.1	20	450	302
9/1/05	Jacobs River	C	05	0.97	8.5	90.5	1.1	0.05	7.6	6	5	1.9	18	290	369
9/1/05	Jacobs River	C	06	0.93	7.6	91.4	1.1	0.05	6.8	4.9	5	1.5	18	280	320
9/1/05	Jacobs River	C	07	1.4	7.1	92.3	0.5	0.05	8.3	5.2	6	2	21	340	324
9/1/05	Jacobs River	C	08	1.3	8.8	90.6	0.5	0.05	8.2	5.9	6	1.8	23	360	343
9/1/05	Jacobs River	C	09	1.3	8.4	91.3	0.3	0.05	7.4	5.5	5	1.6	20	360	334
9/1/05	Jacobs River	C	10	1.5	7.1	92.5	0.4	0.05	8.3	5.5	5	1.9	20	360	301
11/1/05	New River	B	01	1.3	6.4	93.6	0.05	0.05	8.3	3.6	6	1.7	16	320	278
11/1/05	New River	B	02	0.64	3.9	96.1	0.05	0.05	7	3	5	1.5	14	220	247
11/1/05	New River	B	03	0.88	1.9	98.1	0.05	0.05	9.1	3.2	6	1.6	13	290	262
11/1/05	New River	B	04	0.91	4.1	95.9	0.05	0.05	8.2	3.3	6	1.6	14	310	256
11/1/05	New River	B	05	0.9	3.2	96.7	0.1	0.05	7.8	3.5	6	1.8	16	260	240
11/1/05	New River	B	06	1.2	4.5	95.5	0.05	0.05	8.3	3.5	6	1.8	17	230	260
11/1/05	New River	B	07	0.78	4	96	0.05	0.05	8.2	3.8	6	1.8	18	300	282
11/1/05	New River	B	08	1	4.6	95.4	0.05	0.05	8.3	3.4	6	1.8	16	310	259
11/1/05	New River	B	09	0.78	4.4	95.6	0.05	0.05	7.1	3.1	5	1.5	15	260	239
11/1/05	New River	B	10	0.72	3.6	96.3	0.05	0.05	8.4	3.7	6	1.8	15	360	272
8/1/05	New River	C	01	1	6.1	93.8	0.05	0.05	12	4.8	9	2.5	23	310	404
8/1/05	New River	C	02	0.85	4.9	95.1	0.05	0.05	11	4.5	7	2.3	21	250	394
8/1/05	New River	C	03	1.1	6.4	93.5	0.05	0.05	12	4.7	8	2.2	22	230	408
8/1/05	New River	C	04	1.1	6.2	93.8	0.05	0.05	11	4.5	8	2.2	24	240	431
8/1/05	New River	C	05	0.92	5.4	94.5	0.05	0.05	11	4.3	8	2	21	230	373
8/1/05	New River	C	06	0.94	4.9	94.9	0.1	0.05	11	4.5	8	2.1	21	260	442
8/1/05	New River	C	07	1.1	6	93.9	0.05	0.05	11	4.5	7	2.7	23	270	407
8/1/05	New River	C	08	1	5.7	94.2	0.05	0.05	11	4.6	7	2.2	21	330	414
8/1/05	New River	C	09	0.99	5.9	94.1	0.05	0.05	12	4.4	8	2.1	22	240	396
8/1/05	New River	C	10	1.2	5.8	94	0.2	0.05	12	4.5	8	2.2	22	270	484
9/1/05	New River	D	01	0.69	2	97.9	0.1	0.05	7.6	2.9	5	1.7	34	160	258
9/1/05	New River	D	02	0.66	2.6	97.3	0.1	0.05	8.2	3	6	1.7	15	170	251
9/1/05	New River	D	03	0.64	2.7	97.1	0.2	0.05	9.2	3.6	7	2.2	19	190	234
9/1/05	New River	D	04	0.37	1.5	98.1	0.4	0.05	7.7	2.8	5	1.7	23	160	276
9/1/05	New River	D	05	0.4	1.3	98.7	0.05	0.05	8.3	3.1	6	1.7	38	160	248

Results of sediment chemical analyses for Southland estuary sites 2001-2006

Date	Estuary	Site	Rep	AFDW % w/w	Mud (<63µm)	Sands mm & >63	Gravel (>2mm)	Cd mg/kg	Cr mg/kg	Cu mg/kg	Ni mg/kg	Pb mg/kg	Zn mg/kg	TN g/kg (dr	TP mg/kg
9/1/05	New River	D	06	0.52	1.3	98.6	0.1	0.05	6.8	2.6	5	1.6	30	150	266
9/1/05	New River	D	07	0.52	1.3	98.7	0.05	0.05	7.1	3	5	1.8	29	180	249
9/1/05	New River	D	08	0.58	2.1	97.6	0.3	0.05	8.5	3.1	6	1.9	25	160	265
9/1/05	New River	D	09	0.62	2.1	97.8	0.1	0.05	8.4	3	6	1.9	16	160	251
9/1/05	New River	D	10	0.6	1.8	98.2	0.05	0.05	9.7	3.1	7	1.9	18	170	262
12/1/05	Waikawa	A	01	1.8	14.9	75.2	9.9	0.1	9.3	3.7	5	2.6	16	640	367
12/1/05	Waikawa	A	02	1.8	11.7	79.7	8.6	0.1	11	3.3	6	2.2	13	630	368
12/1/05	Waikawa	A	03	2.7	13.8	83.6	2.6	0.1	12	3.2	6	2.2	16	620	389
12/1/05	Waikawa	A	04	2.4	9.3	89	1.8	0.1	9.4	2.7	5	2.2	14	490	332
12/1/05	Waikawa	A	05	1.5	9.4	88.7	1.9	0.1	10	2.8	5	2	12	560	328
12/1/05	Waikawa	A	06	1.7	10	86.8	3.2	0.1	9.2	2.9	5	2.1	17	510	339
12/1/05	Waikawa	A	07	2.3	10.7	85.3	4	0.1	11	3.2	6	2	15	580	340
12/1/05	Waikawa	A	08	1.9	11	85.5	3.5	0.1	11	3.5	6	2.3	17	620	344
12/1/05	Waikawa	A	09	2	12.1	85.6	2.3	0.1	10	3.4	5	2.4	14	660	361
12/1/05	Waikawa	A	10	2.1	10.2	86.4	3.5	0.1	11	3.8	6	2.4	15	790	340
29/11/04	Waikawa	B	01	0.73	1.9	97.6	0.5	0.1	5.1	1.4	2	0.9	2	48	194
29/11/04	Waikawa	B	02	0.77	1.9	97.9	0.2	0.1	4.8	1.4	2	1	3	120	175
29/11/04	Waikawa	B	03	0.72	1.8	98.1	0.1	0.1	4.8	1.3	3	1	3	120	183
29/11/04	Waikawa	B	04	0.76	1.6	98.3	0.1	0.1	4.7	1.2	2	0.9	6	110	192
29/11/04	Waikawa	B	05	0.77	1.6	98	0.5	0.1	5.3	1.4	3	1.1	9	97	172
29/11/04	Waikawa	B	06	0.75	1.4	98.2	0.4	0.1	4.7	1.2	2	1	2	110	179
29/11/04	Waikawa	B	07	0.85	1.9	98	0.1	0.1	5.2	1.3	3	0.9	2	91	195
29/11/04	Waikawa	B	08	0.89	2	97.8	0.2	0.1	5	1.4	2	1	2	95	191
29/11/04	Waikawa	B	09	0.8	1.9	97.7	0.4	0.1	4.7	1.3	2	0.9	2	95	183
29/11/04	Waikawa	B	10	0.77	1.9	97.9	0.2	0.1	5	1.2	2	1	2	96	199
25/11/04	Bluff	A	01	1.6	19.4	79.6	1	0.1	13	4.4	8	2	17	310	588
25/11/04	Bluff	A	02	1.5	22.3	76.8	0.9	0.1	14	5	8	2.4	18	340	617
25/11/04	Bluff	A	03	1.6	19.9	79.7	0.4	0.1	13	4.5	8	2	8	320	522
25/11/04	Bluff	A	04	1.5	20.1	79.7	0.2	0.1	12	4.4	7	2	16	330	581
25/11/04	Bluff	A	05	1.5	16.6	83.1	0.3	0.1	15	4.4	9	2.1	29	340	581
25/11/04	Bluff	A	06	1.5	17.5	82.3	0.2	0.1	14	4.2	9	2	25	300	551
25/11/04	Bluff	A	07	1.4	20.7	79.1	0.2	0.1	14	4.3	8	1.8	30	310	610
25/11/04	Bluff	A	08	1.5	24.1	75.5	0.4	0.1	16	5	10	2.2	26	370	572
25/11/04	Bluff	A	09	1.4	19.3	80.5	0.2	0.1	14	4.9	9	2.2	25	310	579
25/11/04	Bluff	A	10	1.5	19.8	79.8	0.4	0.1	12	4.5	7	1.9	29	300	544
26/11/04	Bluff	B	01	0.72	2.5	84.4	13.2	0.1	6	2	3	1.2	2	180	279
26/11/04	Bluff	B	02	0.76	2.3	85.4	12.3	0.1	5.9	1.9	3	1.2	2	180	261
26/11/04	Bluff	B	03	0.68	2.7	85.5	11.8	0.1	6.6	2	3	1.2	4	180	258
26/11/04	Bluff	B	04	0.5	2.8	81.5	15.7	0.1	5.9	1.8	3	1.1	14	180	233
26/11/04	Bluff	B	05	0.6	2.3	90	7.8	0.1	6.4	1.9	3	1.2	4	160	254
26/11/04	Bluff	B	06	0.8	2.4	89.8	7.7	0.1	6.1	1.9	3	1.1	2	160	254
26/11/04	Bluff	B	07	0.75	2	86.1	11.9	0.1	6.1	2	3	1.1	2	190	251
26/11/04	Bluff	B	08	0.95	2.6	83.5	13.9	0.1	6.9	2	3	1.1	6	170	229
26/11/04	Bluff	B	09	0.89	2.5	89.7	7.8	0.1	6	2	3	1	2	170	245
26/11/04	Bluff	B	10	1.1	2	93.3	4.7	0.1	5.9	1.8	3	0.9	5	180	231
27/11/05	Awarua	A	01	1	7	61.4	31.6	0.1	10	2.6	6	1.6	26	330	319
27/11/05	Awarua	A	02	0.94	7.1	57.6	35.3	0.1	8	2.3	5	1.7	21	340	335
27/11/05	Awarua	A	03	0.83	5.5	55.7	38.8	0.1	7.2	2.1	4	1.5	5	330	274
27/11/05	Awarua	A	04	0.8	4.1	50.5	45.5	0.1	7.1	2.1	4	1.7	33	310	264
27/11/05	Awarua	A	05	0.71	4	54.8	41.2	0.1	7.1	1.9	4	1.7	9	300	270
27/11/05	Awarua	A	06	0.68	5.9	64.8	29.3	0.1	8.3	2.1	4	1.7	13	280	302
27/11/05	Awarua	A	07	0.91	7.5	68.4	24.2	0.1	8.7	2.6	5	2	16	370	352
27/11/05	Awarua	A	08	1.1	7.6	74	18.4	0.1	7.6	2.3	4	1.9	23	380	347
27/11/05	Awarua	A	09	0.96	6.1	72.3	21.5	0.1	8	2.4	4	1.9	14	390	339
27/11/05	Awarua	A	10	1	7	67.9	25.1	0.1	7.7	2.4	4	1.8	15	370	340
27/11/05	Awarua	B	01	0.59	0.9	98.9	0.2	0.1	2.5	0.6	2	0.6	17	75	92
27/11/05	Awarua	B	02	0.64	1.1	98.6	0.3	0.1	2.5	0.7	2	0.6	16	53	107
27/11/05	Awarua	B	03	0.59	0.9	99	<0.1	0.1	2.7	0.7	2	0.6	3	61	108
27/11/05	Awarua	B	04	0.86	2.3	97.5	0.2	0.1	3.7	0.9	2	0.6	2	84	220
27/11/05	Awarua	B	05	0.71	1.2	98.7	0.2	0.1	1.7	0.5	2	0.6	2	75	94
27/11/05	Awarua	B	06	0.7	1.1	98.8	0.1	0.1	1.6	0.5	2	0.5	8	65	73
27/11/05	Awarua	B	07	0.54	0.9	98.8	0.3	0.1	1.9	0.5	2	0.5	2	70	86
27/11/05	Awarua	B	08	0.44	1.2	98.4	0.4	0.1	2	0.5	2	0.5	3	70	92
27/11/05	Awarua	B	09	0.5	1.5	98.3	0.2	0.1	2.1	0.7	2	0.7	7	76	115
27/11/05	Awarua	B	10	0.54	1.4	98.1	0.5	0.1	1.9	0.5	2	0.6	2	74	62

Results of sediment chemical analyses for Southland estuary sites 2001-2006

Date	Estuary	Site	Rep	AFDW % w/w	Mud (<63µm)	Sands mm & >63	Gravel (>2mm)	Cd mg/kg	Cr mg/kg	Cu mg/kg	Ni mg/kg	Pb mg/kg	Zn mg/kg	TN g/kg (dr	TP mg/kg
18/1/06	Jacobs River	A	01	1.2	1.2	98.2	0.6	0.1	8.8	21	11	2.9	57	120	555
18/1/06	Jacobs River	A	02	2.3	1.1	98.8	0.1	0.1	9.1	23	12	3.1	57	170	574
18/1/06	Jacobs River	A	03	2.1	2.2	97	0.8	0.1	8.7	21	11	2.7	55	130	603
16/1/06	Jacobs River	B	01	24	8.4	91.5	0.2	0.1	7.1	6.5	6	1.8	20	230	221
16/1/06	Jacobs River	B	02	1.3	8.6	91.3	0.1	0.1	7.9	7.2	7	1.8	20	260	235
16/1/06	Jacobs River	B	03	1.3	6.1	93.6	0.3	0.1	6.4	5.7	5	1.6	17	260	202
17/1/06	Jacobs River	C	01	1.8	14.6	84.8	0.7	0.1	8.3	6.7	6	2.2	23	360	488
17/1/06	Jacobs River	C	02	1.8	13.1	86.3	0.6	0.1	7	6.4	5	1.9	20	340	323
17/1/06	Jacobs River	C	03	1.9	13.1	86.6	0.4	0.1	7.1	6.3	5	2	21	300	357
21/1/06	Fortrose	A	01	1.1	9.8	72.6	17.6	0.1	6.8	2.7	6	2.7	16	370	231
21/1/06	Fortrose	A	02	0.91	8.5	72.8	18.7	0.1	7.7	2.9	9	2.7	17	350	201
21/1/06	Fortrose	A	03	0.91	7.5	69.6	22.9	0.1	6.2	2.6	4	2.9	16	330	262
20/1/06	Waikawa	A	01	0.95	4.7	93.4	1.9	0.1	7	1.9	4	1.5	13	210	333
20/1/06	Waikawa	A	02	1	5.8	93	1.2	0.1	7.7	2.1	4	1.4	13	230	269
20/1/06	Waikawa	A	03	1.1	5.3	93.5	1.3	0.1	6.6	1.8	3	1.5	11	240	310
20/1/06	Waikawa	B	01	0.75	1.4	98.5	0.1	0.1	5.7	1.3	3	1.2	7	130	250
20/1/06	Waikawa	B	02	0.72	1	97.5	1.5	0.1	5	1.3	5	1	8	130	252
20/1/06	Waikawa	B	03	0.81	0.9	99	0.1	0.1	6.3	1.2	4	1.2	7	120	224
19/1/06	Haldane	A	01	1.9	17.9	82.1	<0.1	0.1	12	4.5	8	2.3	24	290	436
19/1/06	Haldane	A	02	1.6	16.5	83.4	<0.1	0.1	10	4.3	7	2.1	24	330	424
19/1/06	Haldane	A	03	1.7	16.4	83.6	<0.1	0.1	9.5	4.2	7	2.2	24	340	371
19/1/06	Haldane	A	04	1.1	16.1	83.9	<0.1	0.1	8.7	4.1	6	2.1	24	320	402
19/1/06	Haldane	A	05	1	14.1	85.9	<0.1	0.1	8.1	3.7	6	2.1	23	270	350
19/1/06	Haldane	A	06	1.9	19.8	80.2	<0.1	0.1	13	4.2	9	2.3	25	260	389
19/1/06	Haldane	A	07	1.7	16.4	83.6	<0.1	0.1	11	3.9	7	2	23	260	359
19/1/06	Haldane	A	08	1.8	17	83	<0.1	0.1	9.7	4.1	7	2.2	24	380	388
19/1/06	Haldane	A	09	1.7	16.3	83.7	<0.1	0.1	9.1	4	6	2.1	24	350	420
19/1/06	Haldane	A	10	1.8	15.9	84.1	<0.1	0.1	10	4.1	7	2.1	24	330	392

Appendix 2. Infaunal and epifaunal species abundance at sites in New River, Fortrose, Jacobs River, Waikawa and Haldane Estuaries and Bluff Harbour and Awarua Bay

List of Infauna recorded from Southland estuaries 2001-2006

Level	General Group	Taxa	Common name	Feeding type
F	Hirudinea	Hirudinea	Leeches	Ecto Parasitic
G	Anthozoa	*Anthopleura aureoradiata*	Mud flat anemone	Filter feeder
G	Anthozoa	*Edwardsia sp.*	Burrowing anemone	Filter and deposit feeder
G	Anthozoa	*Virgularia gracillima*	Sea Pen	
O	Platyhelminthes	**Platyhelminthes**	Flat Worm	Predator
P	Nemertea	**NEMERTEA**	Ribbon worms	Carnivorous
P	Nematoda	**NEMATODA**	Roundworm	
O	Sipuncula	**Sipuncula**	Peanut Worm	Infaunal deposit feeder
G	Gastropoda	*Amphibola crenata*	Mud Snail	Microalgal grazer
G	Gastropoda	*Cominella glandiformis*	Mud Flat Whelk	Carnivore & scavenger
G	Gastropoda	*Diloma subrostrata*	Mud flat snail	Microalgal & detrital grazer
G	Gastropoda	*Micrelenchus tenebrosus*	Grazing snail	Microalgal grazer
G	Gastropoda	*Notoacmea helmsi*	Limpet	Microalgal & detrital grazer
G	Gastropoda	*Potamopyrgus estuarinus*	Estuarine snail	Microalgal & detrital grazer
G	Gastropoda	*Turbonilla sp.*		
G	Gastropoda	*Zeacumantus subcarinatus*	Small Mud Snail	Microalgal & detrital grazer
G	Bivalvia	*Arthritica bifurca*	Small bivalve	Infaunal deposit feeder
G	Bivalvia	*Austrovenus stutchburyi*	Cockle, Huangi	Infaunal deposit feeder
G	Bivalvia	*Hunkydora australica novozelandica*		Filter feeder
G	Bivalvia	*Macomona liliana*	Wedge shell, Hanikura	Infaunal suspension feeder
G	Bivalvia	*Mactra ovata ovata*		Infaunal suspension feeder
G	Bivalvia	*Nucula cf gallinacea*		Infaunal deposit feeder
G	Bivalvia	*Paphies australis*	Pipi	Filter feeder
G	Bivalvia	*Perna canaliculus*	Green Lipped Mussel	Filter feeder
G	Bivalvia	*Perrierina turneri*	Small bivalve	Surface deposit & filter feeder
G	Bivalvia	*Soletellina sp.*		Infaunal suspension feeder
G	Bivalvia	*Theora lubrica*	Window shell	
C	Oligochaeta	OLIGOCHAETA	Oligochaete worms	Infaunal deposit feeder
G	Polychaeta: Arenicolidae	*Abarenicola affinis*	Lug-worm	Infaunal deposit feeder
G	Polychaeta: Capitellidae	*Capitella capitata*		Infaunal deposit feeder
G	Polychaeta:	*Capitellethus zeylanicus*		Infaunal deposit feeder
G	Polychaeta	*Heteromastus filiformis*		Infaunal deposit feeder
G	Polychaeta: Cossuridae	*Cossura consimilis*		Deposit feeder
F	Polychaeta	Maldanidae	Bamboo Worms	Infaunal deposit feeder
G	Polychaeta	*Orbinia papillosa*		Infaunal deposit feeder
G	Polychaeta	*Scoloplos cylindrifer*		Infaunal deposit feeder
F	Polychaeta	Paraonidae		Infaunal deposit feeder
G	Polychaeta: Paraonidae	*Aricidea sp.*		
G	Polychaeta	*Travisia olens*		Infaunal deposit feeder
F	Polychaeta: Dorvilleidae	Dorvilleidae		Facultative carnivore
G	Polychaeta: Lumbrineridae	*Lumbrineris sp.*		Infaunal carnivore & deposit feeder
F	Polychaeta	Glyceridae	Blood worm	Infaunal carnivore & deposit feeder
G	Polychaeta: Goniadidae	*Goniada sp.*		Infaunal carnivore
G	Polychaeta: Nephtyidae	*Aglaophamus sp.*		Infaunal carnivore
G	Polychaeta	*Aglaophamus macroura*		Infaunal carnivore
F	Polychaeta: Nereididae	Nereidae	Rag worms	Omnivorous
G	Polychaeta	*Nicon aestuariensis*	Rag worm	Omnivorous
G	Polychaeta	*Perinereis camiguinoides*	Rag worm	Omnivorous
G	Polychaeta	*Perinereis vallata*	Rag worm	Omnivorous
F	Polychaeta: Phyllodocidae	Phyllodocidae	Paddle worms	Carnivore & scavenger
G	Polychaeta	*Sphaerodoropsis sp.*		
F	Polychaeta	Syllidae		Omnivorous
G	Polychaeta: Oweniidae	*Owenia petersenae*		Infaunal deposit feeder
G	Polychaeta	*Sphaerosyllis sp.*		Omnivorous
F	Polychaeta	Sabellidae	Umbrella worms	Infaunal suspension feeder
F	Polychaeta: Spionidae	Spionidae		Surface deposit feeder
G	Polychaeta	*Aonides sp.*		Surface deposit feeder
G	Polychaeta	*Boccardia sp.*		Surface deposit feeder
G	Polychaeta	*Polydora sp.*		Surface deposit & filter feeder
G	Polychaeta	*Prionospio sp.*		Surface deposit feeder
G	Polychaeta	*Scolecolepides benhami*		Surface deposit feeder
G	Polychaeta	*Scolecolepides sp.*		Surface deposit feeder
G	Polychaeta	*Scolelepis sp.*		Surface deposit & filter feeder
F	Polychaeta: Ampharetidae	Ampharetidae		Surface deposit feeder
F	Polychaeta: Cirratulidae	Cirratulidae		Deposit feeder

