



Annual freshwater quality monitoring report for the Wellington region, 2007/08

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GW/EMI-G-08/161

October 2008

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1. Introduction

Greater Wellington Regional Council (Greater Wellington) manages water quality in lakes, rivers and streams of the Wellington region for natural state, public water supply, recreation and amenity, fish spawning, and aquatic ecosystem health. Regular monitoring of physico-chemical and microbiological water quality, together with assessments of ecosystem health, are integral in managing water for these purposes.

Greater Wellington conducts a range of freshwater quality monitoring, including routine state of the environment monitoring (56 river and stream sites), recreational water quality monitoring (21 sites), lake monitoring (four sites on Lake Wairarapa), and monitoring associated with a riparian rehabilitation programme (see Perrie 2008). In addition, where warranted, targeted water quality investigations are carried out (e.g., Warr 2007).

This report summarises the results of the Rivers State of the Environment (RSoE) monitoring programme for July 2007 to June 2008 inclusive. A report containing a detailed analysis of long-term trends is produced every six years (see Milne & Perrie 2005). Recreational water quality monitoring results are reported on separately (for the 2007/08 results, see Ryan & Warr 2008).

2. Overview of RSoE monitoring programme

2.1 Background

Surface water quality has been routinely monitored in the western half of the Wellington region since 1987 and in the Wairarapa since 1991. The monitoring programme has continued to evolve since this time with changes made to the location and number of monitoring sites, the range of variables monitored, and the methods of analysis. These changes have been made to improve the representativeness and quality of the information collected (Milne & Perrie 2005).

2.2 Monitoring objectives

The aims of Greater Wellington's Rivers State of the Environment (RSoE) water quality monitoring programme are to:

1. Assist in the detection of spatial and temporal changes in fresh waters;
2. Contribute to our understanding of freshwater biodiversity in the region;
3. Determine the suitability of fresh waters for designated uses*;
4. Provide information to assist in targeted investigations where remediation or mitigation of poor water quality is desired; and
5. Provide a mechanism to determine the effectiveness of policies and plans.

*Note: the suitability of fresh waters for contact recreation purposes is assessed separately under Greater Wellington's recreational water quality monitoring programme (see Ryan & Warr 2008).

2.3 Monitoring sites

There are 56 river and stream sites currently monitored under the RSoE programme (Figure 2.1, Appendix 1). These sites were chosen to represent the natural diversity of rivers and streams, and the major land uses and human activities in the region.

2.4 Water quality variables

River and stream water quality is assessed at monthly intervals by measuring a range of physico-chemical and microbiological variables: dissolved oxygen, temperature, pH, conductivity, visual clarity, turbidity, faecal indicator bacteria, total organic carbon, and dissolved and total nutrients¹. Periphyton cover is also assessed at monthly intervals at 46 of the sites that have suitable substrate. The full list of variables monitored, together with details of field and analytical methods is provided in Appendix 2.

2.5 Biological monitoring

Water quality in the region's rivers and streams is also assessed through annual biological monitoring, incorporating semi-quantitative assessments of the instream periphyton and macroinvertebrate communities during stable/low flows in summer/autumn. The record and scope of monitoring differs between sites (refer Milne & Perrie 2005); those sites with substrates comprised of soft sediment have only had macroinvertebrates assessed since 2003. The assessment of periphyton communities was also extended at this time to include quantitative assessments of chlorophyll *a* concentrations and ash free dry mass, and a semi-quantitative assessment of taxonomic richness. However, these assessments are limited to sites with hard bottomed substrates (e.g., cobbles, large gravel). See Appendix 1 for RSoE site substrate types. Details of current biological monitoring methods are summarised in Appendix 3.

¹ In addition, from January 2008, water samples have been tested for total suspended solids, anions, cations, and – at urban sites – dissolved heavy metals. As most of these tests are only being performed for a period of 12 months, the data are not presented in this annual summary.

3. Physico-chemical and microbiological water quality

3.1 Introduction

A water quality index (WQI) is used as a comparative measure to summarise water quality across the region. The assessment in this section, and the data summaries presented in Appendix 4, are based on physico-chemical and microbiological data collected monthly from July 2007 to June 2008 (inclusive).