List of Infauna recorded from Southland estuaries 2001-2006

Level	General Group	Taxa	Common name	Feeding type
G	Polychaeta	*Pectinaria australis*	Sand mason worm	Infaunal deposit feeder
F	Polychaeta: Terebellidae	Terebellidae		Infaunal deposit feeder
G	Crustacea	*Lysiosquilla spinosa*	Mantus shrimp	
O	Mysidacea	**Mysidacea**	Mysid shrimp	Filter and deposit feeder
O	Cumacea	**Cumacea**	Cumaceans	Infaunal filter or deposit feeder
G	Tanaidacea	*Tanaid sp.*	Tanaid Shrimp	Epifaunal scavenger
F	Isopoda	Flabellifera	Sea louse	Epifaunal scavenger
G	Isopoda	*Exosphaeroma planulum*		
G	Isopoda	*Exosphaeroma sp.*		
G	Amphipoda	*Paracorphium sp.*	Freshwater amphipod	
O	Amphipoda	**Amphipoda**	Amphipods	Epifaunal scavenger
O	Amphipoda	**Amphipoda a**	Amphipods	Epifaunal scavenger
O	Amphipoda	**Amphipoda b**	Amphipods	Epifaunal scavenger
O	Amphipoda	**Amphipoda c**	Amphipods	Epifaunal scavenger
O	Amphipoda	**Amphipoda d**	Amphipods	Epifaunal scavenger
G	Decapoda	*Callianassa filholi*	Ghost Shrimp	
G	Decapoda	*Halicarcinus cookii*	Pill-box Crab	Eats small organisms & some weed
G	Decapoda	*Halicarcinus varius*	Pill-box Crab	Eats small organisms & some weed
G	Decapoda	*Halicarcinus whitei*	Pill-box Crab	Eats small organisms & some weed
G	Decapoda	*Helice crassa*	Tunnelling, Mud Crab	Deposit feeder & scavenger
G	Decapoda	*Macrophthalmus hirtipes*	Stalk-eyed Mud Crab	Deposit feeder & scavenger
G	Decapoda	*Pontophilus australis*	Shrimp	
O	Decapoda	**Decapoda (larvae unid.)**	Unidentified Crab Larvae	
O	Decapoda	**Natantia unid.**	Shrimp	Omnivorous scavenger
C	Ostracoda	OSTRACODA	Ostracods	Omnivorous scavenger
C	Copepoda	COPEPODA	Copepods	
G	Cirripedia	*Austrominius modestus*	Estuarine Barnacle	Filter feeder
G	Pycnogonida	*Pycnogonidae*	Sea spider	
G	Osteichthyes	*Peltorhamphus novaezelandiae*	Common Sole	Omnivorous scavenger
G	Holothuroidea	*Trochodota dendyi*	Sea cucumber	Epifaunal deposit feeder
G	Insecta	*Elmidae larvae*	Beetle Freshwater	
F	Insecta	Muscidae	Fly larvae	Deposit feeder & scavenger
G	Chlorophyta	*Codium geppiorum*		
G	Chlorophyta	*Enteromorpha sp.*	Green seaweed	Photosynthetic
G	Chlorophyta	*Ulva lactuca*	sea lettuce	Photosynthetic
G	Rhodophyta	*Ceramium flaccidum*		Photosynthetic
G	Rhodophyta	*Gracilaria sp.*	Agar seaweed	Photosynthetic

List of Epifauna recorded from Southland estuaries 2001-2006

Level	General Group	Taxa	Common name	Feeding type
G	Anthozoa	*Anthopleura aureoradiata*	Mud flat anemone	Filter feeder
G	Polyplacophora	*Chiton glaucus*	Green Chiton	Microalgal grazer
G	Gastropoda	*Amphibola crenata*	Mud Snail	Microalgal grazer
G	Gastropoda	*Cominella glandiformis*	Mud Flat Whelk	Carnivore & scavenger
G	Gastropoda	*Diloma subrostrata*	Mud flat snail	Microalgal & detrital grazer
G	Gastropoda	*Melagraphia aethiops*	Spotted top shell	
G	Gastropoda	*Micrelenchus huttoni*		
G	Gastropoda	*Micrelenchus tenebrosus*	Grazing snail	Microalgal grazer
G	Gastropoda	*Notoacmea helmsi*	Limpet	Microalgal & detrital grazer
G	Gastropoda	*Potamopyrgus estuarinus*	Estuarine snail	Microalgal & detrital grazer
G	Gastropoda	*Zeacumantus subcarinatus*	Small Mud Snail	Microalgal & detrital grazer
G	Bivalvia	*Austrovenus stutchburyi*	Cockle, Huangi	Infaunal deposit feeder
G	Bivalvia	*Paphies australis*	Pipi	Filter feeder
O	Isopoda	**Isopoda**	Isopods	
G	Decapoda	*Hemigrapsus crenulatus*	Hairy-handed Crab, Mud Crab	Deposit feeder & scavenger
G	Cirripedia	*Austrominius modestus*	Estuarine Barnacle	Filter feeder
G	Ascidiacea	*Corella eumyota*	Transparent Sea Squirt	

Summary statistics: Averages per 0.0133mm^2 core for sediment infauna collected from Southland estuary sites 2001-2006

			Averages						Standard Deviations						CVs					
			Richness	Abundance	Margalef species richness	Pelou's evenness	Shannon-Weiner Diversity	1-Lambda'	Richness	Abundance	Margalef species richness	Pelou's evenness	Shannon-Weiner Diversity	1-Lambda'	Richness	Abundance	Margalef species richness	Pelou's evenness	Shannon-Weiner Diversity	1-Lambda'
Date	**Estuary**	**Site**	S	N	d	J'	H'(loge)	1-Lambda'	S	N	d	J'	H'(loge)	1-Lambda'	S	N	d	J'	H'(loge)	1-Lambda'
12/2/01	New River	A	10.2	130.9	1.9	0.5	1.2	0.6	2.1	35.7	0.4	0.1	0.2	0.1	20.9	27.2	20.7	12.0	15.9	19.2
13/2/01	New River	B	7.7	55.1	1.8	0.8	1.5	0.7	1.7	43.6	0.4	0.1	0.3	0.1	21.8	79.2	24.1	18.2	19.8	16.4
14/2/01	New River	C	10.9	42.1	2.9	0.8	1.9	0.8	3.4	36.3	0.9	0.2	0.5	0.2	31.1	86.2	32.7	22.2	26.7	20.6
15/2/01	New River	D	8.8	127.9	1.6	0.3	0.7	0.3	2.0	25.2	0.4	0.1	0.1	0.1	22.9	19.7	23.6	17.0	19.6	25.4
21/2/03	New River	B	10.3	67.8	2.3	0.8	1.9	0.8	1.3	26.7	0.3	0.1	0.1	0.0	12.2	39.3	13.4	6.3	7.8	5.0
18/2/03	New River	C	12.0	38.5	3.1	0.9	2.2	0.9	2.0	15.8	0.4	0.1	0.2	0.0	16.7	41.1	13.7	6.0	7.7	4.6
17/2/03	New River	D	8.9	84.5	1.8	0.4	0.9	0.4	1.4	13.6	0.3	0.1	0.2	0.1	15.4	16.0	17.4	21.4	25.4	30.6
9/2/04	New River	B	6.6	17.9	2.0	0.8	1.5	0.7	1.3	3.8	0.5	0.1	0.3	0.1	19.2	21.3	23.8	15.6	19.3	18.2
9/2/04	New River	C	10.7	47.3	2.5	0.8	1.8	0.8	2.2	26.3	0.5	0.1	0.4	0.1	20.7	47.2	21.3	19.4	22.1	18.8
9/2/04	New River	D	10.6	81.9	2.2	0.6	1.5	0.7	2.2	12.0	0.5	0.1	0.2	0.1	21.0	14.7	23.7	11.2	15.6	12.3
11/1/05	New River	B	9.5	181.3	1.7	0.5	1.1	0.5	1.7	119.3	0.4	0.1	0.3	0.2	18.1	65.8	24.7	30.6	31.5	31.7
8/1/05	New River	C	12.2	90.0	2.6	0.5	1.4	0.6	1.9	39.2	0.6	0.1	0.4	0.2	15.8	43.6	22.1	23.7	27.8	27.5
9/1/05	New River	D	6.4	43.9	1.4	0.7	1.1	0.6	2.5	16.9	0.6	0.1	0.3	0.1	39.8	38.5	41.8	21.6	28.8	20.0
17/2/03	Jacobs River	A	8.0	60.1	1.8	0.7	1.4	0.7	1.8	31.7	0.4	0.1	0.2	0.1	22.0	52.7	23.3	16.9	16.5	17.1
20/2/03	Jacobs River	B	11.8	51.6	2.8	0.7	1.8	0.7	1.3	11.5	0.3	0.1	0.3	0.1	11.2	22.4	12.1	14.3	15.6	14.6
18/2/03	Jacobs River	C	10.3	72.7	2.3	0.7	1.6	0.7	2.5	42.2	0.6	0.1	0.4	0.1	24.7	58.1	27.2	19.9	22.3	20.6
9/2/04	Jacobs River	A	13.8	97.8	2.8	0.7	1.9	0.8	2.0	22.2	0.5	0.1	0.3	0.1	14.8	22.7	17.9	16.3	17.6	14.2
9/2/04	Jacobs River	B	15.3	90.4	3.2	0.8	2.2	0.8	2.5	29.6	0.5	0.0	0.1	0.0	16.3	32.7	16.2	5.1	6.6	3.9
9/2/04	Jacobs River	C	12.0	124.4	2.3	0.6	1.5	0.7	2.4	42.3	0.5	0.1	0.3	0.1	20.4	34.0	19.7	18.9	20.0	15.3
9/1/05	Jacobs River	A	11.8	81.5	2.6	0.7	1.7	0.7	1.9	40.9	0.5	0.2	0.4	0.2	16.4	50.1	19.8	24.7	22.3	24.4
8/1/05	Jacobs River	B	15.1	75.9	3.4	0.8	2.2	0.9	3.5	44.6	0.4	0.1	0.1	0.0	23.0	58.8	11.5	6.1	5.7	1.9
9/1/05	Jacobs River	C	13.3	93.5	2.7	0.7	1.9	0.8	3.4	30.5	0.7	0.2	0.5	0.2	25.6	32.6	26.4	21.7	27.0	24.4
18/1/06	Jacobs River	A	12.5	82.5	2.6	0.7	1.8	0.8	1.4	18.1	0.3	0.0	0.1	0.0	10.8	21.9	11.4	6.3	7.8	5.1
16/1/06	Jacobs River	B	16.0	77.7	3.5	0.8	2.2	0.9	2.2	32.4	0.4	0.1	0.1	0.0	13.5	41.7	11.0	6.5	5.7	3.2
17/1/06	Jacobs River	C	10.0	55.5	2.4	0.7	1.7	0.7	2.1	28.9	0.6	0.2	0.4	0.1	21.1	52.1	25.8	21.1	23.7	20.9
9/2/04	Fortrose	A	11.6	122.6	2.2	0.7	1.8	0.8	1.3	32.5	0.4	0.1	0.1	0.0	10.9	26.5	15.9	7.8	8.2	5.7
9/2/04	Fortrose	B	10.5	92.8	2.1	0.7	1.6	0.7	1.7	47.9	0.4	0.1	0.3	0.1	16.3	51.6	17.4	19.2	19.9	16.7
10/1/05	Fortrose	A	6.1	37.9	1.4	0.8	1.4	0.7	1.3	14.0	0.3	0.1	0.2	0.1	21.1	36.9	22.6	10.5	16.1	13.4
21/1/06	Fortrose	A	10.0	445.9	1.5	0.3	0.8	0.3	1.4	94.8	0.3	0.1	0.3	0.1	14.1	21.3	17.0	27.6	32.5	36.2
12/1/05	Waikawa	A	14.4	81.5	3.1	0.8	2.1	0.8	3.4	47.0	0.4	0.1	0.2	0.1	23.4	57.7	13.4	14.9	10.8	10.6
29/11/04	Waikawa	B	14.0	57.7	3.2	0.8	2.1	0.8	3.8	21.4	0.7	0.1	0.5	0.2	27.4	37.1	23.2	15.3	23.4	18.9
20/1/06	Waikawa	A	19.4	164.3	3.7	0.8	2.3	0.8	2.1	77.6	0.4	0.1	0.2	0.1	10.9	47.2	10.1	11.6	10.8	9.8
20/1/06	Waikawa	B	17.6	61.0	4.1	0.9	2.4	0.9	2.2	16.8	0.5	0.0	0.0	0.0	12.3	27.5	11.8	3.2	2.0	1.8
25/11/04	Bluff	A	11.7	64.9	2.6	0.7	1.8	0.8	4.3	30.2	0.8	0.1	0.2	0.1	36.5	46.5	29.9	12.7	14.0	10.1
26/11/04	Bluff	B	11.6	49.6	2.8	0.7	1.7	0.7	4.2	24.5	0.9	0.1	0.4	0.1	35.9	49.5	30.9	14.3	23.9	19.1
27/11/05	Awarua	A	9.0	155.6	1.7	0.3	0.7	0.3	2.8	86.1	0.7	0.2	0.5	0.2	31.4	55.3	40.1	65.4	71.6	82.7
27/11/05	Awarua	B	4.7	8.0	2.0	0.9	1.3	0.8	1.9	4.3	0.7	0.1	0.6	0.1	41.4	54.0	32.7	7.9	42.7	15.9
19/1/06	Haldane	A	4.7	435.0	0.6	0.2	0.3	0.1	1.3	123.2	0.2	0.0	0.1	0.0	26.6	28.3	35.9	24.2	18.0	20.5

Average number of sediment infauna per 0.0133mm^2 core collected from Southland estuary sites 2001-2006

Date	Estuary		Hirudinea	*Anthopleura aureoradiata*	*Edwardsia sp.*	*Virgularia gracillima*	**Platyhelminthes**	**NEMERTEA**	**NEMATODA**	**Sipuncula**	*Amphibola crenata*	*Cominella glandiformis*	*Diloma subrostrata*	*Micrelenchus tenebrosus*	*Notoacmea helmsi*	*Potamopyrgus estuarinus*	*Turbonilla sp.*	*Zeacumantus subcarinatus*	*Arthritica bifurca*	*Austrovenus stutchburyi*	*Hunkydora australica novozeland*	*Macomona liliana*	*Mactra ovata ovata*	*Nucula cf gallinacea*	*Paphies australis*	*Perna canaliculus*	*Perrierina turneri*	*Soletellina sp.*	*Theora lubrica*	OLIGOCHAETA	*Abarenicola affinis*	*Capitella capitata*	*Capitellethus zeylanicus*	*Heteromastus filiformis*	*Cossura consimilis*	Maldanidae	*Orbinia papillosa*	*Scoloplos cylindrifer*	Paraonidae	*Aricidea sp.*	*Travisia olens*	Dorvilleidae	*Lumbrineris sp.*	Glyceridae	*Goniada sp.*	*Aglaophamus sp.*	*Aglaophamus macroura*	Nereidae	*Nicon aestuariensis*	*Perinereis camiguinoides*	*Perinereis vallata*	Phyllodocidae	*Sphaerodoropsis sp.*
12/2/01	New River	A	0.0	0.0	0.5	0.0	0.0	2.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	8.3	0.0	0.0	67.8	0.0	0.0	0.1	0.8	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	3.2	0.2	0.0	0.0	0.0	0.0
13/2/01	New River	B	0.0	0.0	0.8	0.0	0.0	1.8	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.3	0.0	0.0	0.0	0.1	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	13.1	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.0	0.0	0.0	0.0	0.0
14/2/01	New River	C	0.0	0.0	0.0	0.0	0.0	1.1	0.2	0.0	2.3	0.6	0.0	0.0	0.0	0.2	0.0	0.0	7.3	5.1	0.1	2.6	0.0	0.0	0.1	0.1	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.8	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.3	0.3	0.0	0.0	0.0	0.0
15/2/01	New River	D	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.6	0.0	0.0	0.0	0.0	104.6	0.0	0.0	9.8	0.2	0.0	0.0	0.3	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.4	1.0	0.0	0.0	0.0	0.0
21/2/03	New River	B	0.0	0.0	2.3	0.0	0.0	0.8	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.0	0.0	12.6	0.0	0.0	0.1	0.0	0.0	18.8	0.0	0.0	0.4	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.8	0.0	0.0	0.0	0.0
18/2/03	New River	C	0.0	0.0	0.3	0.0	0.0	0.7	0.0	0.0	0.3	0.2	0.0	0.0	0.1	0.2	0.0	0.0	3.2	3.5	0.0	3.3	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	0.0	1.0	0.0	0.0	0.0	0.0
17/2/03	New River	D	0.0	0.0	0.2	0.0	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.0	0.0	63.8	0.0	0.0	2.2	0.4	0.0	0.0	0.9	0.0	5.7	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.3	0.0	0.0	0.0	0.0
9/2/04	New River	B	0.0	0.0	2.0	0.0	0.0	0.3	0.0	0.0	0.5	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	8.2	0.0	0.0	0.9	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.7	0.0	0.0	0.0	0.0
9/2/04	New River	C	0.0	0.0	0.9	0.0	0.0	0.6	0.0	0.0	0.3	0.1	0.1	0.0	0.0	0.2	0.0	0.0	6.5	3.9	0.0	3.4	0.1	0.0	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.4	0.0	0.0	0.0	0.0
9/2/04	New River	D	0.0	0.0	1.3	0.0	0.0	0.9	0.1	0.0	0.6	0.0	0.0	0.0	0.0	41.3	0.0	0.0	2.1	0.2	0.0	0.0	0.2	0.0	3.3	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.1	0.0	0.0	0.0	0.0
11/1/05	New River	B	0.1	0.0	0.9	0.0	0.0	2.7	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.1	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.8	0.0	1.1	0.0	0.0	0.0	0.0	0.6	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.3	0.0	0.0	0.0	0.0
8/1/05	New River	C	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	1.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	1.1	3.6	0.0	3.2	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.1	0.2	0.3	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	1.6	0.0	0.0	0.2	0.0
9/1/05	New River	D	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.0	0.7	0.0	0.0	0.0	0.0	11.4	0.0	0.0	3.1	0.4	0.0	0.0	1.2	0.0	0.5	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.4	0.0	0.0	0.0	0.0
17/2/03	Jacobs River	A	0.0	0.0	1.1	0.0	0.0	0.2	0.1	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	7.0	0.0	0.2	0.0	0.0	9.5	0.0	0.0	0.0	0.0	0.7	0.0	0.1	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
20/2/03	Jacobs River	B	0.0	0.0	1.6	0.0	0.0	2.0	0.0	0.0	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	1.1	2.2	0.0	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	1.3	0.0	0.0	0.0	0.0
18/2/03	Jacobs River	C	0.0	0.0	0.6	0.0	0.0	0.5	0.6	0.0	1.5	0.0	0.0	0.0	0.0	36.6	0.0	0.0	0.2	1.1	0.0	0.2	0.4	0.0	2.8	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.5	0.0	0.0	0.0	0.0
9/2/04	Jacobs River	A	0.0	0.0	5.1	0.0	0.0	0.8	3.3	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.0	0.8	0.0	0.0	15.4	0.0	0.0	0.0	0.0	4.5	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.8	0.0	0.4	0.0	0.0	0.0	0.0
9/2/04	Jacobs River	B	0.0	0.0	7.5	0.0	0.0	1.1	2.4	0.0	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	2.7	1.8	0.0	3.9	0.0	0.0	0.0	0.0	0.0	0.4	0.0	14.7	0.0	0.1	0.0	2.4	0.0	0.0	0.0	1.0	1.8	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.9	0.0	1.7	0.0	0.0	0.0	0.0
9/2/04	Jacobs River	C	0.0	1.7	0.0	0.0	0.0	1.1	48.4	0.0	5.4	0.0	0.0	0.0	0.0	11.4	0.0	0.0	2.4	3.0	0.0	0.0	0.3	0.0	2.1	0.0	0.0	0.0	0.0	40.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	2.3	0.0	0.0	0.0	0.0
9/1/05	Jacobs River	A	0.0	0.0	3.8	0.0	0.0	0.9	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.9	0.0	1.2	0.0	0.0	1.1	0.0	0.0	0.0	0.0	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.2	0.0	0.0	0.0	0.0
8/1/05	Jacobs River	B	0.0	0.0	0.6	0.0	0.0	0.6	1.6	0.0	0.1	0.2	0.2	0.0	0.0	0.2	0.0	0.0	2.0	0.8	0.0	3.7	0.2	0.0	0.0	0.0	0.0	0.1	0.0	9.9	0.0	0.0	0.1	1.9	0.0	0.0	0.1	1.1	3.5	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.8	0.0	1.8	0.0	0.0	0.0	0.0
9/1/05	Jacobs River	C	0.0	0.0	1.2	0.0	0.0	0.8	3.6	0.0	1.4	0.0	0.0	0.0	0.0	10.7	0.0	0.0	4.1	1.3	0.0	0.2	0.0	0.0	0.4	0.0	0.0	0.0	0.0	17.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	3.4	0.0	0.0	0.0	0.0
18/1/06	Jacobs River	A	0.0	0.2	4.2	0.0	0.0	1.0	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.2	0.0	0.0	32.9	0.0	0.1	0.0	0.0	0.8	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.6	0.1	0.0	0.0	0.0
16/1/06	Jacobs River	B	0.0	0.0	1.3	0.0	0.0	0.9	4.0	0.0	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	3.6	1.3	0.0	3.8	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	1.2	0.0	0.0	0.0	1.5	6.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	1.1	0.0	0.0	0.0	0.0
17/1/06	Jacobs River	C	0.0	0.0	0.5	0.0	0.2	0.8	0.0	0.0	3.4	0.0	0.0	0.0	0.0	7.4	0.0	0.0	3.7	0.8	0.0	0.4	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	1.6	0.0	0.0	0.0	0.0
9/2/04	Fortrose	A	0.0	0.0	4.4	0.0	0.0	0.5	1.2	0.0	0.3	0.0	0.0	0.0	6.5	32.7	0.0	0.0	7.3	1.8	0.0	0.0	0.0	0.0	33.6	0.0	0.0	0.0	0.0	4.9	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	2.8	0.0	0.0	0.0	0.0
9/2/04	Fortrose	B	0.0	0.0	0.5	0.0	0.0	2.3	0.2	0.0	0.4	0.0	0.0	0.0	0.0	26.0	0.0	0.0	3.3	0.1	0.0	0.0	0.1	0.0	3.4	0.0	0.0	0.0	0.0	4.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	2.8	0.0	0.0	0.0	0.0
10/1/05	Fortrose	A	0.0	0.0	0.3	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	15.0	0.0	0.0	0.0	0.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
21/1/06	Fortrose	A	0.0	0.0	0.0	0.0	14.1	0.4	0.7	0.0	0.0	0.0	0.0	0.0	0.0	9.1	0.0	0.0	0.3	0.5	0.0	0.0	0.0	0.0	4.5	0.0	0.0	0.0	0.0	26.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	0.0	0.0	0.0	0.0
12/1/05	Waikawa	A	0.0	0.5	1.0	0.0	0.0	0.0	0.2	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.5	4.2	0.0	1.4	0.0	1.2	0.0	0.0	0.0	0.1	0.2	4.7	0.0	0.0	0.0	3.5	0.0	16.2	0.0	0.0	16.4	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.3	0.0	0.2	0.0	0.0	0.0	0.1	0.0
29/11/04	Waikawa	B	0.0	0.7	0.3	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.3	2.4	0.0	0.3	0.0	0.0	2.1	0.0	0.2	0.4	0.0	0.7	0.0	0.0	0.0	1.3	0.2	2.0	0.1	0.1	15.1	0.0	2.0	0.0	0.0	0.5	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20/1/06	Waikawa	A	0.0	2.8	1.3	0.0	0.0	0.1	45.1	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	1.2	7.3	0.0	1.5	0.0	7.5	0.0	0.0	0.0	0.0	0.0	12.0	0.0	0.0	0.0	4.5	0.0	13.4	0.0	0.0	18.6	0.0	0.0	0.0	0.0	0.1	0.0	0.0	2.8	0.0	0.1	0.0	0.1	0.0	0.3
20/1/06	Waikawa	B	0.0	1.1	0.9	0.0	0.0	0.0	3.1	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.1	4.0	0.0	0.4	0.0	0.3	0.6	0.0	12.8	0.8	0.0	0.7	0.0	0.0	0.0	2.7	0.0	1.3	0.7	0.0	0.3	0.0	1.1	0.0	0.0	0.2	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.6
25/11/04	Bluff	A	0.0	0.7	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.4	0.0	0.5	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.2	0.0	15.7	0.0	4.7	0.4	0.0	26.6	4.0	0.0	0.0	0.0	0.1	0.0	0.0	0.4	0.0	2.1	0.0	0.0	0.4	0.0
26/11/04	Bluff	B	0.0	1.4	0.0	0.0	0.0	0.2	0.9	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	1.4	0.0	0.0	0.0	1.4	0.0	0.8	0.4	0.0	24.0	3.0	0.1	0.1	0.0	0.1	0.0	0.0	0.2	0.0	0.1	0.0	0.0	0.0	0.0
27/11/05	Awarua	A	0.0	0.3	0.2	0.0	0.0	0.4	1.7	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.3	0.0	1.0	0.0	0.0	0.0	0.4	0.3	0.0	0.0	0.0	0.0	4.2	0.0	0.0	0.1	0.0	0.0	2.8	0.2	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.9	0.0	0.0	0.0
27/11/05	Awarua	B	0.0	0.0	0.6	0.1	0.0	0.2	0.0	0.0	0.0	0.2	0.0	2.3	0.0	0.0	0.0	0.0	0.1	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	0.0	0.2	0.0	0.6	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0
19/1/06	Haldane	A	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Average number of sediment infauna per 0.0133mm^2 core collected from Southland estuary sites 2001-2006

Date	Estuary		Syllidae	*Owenia petersenae*	*Sphaerosyllis sp.*	Sabellidae	Spionidae	*Aonides sp.*	*Boccardia sp.*	*Polydora sp.*	*Prionospio sp.*	*Scolecolepides benhami*	*Scolecolepides sp.*	*Scolelepis sp.*	Ampharetidae	Cirratulidae	*Pectinaria australis*	Terebellidae	*Lysiosquilla spinosa*	**Mysidacea**	**Cumacea**	*Tanaid sp.*	Flabellifera	*Exosphaeroma planulum*	*Exosphaeroma sp.*	*Paracorphium sp.*	**Amphipoda**	**Amphipoda a**	**Amphipoda b**	**Amphipoda c**	**Amphipoda d**	*Callianassa filholi*	*Halicarcinus cookii*	*Halicarcinus varius*	*Halicarcinus whitei*	*Helice crassa*	*Macrophthalmus hirtipes*	*Pontophilus australis*	**Decapoda (larvae unid.)**	**Natantia unid.**	OSTRACODA	COPEPODA	*Austrominius modestus*	*Pycnogonidae*	*Pelthorhamphus novaezelandiae*	*Trochodota dendyi*	*Elmidae larvae*	Muscidae	*Codium geppiorum*	*Enteromorpha sp.*	*Ulva lactuca*	*Ceramium flaccidum*	*Gracilaria sp.*
12/2/01	New River	A	0.0	0.0	0.0	0.2	0.0	0.5	0.0	0.0	0.0	0.0	1.8	37.3	0.0	0.0	0.0	0.0	0.0	0.3	5.4	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13/2/01	New River	B	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	26.3	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14/2/01	New River	C	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.2	0.0	0.0	0.5	0.0	0.0	15.8	0.1	0.0	0.4	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.1	0.3	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15/2/01	New River	D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	2.6	0.0	0.0	0.0	0.0	0.0	0.2	2.2	0.0	0.0	0.0	0.0	0.0	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21/2/03	New River	B	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	5.9	0.0	0.0	0.0	0.0	0.0	0.0	8.2	0.0	0.0	0.0	0.0	0.0	3.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18/2/03	New River	C	0.0	0.0	0.0	0.0	0.0	0.1	0.0	2.7	0.0	0.0	0.1	5.7	0.0	0.0	0.0	0.0	0.0	0.6	4.9	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.2	0.0	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17/2/03	New River	D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.6	0.0	0.0	0.0	0.0	0.0	4.5	1.2	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9/2/04	New River	B	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.1	2.3	0.0	0.1	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9/2/04	New River	C	0.0	0.0	0.0	0.0	0.0	0.2	0.0	7.8	0.7	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	16.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9/2/04	New River	D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	15.5	0.0	0.0	0.1	0.0	0.0	2.7	10.0	0.0	0.1	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11/1/05	New River	B	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.1	119.1	0.0	0.0	0.0	0.0	0.0	0.5	45.1	0.0	0.0	0.0	0.0	0.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8/1/05	New River	C	0.0	0.1	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.2	59.2	0.0	0.0	0.0	0.0	0.0	1.3	0.8	0.0	0.0	0.0	0.0	0.0	10.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.4
9/1/05	New River	D	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.1	23.1	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17/2/03	Jacobs River	A	0.0	0.0	0.0	0.0	0.0	22.2	0.0	0.0	0.7	0.0	1.0	0.4	0.0	0.0	0.0	0.0	0.0	0.3	8.7	0.0	0.1	0.0	0.0	0.0	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20/2/03	Jacobs River	B	0.2	0.0	0.0	0.0	0.0	24.4	0.0	0.1	0.5	0.0	0.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.1	0.0	0.0	0.0	0.0	2.7	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18/2/03	Jacobs River	C	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.5	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	1.3	5.2	0.0	0.0	0.0	0.0	0.0	12.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9/2/04	Jacobs River	A	0.6	0.0	0.0	0.0	0.0	28.3	0.0	5.1	1.0	0.0	0.9	19.1	0.0	0.0	0.0	0.0	0.0	0.0	3.2	0.0	0.1	0.0	0.0	0.0	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9/2/04	Jacobs River	B	0.3	0.0	0.0	2.8	0.0	26.8	0.0	7.4	6.8	0.0	0.1	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9/2/04	Jacobs River	C	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.0	0.0	2.8	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.9	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9/1/05	Jacobs River	A	0.0	0.0	0.0	0.0	0.0	25.3	0.0	1.0	0.0	0.0	1.5	28.4	0.0	0.0	0.0	0.0	0.0	0.2	6.8	0.0	0.0	0.0	0.0	0.0	4.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0
8/1/05	Jacobs River	B	0.1	0.0	0.0	13.8	0.0	12.5	0.1	6.6	0.0	0.0	0.0	2.0	0.0	0.0	0.3	0.0	0.0	0.2	2.4	0.0	0.0	0.0	0.0	0.0	7.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9/1/05	Jacobs River	C	0.0	0.0	0.0	1.5	0.0	0.0	0.3	0.2	0.0	0.0	5.6	2.6	0.0	0.1	0.0	0.0	0.0	0.5	0.8	0.0	1.5	0.0	0.0	0.0	31.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18/1/06	Jacobs River	A	0.0	0.0	3.6	0.0	0.0	18.5	0.0	3.9	0.1	1.3	0.0	4.0	0.0	0.0	0.0	0.0	0.1	0.0	2.6	0.0	0.0	0.1	0.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16/1/06	Jacobs River	B	0.0	0.0	0.0	19.8	0.0	10.4	0.0	8.8	0.5	0.3	0.0	0.8	0.0	0.0	0.2	0.0	0.0	0.0	2.3	0.0	0.0	0.0	0.0	0.0	5.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
17/1/06	Jacobs River	C	0.0	0.0	0.0	0.2	0.0	0.2	0.0	0.0	0.0	2.9	0.0	1.1	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.1	0.0	0.0	29.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9/2/04	Fortrose	A	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.4	0.0	0.0	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.1	0.0	0.0	0.0	24.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9/2/04	Fortrose	B	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	3.6	0.0	0.0	0.0	0.0	0.0	0.2	4.9	0.0	0.4	0.0	0.0	0.0	38.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10/1/05	Fortrose	A	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	7.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21/1/06	Fortrose	A	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	8.8	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	10.5	0.0	366.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
12/1/05	Waikawa	A	0.1	0.0	0.0	0.0	0.1	0.0	0.0	5.7	1.5	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	3.9	0.9	0.0	0.0	0.0	0.0	16.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.3	0.1
29/11/04	Waikawa	B	2.6	0.0	0.0	0.0	0.0	4.9	0.0	3.6	0.2	0.0	0.4	2.9	0.0	0.0	0.0	0.0	0.0	0.0	6.9	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	6.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20/1/06	Waikawa	A	0.0	0.0	19.6	0.0	0.0	0.1	0.0	5.3	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	4.7	0.0	0.0	0.4	0.0	0.0	1.8	1.7	6.5	0.1	0.0	0.0	0.0	0.1	0.0	0.2	0.0	0.1	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
20/1/06	Waikawa	B	1.2	0.0	1.1	0.0	0.0	8.2	0.0	3.7	0.2	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	4.4	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.8	0.3	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	4.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25/11/04	Bluff	A	0.0	0.0	0.0	0.0	0.0	0.0	0.9	1.1	0.0	0.0	0.6	1.4	0.0	0.3	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0
26/11/04	Bluff	B	0.4	0.0	0.0	0.0	0.0	0.0	0.0	4.7	0.0	0.0	0.2	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.7	0.0	0.0	0.0	3.4	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27/11/05	Awarua	A	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	137.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27/11/05	Awarua	B	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	0.1	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19/1/06	Haldane	A	0.0	0.0	0.0	0.0	0.0	0.0	5.3	0.0	0.0	19.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	407.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Number of sediment infauna per 0.0133mm2 core collected from Southland estuary sites 2001-2006

Date	Estuary	Taxa	Hirudinea	*Anthopleura aureoradiata*	*Edwardsia sp.*	*Virgularia gracillima*	**Platyhelminthes**	**NEMERTEA**	**NEMATODA**	**Sipuncula**	*Amphibola crenata*	*Cominella glandiformis*	*Diloma subrostrata*	*Micrelenchus tenebrosus*	*Notoacmea helmsi*	*Potamopyrgus estuarinus*	*Turbonilla sp.*	*Zeacumantus subcarinatus*	*Arbritica bifurca*	*Austrovenus stutchburyi*	*Hunkydora australica novozelana*	*Macomona liliana*	*Mactra ovata ovata*	*Nucula cf gallinacea*	*Paphies australis*	*Perna canaliculus*	*Perrierina turneri*	*Soletellina sp.*	*Theora lubrica*	**OLIGOCHAETA**	*Abarenicola affinis*	*Capitella capitata*	*Capitellethus zeylanicus*	*Heteromastus filiformis*	*Cossura consimilis*	Maldanidae	*Orbinia papillosa*	*Scoloplos cylindrifer*	Paraonidae	*Aricidea sp.*	*Travisia olens*	Dorvilleidae	*Lumbrineris sp.*	Glyceridae	*Goniada sp.*	*Aglaophamus sp.*	*Aglaophamus macroura*	Nereidae	*Nicon aestuariensis*	*Perinereis camiguinoides*	*Perinereis vallata*	Phyllodocidae	*Sphaerodoropsis sp.*	Syllidae
12/2/01	New River	A 01	0	0	0	0	0	1	0	0	2	0	0	0	0	19	0	0	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0
12/2/01	New River	A 02	0	0	0	0	0	3	0	0	1	0	0	0	0	9	0	0	42	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
12/2/01	New River	A 03	0	0	0	0	0	1	0	0	0	0	0	0	0	8	0	0	55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0
12/2/01	New River	A 04	0	0	0	0	0	5	0	0	0	0	0	0	0	8	0	0	88	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0
12/2/01	New River	A 05	0	0	1	0	0	2	0	0	1	0	0	0	0	3	0	0	103	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0
12/2/01	New River	A 06	0	0	0	0	0	1	0	0	0	0	0	0	0	5	0	0	60	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
12/2/01	New River	A 07	0	0	2	0	0	0	0	0	0	0	0	0	0	10	0	0	83	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0
12/2/01	New River	A 08	0	0	2	0	0	2	0	0	2	0	0	0	0	8	0	0	58	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0
12/2/01	New River	A 09	0	0	1	0	0	2	0	0	0	0	0	0	0	5	0	0	69	0	0	0	3	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0
12/2/01	New River	A 10	0	0	0	0	0	2	0	0	0	0	0	0	0	12	0	0	97	0	0	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0
12/2/01	New River	A 11	0	0	0	0	0	3	0	0	0	0	0	0	0	4	0	0	83	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0
12/2/01	New River	A 12	0	0	0	0	0	2	0	0	1	0	0	0	0	9	0	0	25	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	0	0	0	0	0	0
13/2/01	New River	B 01	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	1	0	0	0	0	0	0	38	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
13/2/01	New River	B 02	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	23	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0
13/2/01	New River	B 03	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0
13/2/01	New River	B 04	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
13/2/01	New River	B 05	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	3	0	0	0	1	0	1	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13/2/01	New River	B 06	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13/2/01	New River	B 07	0	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
13/2/01	New River	B 08	0	0	3	0	0	1	0	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
13/2/01	New River	B 09	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	16	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0
13/2/01	New River	B 10	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	1	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0
13/2/01	New River	B 11	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
13/2/01	New River	B 12	0	0	1	0	0	3	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0
14/2/01	New River	C 01	0	0	0	0	0	1	0	0	2	1	0	0	0	1	0	0	24	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
14/2/01	New River	C 02	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	5	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
14/2/01	New River	C 03	0	0	0	0	0	1	0	0	4	2	0	0	0	0	0	0	0	9	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
14/2/01	New River	C 04	0	0	0	0	0	0	0	0	8	1	0	0	0	0	0	0	2	5	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
14/2/01	New River	C 05	0	0	0	0	0	1	0	0	3	0	0	0	0	0	0	0	2	3	0	3	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14/2/01	New River	C 06	0	0	0	0	0	2	0	0	2	1	0	0	0	1	0	0	0	1	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
14/2/01	New River	C 07	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	3	4	0	5	0	0	0	0	0	1	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14/2/01	New River	C 08	0	0	0	0	0	2	0	0	1	1	0	0	0	0	0	0	4	4	0	4	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
14/2/01	New River	C 09	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	4	3	0	1	0	0	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0
14/2/01	New River	C 10	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	7	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14/2/01	New River	C 11	0	0	0	0	0	1	1	0	3	0	0	0	0	0	0	0	40	10	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
14/2/01	New River	C 12	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	9	0	4	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
15/2/01	New River	D 01	0	0	0	0	0	0	0	0	0	0	0	0	0	64	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0
15/2/01	New River	D 02	0	0	0	0	0	1	0	0	1	0	0	0	0	110	0	0	27	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0
15/2/01	New River	D 03	0	0	0	0	0	1	0	0	1	0	0	0	0	123	0	0	6	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
15/2/01	New River	D 04	0	0	0	0	0	1	0	0	0	0	0	0	0	129	0	0	8	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
15/2/01	New River	D 05	0	0	0	0	0	1	0	0	0	0	0	0	0	112	0	0	7	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
15/2/01	New River	D 06	0	0	0	0	0	1	0	0	1	0	0	0	0	102	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
15/2/01	New River	D 07	0	0	0	0	0	1	0	0	0	0	0	0	0	115	0	0	5	2	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
15/2/01	New River	D 08	0	0	0	0	0	1	0	0	3	0	0	0	0	73	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
15/2/01	New River	D 09	0	0	0	0	0	0	0	0	0	0	0	0	0	84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0

Number of sediment infauna per 0.0133mm2 core collected from Southland estuary sites 2001-2006

Date	Estuary	Taxa	Hirudinea	*Anthopleura aureoradiata*	*Edwardsia sp.*	*Virgularia gracillima*	**Platyhelminthes**	**NEMERTEA**	**NEMATODA**	**Sipuncula**	*Amphibola crenata*	*Cominella glandiformis*	*Diloma subrostrata*	*Micrelenchus tenebrosus*	*Notoacmea helmsi*	*Potamopyrgus estuarinus*	*Turbonilla sp.*	*Zeacumantus subcarinatus*	*Arbritica bifurca*	*Austrovenus stutchburyi*	*Hunkydora australica novozelana*	*Macomona liliana*	*Mactra ovata ovata*	*Nucula cf gallinacea*	*Paphies australis*	*Perna canaliculus*	*Perrierina turneri*	*Soletellina sp.*	*Theora lubrica*	**OLIGOCHAETA**	*Abarenicola affinis*	*Capitella capitata*	*Capitellethus zeylanicus*	*Heteromastus filiformis*	*Cossura consimilis*	Maldanidae	*Orbinia papillosa*	*Scoloplos cylindrifer*	Paraonidae	*Aricidea sp.*	*Travisia olens*	Dorvilleidae	*Lumbrineris sp.*	Glyceridae	*Goniada sp.*	*Aglaophamus sp.*	*Aglaophamus macroura*	Nereidae	*Nicon aestuariensis*	*Perinereis camiguinoides*	*Perinereis vallata*	Phyllodocidae	*Sphaerodoropsis sp.*	Syllidae
15/2/01	New River	D 10	0	0	0	0	0	1	0	0	0	0	0	0	0	115	0	0	5	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15/2/01	New River	D 11	0	0	0	0	0	0	0	0	1	0	0	0	0	106	0	0	23	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
15/2/01	New River	D 12	0	0	0	0	0	0	0	0	0	0	0	0	0	122	0	0	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
17/2/03	Jacobs River	A 01	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/2/03	Jacobs River	A 02	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	2	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/2/03	Jacobs River	A 03	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	5	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
17/2/03	Jacobs River	A 04	0	0	6	0	0	1	0	0	0	0	0	0	0	0	0	0	1	5	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/2/03	Jacobs River	A 05	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	12	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/2/03	Jacobs River	A 06	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/2/03	Jacobs River	A 07	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	4	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/2/03	Jacobs River	A 08	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	5	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/2/03	Jacobs River	A 09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/2/03	Jacobs River	A 10	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	0	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20/2/03	Jacobs River	B 01	0	0	0	0	0	2	0	0	3	0	0	0	0	0	0	0	1	0	0	4	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
20/2/03	Jacobs River	B 02	0	0	1	0	0	7	0	0	0	0	0	0	0	0	0	0	2	2	0	5	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	3	0	0	0	0	0
20/2/03	Jacobs River	B 03	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	1	6	0	8	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	1
20/2/03	Jacobs River	B 04	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	3	4	0	5	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20/2/03	Jacobs River	B 06	0	0	4	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	3	0	0	0	0	0	0	0	15	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
20/2/03	Jacobs River	B 08	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	5	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20/2/03	Jacobs River	B 09	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	5	0	0	0	0	0	0	0	7	0	0	0	3	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0
20/2/03	Jacobs River	B 10	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	1	2	0	3	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
20/2/03	Jacobs River	B 11	0	0	3	0	0	0	0	0	0	1	0	0	0	0	0	0	2	3	0	3	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0
20/2/03	Jacobs River	B 12	0	0	4	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	6	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
18/2/03	Jacobs River	C 01	0	0	0	0	0	0	0	0	1	0	0	0	0	26	0	0	2	0	0	0	0	0	6	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
18/2/03	Jacobs River	C 02	0	0	0	0	0	1	0	0	1	0	0	0	0	19	0	0	0	1	0	1	0	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
18/2/03	Jacobs River	C 03	0	0	0	0	0	1	5	0	1	0	0	0	0	21	0	0	0	5	0	0	0	0	2	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/2/03	Jacobs River	C 04	0	0	0	0	0	1	0	0	1	0	0	0	0	68	0	0	0	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/2/03	Jacobs River	C 05	0	0	0	0	0	0	1	0	0	0	0	0	0	113	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/2/03	Jacobs River	C 07	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
18/2/03	Jacobs River	C 08	0	0	0	0	0	0	0	0	2	0	0	0	0	14	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
18/2/03	Jacobs River	C 09	0	0	1	0	0	1	0	0	1	0	0	0	0	14	0	0	0	0	0	0	1	0	10	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0
18/2/03	Jacobs River	C 10	0	0	0	0	0	0	0	0	6	0	0	0	0	22	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/2/03	Jacobs River	C 12	0	0	5	0	0	1	0	0	2	0	0	0	0	58	0	0	0	1	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
21/2/03	New River	B 01	0	0	4	0	0	1	0	0	0	0	0	0	0	0	0	0	17	0	0	0	0	0	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
21/2/03	New River	B 02	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	18	0	0	0	0	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
21/2/03	New River	B 03	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	20	0	0	0	0	0	12	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
21/2/03	New River	B 05	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
21/2/03	New River	B 06	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	21	0	0	0	0	0	24	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
21/2/03	New River	B 07	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	13	0	0	0	0	0	20	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	2	0	0	0	0	0	0
21/2/03	New River	B 08	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	3	0	0	1	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
21/2/03	New River	B 09	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	9	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
21/2/03	New River	B 10	0	0	5	0	0	1	0	0	0	0	0	0	0	2	0	0	3	0	0	0	0	0	21	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
21/2/03	New River	B 11	0	0	3	0	0	1	0	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
18/2/03	New River	C 01	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	7	5	0	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0
18/2/03	New River	C 03	0	0	0	0	0	1	0	0	1	0	0	0	1	0	0	0	4	5	0	4	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0

Number of sediment infauna per 0.0133mm2 core collected from Southland estuary sites 2001-2006