The WQI and data summaries are based on 12 sampling events for all 56 sites except in the case of the Parkvale Tributary at Lowes Reserve. This site was not visited on two occasions to avoid disruption of farming operations while lambing was in progress. In addition, due to environmental conditions, not all sites have 12 data points for all variables assessed in the field (e.g., periphyton cover).

During data processing, any water quality variables reported as less than or greater than detection limits were replaced by values one half of the detection limit or the detection limit respectively (e.g., a value of <2 became 1, a value of >400 became 400).

3.2 Water quality index

A water quality index (WQI), as described in Perrie (2007a), is used to facilitate inter-site comparisons of the state of water quality in the region's rivers and streams. The WQI is derived from the *median* values for the following six variables: visual clarity (black disc), dissolved oxygen (% saturation), dissolved reactive phosphorus, ammoniacal nitrogen, nitrite-nitrate nitrogen and *Escherichia coli* (*E. coli*).

The application of the WQI enables water quality at each site to be classified into one of four categories as follows:

- Excellent: median values for all 6 variables comply with guideline values
- Good: median values for 5 of the 6 variables comply with guideline values, of which dissolved oxygen is one variable that must comply²
- Fair: median values for 3 or 4 of the 6 variables comply with guideline values, of which dissolved oxygen is one variable that must comply¹
- Poor: median values for <3 of the 6 variables comply with guideline values.

The guidelines used to compare the median values against for the six key water quality variables in WQI are listed in Table 3.1. Refer to Perrie (2007a) for further discussion on these guidelines.

² If the median dissolved oxygen concentration does not comply with the guideline value, then the WQI grade automatically drops to "poor".

Table 3.1: Physico-chemical and microbiological variables and guideline values

Variable	Guideline Value	Reference
Dissolved Oxygen (% saturation)	≥ 80	RMA 1991 Third Schedule
Visual Clarity (m)	≥ 1.6	MfE (1994)
Nitrite-Nitrate Nitrogen (mg/L)	≤ 0.444	ANZECC & ARMCANZ (2000)
Ammoniacal Nitrogen (mg/L)	≤ 0.021	ANZECC & ARMCANZ (2000)
Dissolved Reactive Phosphorus (mg/L)	≤ 0.010	ANZECC & ARMCANZ (2000)
<i>E. coli</i> (cfu/100 mL)	≤ 100	ANZECC & ARMCANZ (2000)

3.3 Results

Application of the WQI resulted in the following overall water quality grades for the 56 RSoE sites monitored in the Wellington region over the July 2007 to June 2008 reporting period (Figure 3.1):

- Excellent: 19 sites (33.9 %)
- Good: 10 sites (17.9 %)
- Fair: 16 sites (28.6 %)
- Poor 11 sites (19.6 %)