Date	Estuary	Taxa	Hirudinea	*Anthopleura aureoradiata*	*Edwardsia sp.*	*Virgularia gracillima*	**Platyhelminthes**	**NEMERTEA**	**NEMATODA**	**Sipuncula**	*Amphibola crenata*	*Cominella glandiformis*	*Diloma subrostrata*	*Micrelenchus tenebrosus*	*Notoacmea helmsi*	*Potamopyrgus estuarinus*	*Turbonilla sp.*	*Zeacumantus subcarinatus*	*Arbritica bifurca*	*Austrovenus stutchburyi*	*Hunkydora australica novozelana*	*Macomona liliana*	*Mactra ovata ovata*	*Nucula cf gallinacea*	*Paphies australis*	*Perna canaliculus*	*Perrierina turneri*	*Soletellina sp.*	*Theora lubrica*	**OLIGOCHAETA**	*Abarenicola affinis*	*Capitella capitata*	*Capitellethus zeylanicus*	*Heteromastus filiformis*	*Cossura consimilis*	Maldanidae	*Orbinia papillosa*	*Scoloplos cylindrifer*	Paraonidae	*Aricidea sp.*	*Travisia olens*	Dorvilleidae	*Lumbrineris sp.*	Glyceridae	*Goniada sp.*	*Aglaophamus sp.*	*Aglaophamus macroura*	Nereidae	*Nicon aestuariensis*	*Perinereis camiguinoides*	*Perinereis vallata*	Phyllodocidae	*Sphaerodoropsis sp.*	Syllidae
18/2/03	New River	C 04	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2	0	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
18/2/03	New River	C 05	0	0	0	0	0	1	0	0	0	2	0	0	0	1	0	0	1	3	0	2	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
18/2/03	New River	C 06	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	5	0	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0
18/2/03	New River	C 07	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	9	1	0	6	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	3	0	0	0	0	0
18/2/03	New River	C 08	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	8	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0
18/2/03	New River	C 09	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	5	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	2	0	0	0	0	0
18/2/03	New River	C 10	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2	3	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
18/2/03	New River	C 12	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	7	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
17/2/03	New River	D 01	0	0	1	0	0	0	0	0	1	0	0	0	0	34	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0
17/2/03	New River	D 02	0	0	0	0	0	0	0	0	0	0	0	0	0	80	0	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
17/2/03	New River	D 04	0	0	0	0	0	0	0	0	0	0	0	0	0	55	0	0	1	0	0	0	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0
17/2/03	New River	D 07	0	0	0	0	0	1	0	0	0	0	0	0	0	67	0	0	3	1	0	0	2	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
17/2/03	New River	D 08	0	0	0	0	0	1	0	0	2	0	0	0	0	87	0	0	0	1	0	0	2	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
17/2/03	New River	D 10	0	0	1	0	0	2	0	0	0	0	0	0	0	54	0	0	1	0	0	0	1	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
17/2/03	New River	D 11	0	0	0	0	0	1	0	0	1	0	0	0	0	63	0	0	1	1	0	0	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/2/03	New River	D 12	0	0	0	0	0	0	0	0	1	0	0	0	0	71	0	0	8	0	0	0	1	0	10	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
17/2/03	New River	D 05	0	0	0	0	0	0	0	0	0	0	0	0	0	53	0	0	6	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
17/2/03	New River	D 09	0	0	0	0	0	0	0	0	0	0	0	0	0	74	0	0	0	1	0	0	1	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
9/2/04	Fortrose	A 01	0	0	4	0	0	0	0	0	2	0	0	0	12	42	0	0	22	1	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0
9/2/04	Fortrose	A 02	0	0	2	0	0	1	3	0	1	0	0	0	3	48	0	0	7	0	0	0	0	0	47	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
9/2/04	Fortrose	A 04	0	0	6	0	0	1	3	0	0	0	0	0	2	19	0	0	4	2	0	0	0	0	49	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
9/2/04	Fortrose	A 05	0	0	12	0	0	0	0	0	0	0	0	0	5	33	0	0	5	1	0	0	0	0	49	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
9/2/04	Fortrose	A 06	0	0	4	0	0	0	1	0	0	0	0	0	9	12	0	0	4	5	0	0	0	0	33	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	0	0	0	0	0
9/2/04	Fortrose	A 07	0	0	3	0	0	1	3	0	0	0	0	0	2	43	0	0	1	2	0	0	0	0	12	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
9/2/04	Fortrose	A 09	0	0	1	0	0	1	2	0	0	0	0	0	4	30	0	0	3	0	0	0	0	0	37	0	0	0	0	14	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
9/2/04	Fortrose	A 10	0	0	5	0	0	0	0	0	0	0	0	0	3	41	0	0	13	2	0	0	0	0	34	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0
9/2/04	Fortrose	A 11	0	0	4	0	0	1	0	0	0	0	0	0	13	23	0	0	11	1	0	0	0	0	8	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
9/2/04	Fortrose	A 12	0	0	3	0	0	0	0	0	0	0	0	0	12	36	0	0	3	4	0	0	0	0	57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0
9/2/04	Fortrose	B 01	0	0	0	0	0	2	0	0	0	0	0	0	0	21	0	0	0	0	0	0	0	0	2	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0
9/2/04	Fortrose	B 02	0	0	0	0	0	2	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	2	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
9/2/04	Fortrose	B 03	0	0	2	0	0	2	0	0	1	0	0	0	0	29	0	0	2	0	0	0	0	0	8	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
9/2/04	Fortrose	B 04	0	0	2	0	0	1	1	0	0	0	0	0	0	21	0	0	0	0	0	0	0	0	8	0	0	0	0	6	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
9/2/04	Fortrose	B 05	0	0	0	0	0	2	0	0	0	0	0	0	0	27	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0
9/2/04	Fortrose	B 06	0	0	0	0	0	3	0	0	1	0	0	0	0	43	0	0	3	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
9/2/04	Fortrose	B 07	0	0	0	0	0	2	0	0	1	0	0	0	0	17	0	0	17	0	0	0	0	0	9	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0
9/2/04	Fortrose	B 08	0	0	0	0	0	1	0	0	1	0	0	0	0	16	0	0	1	0	0	0	1	0	2	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
9/2/04	Fortrose	B 09	0	0	1	0	0	7	1	0	0	0	0	0	0	28	0	0	9	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0
9/2/04	Fortrose	B 10	0	0	0	0	0	1	0	0	0	0	0	0	0	38	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
9/2/04	Jacobs River	A 01	0	0	5	0	0	1	10	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	20	0	0	0	0	5	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	3
9/2/04	Jacobs River	A 02	0	0	3	0	0	1	5	0	0	1	0	0	0	0	0	0	0	2	0	1	0	0	37	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
9/2/04	Jacobs River	A 03	0	0	5	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	14	0	0	0	0	8	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
9/2/04	Jacobs River	A 04	0	0	9	0	0	1	2	0	0	1	0	0	0	0	0	0	0	7	0	2	0	0	8	0	0	0	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
9/2/04	Jacobs River	A 05	0	0	7	0	0	1	0	0	0	1	0	0	0	0	0	0	0	4	0	2	0	0	8	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
9/2/04	Jacobs River	A 06	0	0	9	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	13	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	A 08	0	0	2	0	0	1	3	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	14	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0

Number of sediment infauna per 0.0133mm2 core collected from Southland estuary sites 2001-2006

Date	Estuary	Taxa	Hirudinea	*Anthopleura aureoradiata*	*Edwardsia sp.*	*Virgularia gracillima*	**Platyhelminthes**	**NEMERTEA**	**NEMATODA**	**Sipuncula**	*Amphibola crenata*	*Cominella glandiformis*	*Diloma subrostrata*	*Micrelenchus tenebrosus*	*Notoacmea helmsi*	*Potamopyrgus estuarinus*	*Turbonilla sp.*	*Zeacumantus subcarinatus*	*Arbritica bifurca*	*Austrovenus stutchburyi*	*Hunkydora australica novozelana*	*Macomona liliana*	*Mactra ovata ovata*	*Nucula cf gallinacea*	*Paphies australis*	*Perna canaliculus*	*Perrierina turneri*	*Soletellina sp.*	*Theora lubrica*	**OLIGOCHAETA**	*Abarenicola affinis*	*Capitella capitata*	*Capitellethus zeylanicus*	*Heteromastus filiformis*	*Cossura consimilis*	Maldanidae	*Orbinia papillosa*	*Scoloplos cylindrifer*	Paraonidae	*Aricidea sp.*	*Travisia olens*	Dorvilleidae	*Lumbrineris sp.*	Glyceridae	*Goniada sp.*	*Aglaophamus sp.*	*Aglaophamus macroura*	Nereidae	*Nicon aestuariensis*	*Perinereis camiguinoides*	*Perinereis vallata*	Phyllodocidae	*Sphaerodoropsis sp.*	Syllidae
9/2/04	Jacobs River	A 10	0	0	5	0	0	1	5	0	0	0	0	0	0	0	0	0	0	4	0	1	0	0	7	0	0	0	0	10	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
9/2/04	Jacobs River	A 11	0	0	5	0	0	0	8	0	0	1	0	0	0	0	0	0	0	11	0	0	0	0	16	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
9/2/04	Jacobs River	A 12	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	17	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
9/2/04	Jacobs River	B 01	0	0	16	0	0	3	8	0	0	0	0	0	0	0	0	0	17	1	0	3	0	0	0	0	0	1	0	24	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
9/2/04	Jacobs River	B 02	0	0	13	0	0	1	0	0	0	1	0	0	0	0	0	0	3	0	0	6	0	0	0	0	0	0	0	28	0	0	0	2	0	0	0	0	0	0	0	0	1	0	0	1	0	0	2	0	0	0	0	0
9/2/04	Jacobs River	B 03	0	0	16	0	0	1	4	0	0	0	0	0	0	0	0	0	0	5	0	5	0	0	0	0	0	0	0	21	0	0	0	1	0	0	0	1	4	0	0	0	0	0	0	0	1	0	4	0	0	0	0	0
9/2/04	Jacobs River	B 06	0	0	3	0	0	1	0	0	0	1	0	0	0	0	0	0	2	1	0	3	0	0	0	0	0	1	0	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
9/2/04	Jacobs River	B 07	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2
9/2/04	Jacobs River	B 08	0	0	4	0	0	2	5	0	0	0	0	0	0	0	0	0	0	2	0	4	0	0	0	0	0	1	0	12	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0
9/2/04	Jacobs River	B 09	0	0	4	0	0	1	4	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	24	0	1	0	2	0	0	0	2	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
9/2/04	Jacobs River	B 10	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	4	0	0	0	0	0	0	0	6	0	0	0	11	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0
9/2/04	Jacobs River	B 11	0	0	5	0	0	2	3	0	0	1	0	0	0	0	0	0	2	4	0	3	0	0	0	0	0	0	0	8	0	0	0	2	0	0	0	4	6	0	0	0	0	0	0	0	3	0	1	0	0	0	0	1
9/2/04	Jacobs River	B 12	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	5	0	0	0	0	0	1	0	6	0	0	0	1	0	0	0	0	7	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
9/2/04	Jacobs River	C 01	0	5	0	0	0	1	5	0	1	0	0	0	0	11	0	0	3	4	0	0	0	0	10	0	0	0	0	106	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
9/2/04	Jacobs River	C 02	0	2	0	0	0	3	39	0	3	0	0	0	0	10	0	0	5	3	0	0	0	0	2	0	0	0	0	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
9/2/04	Jacobs River	C 03	0	1	0	0	0	2	61	0	3	0	0	0	0	11	0	0	1	7	0	0	1	0	3	0	0	0	0	68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0
9/2/04	Jacobs River	C 04	0	0	0	0	0	2	5	0	12	0	0	0	0	27	0	0	6	5	0	0	1	0	1	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
9/2/04	Jacobs River	C 05	0	0	0	0	0	0	63	0	3	0	0	0	0	6	0	0	2	3	0	0	0	0	0	0	0	0	0	42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0
9/2/04	Jacobs River	C 06	0	1	0	0	0	1	83	0	5	0	0	0	0	0	0	0	0	3	0	0	1	0	0	0	0	0	0	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
9/2/04	Jacobs River	C 07	0	2	0	0	0	1	75	0	2	0	0	0	0	14	0	0	5	3	0	0	0	0	1	0	0	0	0	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	0	0	0	0	0
9/2/04	Jacobs River	C 08	0	4	0	0	0	1	15	0	7	0	0	0	0	6	0	0	0	0	0	0	0	0	1	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
9/2/04	Jacobs River	C 10	0	2	0	0	0	0	42	0	2	0	0	0	0	4	0	0	0	1	0	0	0	0	1	0	0	0	0	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	C 12	0	0	0	0	0	0	96	0	16	0	0	0	0	25	0	0	2	1	0	0	0	0	2	0	0	0	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0
9/2/04	New River	B 02	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	5	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0
9/2/04	New River	B 03	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
9/2/04	New River	B 04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
9/2/04	New River	B 06	0	0	2	0	0	0	0	0	2	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	B 07	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
9/2/04	New River	B 08	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	8	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
9/2/04	New River	B 09	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
9/2/04	New River	B 10	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	B 11	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	13	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
9/2/04	New River	B 12	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
9/2/04	New River	C 01	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	3	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0
9/2/04	New River	C 02	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0	21	2	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0
9/2/04	New River	C 03	0	0	0	0	0	1	0	0	1	1	1	0	0	0	0	0	4	7	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
9/2/04	New River	C 04	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	6	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	1	0	0	0	0	0
9/2/04	New River	C 06	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	6	3	0	5	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
9/2/04	New River	C 07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	4	0	3	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	1	0	0	0	0	0
9/2/04	New River	C 08	0	0	3	0	0	0	0	0	0	0	0	0	0	1	0	0	16	7	0	4	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
9/2/04	New River	C 09	0	0	2	0	0	1	0	0	0	0	0	0	0	1	0	0	9	4	0	4	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
9/2/04	New River	C 10	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
9/2/04	New River	C 11	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	6	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
9/2/04	New River	D 01	0	0	1	0	0	1	0	0	2	0	0	0	0	62	0	0	0	0	0	0	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	D 02	0	0	1	0	0	1	0	0	0	0	0	0	0	42	0	0	0	1	0	0	1	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0

Number of sediment infauna per 0.0133mm2 core collected from Southland estuary sites 2001-2006

Date	Estuary	Taxa	Hirudinea	*Anthopleura aureoradiata*	*Edwardsia sp.*	*Virgularia gracillima*	**Platyhelminthes**	**NEMERTEA**	**NEMATODA**	**Sipuncula**	*Amphibola crenata*	*Cominella glandiformis*	*Diloma subrostrata*	*Micrelenchus tenebrosus*	*Notoacmea helmsi*	*Potamopyrgus estuarinus*	*Turbonilla sp.*	*Zeacumantus subcarinatus*	*Arbritica bifurca*	*Austrovenus stutchburyi*	*Hunkydora australica novozelana*	*Macomona liliana*	*Mactra ovata ovata*	*Nucula cf gallinacea*	*Paphies australis*	*Perna canaliculus*	*Perrierina turneri*	*Soletellina sp.*	*Theora lubrica*	**OLIGOCHAETA**	*Abarenicola affinis*	*Capitella capitata*	*Capitellethus zeylanicus*	*Heteromastus filiformis*	*Cossura consimilis*	Maldanidae	*Orbinia papillosa*	*Scoloplos cylindrifer*	Paraonidae	*Aricidea sp.*	*Travisia olens*	Dorvilleidae	*Lumbrineris sp.*	Glyceridae	*Goniada sp.*	*Aglaophamus sp.*	*Aglaophamus macroura*	Nereidae	*Nicon aestuariensis*	*Perinereis camiguinoides*	*Perinereis vallata*	Phyllodocidae	*Sphaerodoropsis sp.*	Syllidae
9/2/04	New River	D 03	0	0	2	0	0	1	0	0	0	0	0	0	0	48	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
9/2/04	New River	D 04	0	0	0	0	0	1	0	0	0	0	0	0	0	27	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
9/2/04	New River	D 05	0	0	2	0	0	1	0	0	0	0	0	0	0	34	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
9/2/04	New River	D 07	0	0	2	0	0	1	0	0	1	0	0	0	0	47	0	0	3	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
9/2/04	New River	D 08	0	0	3	0	0	1	0	0	0	0	0	0	0	43	0	0	5	0	0	0	0	0	4	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
9/2/04	New River	D 09	0	0	1	0	0	2	0	0	2	0	0	0	0	21	0	0	3	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
9/2/04	New River	D 10	0	0	1	0	0	0	1	0	0	0	0	0	0	38	0	0	10	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
9/2/04	New River	D 12	0	0	0	0	0	0	0	0	1	0	0	0	0	51	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0
10/1/05	Fortrose	A 01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0
10/1/05	Fortrose	A 02	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/1/05	Fortrose	A 03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	31	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
10/1/05	Fortrose	A 04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	22	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
10/1/05	Fortrose	A 05	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	25	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/1/05	Fortrose	A 06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	28	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/1/05	Fortrose	A 07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
10/1/05	Fortrose	A 08	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
10/1/05	Fortrose	A 09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	11	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
10/1/05	Fortrose	A 10	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	5	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
9/1/05	Jacobs River	A 01	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
9/1/05	Jacobs River	A 02	0	0	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3	0	2	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
9/1/05	Jacobs River	A 03	0	0	3	0	0	2	0	0	0	0	0	0	0	0	0	0	0	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/1/05	Jacobs River	A 04	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	3	0	3	0	0	3	0	0	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/1/05	Jacobs River	A 05	0	0	4	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3	0	1	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
9/1/05	Jacobs River	A 06	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	2	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
9/1/05	Jacobs River	A 07	0	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	2	0	0	2	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/1/05	Jacobs River	A 08	0	0	8	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/1/05	Jacobs River	A 09	0	0	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
9/1/05	Jacobs River	A 10	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
8/1/05	Jacobs River	B 01	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	3	2	0	5	0	0	0	0	0	0	0	6	0	0	0	6	0	0	1	4	1	0	0	0	0	0	0	1	0	3	0	0	0	0	0
8/1/05	Jacobs River	B 02	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	4	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	0	0	0	0	0
8/1/05	Jacobs River	B 03	0	0	3	0	0	1	1	0	0	0	0	0	0	1	0	0	7	2	0	3	0	0	0	0	0	1	0	15	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
8/1/05	Jacobs River	B 04	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	4	0	0	0	0	0	0	0	3	0	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/1/05	Jacobs River	B 05	0	0	0	0	0	1	0	0	0	2	0	0	0	0	0	0	0	1	0	3	1	0	0	0	0	0	0	4	0	0	0	3	0	0	0	1	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0
8/1/05	Jacobs River	B 06	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	6	1	0	0	0	0	0	0	40	0	0	1	2	0	0	0	0	25	0	0	0	0	0	0	1	0	2	0	0	0	0	1
8/1/05	Jacobs River	B 07	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	2	0	6	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	1	0	1	0	0	0	0	0
8/1/05	Jacobs River	B 08	0	0	1	0	0	1	13	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	8	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
8/1/05	Jacobs River	B 09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0
8/1/05	Jacobs River	B 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	2	0	0	0	0	0	0	0	12	0	0	0	4	0	0	0	4	2	0	0	0	0	1	0	0	2	0	2	0	0	0	0
9/1/05	Jacobs River	C 01	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/1/05	Jacobs River	C 02	0	0	3	0	0	1	5	0	1	0	0	0	0	3	0	0	2	1	0	0	0	0	0	0	0	0	0	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0
9/1/05	Jacobs River	C 03	0	0	0	0	0	1	1	0	2	0	0	0	0	14	0	0	11	1	0	0	0	0	1	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	5	0	0	0	0	0
9/1/05	Jacobs River	C 04	0	0	0	0	0	0	6	0	4	0	0	0	0	3	0	0	5	1	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0
9/1/05	Jacobs River	C 05	0	0	2	0	0	1	1	0	0	0	0	0	0	18	0	0	0	2	0	2	0	0	2	0	0	0	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
9/1/05	Jacobs River	C 06	0	0	0	0	0	1	0	0	0	0	0	0	0	10	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
9/1/05	Jacobs River	C 07	0	0	0	0	0	3	4	0	0	0	0	0	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0

Number of sediment infauna per 0.0133mm2 core collected from Southland estuary sites 2001-2006

Date	Estuary	Taxa	Hirudinea	*Anthopleura aureoradiata*	*Edwardsia sp.*	*Virgularia gracillima*	**Platyhelminthes**	**NEMERTEA**	**NEMATODA**	**Sipuncula**	*Amphibola crenata*	*Cominella glandiformis*	*Diloma subrostrata*	*Micrelenchus tenebrosus*	*Notoacmea helmsi*	*Potamopyrgus estuarinus*	*Turbonilla sp.*	*Zeacumantus subcarinatus*	*Arbritica bifurca*	*Austrovenus stutchburyi*	*Hunkydora australica novozelana*	*Macomona liliana*	*Mactra ovata ovata*	*Nucula cf gallinacea*	*Paphies australis*	*Perna canaliculus*	*Perrierina turneri*	*Soletellina sp.*	*Theora lubrica*	**OLIGOCHAETA**	*Abarenicola affinis*	*Capitella capitata*	*Capitellethus zeylanicus*	*Heteromastus filiformis*	*Cossura consimilis*	Maldanidae	*Orbinia papillosa*	*Scoloplos cylindrifer*	Paraonidae	*Aricidea sp.*	*Travisia olens*	Dorvilleidae	*Lumbrineris sp.*	Glyceridae	*Goniada sp.*	*Aglaophamus sp.*	*Aglaophamus macroura*	Nereidae	*Nicon aestuariensis*	*Perinereis camiguinoides*	*Perinereis vallata*	Phyllodocidae	*Sphaerodoropsis sp.*	Syllidae
9/1/05	Jacobs River	C 08	0	0	3	0	0	0	4	0	4	0	0	0	0	12	0	0	3	1	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0
9/1/05	Jacobs River	C 09	0	0	3	0	0	0	0	0	2	0	0	0	0	8	0	0	12	1	0	0	0	0	0	0	0	0	0	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0
9/1/05	Jacobs River	C 10	0	0	1	0	0	1	15	0	1	0	0	0	0	16	0	0	8	2	0	0	0	0	1	0	0	0	0	41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0
11/1/05	New River	B 01	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	4	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
11/1/05	New River	B 02	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/1/05	New River	B 03	0	0	0	0	0	9	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/1/05	New River	B 04	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/1/05	New River	B 05	1	0	2	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/1/05	New River	B 06	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	3	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
11/1/05	New River	B 07	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
11/1/05	New River	B 08	0	0	3	0	0	4	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
11/1/05	New River	B 09	0	0	1	0	0	3	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/1/05	New River	B 10	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	4	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
8/1/05	New River	C 01	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
8/1/05	New River	C 02	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	5	3	0	4	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
8/1/05	New River	C 03	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0
8/1/05	New River	C 04	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	1	8	0	3	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
8/1/05	New River	C 05	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	7	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
8/1/05	New River	C 06	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
8/1/05	New River	C 07	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	3	2	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	1	0	0	0	0	0
8/1/05	New River	C 08	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2	3	0	3	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	1	0	0
8/1/05	New River	C 09	0	0	0	0	0	1	0	0	3	0	0	0	0	0	0	0	0	7	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	1	0	0
8/1/05	New River	C 10	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	1	0	5	0	0	0	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0
9/1/05	New River	D 01	0	0	0	0	0	0	0	0	1	0	0	0	0	15	0	0	28	0	0	0	1	0	1	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
9/1/05	New River	D 02	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
9/1/05	New River	D 03	0	0	0	0	0	1	0	0	0	0	0	0	0	10	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/1/05	New River	D 04	0	0	0	0	0	1	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
9/1/05	New River	D 05	0	0	0	0	0	0	0	0	1	0	0	0	0	8	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
9/1/05	New River	D 06	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
9/1/05	New River	D 07	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/1/05	New River	D 08	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/1/05	New River	D 09	0	0	0	0	0	0	0	0	2	0	0	0	0	15	0	0	1	2	0	0	5	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
9/1/05	New River	D 10	0	0	1	0	0	0	0	0	3	0	0	0	0	16	0	0	2	0	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/1/05	Waikawa	A 01	0	1	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0	0	1	0	0	0	1	0	10	0	0	3	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
12/1/05	Waikawa	A 02	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	2	5	0	3	0	2	0	0	0	1	0	9	0	0	0	10	0	32	0	0	18	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
12/1/05	Waikawa	A 03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	1	0	1	0	0	0	0	1	6	0	0	0	5	0	16	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/1/05	Waikawa	A 04	0	2	3	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	1	0	0	0	1	0	22	0	0	25	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
12/1/05	Waikawa	A 05	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	5	0	0	0	1	0	0	0	0	0	0	0	0	0	3	0	12	0	0	3	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
12/1/05	Waikawa	A 06	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	7	0	1	0	1	0	0	0	0	0	14	0	0	0	7	0	14	0	0	27	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
12/1/05	Waikawa	A 07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	2	0	0	0	4	0	7	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/1/05	Waikawa	A 08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	3	0	0	0	0	0	4	0	0	0	2	0	11	0	0	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/1/05	Waikawa	A 09	0	1	2	0	0	0	0	0	0	1	0	0	0	0	0	0	1	4	0	5	0	0	0	0	0	0	0	5	0	0	0	0	0	22	0	0	41	0	0	0	0	0	0	1	0	1	0	0	0	0	1
12/1/05	Waikawa	A 10	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	6	0	1	0	1	0	0	0	0	1	5	0	0	0	2	0	16	0	0	20	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
29/11/04	Waikawa	B 01	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	1	0	0	6	0	0	0	0	0	0	0	0	3	0	4	0	0	8	0	4	0	0	2	0	0	0	0	0	0	0	0	0	7
29/11/04	Waikawa	B 02	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	2	0	1	8	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1

Number of sediment infauna per 0.0133mm2 core collected from Southland estuary sites 2001-2006

Date	Estuary	Taxa	Hirudinea	*Anthopleura aureoradiata*	*Edwardsia sp.*	*Virgularia gracillima*	**Platyhelminthes**	**NEMERTEA**	**NEMATODA**	**Sipuncula**	*Amphibola crenata*	*Cominella glandiformis*	*Diloma subrostrata*	*Micrelenchus tenebrosus*	*Notoacmea helmsi*	*Potamopyrgus estuarinus*	*Turbonilla sp.*	*Zeacumantus subcarinatus*	*Arbritica bifurca*	*Austrovenus stutchburyi*	*Hunkydora australica novozelana*	*Macomona liliana*	*Mactra ovata ovata*	*Nucula cf gallinacea*	*Paphies australis*	*Perna canaliculus*	*Perrierina turneri*	*Soletellina sp.*	*Theora lubrica*	**OLIGOCHAETA**	*Abarenicola affinis*	*Capitella capitata*	*Capitellethus zeylanicus*	*Heteromastus filiformis*	*Cossura consimilis*	Maldanidae	*Orbinia papillosa*	*Scoloplos cylindrifer*	Paraonidae	*Aricidea sp.*	*Travisia olens*	Dorvilleidae	*Lumbrineris sp.*	Glyceridae	*Goniada sp.*	*Aglaophamus sp.*	*Aglaophamus macroura*	Nereidae	*Nicon aestuariensis*	*Perinereis camiguinoides*	*Perinereis vallata*	Phyllodocidae	*Sphaerodoropsis sp.*	Syllidae
29/11/04	Waikawa	B 03	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	15	0	6	0	0	1	0	0	1	0	0	0	0	0	0	3
29/11/04	Waikawa	B 04	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	4	0	0	0	0	0	0	0	0	1	0	0	0	0	17	0	3	0	0	0	0	0	0	0	0	0	0	0	0	1
29/11/04	Waikawa	B 05	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0	10	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0
29/11/04	Waikawa	B 06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	1	0	0	22	0	1	0	0	0	0	0	0	0	0	0	0	0	0	4
29/11/04	Waikawa	B 07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2	0	1	0	0	5	0	1	4	0	1	0	0	0	0	0	4	0	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
29/11/04	Waikawa	B 08	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	0	0	0	0	1	0	1	0	0	1	0	0	0	0	0	3	1	0	12	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
29/11/04	Waikawa	B 09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	0	26	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
29/11/04	Waikawa	B 10	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	5	0	0	0	0	5	0	0	0	0	2	0	0	0	3	0	3	0	0	15	0	4	0	0	0	0	0	1	0	0	0	0	0	0	5
25/11/04	Bluff	A 01	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0	5	0	0	40	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0
25/11/04	Bluff	A 02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	4	0	0	43	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25/11/04	Bluff	A 03	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	3	1	0	15	4	0	0	0	0	0	0	0	0	2	0	0	0	0	0
25/11/04	Bluff	A 04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	2	1	0	0	2	0	0	0	1	0	0	0	0	0	0	0	1	0	0
25/11/04	Bluff	A 05	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	18	0	3	1	0	11	3	0	0	0	0	0	0	0	0	2	0	0	1	0	0
25/11/04	Bluff	A 06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	22	0	8	1	0	22	5	0	0	0	0	0	0	0	0	3	0	0	0	0	0
25/11/04	Bluff	A 07	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	7	0	0	0	0	0	0	0	0	0	0	0	2	0	25	0	4	0	0	40	2	0	0	0	0	0	0	1	0	1	0	0	0	0	0
25/11/04	Bluff	A 08	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	11	0	0	54	5	0	0	0	0	0	0	1	0	7	0	0	1	0	0
25/11/04	Bluff	A 09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	4	0	0	18	7	0	0	0	0	0	0	0	0	0	0	0	1	0	0
25/11/04	Bluff	A 10	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	0	3	0	0	23	8	0	0	0	0	0	0	2	0	5	0	0	0	0	0
26/11/04	Bluff	B 01	0	1	0	0	0	0	3	0	0	1	0	0	0	0	0	0	0	3	0	0	0	0	1	0	0	0	0	1	0	0	0	1	0	1	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26/11/04	Bluff	B 02	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26/11/04	Bluff	B 03	0	3	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	16	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26/11/04	Bluff	B 04	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	1	0	0	16	3	0	0	0	0	0	0	1	0	1	0	0	0	0	0
26/11/04	Bluff	B 05	0	1	0	0	0	1	4	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	0	0	3	0	0	0	0	43	10	0	1	0	0	0	0	0	0	0	0	0	0	0	3
26/11/04	Bluff	B 06	0	0	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	6	0	0	0	0	0	1	0	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26/11/04	Bluff	B 07	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26/11/04	Bluff	B 08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	2	0	0	0	3	0	2	3	0	43	5	0	0	0	1	0	0	0	0	0	0	0	0	0	1
26/11/04	Bluff	B 09	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	4	0	1	0	0	0	0	0	0	0	1	0	0	0	2	0	0	1	0	25	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0
26/11/04	Bluff	B 10	0	3	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	29	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0
27/11/05	Awarua	A 01	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
27/11/05	Awarua	A 02	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0	3	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
27/11/05	Awarua	A 03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27/11/05	Awarua	A 04	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2
27/11/05	Awarua	A 05	0	0	0	0	0	1	3	1	0	0	0	0	0	0	0	2	0	1	0	0	0	0	1	0	0	0	0	18	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
27/11/05	Awarua	A 06	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
27/11/05	Awarua	A 07	0	1	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
27/11/05	Awarua	A 08	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	3	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27/11/05	Awarua	A 09	0	2	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	7	0	0	8	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
27/11/05	Awarua	A 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	9	0	0	4	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0
27/11/05	Awarua	B 01	0	0	0	1	0	0	0	0	0	0	0	5	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27/11/05	Awarua	B 02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
27/11/05	Awarua	B 03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27/11/05	Awarua	B 04	0	0	2	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27/11/05	Awarua	B 05	0	0	0	0	0	1	0	0	0	1	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27/11/05	Awarua	B 06	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27/11/05	Awarua	B 07	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0

Number of sediment infauna per 0.0133mm2 core collected from Southland estuary sites 2001-2006

Date	Estuary	Taxa	Hirudinea	*Anthopleura aureoradiata*	*Edwardsia sp.*	*Virgularia gracillima*	**Platyhelminthes**	**NEMERTEA**	**NEMATODA**	**Sipuncula**	*Amphibola crenata*	*Cominella glandiformis*	*Diloma subrostrata*	*Micrelenchus tenebrosus*	*Notoacmea helmsi*	*Potamopyrgus estuarinus*	*Turbonilla sp.*	*Zeacumantus subcarinatus*	*Arbritica bifurca*	*Austrovenus stutchburyi*	*Hunkydora australica novozelana*	*Macomona liliana*	*Mactra ovata ovata*	*Nucula cf gallinacea*	*Paphies australis*	*Perna canaliculus*	*Perrierina turneri*	*Soletellina sp.*	*Theora lubrica*	**OLIGOCHAETA**	*Abarenicola affinis*	*Capitella capitata*	*Capitellethus zeylanicus*	*Heteromastus filiformis*	*Cossura consimilis*	Maldanidae	*Orbinia papillosa*	*Scoloplos cylindrifer*	Paraonidae	*Aricidea sp.*	*Travisia olens*	Dorvilleidae	*Lumbrineris sp.*	Glyceridae	*Goniada sp.*	*Aglaophamus sp.*	*Aglaophamus macroura*	Nereidae	*Nicon aestuariensis*	*Perinereis camiguinoides*	*Perinereis vallata*	Phyllodocidae	*Sphaerodoropsis sp.*	Syllidae
27/11/05	Awarua	B 08	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27/11/05	Awarua	B 09	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
27/11/05	Awarua	B 10	0	0	0	0	0	1	0	0	0	1	0	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
18/1/06	Jacobs River	A 01	0	0	4	0	0	2	0	0	0	0	0	0	0	0	0	0	0	3	0	1	0	0	49	0	0	0	0	3	0	0	0	3	0	0	0	0	1	0	0	0	0	0	0	0	4	0	1	0	0	0	0	0
18/1/06	Jacobs River	A 02	0	0	4	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	32	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0
18/1/06	Jacobs River	A 03	0	0	6	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	36	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	6	0	1	0	0	0	0	0
18/1/06	Jacobs River	A 04	0	0	5	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/1/06	Jacobs River	A 05	0	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	1	0	0	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0
18/1/06	Jacobs River	A 06	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41	0	0	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/1/06	Jacobs River	A 07	0	0	2	0	0	1	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	1	0	0	0	0	0
18/1/06	Jacobs River	A 08	0	0	5	0	0	2	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	32	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	2	0	0	0	0	0
18/1/06	Jacobs River	A 09	0	0	5	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	28	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0
18/1/06	Jacobs River	A 10	0	0	4	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0
16/1/06	Jacobs River	B 01	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	10	3	0	3	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
16/1/06	Jacobs River	B 02	0	0	3	0	0	1	1	0	1	2	0	0	0	0	0	0	1	1	0	4	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
16/1/06	Jacobs River	B 03	0	0	1	0	0	1	6	0	0	0	0	0	0	0	0	0	4	2	0	6	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	2	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0
16/1/06	Jacobs River	B 04	0	0	3	0	0	1	3	0	0	0	0	0	0	0	0	0	0	2	0	5	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	4	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
16/1/06	Jacobs River	B 05	0	0	4	0	0	1	1	0	1	0	0	0	0	0	0	0	12	3	0	6	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	3	55	0	0	0	0	0	0	0	4	0	3	0	0	0	0	0
16/1/06	Jacobs River	B 06	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	3	0	1	0	0	0	0	0
16/1/06	Jacobs River	B 07	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	2	1	0	4	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	2	0	3	0	0	0	0	0
16/1/06	Jacobs River	B 08	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
16/1/06	Jacobs River	B 09	0	0	1	0	0	0	10	0	1	0	0	0	0	0	0	0	7	0	0	3	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	1	1	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0
16/1/06	Jacobs River	B 10	0	0	0	0	0	3	9	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
17/1/06	Jacobs River	C 01	0	0	0	0	0	2	0	0	3	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
17/1/06	Jacobs River	C 02	0	0	0	0	0	1	0	0	4	0	0	0	0	3	0	0	3	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	0	0	0	0	0
17/1/06	Jacobs River	C 03	0	0	1	0	0	1	0	0	3	0	0	0	0	2	0	0	2	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
17/1/06	Jacobs River	C 04	0	0	0	0	0	0	0	0	5	0	0	0	0	11	0	0	6	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	2	0	0	0	0	0
17/1/06	Jacobs River	C 05	0	0	3	0	0	1	0	0	3	0	0	0	0	13	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0
17/1/06	Jacobs River	C 06	0	0	0	0	0	0	0	0	5	0	0	0	0	12	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
17/1/06	Jacobs River	C 07	0	0	0	0	2	0	0	0	2	0	0	0	0	6	0	0	3	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0
17/1/06	Jacobs River	C 08	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
17/1/06	Jacobs River	C 09	0	0	0	0	0	1	0	0	7	0	0	0	0	6	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
17/1/06	Jacobs River	C 10	0	0	1	0	0	1	0	0	0	0	0	0	0	20	0	0	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
21/1/06	Fortrose	A 01	0	0	0	0	6	0	2	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0
21/1/06	Fortrose	A 02	0	0	0	0	19	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3	0	0	0	0	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0
21/1/06	Fortrose	A 03	0	0	0	0	21	0	2	0	0	0	0	0	0	15	0	0	1	1	0	0	0	0	6	0	0	0	0	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
21/1/06	Fortrose	A 04	0	0	0	0	13	1	1	0	0	0	0	0	0	26	0	0	0	4	0	0	0	0	3	0	0	0	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21/1/06	Fortrose	A 05	0	0	0	0	18	1	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	0	9	0	0	0	0	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
21/1/06	Fortrose	A 06	0	0	0	0	26	0	0	0	0	0	0	0	0	13	0	0	0	0	0	0	0	0	1	0	0	0	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21/1/06	Fortrose	A 07	0	0	0	0	7	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	4	0	0	0	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0
21/1/06	Fortrose	A 08	0	0	0	0	15	1	1	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	10	0	0	0	0	42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0
21/1/06	Fortrose	A 09	0	0	0	0	6	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	2	0	0	0	0	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0
21/1/06	Fortrose	A 10	0	0	0	0	10	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	7	0	0	0	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0
20/1/06	Waikawa	A 01	0	1	4	0	0	0	19	0	0	0	0	0	0	0	0	0	0	8	0	1	0	16	0	0	0	0	0	3	0	0	0	1	0	10	0	0	26	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0
20/1/06	Waikawa	A 02	0	1	1	0	0	0	12	0	0	1	0	0	0	0	0	0	0	4	0	0	0	4	0	0	0	0	0	8	0	0	0	5	0	14	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Number of sediment infauna per 0.0133mm2 core collected from Southland estuary sites 2001-2006

Date	Estuary	Taxa	Hirudinea	*Anthopleura aureoradiata*	*Edwardsia sp.*	*Virgularia gracillima*	**Platyhelminthes**	**NEMERTEA**	**NEMATODA**	**Sipuncula**	*Amphibola crenata*	*Cominella glandiformis*	*Diloma subrostrata*	*Micrelenchus tenebrosus*	*Notoacmea helmsi*	*Potamopyrgus estuarinus*	*Turbonilla sp.*	*Zeacumantus subcarinatus*	*Arbritica bifurca*	*Austrovenus stutchburyi*	*Hunkydora australica novozelana*	*Macomona liliana*	*Mactra ovata ovata*	*Nucula cf gallinacea*	*Paphies australis*	*Perna canaliculus*	*Perrierina turneri*	*Soletellina sp.*	*Theora lubrica*	**OLIGOCHAETA**	*Abarenicola affinis*	*Capitella capitata*	*Capitellethus zeylanicus*	*Heteromastus filiformis*	*Cossura consimilis*	Maldanidae	*Orbinia papillosa*	*Scoloplos cylindrifer*	Paraonidae	*Aricidea sp.*	*Travisia olens*	Dorvilleidae	*Lumbrineris sp.*	Glyceridae	*Goniada sp.*	*Aglaophamus sp.*	*Aglaophamus macroura*	Nereidae	*Nicon aestuariensis*	*Perinereis camiguinoides*	*Perinereis vallata*	Phyllodocidae	*Sphaerodoropsis sp.*	Syllidae
20/1/06	Waikawa	A 03	0	1	0	0	0	1	4	0	0	0	0	0	0	0	0	0	0	9	0	0	0	1	0	0	0	0	0	9	0	0	0	3	0	7	0	0	20	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
20/1/06	Waikawa	A 04	0	6	3	0	0	0	55	0	0	0	0	0	0	0	0	0	5	12	0	2	0	15	0	0	0	0	0	65	0	0	0	8	0	24	0	0	25	0	0	0	0	1	0	0	6	0	0	0	1	0	2	0
20/1/06	Waikawa	A 05	0	1	1	0	0	0	8	0	0	0	1	0	0	0	0	0	1	5	0	1	0	9	0	0	0	0	0	7	0	0	0	3	0	7	0	0	15	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
20/1/06	Waikawa	A 06	0	3	0	0	0	0	75	0	0	0	0	0	0	0	0	0	2	6	0	1	0	9	0	0	0	0	0	6	0	0	0	13	0	19	0	0	30	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0
20/1/06	Waikawa	A 07	0	3	0	0	0	0	112	0	0	0	0	0	0	0	0	0	1	7	0	1	0	6	0	0	0	0	0	11	0	0	0	5	0	18	0	0	18	0	0	0	0	0	0	0	4	0	0	0	0	0	1	0
20/1/06	Waikawa	A 08	0	3	1	0	0	0	32	0	0	0	1	0	0	0	0	0	0	3	0	4	0	5	0	0	0	0	0	9	0	0	0	1	0	13	0	0	14	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
20/1/06	Waikawa	A 09	0	4	0	0	0	0	14	0	0	0	0	0	0	0	0	0	3	8	0	2	0	7	0	0	0	0	0	1	0	0	0	2	0	12	0	0	13	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
20/1/06	Waikawa	A 10	0	5	3	0	0	0	120	0	0	1	0	0	0	0	0	0	0	11	0	3	0	3	0	0	0	0	0	1	0	0	0	4	0	10	0	0	9	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
20/1/06	Waikawa	B 01	0	4	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	4	0	0	0	1	0	0	2	1	0	0	0	0	0	7	0	2	0	0	1	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0
20/1/06	Waikawa	B 02	0	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	1	0	20	2	0	0	0	0	0	6	0	2	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0
20/1/06	Waikawa	B 03	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	10	1	0	0	0	0	0	1	0	2	1	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	1	2
20/1/06	Waikawa	B 04	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	4	3	0	0	0	0	0	2	0	1	1	0	1	0	1	0	0	0	0	0	6	0	0	0	0	0	1	1
20/1/06	Waikawa	B 05	0	1	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	3	0	0	0	1	1	0	13	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
20/1/06	Waikawa	B 06	0	1	2	0	0	0	7	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	21	0	0	2	0	0	0	0	0	1	2	0	0	0	3	0	0	1	0	0	0	0	0	0	0	0	1	1
20/1/06	Waikawa	B 07	0	0	0	0	0	0	4	0	0	0	1	0	0	0	0	0	0	9	0	0	0	0	0	0	5	0	0	1	0	0	0	4	0	1	0	0	1	0	2	0	0	1	0	0	5	0	0	0	0	0	0	1
20/1/06	Waikawa	B 08	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1	4	0	1	0	0	0	0	20	0	0	1	0	0	0	3	0	2	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	4
20/1/06	Waikawa	B 09	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	4	0	1	0	0	0	0	20	1	0	1	0	0	0	1	0	1	1	0	0	0	3	0	0	0	0	0	5	0	0	0	0	0	0	3
20/1/06	Waikawa	B 10	0	0	1	0	0	0	5	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	3	0	13	0	0	2	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0
01/19/06	Haldane	A 01	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/19/06	Haldane	A 02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/19/06	Haldane	A 03	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/19/06	Haldane	A 04	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/19/06	Haldane	A 05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/19/06	Haldane	A 06	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/19/06	Haldane	A 07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/19/06	Haldane	A 08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/19/06	Haldane	A 09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/19/06	Haldane	A 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Number of sediment infauna per 0.0133mm2 core collected from Southland estuary sites 2001-2006

Date	Estuary	Taxa	*Owenia petersenae*	*Sphaerosyllis sp.*	Sabellidae	Spionidae	*Aonides sp.*	*Boccardia sp.*	*Polydora sp.*	*Prionospio sp.*	*Scolecolepides benhami*	*Scolecolepides sp.*	*Scolelepis sp.*	Ampharetidae	Cirratulidae	*Pectinaria australis*	Terebellidae	*Lysiosquilla spinosa*	**Mysidacea**	**Cumacea**	*Tanaid sp.*	Flabellifera	*Exosphaeroma planulum*	*Exosphaeroma sp.*	*Paracorphium sp.*	**Amphipoda**	**Amphipoda a**	**Amphipoda b**	**Amphipoda c**	**Amphipoda d**	*Callianassa filholi*	*Halicarcinus cookii*	*Halicarcinus varius*	*Halicarcinus whitei*	*Helice crassa*	*Macrophthalmus hirtipes*	*Pontophilus australis*	**Decapoda (larvae unid.)**	**Natantia unid.**	OSTRACODA	COPEPODA	*Austrominius modestus*	*Pycnogonidae*	*Peltorhamphus novaezelandiae*	*Trochodota dendyi*	*Elmidae larvae*	Muscidae	*Codium geppiorum*	*Enteromorpha sp.*	*Ulva lactuca*	*Ceramium flaccidum*	*Gracilaria sp.*
12/2/01	New River	A 01	0	0	0	0	2	0	0	0	0	0	38	0	0	0	0	0	2	7	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/2/01	New River	A 02	0	0	0	0	1	0	0	0	0	5	84	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/2/01	New River	A 03	0	0	0	0	0	0	0	0	0	2	10	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/2/01	New River	A 04	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	7	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/2/01	New River	A 05	0	0	0	0	2	0	0	0	0	2	15	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/2/01	New River	A 06	0	0	0	0	0	0	0	0	0	2	5	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/2/01	New River	A 07	0	0	0	0	0	0	0	0	0	3	9	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/2/01	New River	A 08	0	0	0	0	1	0	0	0	0	2	71	0	0	0	0	0	0	9	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/2/01	New River	A 09	0	0	0	0	0	0	0	0	0	2	11	0	0	0	0	0	0	6	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/2/01	New River	A 10	0	0	2	0	0	0	0	0	0	1	67	0	0	0	0	0	0	17	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/2/01	New River	A 11	0	0	0	0	0	0	0	0	0	0	35	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/2/01	New River	A 12	0	0	0	0	0	0	0	0	0	3	98	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13/2/01	New River	B 01	0	0	0	0	0	0	0	0	0	2	26	0	0	0	0	0	0	4	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13/2/01	New River	B 02	0	0	0	0	0	0	0	0	0	1	132	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13/2/01	New River	B 03	0	0	0	0	0	0	0	0	0	0	16	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13/2/01	New River	B 04	0	0	0	0	0	0	0	0	0	2	10	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13/2/01	New River	B 05	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13/2/01	New River	B 06	0	0	0	0	0	0	0	0	0	2	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13/2/01	New River	B 07	0	0	0	0	0	0	0	0	0	1	10	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13/2/01	New River	B 08	0	0	0	0	0	0	0	0	0	1	31	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13/2/01	New River	B 09	0	0	0	0	0	0	0	0	0	0	18	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13/2/01	New River	B 10	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13/2/01	New River	B 11	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13/2/01	New River	B 12	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14/2/01	New River	C 01	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14/2/01	New River	C 02	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14/2/01	New River	C 03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14/2/01	New River	C 04	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14/2/01	New River	C 05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14/2/01	New River	C 06	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14/2/01	New River	C 07	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	0	0	1	0	0	0	4	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
14/2/01	New River	C 08	0	0	0	0	0	0	0	0	0	0	3	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
14/2/01	New River	C 09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
14/2/01	New River	C 10	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14/2/01	New River	C 11	0	0	0	0	0	0	0	0	0	1	1	0	0	2	0	0	34	0	0	1	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
14/2/01	New River	C 12	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	72	0	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15/2/01	New River	D 01	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15/2/01	New River	D 02	0	0	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15/2/01	New River	D 03	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15/2/01	New River	D 04	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	2	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15/2/01	New River	D 05	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	5	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15/2/01	New River	D 06	0	0	0	0	0	0	0	0	0	1	10	0	0	0	0	0	0	1	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15/2/01	New River	D 07	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15/2/01	New River	D 08	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15/2/01	New River	D 09	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Number of sediment infauna per 0.0133mm2 core collected from Southland estuary sites 2001-2006