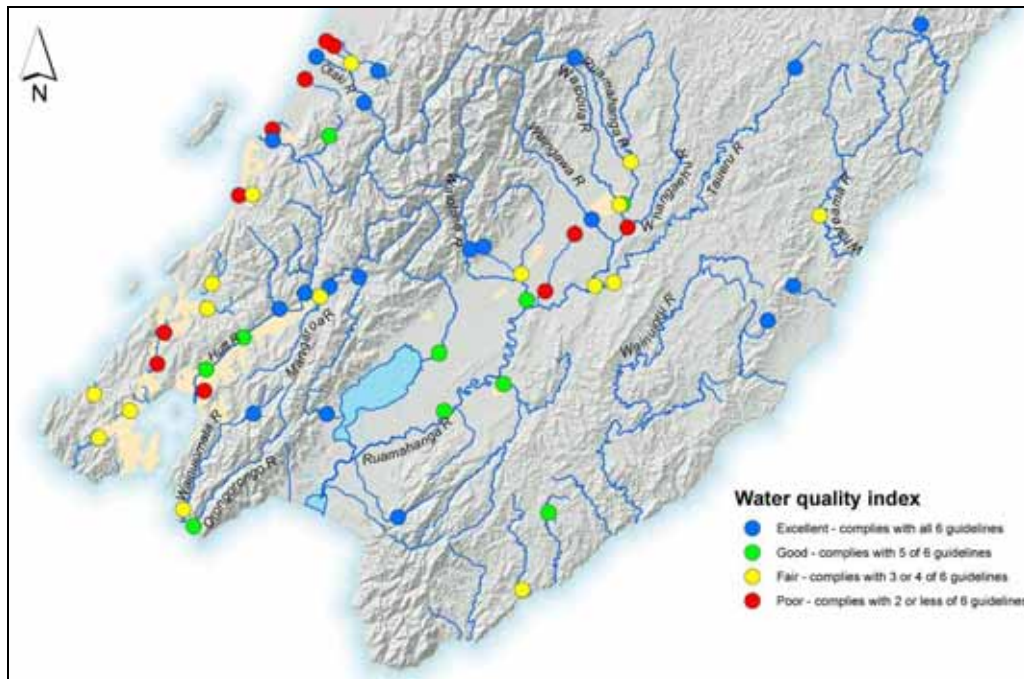


Figure 3.1: Water Quality Index grades for RSoE sites sampled at monthly intervals over June 2007 to July 2008, based on compliance of median dissolved oxygen, visual clarity, nitrite-nitrate nitrogen, ammoniacal nitrogen, dissolved reactive phosphorus and *E. coli* values with guideline values

The majority of RSoE sites graded “excellent” (16 of 19 sites) are located on river and stream reaches in catchments with predominantly unmodified indigenous forest cover (refer Appendix 1 for dominant land cover). These tend to be sites on rivers flowing out of the Aorangi, Tararua and Rimutaka ranges and include the Akatarawa, Otaki, and Waingawa rivers, and the upper reaches of the Waitohu, Hutt, Wainuiomata, Waiohine and Ruamahanga rivers.

In contrast, RSoE sites graded “poor” were typically small streams draining pastoral (8 sites) or urban (3 sites) catchments. Sites with the poorest water quality include the Mangaone, Mangapouri, Ngarara and Waiwhetu streams, and the Whangaehu River.

As outlined in Section 3.2, the WQI is for comparative purposes rather than an absolute measure of water quality; sites with a grade of “good”, “fair”, or “poor” are all considered degraded because the median value of at least one of the six physico-chemical or microbiological variables in the WQI exceeded a guideline value. In addition, as the WQI is based on median values (i.e., 50 % compliance), sites awarded the same water quality grade may exhibit varying degrees of compliance (from 51 to 100 %) with the guideline value, and so while two sites may fall within the same WQI class they may differ in actual water quality. Therefore to differentiate between “better” and “poorer” sites within a water quality grade, in Table 3.2 the sites within each WQI grade have been ranked based on the number of guideline exceedances for each of the six key variables (i.e., a site that exceeded a guideline on 40% of sampling occasions will be ranked lower than a site with the same WQI grade that exceeded the guideline on 10% of sampling occasions).

The water quality variables that most commonly exceeded guideline values (based on median values) were dissolved reactive phosphorus (24 sites), followed by visual clarity (22 sites), *E. coli* (22 sites) and nitrite-nitrate nitrogen (19 sites). Guidelines for ammonical nitrogen and dissolved oxygen were exceeded by seven and five sites respectively.

Table 3.2: Water Quality Index grades for RSoE sites monitored at monthly intervals over June 2007 to July 2008 inclusive, based on compliance of median dissolved oxygen, visual clarity, nitrite-nitrate nitrogen, ammoniacal nitrogen, dissolved reactive phosphorus and *E. coli* values with guideline values