Date	Estuary	Taxa	*Owenia petersenae*	*Sphaerosyllis sp.*	Sabellidae	Spionidae	*Aonides sp.*	*Boccardia sp.*	*Polydora sp.*	*Prionospio sp.*	*Scolecolepides benhami*	*Scolecolepides sp.*	*Scolelepis sp.*	Ampharetidae	Cirratulidae	*Pectinaria australis*	Terebellidae	*Lysiosquilla spinosa*	**Mysidacea**	**Cumacea**	*Tanaid sp.*	Flabellifera	*Exosphaeroma planulum*	*Exosphaeroma sp.*	*Paracorphium sp.*	**Amphipoda**	**Amphipoda a**	**Amphipoda b**	**Amphipoda c**	**Amphipoda d**	*Callianassa filholi*	*Halicarcinus cookii*	*Halicarcinus varius*	*Halicarcinus whitei*	*Helice crassa*	*Macrophthalmus hirtipes*	*Pontophilus australis*	**Decapoda (larvae unid.)**	**Natantia unid.**	OSTRACODA	COPEPODA	*Austrominius modestus*	*Pycnogonidae*	*Peltorhamphus novaezelandiae*	*Trochodota dendyi*	*Elmidae larvae*	Muscidae	*Codium geppiorum*	*Enteromorpha sp.*	*Ulva lactuca*	*Ceramium flaccidum*	*Gracilaria sp.*
15/2/01	New River	D 10	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15/2/01	New River	D 11	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15/2/01	New River	D 12	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	1	8	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/2/03	Jacobs River	A 01	0	0	0	0	8	0	0	4	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/2/03	Jacobs River	A 02	0	0	0	0	27	0	0	0	0	2	1	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/2/03	Jacobs River	A 03	0	0	0	0	52	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/2/03	Jacobs River	A 04	0	0	0	0	43	0	0	0	0	2	0	0	0	0	0	0	0	9	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/2/03	Jacobs River	A 05	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/2/03	Jacobs River	A 06	0	0	0	0	19	0	0	0	0	1	0	0	0	0	0	0	0	7	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/2/03	Jacobs River	A 07	0	0	0	0	34	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/2/03	Jacobs River	A 08	0	0	0	0	31	0	0	0	0	1	0	0	0	0	0	0	3	8	0	0	0	0	0	45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/2/03	Jacobs River	A 09	0	0	0	0	2	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/2/03	Jacobs River	A 10	0	0	0	0	1	0	0	3	0	0	0	0	0	0	0	0	0	60	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20/2/03	Jacobs River	B 01	0	0	0	0	28	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20/2/03	Jacobs River	B 02	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20/2/03	Jacobs River	B 03	0	0	0	0	32	0	0	2	0	0	1	0	0	0	0	0	0	8	0	1	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
20/2/03	Jacobs River	B 04	0	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20/2/03	Jacobs River	B 06	0	0	0	0	21	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20/2/03	Jacobs River	B 08	0	0	0	0	34	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	3	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20/2/03	Jacobs River	B 09	0	0	0	0	25	0	0	1	0	1	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20/2/03	Jacobs River	B 10	0	0	0	0	14	0	1	1	0	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	0	0	0	0	0	0	0	0	0	0	0
20/2/03	Jacobs River	B 11	0	0	0	0	25	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20/2/03	Jacobs River	B 12	0	0	0	0	38	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/2/03	Jacobs River	C 01	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	2	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/2/03	Jacobs River	C 02	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0
18/2/03	Jacobs River	C 03	0	0	1	0	0	0	0	1	0	2	0	0	0	0	0	0	0	8	0	0	0	0	0	48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0
18/2/03	Jacobs River	C 04	0	0	1	0	0	0	0	1	0	4	0	0	0	0	0	0	5	10	0	0	0	0	0	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
18/2/03	Jacobs River	C 05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
18/2/03	Jacobs River	C 07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0
18/2/03	Jacobs River	C 08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	7	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0
18/2/03	Jacobs River	C 09	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	5	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0
18/2/03	Jacobs River	C 10	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	2	10	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0
18/2/03	Jacobs River	C 12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
21/2/03	New River	B 01	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	4	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
21/2/03	New River	B 02	0	0	0	0	0	0	0	0	0	2	16	0	0	0	0	0	0	9	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	0	0	0	0	0	0	0	0	0	0	0	0
21/2/03	New River	B 03	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
21/2/03	New River	B 05	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	5	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0
21/2/03	New River	B 06	0	0	0	0	0	0	0	0	0	1	4	0	0	0	0	0	0	13	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34	0	0	0	0	0	0	0	0	0	0	0	0
21/2/03	New River	B 07	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	18	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0
21/2/03	New River	B 08	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	12	0	0	0	0	0	2	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
21/2/03	New River	B 09	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	4	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0
21/2/03	New River	B 10	0	0	0	0	0	0	0	0	0	1	20	0	0	0	0	0	0	10	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0
21/2/03	New River	B 11	0	0	0	0	0	0	0	0	0	2	7	0	0	0	0	0	0	4	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0
18/2/03	New River	C 01	0	0	0	0	0	0	5	0	0	0	2	0	0	0	0	0	0	3	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
18/2/03	New River	C 03	0	0	0	0	0	0	3	0	0	0	9	0	0	0	0	0	0	9	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	27	0	0	0	0	0	0	0	0	0	0	0	0

Number of sediment infauna per 0.0133mm2 core collected from Southland estuary sites 2001-2006

Date	Estuary	Taxa	*Owenia petersenae*	*Sphaerosyllis sp.*	Sabellidae	Spionidae	*Aonides sp.*	*Boccardia sp.*	*Polydora sp.*	*Prionospio sp.*	*Scolecolepides benhami*	*Scolecolepides sp.*	*Scolelepis sp.*	Ampharetidae	Cirratulidae	*Pectinaria australis*	Terebellidae	*Lysiosquilla spinosa*	**Mysidacea**	**Cumacea**	*Tanaid sp.*	Flabellifera	*Exosphaeroma planulum*	*Exosphaeroma sp.*	*Paracorphium sp.*	**Amphipoda**	**Amphipoda a**	**Amphipoda b**	**Amphipoda c**	**Amphipoda d**	*Callianassa filholi*	*Halicarcinus cookii*	*Halicarcinus varius*	*Halicarcinus whitei*	*Helice crassa*	*Macrophthalmus hirtipes*	*Pontophilus australis*	**Decapoda (larvae unid.)**	**Natantia unid.**	OSTRACODA	COPEPODA	*Austrominius modestus*	*Pyonogonidae*	*Peltorhamphus novaezelandiae*	*Trochodota dendyi*	*Elmidae larvae*	Muscidae	*Codium geppiorum*	*Enteromorpha sp.*	*Ulva lactuca*	*Ceramium flaccidum*	*Gracilaria sp.*
18/2/03	New River	C 04	0	0	0	0	1	0	3	0	0	0	10	0	0	0	0	0	1	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/2/03	New River	C 05	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	0	0	5	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/2/03	New River	C 06	0	0	0	0	0	0	2	0	0	0	15	0	0	0	0	0	0	5	0	0	0	0	0	5	0	0	0	0	1	0	0	0	0	1	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0
18/2/03	New River	C 07	0	0	0	0	0	0	7	0	0	0	8	0	0	0	0	0	3	9	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/2/03	New River	C 08	0	0	0	0	0	0	3	0	0	0	6	0	0	0	0	0	0	7	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
18/2/03	New River	C 09	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	6	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
18/2/03	New River	C 10	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
18/2/03	New River	C 12	0	0	0	0	0	0	2	0	0	0	3	0	0	0	0	0	2	4	0	0	0	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/2/03	New River	D 01	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	30	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/2/03	New River	D 02	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	1	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/2/03	New River	D 04	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/2/03	New River	D 07	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/2/03	New River	D 08	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/2/03	New River	D 10	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	8	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/2/03	New River	D 11	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/2/03	New River	D 12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
17/2/03	New River	D 05	0	0	0	0	0	0	0	0	0	6	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/2/03	New River	D 09	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	A 01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	A 02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	A 04	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	A 05	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	A 06	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	A 07	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	A 09	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	A 10	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	A 11	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	A 12	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	2	0	0	0	0	0	61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	B 01	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	4	0	0	0	0	0	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	B 02	0	0	0	0	0	0	0	0	0	2	3	0	0	0	0	0	0	5	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	B 03	0	0	0	0	0	0	0	0	0	2	3	0	0	0	0	0	0	8	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	B 04	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	B 05	0	0	0	0	0	0	0	0	0	1	5	0	0	0	0	0	0	2	0	0	0	0	0	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	B 06	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	1	0	0	0	0	0	32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	B 07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	11	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	B 08	0	0	0	0	0	0	0	0	0	3	12	0	0	0	0	0	1	4	0	0	0	0	0	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	B 09	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	7	0	3	0	0	0	151	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	B 10	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	7	0	1	0	0	0	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	A 01	0	0	0	0	32	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	A 02	0	0	0	0	54	0	3	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	A 03	0	0	0	0	61	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	A 04	0	0	0	0	26	0	2	1	0	0	14	0	0	0	0	0	0	4	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	A 05	0	0	0	0	38	0	16	2	0	1	13	0	0	0	0	0	0	4	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	A 06	0	0	0	0	18	0	12	0	0	1	29	0	0	0	0	0	0	5	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	A 08	0	0	0	0	5	0	2	0	0	2	10	0	0	0	0	0	0	1	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Number of sediment infauna per 0.0133mm2 core collected from Southland estuary sites 2001-2006

Date	Estuary	Taxa	*Owenia petersenae*	*Sphaerosyllis sp.*	Sabellidae	Spionidae	*Aonides sp.*	*Boccardia sp.*	*Polydora sp.*	*Prionospio sp.*	*Scolecolepides benhami*	*Scolecolepides sp.*	*Scolelepis sp.*	Ampharetidae	Cirratulidae	*Pectinaria australis*	Terebellidae	*Lysiosquilla spinosa*	**Mysidacea**	**Cumacea**	*Tanaid sp.*	Flabellifera	*Exosphaeroma planulum*	*Exosphaeroma sp.*	*Paracorphium sp.*	**Amphipoda**	**Amphipoda a**	**Amphipoda b**	**Amphipoda c**	**Amphipoda d**	*Callianassa filholi*	*Halicarcinus cookii*	*Halicarcinus varius*	*Halicarcinus whitei*	*Helice crassa*	*Macrophthalmus hirtipes*	*Pontophilus australis*	**Decapoda (larvae unid.)**	**Natantia unid.**	OSTRACODA	COPEPODA	*Austrominius modestus*	*Pycnogonidae*	*Peltorhamphus novaezelandiae*	*Trochodota dendyi*	*Elmidae larvae*	Muscidae	*Codium geppiorum*	*Enteromorpha sp.*	*Ulva lactuca*	*Ceramium flaccidum*	*Gracilaria sp.*
9/2/04	Jacobs River	A 10	0	0	0	0	42	0	2	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	A 11	0	0	0	0	6	0	7	0	0	1	35	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	A 12	0	0	0	0	1	0	6	0	0	0	88	0	0	0	0	0	0	16	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	B 01	0	0	0	0	29	0	7	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	B 02	0	0	1	0	18	0	7	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	B 03	0	0	2	0	29	0	25	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	B 06	0	0	0	0	8	0	6	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	B 07	0	0	2	0	13	0	5	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	B 08	0	0	0	0	33	0	2	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	B 09	0	0	3	0	25	0	2	4	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	B 10	0	0	4	0	41	0	6	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	B 11	0	0	8	0	37	0	5	8	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	B 12	0	0	8	0	35	0	9	10	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	C 01	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	C 02	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	C 03	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	C 04	0	0	0	0	0	0	0	0	0	5	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	C 05	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	C 06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	C 07	0	0	0	0	0	0	1	0	0	2	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	C 08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	C 10	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	C 12	0	0	1	0	0	0	0	0	0	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	B 02	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	B 03	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	B 04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	B 06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	B 07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	B 08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	B 09	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	B 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	B 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	B 12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	C 01	0	0	0	0	0	0	1	3	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	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	C 02	0	0	0	0	0	0	18	1	0	0	0	0	0	1	0	0	0	4	0	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	C 03	0	0	0	0	0	0	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	C 04	0	0	0	0	2	0	6	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	C 06	0	0	0	0	0	0	7	1	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	C 07	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	C 08	0	0	0	0	0	0	5	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	C 09	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	C 10	0	0	0	0	0	0	8	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	C 11	0	0	0	0	0	0	4	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	D 01	0	0	0	0	0	0	0	0	0	0	27	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	D 02	0	0	0	0	0	0	0	0	0	0	23	0	0	1	0	0	1	9	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0

Number of sediment infauna per 0.0133mm2 core collected from Southland estuary sites 2001-2006

Date	Estuary	Taxa	*Owenia petersenae*	*Sphaerosyllis sp.*	Sabellidae	Spionidae	*Aonides sp.*	*Boccardia sp.*	*Polydora sp.*	*Prionospio sp.*	*Scolecolepides benhami*	*Scolecolepides sp.*	*Scolelepis sp.*	Ampharetidae	Cirratulidae	*Pectinaria australis*	Terebellidae	*Lysiosquilla spinosa*	**Mysidacea**	**Cumacea**	*Tanaid sp.*	Flabellifera	*Exosphaeroma planulum*	*Exosphaeroma sp.*	*Paracorphium sp.*	**Amphipoda**	**Amphipoda a**	**Amphipoda b**	**Amphipoda c**	**Amphipoda d**	*Callianassa filholi*	*Halicarcinus cookii*	*Halicarcinus varius*	*Halicarcinus whitei*	*Helice crassa*	*Macrophthalmus hirtipes*	*Pontophilus australis*	**Decapoda (larvae unid.)**	**Natantia unid.**	OSTRACODA	COPEPODA	*Austrominius modestus*	*Pycnogonidae*	*Peltorhamphus novaezelandiae*	*Trochodota dendyi*	*Elmidae larvae*	Muscidae	*Codium geppiorum*	*Enteromorpha sp.*	*Ulva lactuca*	*Ceramium flaccidum*	*Gracilaria sp.*
9/2/04	New River	D 03	0	0	0	0	0	0	0	0	0	1	11	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	D 04	0	0	0	0	0	0	0	0	0	1	20	0	0	0	0	0	6	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	D 05	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	4	17	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	D 07	0	0	0	0	0	0	0	0	0	1	10	0	0	0	0	0	1	6	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	D 08	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	1	10	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	D 09	0	0	0	0	0	0	0	0	0	1	11	0	0	0	0	0	2	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	D 10	0	0	0	0	0	0	0	0	0	1	24	0	0	0	0	0	3	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	D 12	0	0	0	0	0	0	0	0	0	1	13	0	0	0	0	0	9	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/1/05	Fortrose	A 01	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/1/05	Fortrose	A 02	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/1/05	Fortrose	A 03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/1/05	Fortrose	A 04	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	1	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
10/1/05	Fortrose	A 05	0	0	0	0	0	0	0	0	0	1	4	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/1/05	Fortrose	A 06	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/1/05	Fortrose	A 07	0	0	0	0	0	1	0	0	0	0	4	0	0	0	0	0	0	0	0	3	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/1/05	Fortrose	A 08	0	0	0	0	0	0	0	0	0	1	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	0	0	0	0	1	0	0	0	0	0	0
10/1/05	Fortrose	A 09	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/1/05	Fortrose	A 10	0	0	0	0	0	0	0	0	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	0	0	0	0	0	0	0	0	0	0	0
9/1/05	Jacobs River	A 01	0	0	0	0	23	0	0	0	0	1	8	0	0	0	0	0	1	9	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/1/05	Jacobs River	A 02	0	0	0	0	24	0	2	0	0	2	28	0	0	0	0	0	0	1	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/1/05	Jacobs River	A 03	0	0	0	0	25	0	0	0	0	2	21	0	0	0	0	0	0	5	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/1/05	Jacobs River	A 04	0	0	0	0	43	0	0	0	0	7	34	0	0	0	0	0	0	4	0	0	0	0	0	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/1/05	Jacobs River	A 05	0	0	0	0	8	0	2	0	0	0	88	0	0	0	0	0	0	8	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0
9/1/05	Jacobs River	A 06	0	0	0	0	6	0	0	0	0	0	95	0	0	0	0	0	0	5	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
9/1/05	Jacobs River	A 07	0	0	0	0	45	0	2	0	0	1	3	0	0	0	0	0	1	7	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
9/1/05	Jacobs River	A 08	0	0	0	0	75	0	1	0	0	1	3	0	0	0	0	0	0	18	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/1/05	Jacobs River	A 09	0	0	0	0	2	0	2	0	0	1	3	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/1/05	Jacobs River	A 10	0	0	0	0	2	0	1	0	0	0	1	0	0	0	0	0	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/1/05	Jacobs River	B 01	0	0	26	0	11	0	1	0	0	0	3	0	0	0	0	0	0	9	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/1/05	Jacobs River	B 02	0	0	9	0	7	0	1	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/1/05	Jacobs River	B 03	0	0	29	0	9	0	31	0	0	0	3	0	0	1	0	0	0	3	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/1/05	Jacobs River	B 04	0	0	6	0	6	0	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/1/05	Jacobs River	B 05	0	0	12	0	12	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/1/05	Jacobs River	B 06	0	0	16	0	19	0	16	0	0	0	0	0	0	1	0	0	0	3	0	0	0	0	0	16	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/1/05	Jacobs River	B 07	0	0	5	0	10	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/1/05	Jacobs River	B 08	0	0	8	0	24	1	1	0	0	0	10	0	0	0	0	0	1	4	0	0	0	0	0	18	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/1/05	Jacobs River	B 09	0	0	2	0	7	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/1/05	Jacobs River	B 10	0	0	25	0	20	0	10	0	0	0	0	0	0	1	0	0	0	3	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/1/05	Jacobs River	C 01	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	2	0	0	2	0	0	0	20	0	0	0	0	0	0	0	0	0	1	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0
9/1/05	Jacobs River	C 02	0	0	1	0	0	0	0	0	0	0	7	0	0	0	0	0	2	0	0	3	0	0	0	49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0
9/1/05	Jacobs River	C 03	0	0	0	0	0	2	0	0	0	3	1	0	0	0	0	0	0	1	0	0	0	0	0	24	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
9/1/05	Jacobs River	C 04	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	1	0	1	0	0	0	15	0	0	0	0	0	0	0	0	0	1	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0
9/1/05	Jacobs River	C 05	0	0	1	0	0	0	0	0	0	13	0	0	0	0	0	0	1	4	0	2	0	0	0	32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0
9/1/05	Jacobs River	C 06	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0	122	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/1/05	Jacobs River	C 07	0	0	8	0	0	0	0	0	0	12	7	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0

Number of sediment infauna per 0.0133mm2 core collected from Southland estuary sites 2001-2006

Date	Estuary	Taxa	*Owenia petersenae*	*Sphaerosyllis sp.*	Sabellidae	Spionidae	*Aonides sp.*	*Boccardia sp.*	*Polydora sp.*	*Prionospio sp.*	*Scolecolepides benhami*	*Scolecolepides sp.*	*Scolelepis sp.*	Ampharetidae	Cirratulidae	*Pectinaria australis*	Terebellidae	*Lysiosquilla spinosa*	**Mysidacea**	**Cumacea**	*Tanaid sp.*	Flabellifera	*Exosphaeroma planulum*	*Exosphaeroma sp.*	*Paracorphium sp.*	**Amphipoda**	**Amphipoda a**	**Amphipoda b**	**Amphipoda c**	**Amphipoda d**	*Callianassa filholi*	*Halicarcinus cookii*	*Halicarcinus varius*	*Halicarcinus whitei*	*Helice crassa*	*Macrophthalmus hirtipes*	*Pontophilus australis*	**Decapoda (larvae unid.)**	**Natantia unid.**	OSTRACODA	COPEPODA	*Austrominius modestus*	*Pycnogonidae*	*Peltorhamphus novaezelandiae*	*Trochodota dendyi*	*Elmidae larvae*	Muscidae	*Codium geppiorum*	*Enteromorpha sp.*	*Ulva lactuca*	*Ceramium flaccidum*	*Gracilaria sp.*
9/1/05	Jacobs River	C 08	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	24	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
9/1/05	Jacobs River	C 09	0	0	1	0	0	0	0	0	0	12	1	0	0	0	0	0	0	0	0	1	0	0	0	14	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
9/1/05	Jacobs River	C 10	0	0	4	0	0	0	2	0	0	11	5	0	0	0	0	0	0	2	0	4	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/1/05	New River	B 01	0	0	0	0	0	0	0	0	0	0	36	0	0	0	0	0	2	52	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
11/1/05	New River	B 02	0	0	0	0	0	0	0	0	0	0	278	0	0	0	0	0	1	61	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
11/1/05	New River	B 03	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	47	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/1/05	New River	B 04	0	0	0	0	0	0	0	0	0	0	313	0	0	0	0	0	1	105	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/1/05	New River	B 05	0	0	0	0	0	0	0	0	0	0	167	0	0	0	0	0	1	14	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/1/05	New River	B 06	0	0	0	0	0	0	0	0	0	0	81	0	0	0	0	0	0	47	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/1/05	New River	B 07	0	0	0	0	0	0	0	0	0	0	24	0	0	0	0	0	0	54	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/1/05	New River	B 08	0	0	0	0	0	0	0	0	0	0	40	0	0	0	0	0	0	24	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
11/1/05	New River	B 09	0	0	0	0	0	0	5	0	0	1	78	0	0	0	0	0	0	31	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/1/05	New River	B 10	0	0	0	0	0	0	2	0	0	0	160	0	0	0	0	0	0	16	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0
8/1/05	New River	C 01	0	0	0	0	0	0	0	0	0	0	58	0	0	0	0	0	0	3	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/1/05	New River	C 02	1	0	0	0	0	0	4	0	0	0	134	0	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/1/05	New River	C 03	0	0	0	0	0	0	2	0	0	1	52	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
8/1/05	New River	C 04	0	0	0	0	0	0	0	0	0	0	42	0	0	0	0	0	0	1	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8/1/05	New River	C 05	0	0	0	0	0	0	0	0	0	0	44	0	0	0	0	0	1	0	0	0	0	0	0	22	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0
8/1/05	New River	C 06	0	0	0	0	0	0	4	0	0	1	55	0	0	0	0	0	10	0	0	0	0	0	0	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	1	0	0	1
8/1/05	New River	C 07	0	0	0	0	0	0	0	0	0	0	71	0	0	0	0	0	0	2	0	0	0	0	0	10	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	0	1
8/1/05	New River	C 08	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	1	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8/1/05	New River	C 09	0	0	0	0	0	0	3	0	0	0	97	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/1/05	New River	C 10	0	0	0	0	0	0	0	0	0	0	25	0	0	0	0	0	1	1	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/1/05	New River	D 01	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/1/05	New River	D 02	0	0	0	0	0	0	0	0	0	0	35	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/1/05	New River	D 03	0	0	0	0	0	0	0	0	0	1	12	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/1/05	New River	D 04	0	0	0	0	0	0	0	0	0	0	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/1/05	New River	D 05	0	0	0	0	0	0	0	0	0	0	28	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/1/05	New River	D 06	0	0	0	0	1	0	0	0	0	0	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/1/05	New River	D 07	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/1/05	New River	D 08	0	0	0	0	0	0	0	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/1/05	New River	D 09	0	0	0	0	2	0	0	0	0	0	23	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/1/05	New River	D 10	0	0	0	0	0	0	0	0	0	0	42	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/1/05	Waikawa	A 01	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
12/1/05	Waikawa	A 02	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	9	2	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
12/1/05	Waikawa	A 03	0	0	0	0	0	0	8	4	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/1/05	Waikawa	A 04	0	0	0	0	0	0	17	0	0	0	0	0	0	0	0	0	0	5	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
12/1/05	Waikawa	A 05	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
12/1/05	Waikawa	A 06	0	0	0	0	0	0	5	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/1/05	Waikawa	A 07	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/1/05	Waikawa	A 08	0	0	0	1	0	0	3	4	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/1/05	Waikawa	A 09	0	0	0	0	0	0	3	1	0	0	0	0	1	0	0	0	0	17	2	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/1/05	Waikawa	A 10	0	0	0	0	0	0	3	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	115	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2	1
29/11/04	Waikawa	B 01	0	0	0	0	10	0	3	0	0	1	3	0	0	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0
29/11/04	Waikawa	B 02	0	0	0	0	3	0	2	0	0	1	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Number of sediment infauna per 0.0133mm2 core collected from Southland estuary sites 2001-2006

Date	Estuary	Taxa	*Owenia petersenae*	*Sphaerosyllis sp.*	Sabellidae	Spionidae	*Aonides sp.*	*Boccardia sp.*	*Polydora sp.*	*Prionospio sp.*	*Scolecolepides benhami*	*Scolecolepides sp.*	*Scolelepis sp.*	Ampharetidae	Cirratulidae	*Pectinaria australis*	Terebellidae	*Lysiosquilla spinosa*	**Mysidacea**	**Cumacea**	*Tanaid sp.*	Flabellifera	*Exosphaeroma planulum*	*Exosphaeroma sp.*	*Paracorphium sp.*	**Amphipoda**	**Amphipoda a**	**Amphipoda b**	**Amphipoda c**	**Amphipoda d**	*Callianassa filholi*	*Halicarcinus cookii*	*Halicarcinus varius*	*Halicarcinus whitei*	*Helice crassa*	*Macrophthalmus hirtipes*	*Pontophilus australis*	**Decapoda (larvae unid.)**	**Natantia unid.**	OSTRACODA	COPEPODA	*Austrominius modestus*	*Pyonogonidae*	*Peltorhamphus novaezelandiae*	*Trochodota dendyi*	*Elmidae larvae*	Muscidae	*Codium geppiorum*	*Enteromorpha sp.*	*Ulva lactuca*	*Ceramium flaccidum*	*Gracilaria sp.*
29/11/04	Waikawa	B 03	0	0	0	0	3	0	1	0	0	1	3	0	0	0	0	0	0	5	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0
29/11/04	Waikawa	B 04	0	0	0	0	6	0	9	1	0	1	10	0	0	0	0	0	0	4	0	0	0	0	0	1	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
29/11/04	Waikawa	B 05	0	0	0	0	2	0	4	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29/11/04	Waikawa	B 06	0	0	0	0	2	0	2	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29/11/04	Waikawa	B 07	0	0	0	0	10	0	7	0	0	0	1	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
29/11/04	Waikawa	B 08	0	0	0	0	12	0	4	0	0	0	2	0	0	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	14	0	0	0	0	0	0	0	0	0	0	0
29/11/04	Waikawa	B 09	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29/11/04	Waikawa	B 10	0	0	0	0	0	0	4	1	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	13	0	0	0	0	0	0	0	0	0	0	0
25/11/04	Bluff	A 01	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
25/11/04	Bluff	A 02	0	0	0	0	0	0	3	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25/11/04	Bluff	A 03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25/11/04	Bluff	A 04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25/11/04	Bluff	A 05	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25/11/04	Bluff	A 06	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25/11/04	Bluff	A 07	0	0	0	0	0	3	0	0	0	1	1	0	2	0	0	0	0	2	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25/11/04	Bluff	A 08	0	0	0	0	0	3	1	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25/11/04	Bluff	A 09	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25/11/04	Bluff	A 10	0	0	0	0	0	2	1	0	0	2	1	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
26/11/04	Bluff	B 01	0	0	0	0	0	0	8	0	0	0	5	0	0	0	0	0	0	0	1	1	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26/11/04	Bluff	B 02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26/11/04	Bluff	B 03	0	0	0	0	0	0	5	0	0	1	2	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26/11/04	Bluff	B 04	0	0	0	0	0	0	6	0	0	0	2	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26/11/04	Bluff	B 05	0	0	0	0	0	0	7	0	0	1	6	0	0	0	0	0	0	1	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26/11/04	Bluff	B 06	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26/11/04	Bluff	B 07	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26/11/04	Bluff	B 08	0	0	0	0	0	0	4	0	0	0	2	0	0	0	0	0	0	0	0	2	0	0	0	3	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26/11/04	Bluff	B 09	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26/11/04	Bluff	B 10	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	9	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27/11/05	Awarua	A 01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	245	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27/11/05	Awarua	A 02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	105	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27/11/05	Awarua	A 03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	149	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27/11/05	Awarua	A 04	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27/11/05	Awarua	A 05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27/11/05	Awarua	A 06	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27/11/05	Awarua	A 07	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	196	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27/11/05	Awarua	A 08	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	220	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
27/11/05	Awarua	A 09	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	205	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
27/11/05	Awarua	A 10	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	183	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
27/11/05	Awarua	B 01	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27/11/05	Awarua	B 02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27/11/05	Awarua	B 03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27/11/05	Awarua	B 04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27/11/05	Awarua	B 05	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27/11/05	Awarua	B 06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27/11/05	Awarua	B 07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Number of sediment infauna per 0.0133mm2 core collected from Southland estuary sites 2001-2006

Date	Estuary	Taxa	*Owenia petersenae*	*Sphaerosyllis sp.*	Sabellidae	Spionidae	*Aonides sp.*	*Boccardia sp.*	*Polydora sp.*	*Prionospio sp.*	*Scolecolepides benhami*	*Scolecolepides sp.*	*Scolelepis sp.*	Ampharetidae	Cirratulidae	*Pectinaria australis*	Terebellidae	*Lysiosquilla spinosa*	**Mysidacea**	**Cumacea**	*Tanaid sp.*	Flabellifera	*Exosphaeroma planulum*	*Exosphaeroma sp.*	*Paracorphium sp.*	**Amphipoda**	**Amphipoda a**	**Amphipoda b**	**Amphipoda c**	**Amphipoda d**	*Callianassa filholi*	*Halicarcinus cookii*	*Halicarcinus varius*	*Halicarcinus whitei*	*Helice crassa*	*Macrophthalmus hirtipes*	*Pontophilus australis*	**Decapoda (larvae unid.)**	**Natantia unid.**	OSTRACODA	COPEPODA	*Austrominius modestus*	*Pycnogonidae*	*Peltorhamphus novaezelandiae*	*Trochodota dendyi*	*Elmidae larvae*	Muscidae	*Codium geppiorum*	*Enteromorpha sp.*	*Ulva lactuca*	*Ceramium flaccidum*	*Gracilaria sp.*
27/11/05	Awarua	B 08	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27/11/05	Awarua	B 09	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27/11/05	Awarua	B 10	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/1/06	Jacobs River	A 01	0	0	0	0	25	0	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/1/06	Jacobs River	A 02	0	1	0	0	22	0	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/1/06	Jacobs River	A 03	0	0	0	0	20	0	4	0	1	0	8	0	0	0	0	0	0	0	0	0	1	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/1/06	Jacobs River	A 04	0	2	0	0	10	0	3	0	8	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/1/06	Jacobs River	A 05	0	0	0	0	5	0	1	0	0	0	1	0	0	0	0	1	0	3	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
18/1/06	Jacobs River	A 06	0	1	0	0	4	0	8	0	1	0	21	0	0	0	0	0	0	4	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/1/06	Jacobs River	A 07	0	10	0	0	32	0	9	0	0	0	1	0	0	0	0	0	0	6	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/1/06	Jacobs River	A 08	0	15	0	0	29	0	2	0	0	0	2	0	0	0	0	0	0	6	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/1/06	Jacobs River	A 09	0	5	0	0	2	0	1	0	0	0	4	0	0	0	0	0	0	4	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/1/06	Jacobs River	A 10	0	2	0	0	36	0	3	0	1	0	2	0	0	0	0	0	0	3	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16/1/06	Jacobs River	B 01	0	0	25	0	13	0	18	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
16/1/06	Jacobs River	B 02	0	0	20	0	19	0	18	0	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	0	0	0	0	0	0	0	0	0	0	0
16/1/06	Jacobs River	B 03	0	0	16	0	10	0	7	0	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16/1/06	Jacobs River	B 04	0	0	26	0	10	0	7	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16/1/06	Jacobs River	B 05	0	0	35	0	13	0	5	1	0	0	1	0	0	1	0	0	0	3	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16/1/06	Jacobs River	B 06	0	0	14	0	13	0	8	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16/1/06	Jacobs River	B 07	0	0	25	0	6	0	11	0	1	0	1	0	0	0	0	0	0	4	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16/1/06	Jacobs River	B 08	0	0	14	0	7	0	5	1	1	0	1	0	0	0	0	0	0	3	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16/1/06	Jacobs River	B 09	0	0	8	0	2	0	7	1	0	0	3	0	0	1	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16/1/06	Jacobs River	B 10	0	0	15	0	11	0	2	1	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/1/06	Jacobs River	C 01	0	0	1	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/1/06	Jacobs River	C 02	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/1/06	Jacobs River	C 03	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/1/06	Jacobs River	C 04	0	0	0	0	0	0	0	0	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0	56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/1/06	Jacobs River	C 05	0	0	1	0	0	0	0	0	5	0	1	0	0	0	0	0	0	0	0	0	0	0	0	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/1/06	Jacobs River	C 06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/1/06	Jacobs River	C 07	0	0	0	0	2	0	0	0	4	0	0	0	0	0	0	0	5	0	0	0	1	0	0	20	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/1/06	Jacobs River	C 08	0	0	0	0	0	0	0	0	5	0	7	0	0	0	0	0	3	0	0	0	0	0	0	84	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/1/06	Jacobs River	C 09	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	26	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/1/06	Jacobs River	C 10	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21/1/06	Fortrose	A 01	0	0	0	0	0	0	0	0	2	0	3	0	0	0	0	0	0	0	0	0	13	0	369	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21/1/06	Fortrose	A 02	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	10	0	517	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21/1/06	Fortrose	A 03	0	0	0	0	0	0	0	0	1	0	25	0	0	0	0	0	0	0	0	0	4	0	412	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21/1/06	Fortrose	A 04	0	0	0	0	0	0	0	0	1	0	45	0	0	0	0	0	0	0	0	0	22	0	201	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
21/1/06	Fortrose	A 05	0	0	0	0	0	0	0	0	1	0	5	0	0	0	0	0	0	0	0	0	10	0	372	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21/1/06	Fortrose	A 06	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	8	0	492	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21/1/06	Fortrose	A 07	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	4	0	0	0	12	0	248	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21/1/06	Fortrose	A 08	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	8	0	378	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21/1/06	Fortrose	A 09	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	10	0	376	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21/1/06	Fortrose	A 10	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	8	0	304	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20/1/06	Waikawa	A 01	0	38	0	0	0	0	5	6	0	0	0	0	0	0	0	0	0	1	2	0	0	1	0	0	1	1	63	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
20/1/06	Waikawa	A 02	0	11	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0

Number of sediment infauna per 0.0133mm2 core collected from Southland estuary sites 2001-2006

Date	Estuary	Taxa	*Owenia petersenae*	*Sphaerosyllis sp.*	Sabellidae	Spionidae	*Aonides sp.*	*Boccardia sp.*	*Polydora sp.*	*Prionospio sp.*	*Scolecolepides benhami*	*Scolecolepides sp.*	*Scolelepis sp.*	Ampharetidae	Cirratulidae	*Pectinaria australis*	Terebellidae	*Lysiosquilla spinosa*	**Mysidacea**	**Cumacea**	*Tanaid sp.*	Flabellifera	*Exosphaeroma planulum*	*Exosphaeroma sp.*	*Paracorphium sp.*	**Amphipoda**	**Amphipoda a**	**Amphipoda b**	**Amphipoda c**	**Amphipoda d**	*Callianassa filholi*	*Halicarcinus cookii*	*Halicarcinus varius*	*Halicarcinus whitei*	*Helice crassa*	*Macrophthalmus hirtipes*	*Pontophilus australis*	**Decapoda (larvae unid.)**	**Natantia unid.**	OSTRACODA	COPEPODA	*Austrominius modestus*	*Pycnogonidae*	*Peltorhamphus novaezelandiae*	*Trochodota dendyi*	*Elmidae larvae*	Muscidae	*Codium geppiorum*	*Enteromorpha sp.*	*Ulva lactuca*	*Ceramium flaccidum*	*Gracilaria sp.*
20/1/06	Waikawa	A 03	0	6	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
20/1/06	Waikawa	A 04	0	46	0	0	0	0	8	4	0	0	0	0	0	0	0	0	0	1	3	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20/1/06	Waikawa	A 05	0	10	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20/1/06	Waikawa	A 06	0	21	0	0	0	0	12	2	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
20/1/06	Waikawa	A 07	0	18	0	0	0	0	13	3	0	0	0	0	0	0	0	0	0	2	3	0	0	0	0	0	3	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20/1/06	Waikawa	A 08	0	17	0	0	0	0	4	2	0	0	0	0	0	0	0	0	0	1	8	0	0	0	0	0	1	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0
20/1/06	Waikawa	A 09	0	11	0	0	0	0	4	4	0	0	0	0	0	0	0	0	0	1	13	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20/1/06	Waikawa	A 10	0	18	0	0	0	0	4	3	0	0	0	0	0	0	0	0	0	2	3	0	0	0	0	0	3	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20/1/06	Waikawa	B 01	0	1	0	0	11	0	3	1	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0
20/1/06	Waikawa	B 02	0	0	0	0	10	0	12	0	0	0	0	0	0	1	0	0	0	5	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0
20/1/06	Waikawa	B 03	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20/1/06	Waikawa	B 04	0	0	0	0	10	0	1	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20/1/06	Waikawa	B 05	0	1	0	0	7	0	5	0	0	0	0	0	0	0	0	0	0	7	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0
20/1/06	Waikawa	B 06	0	3	0	0	4	0	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
20/1/06	Waikawa	B 07	0	0	0	0	11	0	1	0	0	1	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0
20/1/06	Waikawa	B 08	0	2	0	0	14	0	3	1	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0
20/1/06	Waikawa	B 09	0	2	0	0	9	0	6	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20/1/06	Waikawa	B 10	0	2	0	0	4	0	1	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/19/06	Haldane	A 01	0	0	0	0	0	2	0	0	33	0	0	0	0	0	0	0	0	0	0	0	0	0	600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/19/06	Haldane	A 02	0	0	0	0	0	5	0	0	29	0	0	0	0	0	0	0	0	0	0	0	0	0	420	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/19/06	Haldane	A 03	0	0	0	0	0	5	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	477	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/19/06	Haldane	A 04	0	0	0	0	0	4	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	236	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/19/06	Haldane	A 05	0	0	0	0	0	11	0	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	350	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/19/06	Haldane	A 06	0	0	0	0	0	11	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	505	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/19/06	Haldane	A 07	0	0	0	0	0	5	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	370	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/19/06	Haldane	A 08	0	0	0	0	0	4	0	0	29	0	0	0	0	0	0	0	0	0	0	0	0	0	455	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/19/06	Haldane	A 09	0	0	0	0	0	2	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	214	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/19/06	Haldane	A 10	0	0	0	0	0	4	0	0	19	0	0	0	0	0	0	0	0	0	0	0	0	0	444	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Number of epifauna per 0.25m^2 quadrat collected from Southland estuary sites 2001-2006

Date	Estuary	Site	Rep	*Anthopleura aureoradiata*	*Chiton glaucus*	*Amphibola crenata*	*Cominella glandiformis*	*Diloma subrostrata*	*Melagraphia aethiops*	*Micrelenchus huttoni*	*Micrelenchus tenebrosus*	*Notoacmea helmsi*	*Potamopyrgus estuarinus*	*Zeacumantus subcarinatus*	*Austrovenus stutchburyi*	*Paphies australis*	**Isopoda**	*Hemigrapsus crenulatus*	*Austrominius modestus*	*Corella eumyota*
12/2/01	New River	A	01	0	0	0	0	0	0	0	0	0	41	0	0	0	0	0	0	0
12/2/01	New River	A	02	0	0	1	0	0	0	0	0	0	34	0	0	0	0	0	0	0
12/2/01	New River	A	03	0	0	6	0	0	0	0	0	0	24	0	0	0	0	0	0	0
12/2/01	New River	A	04	0	0	2	0	0	0	0	0	0	13	0	0	0	0	0	0	0
12/2/01	New River	A	05	0	0	4	0	0	0	0	0	0	11	0	0	0	0	0	0	0
12/2/01	New River	A	06	0	0	2	0	0	0	0	0	0	25	0	0	0	0	0	0	0
12/2/01	New River	A	07	0	0	1	0	0	0	0	0	0	21	0	0	0	0	0	0	0
12/2/01	New River	A	08	0	0	2	0	0	0	0	0	0	33	0	0	0	0	0	0	0
12/2/01	New River	A	09	0	0	1	0	0	0	0	0	0	46	0	0	0	0	0	0	0
12/2/01	New River	A	10	0	0	3	0	0	0	0	0	0	28	0	0	0	0	0	0	0
12/2/01	New River	A	11	0	0	0	0	0	0	0	0	0	16	0	0	0	0	0	0	0
12/2/01	New River	A	12	0	0	1	0	0	0	0	0	0	5	0	0	0	0	0	0	0
12/2/01	New River	A	13	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/2/01	New River	A	14	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/2/01	New River	A	15	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/2/01	New River	A	16	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/2/01	New River	A	17	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/2/01	New River	A	18	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/2/01	New River	A	19	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/2/01	New River	A	20	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/2/01	New River	A	21	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/2/01	New River	A	22	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/2/01	New River	A	23	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/2/01	New River	A	24	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13/2/01	New River	B	01	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13/2/01	New River	B	02	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13/2/01	New River	B	03	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13/2/01	New River	B	04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13/2/01	New River	B	05	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13/2/01	New River	B	06	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13/2/01	New River	B	07	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13/2/01	New River	B	08	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13/2/01	New River	B	09	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13/2/01	New River	B	10	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13/2/01	New River	B	11	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13/2/01	New River	B	12	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13/2/01	New River	B	13	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13/2/01	New River	B	14	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13/2/01	New River	B	15	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13/2/01	New River	B	16	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13/2/01	New River	B	17	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13/2/01	New River	B	18	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13/2/01	New River	B	19	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13/2/01	New River	B	20	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13/2/01	New River	B	21	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13/2/01	New River	B	22	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13/2/01	New River	B	23	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13/2/01	New River	B	24	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14/2/01	New River	C	01	0	0	12	0	1	0	0	0	0	0	0	3	0	0	0	0	0
14/2/01	New River	C	02	0	0	9	0	1	0	0	0	0	0	0	5	0	0	0	0	0
14/2/01	New River	C	03	0	0	9	1	1	0	0	0	0	0	0	5	0	0	0	0	0
14/2/01	New River	C	04	0	0	1	1	0	0	0	0	0	0	0	3	0	0	0	0	0
14/2/01	New River	C	05	0	0	4	0	0	0	0	0	0	0	0	1	1	0	0	0	0
14/2/01	New River	C	06	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14/2/01	New River	C	07	0	0	6	1	0	0	0	0	0	0	0	1	0	0	0	0	0
14/2/01	New River	C	08	0	0	8	2	0	0	0	0	0	0	0	4	0	0	0	0	0
14/2/01	New River	C	09	0	0	12	0	0	0	0	0	0	0	0	2	0	0	0	0	0
14/2/01	New River	C	10	0	0	11	0	1	0	0	0	1	0	0	3	0	0	0	0	0
14/2/01	New River	C	11	0	0	11	0	0	0	0	0	0	0	0	2	0	0	0	0	0
14/2/01	New River	C	12	0	0	8	0	2	0	0	0	0	0	0	1	0	0	0	0	0
14/2/01	New River	C	13	0	0	28	0	2	0	0	0	0	0	0	8	0	0	0	0	0
14/2/01	New River	C	14	0	0	28	1	2	0	0	0	0	0	0	23	0	0	0	0	0
14/2/01	New River	C	15	0	0	25	1	3	0	0	0	0	0	0	14	0	0	0	0	0
14/2/01	New River	C	16	0	0	13	1	0	0	0	0	0	0	0	17	0	0	0	0	0
14/2/01	New River	C	17	0	0	21	2	2	0	0	0	0	0	0	14	0	0	0	0	0
14/2/01	New River	C	18	0	0	23	0	1	0	0	0	0	0	0	7	0	0	0	0	0
14/2/01	New River	C	19	0	0	18	1	3	0	0	0	1	0	0	6	0	0	0	0	0
14/2/01	New River	C	20	0	0	33	2	0	0	0	0	0	0	0	15	0	0	0	0	0
14/2/01	New River	C	21	0	0	50	1	0	0	0	0	0	0	0	8	0	0	0	0	0
14/2/01	New River	C	22	0	0	23	0	2	0	0	0	1	0	0	14	0	0	0	0	0
14/2/01	New River	C	23	0	0	16	0	1	0	0	0	1	0	0	10	0	0	0	0	0
14/2/01	New River	C	24	0	0	34	0	3	0	0	0	1	0	0	11	0	0	0	0	0
15/2/01	New River	D	01	0	0	3	0	0	0	0	0	0	200	0	0	0	0	0	0	0

Number of epifauna per 0.25m^2 quadrat collected from Southland estuary sites 2001-2006

Date	Estuary	Site	Rep	*Anthopleura aureoradiata*	*Chiton glaucus*	*Amphibola crenata*	*Cominella glandiformis*	*Diloma subrostrata*	*Melagraphia aethiops*	*Micrelenchus huttoni*	*Micrelenchus tenebrosus*	*Notoacmea helmsi*	*Potamopyrgus estuarinus*	*Zeacumantus subcarinatus*	*Austrovenus stutchburyi*	*Paphies australis*	**Isopoda**	*Hemigrapsus crenulatus*	*Austrominius modestus*	*Corella eumyota*
15/2/01	New River	D	02	0	0	1	0	0	0	0	0	0	184	0	0	0	0	0	0	0
15/2/01	New River	D	03	0	0	3	0	0	0	0	0	0	94	0	0	0	0	0	0	0
15/2/01	New River	D	04	0	0	4	0	0	0	0	0	0	114	0	0	0	0	0	0	0
15/2/01	New River	D	05	0	0	1	0	0	0	0	0	0	102	0	0	0	0	0	0	0
15/2/01	New River	D	06	0	0	3	0	0	0	0	0	0	156	0	0	0	0	0	0	0
15/2/01	New River	D	07	0	0	1	0	0	0	0	0	0	178	0	0	0	0	0	0	0
15/2/01	New River	D	08	0	0	4	0	0	0	0	0	0	134	0	0	0	0	0	0	0
15/2/01	New River	D	09	0	0	2	0	0	0	0	0	0	34	0	0	0	0	0	0	0
15/2/01	New River	D	10	0	0	7	0	0	0	0	0	0	98	0	0	0	0	0	0	0
15/2/01	New River	D	11	0	0	2	0	0	0	0	0	0	108	0	0	0	0	0	0	0
15/2/01	New River	D	12	0	0	3	0	0	0	0	0	0	48	0	0	0	0	0	0	0
15/2/01	New River	D	01	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15/2/01	New River	D	02	0	0	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15/2/01	New River	D	03	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15/2/01	New River	D	04	0	0	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15/2/01	New River	D	05	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15/2/01	New River	D	06	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15/2/01	New River	D	07	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15/2/01	New River	D	08	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15/2/01	New River	D	09	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15/2/01	New River	D	10	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15/2/01	New River	D	11	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15/2/01	New River	D	12	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/2/03	Jacobs River	A	01	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
17/2/03	Jacobs River	A	02	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
17/2/03	Jacobs River	A	03	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
17/2/03	Jacobs River	A	04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/2/03	Jacobs River	A	05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/2/03	Jacobs River	A	06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/2/03	Jacobs River	A	07	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
17/2/03	Jacobs River	A	08	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0
17/2/03	Jacobs River	A	09	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0
17/2/03	Jacobs River	A	10	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
20/2/03	Jacobs River	B	01	0	0	4	0	0	0	0	0	0	0	0	1	0	0	0	0	0
20/2/03	Jacobs River	B	02	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20/2/03	Jacobs River	B	03	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20/2/03	Jacobs River	B	04	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20/2/03	Jacobs River	B	06	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0
20/2/03	Jacobs River	B	08	0	0	6	0	0	0	0	0	0	0	0	1	0	0	0	0	0
20/2/03	Jacobs River	B	09	0	0	6	0	1	0	0	0	0	0	0	0	0	0	0	0	0
20/2/03	Jacobs River	B	10	0	0	5	0	2	0	0	0	0	0	0	1	0	0	0	0	0
20/2/03	Jacobs River	B	11	0	0	4	0	0	0	0	0	0	0	0	1	0	0	0	0	0
20/2/03	Jacobs River	B	12	0	0	3	0	0	0	0	0	0	0	0	1	0	0	0	0	0
18/2/03	Jacobs River	C	01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/2/03	Jacobs River	C	02	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/2/03	Jacobs River	C	03	0	0	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/2/03	Jacobs River	C	04	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/2/03	Jacobs River	C	05	0	0	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/2/03	Jacobs River	C	07	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/2/03	Jacobs River	C	08	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/2/03	Jacobs River	C	09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/2/03	Jacobs River	C	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/2/03	Jacobs River	C	12	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21/2/03	New River	B	01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21/2/03	New River	B	02	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21/2/03	New River	B	03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21/2/03	New River	B	05	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21/2/03	New River	B	06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21/2/03	New River	B	07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21/2/03	New River	B	08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21/2/03	New River	B	09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21/2/03	New River	B	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21/2/03	New River	B	11	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/2/03	New River	C	01	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0
18/2/03	New River	C	03	0	0	0	1	0	0	0	0	0	0	0	6	0	1	0	0	0
18/2/03	New River	C	04	0	0	1	0	0	0	0	0	0	0	0	3	0	0	0	0	0
18/2/03	New River	C	05	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0
18/2/03	New River	C	06	0	0	1	0	0	0	0	0	0	0	0	3	0	0	0	0	0
18/2/03	New River	C	07	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
18/2/03	New River	C	08	0	0	3	1	0	0	0	0	0	0	0	2	0	1	0	0	0
18/2/03	New River	C	09	0	0	2	0	0	0	0	0	0	0	0	2	0	0	0	0	0
18/2/03	New River	C	10	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
18/2/03	New River	C	12	0	0	2	0	1	0	0	0	0	0	0	4	0	0	0	1	0