Rank	Site No.	Site Name	Guideline Compliance (median values)					
			DO	Clarity	<i>E. coli</i>	NNN	Amm. N	DRP
<i>Excellent water quality</i>								
1	RS03	Waitohu Stream at Forest Park	✓	✓	✓	✓	✓	✓
2	RS47	Waiohine River at Gorge	✓	✓	✓	✓	✓	✓
3	RS05	Otaki River at Pukehinau	✓	✓	✓	✓	✓	✓
4	RS31	Ruamahanga River at McLays	✓	✓	✓	✓	✓	✓
5	RS52	Tauanui River at Whakatomotomo Rd	✓	✓	✓	✓	✓	✓
6	RS20	Hutt River at Te Marua Intake Site	✓	✓	✓	✓	✓	✓
7	RS56	Waiorongomai River at Forest Park	✓	✓	✓	✓	✓	✓
8	RS10	Waikanae River at Greenaway Rd	✓	✓	✓	✓	✓	✓
9	RS28	Wainuiomata River at Manuka Track	✓	✓	✓	✓	✓	✓
10	RS06	Otaki River at Mouth	✓	✓	✓	✓	✓	✓
11	RS41	Waingawa River at South Rd	✓	✓	✓	✓	✓	✓
12	RS25	Akatarawa River at Hutt Confluence	✓	✓	✓	✓	✓	✓
13	RS44	Totara Stream at Stronvar	✓	✓	✓	✓	✓	✓
14	RS49	Beef Creek at headwaters	✓	✓	✓	✓	✓	✓
15	RS26	Whakatikei River at Riverstone	✓	✓	✓	✓	✓	✓
16	RS23	Pakuratahi River 50m Below Farm Creek	✓	✓	✓	✓	✓	✓
17	RS43	Motuwaireka Stream at headwaters	✓	✓	✓	✓	✓	✓
18	RS35	Matakona tributary at Sugar Loaf Rd	✓	✓	✓	✓	✓	✓
19	RS36	Taueru River at Castlehill	✓	✓	✓	✓	✓	✓
<i>Good water quality</i>								
20	RS09	Waikanae River at Mangaone Walkway	✓	✓	✓	✓	✓	x
21	RS55	Tauherenikau River at Websters	✓	x	✓	✓	✓	✓
22	RS21	Hutt River Opposite Manor Park Golf Club	✓	✓	x	✓	✓	✓
23	RS30	Orongorongo River at Orongorongo Stn.	✓	x	✓	✓	✓	✓
24	RS22	Hutt River at Boulcott	✓	✓	x	✓	✓	✓
25	RS54	Coles Creek tributary at Lagoon Hill Rd	✓	x	✓	✓	✓	✓
26	RS32	Ruamahanga River at Te Ore Ore	✓	✓	✓	x	✓	✓
27	RS51	Huangarua River at Ponatahi Bridge	✓	x	✓	✓	✓	✓
28	RS48	Waiohine River at Bicknells	✓	✓	✓	✓	✓	x
29	RS34	Ruamahanga River at Pukio	✓	✓	✓	✓	✓	x
<i>Fair water quality</i>								
30	RS40	Waipoua River at Colombo Rd Bridge	✓	✓	x	x	✓	✓
31	RS53	Awhea River at Tora Rd	✓	x	x	✓	✓	✓
32	RS42	Whareama River at Gauge	✓	x	x	✓	✓	✓
33	RS14	Pauatahanui Stream at Elmwood Bridge	✓	✓	x	✓	✓	x
34	RS33	Ruamahanga River at Gladstone Bridge	✓	✓	✓	x	✓	x
35	RS11	Whareroa Stream at Waterfall Rd	✓	x	✓	✓	✓	x
36	RS37	Taueru River at Gladstone	✓	x	✓	x	✓	✓
37	RS01	Mangapouri Stream at Rahui Rd	✓	x	✓	x	✓	✓
38	RS38	Kopuaranga River at Stewarts	✓	✓	✓	x	✓	x
39	RS24	Mangaroa River at Te Marua	✓	x	x	x	✓	✓
40	RS13	Horokiri Stream at Snodgrass	✓	✓	x	x	✓	x
41	RS29	Wainuiomata River Upstr of White Bridge	✓	x	x	✓	✓	x
42	RS50	Mangatarere River at State Highway 2	✓	✓	✓	x	x	x
43	RS17	Makara Stream at Kennels	✓	x	x	✓	✓	x
44	RS18	Karori Stream at Makara Peak Mountain	✓	✓	x	x	✓	x
45	RS19	Kaiwharawhara Stream at Ngaio Gorge	✓	✓	x	x	✓	x
<i>Poor water quality</i>								
46	RS45	Parkvale tributary at Lowes Reserve	x	✓	✓	x	✓	x
47	RS39	Whangaehu River at 250m from Confl.	✓	x	x	x	✓	x
48	RS15	Porirua Stream at Glenside Overhead Ca.	✓	x	x	x	✓	x
49	RS16	Porirua Stream at Milk Depot	✓	x	x	x	✓	x
50	RS46	Parkvale Stream at Weir	✓	x	x	x	✓	x
51	RS08	Ngarara Stream at Field Way	x	x	x	✓	x	x
52	RS04	Waitohu Stream at Norfolk Crescent	✓	x	x	x	x	x
53	RS27	Waiwhetu Stream at Wainui Hill Bridge	x	x	x	✓	x	x
54	RS12	Whareroa Stream at QE Park	x	x	x	✓	x	x
55	RS07	Mangaone Stream at Sims Road Bridge	✓	x	x	x	x	x
56	RS02	Mangapouri Stream at Bennetts Rd	x	x	x	x	x	x

4. Periphyton

4.1 Introduction

Assessment of periphyton data is limited to RSoE sites with hard bottomed substrates (46 of the 56 sites). Monthly observations of percent periphyton streambed cover, from July 2007 to June 2008 inclusive, and an assessment of periphyton biomass (chlorophyll *a* and Ash Free Dry Mass (AFDM)) undertaken during macroinvertebrate sampling over late summer/early autumn 2008 are compared against various MfE (2000) guidelines (Table 4.1).

Table 4.1: Guidelines used to assess periphyton streambed cover and biomass (MfE 2000)

Instream value/variable	Mat periphyton	Filamentous periphyton
<i>Aesthetics/recreation</i>		
Maximum cover of visible streambed	60% >0.3 cm thick	30% >2 cm long
<i>Benthic biodiversity</i>		
Maximum chlorophyll <i>a</i>	50 mg/m ²	50 mg/m ²
<i>Trout habitat and angling</i>		
Maximum AFDM (mg/m ²)	35 mg/m ²	35 mg/m ²
Maximum cover of visible streambed	N/A	30% >2 cm long

4.2 Results

The number of observations of periphyton streambed cover varied among the 46 RSoE sites assessed over the reporting period with some sites missing up to five of the possible 12 observations due to either turbid water or high flows.

Of the 46 RSoE sites, 16 exceeded the MfE (2000) guideline for filamentous periphyton streambed cover on at least one sampling occasion. The sites that most often exceeded the guideline were the Kopuranga River at Stewarts (six times), Taueru River at Gladstone (four times) and the Huangarua River at Ponatahi Bridge (four times) (Table 4.2); these sites are all located in catchments dominated by pastoral landuse. Exceedance of MfE (2000) guideline for mat-forming periphyton cover occurred at two RSoE sites during the reporting period; the Mangaroa River at Te Marua (twice) and the Hutt River at Boulcott (once) (Table 4.2).

Seventeen RSoE sites exceeded the MfE (2000) chlorophyll *a* guideline for benthic biodiversity (Table 4.3). The highest chlorophyll *a* biomass recorded was in the Kopuaranga River at Stewarts (1,221 mg/m²).

Four sites exceeded the MfE (2000) AFDM guideline for trout habitat and angling (Table 4.3) with the highest biomass recorded in the Awhea River at Tora Road (328 g/m², Figure 4.1).

Table 4.2: Summary of monthly observations at RSoE sites, over July 2007 to June 2008 inclusive, of visible streambed cover for filamentous and mat-forming periphyton in relation to exceedances of the MfE (2000) guidelines