Number of epifauna per 0.25m^2 quadrat collected from Southland estuary sites 2001-2006

Date	Estuary	Site	Rep	*Anthopleura aureoradiata*	*Chiton glaucus*	*Amphibola crenata*	*Cominella glandiformis*	*Diloma subrostrata*	*Melagraphia aethiops*	*Micrelenchus huttoni*	*Micrelenchus tenebrosus*	*Notoacmea helmsi*	*Potamopyrgus estuarinus*	*Zeacumantus subcarinatus*	*Austrovenus stutchburyi*	*Paphies australis*	**Isopoda**	*Hemigrapsus crenulatus*	*Austrominius modestus*	*Corella eumyota*
17/2/03	New River	D	01	0	0	12	0	0	0	0	0	0	270	0	0	0	0	0	0	0
17/2/03	New River	D	02	0	0	12	0	0	0	0	0	0	55	0	0	0	0	0	0	0
17/2/03	New River	D	04	0	0	15	0	0	0	0	0	0	35	0	0	0	0	0	0	0
17/2/03	New River	D	07	0	0	9	0	0	0	0	0	0	19	0	0	0	0	0	0	0
17/2/03	New River	D	08	0	0	12	0	0	0	0	0	0	33	0	0	0	0	0	0	0
17/2/03	New River	D	10	0	0	16	0	0	0	0	0	0	66	0	0	0	0	0	0	0
17/2/03	New River	D	11	0	0	26	0	0	0	0	0	0	20	0	0	0	0	0	0	0
17/2/03	New River	D	12	0	0	25	0	0	0	0	0	0	28	0	0	0	0	0	0	0
17/2/03	New River	D	05	0	0	33	0	0	0	0	0	0	14	0	0	0	0	0	0	0
17/2/03	New River	D	09	0	0	17	0	0	0	0	0	0	14	0	0	0	0	0	0	0
9/2/04	Fortrose	A	01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	A	02	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	A	04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	A	05	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	A	06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	A	07	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	A	09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	A	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	A	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	A	12	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	B	01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	B	02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	B	03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	B	04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	B	05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	B	06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	B	07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	B	08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	B	09	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Fortrose	B	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	A	01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	A	02	0	0	0	0	1	0	0	0	0	0	0	2	0	0	0	0	0
9/2/04	Jacobs River	A	03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	A	04	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
9/2/04	Jacobs River	A	05	0	0	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0
9/2/04	Jacobs River	A	06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	A	08	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
9/2/04	Jacobs River	A	10	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	A	11	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	A	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	B	01	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	B	02	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	B	03	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	B	06	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	B	07	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	B	08	0	0	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	B	09	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	B	10	0	0	5	0	2	0	0	0	1	0	0	0	0	0	0	1	0
9/2/04	Jacobs River	B	11	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	B	12	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	1	0
9/2/04	Jacobs River	C	01	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	C	02	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	C	03	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	C	04	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	C	05	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	C	06	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	C	07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	C	08	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	C	10	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	Jacobs River	C	12	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	B	02	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	B	03	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	B	04	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	B	06	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	B	07	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	B	08	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	B	09	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	B	10	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	B	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	B	12	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	C	01	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	C	02	0	0	2	0	1	0	0	0	0	0	0	2	0	0	0	0	0
9/2/04	New River	C	03	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Number of epifauna per 0.25m^2 quadrat collected from Southland estuary sites 2001-2006

Date	Estuary	Site	Rep	*Anthopleura aureoradiata*	*Chiton glaucus*	*Amphibola crenata*	*Cominella glandiformis*	*Diloma subrostrata*	*Melagraphia aethiops*	*Micrelenchus huttoni*	*Micrelenchus tenebrosus*	*Notoacmea helmsi*	*Potamopyrgus estuarinus*	*Zeacumantus subcarinatus*	*Austrovenus stutchburyi*	*Paphies australis*	**Isopoda**	*Hemigrapsus crenulatus*	*Austrominius modestus*	*Corella eumyota*
9/2/04	New River	C	04	0	0	3	1	1	0	0	0	0	0	0	2	0	0	0	0	0
9/2/04	New River	C	06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	C	07	0	0	3	0	3	0	0	0	0	0	0	1	0	0	0	0	0
9/2/04	New River	C	08	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	C	09	0	0	1	1	0	0	0	0	0	0	0	2	0	0	0	0	0
9/2/04	New River	C	10	0	0	3	0	0	0	0	0	0	0	0	1	0	0	0	0	0
9/2/04	New River	C	11	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/04	New River	D	01	0	0	9	0	0	0	0	0	0	20	0	0	0	0	0	0	0
9/2/04	New River	D	02	0	0	7	0	0	0	0	0	0	40	0	0	0	0	0	0	0
9/2/04	New River	D	03	0	0	11	0	0	0	0	0	0	20	0	0	0	0	0	0	0
9/2/04	New River	D	04	0	0	16	0	0	0	0	0	0	28	0	0	0	0	0	0	0
9/2/04	New River	D	05	0	0	20	0	0	0	0	0	0	32	0	0	0	0	0	0	0
9/2/04	New River	D	07	0	0	13	0	0	0	0	0	0	45	0	0	0	0	0	0	0
9/2/04	New River	D	08	0	0	14	0	0	0	0	0	0	52	0	0	0	0	0	0	0
9/2/04	New River	D	09	0	0	8	0	0	0	0	0	0	75	0	0	0	0	0	0	0
9/2/04	New River	D	10	0	0	14	0	0	0	0	0	0	50	0	0	0	0	0	0	0
9/2/04	New River	D	12	0	0	11	0	0	0	0	0	0	46	0	0	0	0	0	0	0
10/1/05	Fortrose	A	01	0	0	0	0	0	0	0	0	0	16	0	7	0	0	0	0	0
10/1/05	Fortrose	A	02	0	0	0	0	0	0	0	0	0	8	0	4	0	0	0	0	0
10/1/05	Fortrose	A	03	0	0	0	0	0	0	0	0	0	4	0	3	0	0	0	0	0
10/1/05	Fortrose	A	04	0	0	0	0	0	0	0	0	0	8	0	6	0	0	0	0	0
10/1/05	Fortrose	A	05	0	0	0	0	0	0	0	0	0	8	0	9	0	0	0	0	0
10/1/05	Fortrose	A	06	0	0	0	0	0	0	0	0	0	16	0	8	0	0	0	0	0
10/1/05	Fortrose	A	07	0	0	0	0	0	0	0	0	0	5	0	4	0	0	0	0	0
10/1/05	Fortrose	A	08	0	0	0	0	0	0	0	0	0	8	0	4	0	0	0	0	0
10/1/05	Fortrose	A	09	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
10/1/05	Fortrose	A	10	0	0	0	0	0	0	0	0	0	8	0	4	0	0	0	0	0
9/1/05	Jacobs River	A	01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/1/05	Jacobs River	A	02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/1/05	Jacobs River	A	03	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
9/1/05	Jacobs River	A	04	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
9/1/05	Jacobs River	A	05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/1/05	Jacobs River	A	06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/1/05	Jacobs River	A	07	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
9/1/05	Jacobs River	A	08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/1/05	Jacobs River	A	09	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	7	0
9/1/05	Jacobs River	A	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/1/05	Jacobs River	B	01	0	0	2	0	3	0	0	0	0	0	0	1	0	0	0	0	0
8/1/05	Jacobs River	B	02	0	0	4	0	1	0	0	0	0	0	0	1	0	0	0	0	0
8/1/05	Jacobs River	B	03	0	0	5	0	1	0	0	0	0	0	0	0	0	0	0	0	0
8/1/05	Jacobs River	B	04	0	0	10	1	0	0	0	0	0	0	0	1	0	0	0	0	0
8/1/05	Jacobs River	B	05	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/1/05	Jacobs River	B	06	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/1/05	Jacobs River	B	07	0	0	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0
8/1/05	Jacobs River	B	08	0	0	12	0	3	0	0	0	0	0	0	0	0	0	0	0	0
8/1/05	Jacobs River	B	09	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/1/05	Jacobs River	B	10	0	0	9	0	2	0	0	0	0	0	0	0	0	0	0	0	0
9/1/05	Jacobs River	C	01	0	0	0	0	0	0	0	0	0	95	0	0	0	0	0	0	0
9/1/05	Jacobs River	C	02	0	0	1	0	0	0	0	0	0	110	0	0	0	0	0	0	0
9/1/05	Jacobs River	C	03	0	0	20	0	0	0	0	0	0	195	0	0	0	0	0	0	0
9/1/05	Jacobs River	C	04	0	0	30	0	0	0	0	0	0	188	0	0	0	0	0	0	0
9/1/05	Jacobs River	C	05	0	0	10	0	0	0	0	0	0	146	0	0	0	0	0	0	0
9/1/05	Jacobs River	C	06	0	0	0	0	0	0	0	0	0	96	0	0	0	0	0	0	0
9/1/05	Jacobs River	C	07	0	0	0	0	0	0	0	0	0	108	0	0	0	0	0	0	0
9/1/05	Jacobs River	C	08	0	0	2	0	0	0	0	0	0	92	0	0	0	0	0	0	0
9/1/05	Jacobs River	C	09	0	0	1	0	0	0	0	0	0	50	0	0	0	0	0	0	0
9/1/05	Jacobs River	C	10	0	0	0	0	0	0	0	0	0	116	0	0	0	0	0	0	0
11/1/05	New River	B	01	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/1/05	New River	B	02	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/1/05	New River	B	03	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/1/05	New River	B	04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/1/05	New River	B	05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/1/05	New River	B	06	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/1/05	New River	B	07	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/1/05	New River	B	08	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/1/05	New River	B	09	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/1/05	New River	B	10	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/1/05	New River	C	01	0	0	0	0	0	0	0	0	0	0	0	3	0	0	1	0	0
8/1/05	New River	C	02	0	0	2	0	0	0	0	0	0	0	0	3	0	0	0	0	0
8/1/05	New River	C	03	0	0	6	0	1	0	0	0	0	0	0	0	0	0	0	0	0
8/1/05	New River	C	04	0	0	5	1	0	0	0	0	0	0	0	2	0	0	0	0	0
8/1/05	New River	C	05	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/1/05	New River	C	06	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0

Number of epifauna per 0.25m^2 quadrat collected from Southland estuary sites 2001-2006

Date	Estuary	Site	Rep	*Anthopleura aureoradiata*	*Chiton glaucus*	*Amphibola crenata*	*Cominella glandiformis*	*Diloma subrostrata*	*Melagraphia aethiops*	*Micrelenchus huttoni*	*Micrelenchus tenebrosus*	*Notoacmea helmsi*	*Potamopyrgus estuarinus*	*Zeacumantus subcarinatus*	*Austrovenus stutchburyi*	*Paphies australis*	**Isopoda**	*Hemigrapsus crenulatus*	*Austrominius modestus*	*Corella eumyota*
8/1/05	New River	C	07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/1/05	New River	C	08	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0
8/1/05	New River	C	09	0	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0
8/1/05	New River	C	10	0	0	7	1	1	0	0	0	0	0	0	0	0	0	0	0	0
9/1/05	New River	D	01	0	0	6	0	0	0	0	0	0	49	0	0	0	0	0	0	0
9/1/05	New River	D	02	0	0	6	0	0	0	0	0	0	35	0	0	0	0	0	0	0
9/1/05	New River	D	03	0	0	6	0	0	0	0	0	0	46	0	0	0	0	0	0	0
9/1/05	New River	D	04	0	0	7	0	0	0	0	0	0	58	0	0	0	0	0	0	0
9/1/05	New River	D	05	0	0	5	0	0	0	0	0	0	34	0	0	0	0	0	0	0
9/1/05	New River	D	06	0	0	5	0	0	0	0	0	0	27	0	0	0	0	0	0	0
9/1/05	New River	D	07	0	0	3	0	0	0	0	0	0	20	0	0	0	0	0	0	0
9/1/05	New River	D	08	0	0	3	0	0	0	0	0	0	25	0	0	0	0	0	0	0
9/1/05	New River	D	09	0	0	3	0	0	0	0	0	0	27	0	0	0	0	0	0	0
9/1/05	New River	D	10	0	0	1	0	0	0	0	0	0	31	0	0	0	0	0	0	0
12/1/05	Waikawa	A	01	0	0	0	0	2	0	0	0	0	0	0	2	0	0	0	0	0
12/1/05	Waikawa	A	02	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0
12/1/05	Waikawa	A	03	0	0	0	0	4	0	0	0	0	0	0	2	0	0	0	0	0
12/1/05	Waikawa	A	04	0	0	0	1	2	0	2	0	0	0	0	2	0	0	0	0	0
12/1/05	Waikawa	A	05	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0
12/1/05	Waikawa	A	06	0	0	0	1	5	0	5	0	0	0	0	2	0	0	0	0	0
12/1/05	Waikawa	A	07	0	0	0	0	5	0	3	0	0	0	0	4	0	0	0	0	0
12/1/05	Waikawa	A	08	0	0	0	2	2	0	1	0	0	0	0	2	0	0	0	0	0
12/1/05	Waikawa	A	09	0	0	0	2	1	0	0	0	0	0	0	4	0	0	0	0	0
12/1/05	Waikawa	A	10	0	0	0	1	3	0	0	0	0	0	0	4	0	0	0	0	0
29/11/04	Waikawa	B	01	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0
29/11/04	Waikawa	B	02	0	0	0	0	3	0	0	0	1	0	0	3	0	0	0	14	0
29/11/04	Waikawa	B	03	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0
29/11/04	Waikawa	B	04	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	18	0
29/11/04	Waikawa	B	05	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0
29/11/04	Waikawa	B	06	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	11	0
29/11/04	Waikawa	B	07	0	0	0	0	6	0	0	0	0	0	0	1	0	0	0	3	0
29/11/04	Waikawa	B	08	0	0	1	0	7	0	1	0	2	0	0	0	0	0	0	0	0
29/11/04	Waikawa	B	09	0	0	0	1	4	0	0	0	0	0	0	2	0	0	0	21	0
29/11/04	Waikawa	B	10	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	4	0
25/11/04	Bluff	A	01	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0
25/11/04	Bluff	A	02	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0
25/11/04	Bluff	A	03	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
25/11/04	Bluff	A	04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25/11/04	Bluff	A	05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25/11/04	Bluff	A	06	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0
25/11/04	Bluff	A	07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25/11/04	Bluff	A	08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25/11/04	Bluff	A	09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25/11/04	Bluff	A	10	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
26/11/04	Bluff	B	01	0	0	0	1	4	0	0	0	0	0	0	0	0	0	0	0	0
26/11/04	Bluff	B	02	0	0	0	0	7	0	4	0	0	0	0	0	0	0	0	0	0
26/11/04	Bluff	B	03	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0
26/11/04	Bluff	B	04	0	0	0	0	1	0	4	0	0	0	0	0	0	0	0	0	0
26/11/04	Bluff	B	05	0	0	0	0	3	0	5	0	0	0	0	0	0	0	0	0	0
26/11/04	Bluff	B	06	0	0	0	0	1	0	4	0	0	0	0	0	0	0	0	0	2
26/11/04	Bluff	B	07	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
26/11/04	Bluff	B	08	0	0	0	2	3	0	2	0	1	0	0	0	0	0	0	0	0
26/11/04	Bluff	B	09	0	0	0	0	1	0	0	0	0	0	0	2	0	0	0	0	0
26/11/04	Bluff	B	10	0	0	0	2	6	0	4	0	0	0	0	0	0	0	0	0	0
27/11/05	Awarua	A	01	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
27/11/05	Awarua	A	02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27/11/05	Awarua	A	03	0	0	0	0	11	0	0	0	0	0	0	1	0	0	0	0	0
27/11/05	Awarua	A	04	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0
27/11/05	Awarua	A	05	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0
27/11/05	Awarua	A	06	0	0	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0
27/11/05	Awarua	A	07	0	0	0	0	3	0	0	0	0	0	2	0	0	0	0	0	0
27/11/05	Awarua	A	08	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
27/11/05	Awarua	A	09	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0
27/11/05	Awarua	A	10	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
27/11/05	Awarua	B	01	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0
27/11/05	Awarua	B	02	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0
27/11/05	Awarua	B	03	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0
27/11/05	Awarua	B	04	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0
27/11/05	Awarua	B	05	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0
27/11/05	Awarua	B	06	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0
27/11/05	Awarua	B	07	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0
27/11/05	Awarua	B	08	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0
27/11/05	Awarua	B	09	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0

Number of epifauna per 0.25m^2 quadrat collected from Southland estuary sites 2001-2006

Date	Estuary	Site	Rep	*Anthopleura aureoradiata*	*Chiton glaucus*	*Amphibola crenata*	*Cominella glandiformis*	*Diloma subrostrata*	*Melagraphia aethiops*	*Micrelenchus huttoni*	*Micrelenchus tenebrosus*	*Notoacmea helmsi*	*Potamopyrgus estuarinus*	*Zeacumantus subcarinatus*	*Austrovenus stutchburyi*	*Paphies australis*	**Isopoda**	*Hemigrapsus crenulatus*	*Austrominius modestus*	*Corella eumyota*
27/11/05	Awarua	B	10	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0
18/1/06	Jacobs River	A	01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/1/06	Jacobs River	A	02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/1/06	Jacobs River	A	03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/1/06	Jacobs River	A	04	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
18/1/06	Jacobs River	A	05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
18/1/06	Jacobs River	A	06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/1/06	Jacobs River	A	07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/1/06	Jacobs River	A	08	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/1/06	Jacobs River	A	09	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/1/06	Jacobs River	A	10	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
16/1/06	Jacobs River	B	01	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
16/1/06	Jacobs River	B	02	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
16/1/06	Jacobs River	B	03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16/1/06	Jacobs River	B	04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16/1/06	Jacobs River	B	05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16/1/06	Jacobs River	B	06	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
16/1/06	Jacobs River	B	07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16/1/06	Jacobs River	B	08	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16/1/06	Jacobs River	B	09	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
16/1/06	Jacobs River	B	10	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/1/06	Jacobs River	C	01	0	0	4	0	0	0	0	0	0	9	0	0	0	0	0	0	0
17/1/06	Jacobs River	C	02	0	0	11	0	0	0	0	0	0	12	0	0	0	0	0	0	0
17/1/06	Jacobs River	C	03	0	0	8	0	0	0	0	0	0	16	0	0	0	0	0	0	0
17/1/06	Jacobs River	C	04	0	0	14	0	0	0	0	0	0	40	0	0	0	0	0	0	0
17/1/06	Jacobs River	C	05	0	0	2	0	0	0	0	0	0	58	0	0	0	0	0	0	0
17/1/06	Jacobs River	C	06	0	0	7	0	0	0	0	0	0	50	0	0	0	0	0	0	0
17/1/06	Jacobs River	C	07	0	0	6	0	0	0	0	0	0	42	0	0	0	0	0	0	0
17/1/06	Jacobs River	C	08	0	0	0	0	0	0	0	0	0	28	0	0	0	0	0	0	0
17/1/06	Jacobs River	C	09	0	0	3	0	0	0	0	0	0	12	0	0	0	0	0	0	0
17/1/06	Jacobs River	C	10	0	0	9	0	0	0	0	0	0	18	0	0	0	0	0	0	0
21/1/06	Fortrose	A	01	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21/1/06	Fortrose	A	02	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21/1/06	Fortrose	A	03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21/1/06	Fortrose	A	04	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21/1/06	Fortrose	A	05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21/1/06	Fortrose	A	06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21/1/06	Fortrose	A	07	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21/1/06	Fortrose	A	08	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21/1/06	Fortrose	A	09	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21/1/06	Fortrose	A	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20/1/06	Waikawa	A	01	0	0	0	0	5	0	0	1	0	0	0	0	0	0	0	0	0
20/1/06	Waikawa	A	02	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
20/1/06	Waikawa	A	03	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
20/1/06	Waikawa	A	04	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0
20/1/06	Waikawa	A	05	0	0	0	0	3	0	0	6	0	0	0	0	0	0	0	0	0
20/1/06	Waikawa	A	06	0	0	0	0	5	0	0	4	0	0	0	0	0	0	0	0	0
20/1/06	Waikawa	A	07	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
20/1/06	Waikawa	A	08	0	0	0	1	2	0	0	0	0	0	0	1	0	0	0	0	0
20/1/06	Waikawa	A	09	3	0	0	0	3	0	0	1	0	0	0	1	0	0	0	0	0
20/1/06	Waikawa	A	10	1	0	0	0	6	0	0	6	0	0	0	0	0	0	0	0	0
20/1/06	Waikawa	B	01	5	0	0	0	18	0	0	0	0	0	0	0	0	0	0	0	0
20/1/06	Waikawa	B	02	2	0	0	0	9	0	0	0	0	0	0	0	0	0	0	2	0
20/1/06	Waikawa	B	03	0	0	0	0	8	0	0	1	1	0	0	0	0	0	0	4	0
20/1/06	Waikawa	B	04	0	0	0	1	5	0	0	0	0	0	0	2	0	0	0	9	0
20/1/06	Waikawa	B	05	1	0	0	0	6	0	0	0	1	0	0	0	0	0	0	0	0
20/1/06	Waikawa	B	06	4	0	0	1	5	0	0	1	0	0	0	1	0	0	0	3	0
20/1/06	Waikawa	B	07	0	0	0	0	13	0	0	0	0	0	0	0	0	0	0	3	0
20/1/06	Waikawa	B	08	2	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0
20/1/06	Waikawa	B	09	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	4	0
20/1/06	Waikawa	B	10	2	0	0	1	5	0	0	0	0	0	0	0	0	0	0	7	0