Site No.	Site Name	Streambed cover (%)					
		Filamentous (>2 cm long)			Mats (>0.03 cm thick)		
		Max	n >30 % cover	n	Max	n >60 % cover	n
RS03	Waitohu S at Forest Pk	0	0	11	0	0	11
RS05	Otaki R at Pukehinau	0	0	10	0	0	10
RS06	Otaki R at Mouth	13	0	9	32	0	9
RS09	Waikanae R at Mangaone Walkway	0	0	11	0	0	11
RS10	Waikanae R at Greenaway Rd	27	0	11	0	0	11
RS11	Whareroa S at Waterfall Rd	22	0	12	6	0	12
RS13	Horokiri S at Snodgrass	63	1	12	0	0	12
RS14	Pauatahanui S at Elmwood Br	78	2	7	0	0	7
RS15	Porirua S at Glenside	0	0	10	35	0	10
RS16	Porirua S at Wall Park (Milk Depot)	37	1	10	0	0	10
RS17	Makara S at Kennels	9	0	12	10	0	12
RS18	Karori S at Makara Peak	0	0	12	2	0	12
RS19	Kaiwharawhara S at Ngaio Gorge	10	0	12	8	0	12
RS20	Hutt R at Te Marua Intake Site	0	0	11	0	0	11
RS21	Hutt R opp. Manor Park G.C.	1	0	10	20	0	10
RS22	Hutt R at Boulcott	26	0	10	75	1	10
RS23	Pakuratahi R 50m d/s Farm Ck	14	0	12	22	0	12
RS24	Mangaroa R at Te Marua	20	0	10	86	2	10
RS25	Akatarawa R at Hutt confl.	0	0	12	15	0	12
RS26	Whakatikei R at Riverstone	59	1	12	17	0	12
RS28	Wainuiomata R at Manuka Track	0	0	12	1	0	12
RS29	Wainuiomata R u/s of White Br	33	1	12	4	0	12
RS30	Orongorongo R at Orongorongo Stn	7	0	9	0	0	9
RS31	Ruamahanga R at McLays	1	0	11	0	0	11
RS32	Ruamahanga R at Te Ore Ore	23	0	10	26	0	10
RS33	Ruamahanga R at Gladstone Br	8.5	0	11	46	0	11
RS34	Ruamahanga R at Pukio	24	0	10	0	0	10
RS35	Mataikona Trib at Sugar Loaf Rd	42	1	10	23	0	10
RS37	Taueru R at Gladstone	100	4	9	4	0	9
RS38	Kopuaranga R at Stewarts	92	6	8	14	0	8
RS40	Waipoua R at Colombo Rd Br	18	0	11	27	0	11
RS41	Waingawa R at South Rd	8	0	11	19	0	11
RS43	Motuwaireka S at Headwaters	1	0	9	24	0	9
RS44	Totara S at Stronvar	60	2	9	12	0	9
RS45	Parkvale Trib at Lowes Res.	0	0	10	2	0	10
RS46	Parkvale S at Weir	90	3	10	4	0	10
RS47	Waiohine R at Gorge	2	0	11	0	0	11
RS48	Waiohine R at Bicknells	0	0	11	0	0	11
RS49	Beef Ck at Headwaters	1	0	12	10	0	12
RS50	Mangatarere S at SH 2	89	3	11	9	0	11
RS51	Huangaaru R at Ponatahi Br	96	4	9	0	0	9
RS52	Tauanui R at Whakatomotomo Rd	7	0	12	0	0	12
RS53	Awhea R at Tora Rd	100	3	10	34	0	10
RS54	Coles Ck Trib at Lagoon Hill Rd	49	2	11	1	0	11
RS55	Tauherenikau R at Websters	100	1	10	0	0	10
RS56	Waiorongomai R at Forest Pk	78	2	11	0	0	11

Table 4.3: Summary of periphyton biomass (chlorophyll *a* and AFDM) measurements collected during late summer/ autumn of 2008. Non-compliance with MfE (2000) guidelines is highlighted in bold type.

Site No.	Site Name	AFDM (g/m ²)	Chlorophyll <i>a</i> (mg/m ²)
RS03	Waitohu S at Forest Pk	0.55	1.14
RS05	Otaki R at Pukehinau	0.36	1.13
RS06	Otaki R at Mouth	1.24	4.96
RS09	Waikanae R at Mangaone Walkway	0.69	3.94
RS10	Waikanae R at Greenaway Rd	1.80	4.93
RS11	Whareroa S at Waterfall Rd	2.14	5.08
RS13	Horokiri S at Snodgrass	1.70	12.1
RS14	Pauatahanui S at Elmwood Br	8.27	51.1
RS15	Porirua S at Glenside	6.06	64.5
RS16	Porirua S at Wall Park (Milk Depot)	11.2	109.3
RS17	Makara S at Kennels	4.17	2.14
RS18	Karori S at Makara Peak	3.57	32.6
RS19	Kaiwharawhara S at Ngaio Gorge	9.08	89.1
RS20	Hutt R at Te Marua Intake Site	0.53	1.42
RS21	Hutt R opp. Manor Park G.C.	7.55	49.2
RS22	Hutt R at Boulcott	11.5	112.0
RS23	Pakuratahi R 50m d/s Farm Ck	3.55	28.4
RS24	Mangaroa R at Te Marua	6.31	52.0
RS25	Akatarawa R at Hutt confl.	5.42	39.2
RS26	Whakatikei R at Riverstone	2.31	16.7
RS28	Wainuiomata R at Manuka Track	1.90	8.97
RS29	Wainuiomata R u/s of White Br	14.7	32.2
RS30	Orongorongo R at Orongorongo Stn	0.56	0.50
RS31	Ruamahanga R at McLays	0.11	0.24
RS32	Ruamahanga R at Te Ore Ore	7.24	61.8
RS33	Ruamahanga R at Gladstone Br	6.59	59.4
RS34	Ruamahanga R at Pukio	17.6	99.4
RS35	Mataikona Trib at Sugar Loaf Rd	2.92	7.45
RS37	Taueru R at Gladstone	156.9	692.7
RS38	Kopuaranga R at Stewarts	128.3	1,221
RS40	Waipoua R at Colombo Rd Br	7.33	78.8
RS41	Waingawa R at South Rd	0.68	5.73
RS43	Motuwaireka S at Headwaters	1.17	2.30
RS44	Totara S at Stronvar	3.87	6.12
RS45	Parkvale Trib at Lowes Res.	6.96	29.1
RS46	Parkvale S at Weir	13.1	77.5
RS47	Waiohine R at Gorge	0.10	0.27
RS48	Waiohine R at Bicknells	0.37	1.00
RS49	Beef Ck at Headwaters	0.96	5.34
RS50	Mangatarere S at SH 2	17.6	243.5
RS51	Huangarua R at Ponatahi Br	101.6	310.3
RS52	Tauanui R at Whakatomotomo Rd	6.58	35.3
RS53	Awhea R at Tora Rd	327.7	331.1
RS54	Coles Ck Trib at Lagoon Hill Rd	22.1	87.8
RS55	Tauherenikau R at Websters	1.71	7.46
RS56	Waiorongomai R at Forest Pk	0.35	0.65



Figure 4.1: The Awhea River at Tora Road (eastern Wairarapa) recorded the highest periphyton biomass during one-off sampling in March 2008

5. Macroinvertebrates

5.1 Introduction

This section presents the results of macroinvertebrate sampling undertaken at the 56 RSoE sites during late summer/early autumn 2008. The Macroinvertebrate Community Index (MCI) – an index of sensitivity to a complex of environmental variables (Stark & Maxted 2007) – is used to summarise macroinvertebrate health. Additional macroinvertebrate indices (QMCI, % EPT taxa, and taxa richness) are presented in Appendix 5³. Refer to Perrie (2007a) for further explanation on these indices.

The quality classification, as recommended by Stark & Maxted (2007), for interpretation of the MCI scores is outlined in Table 5.1. Soft bottomed MCI scores (MCI-sb) were calculated for the ten RSoE sites with soft bottomed substrates (see Appendix 1).

Table 5.1: Interpretation of MCI-type scores (from Stark & Maxted 2007)

Quality Class	MCI and MCI-sb
Excellent	>119
Good	100-119
Fair	80-99
Poor	<80

5.2 Results

The MCI scores for three replicate samples collected at each site are summarised in Table 5.2 along with the mean score and standard deviation. Based on mean MCI scores, the 56 RSoE sites fell into the following MCI quality classes (Figure 5.1):

- Excellent: 18 sites (32.1 %)
- Good: 13 sites (23.2 %)
- Fair: 16 sites (28.6 %)
- Poor: 9 sites (16.1 %)

All of the 18 RSoE sites in the “excellent” MCI quality class are located in catchments with 60 % or greater cover of indigenous forest cover (e.g., the Ruamahanga River at McLays). The nine RSoE sites in the “poor” quality class were typically located in catchments dominated by pastoral landcover (e.g., Parkvale Stream at Weir) except in the case of the Mangapouri Stream at Bennetts Road (urban) and the Wainuiomata River upstream of White Bridge (indigenous forest).

³ Macroinvertebrate indices from samples collected in 2006/07 are also presented in Appendix 6. These results differ from those presented in Perrie (2007b) which used a higher taxonomic resolution than that recommended for SoE reporting by Stark & Maxted (2007).

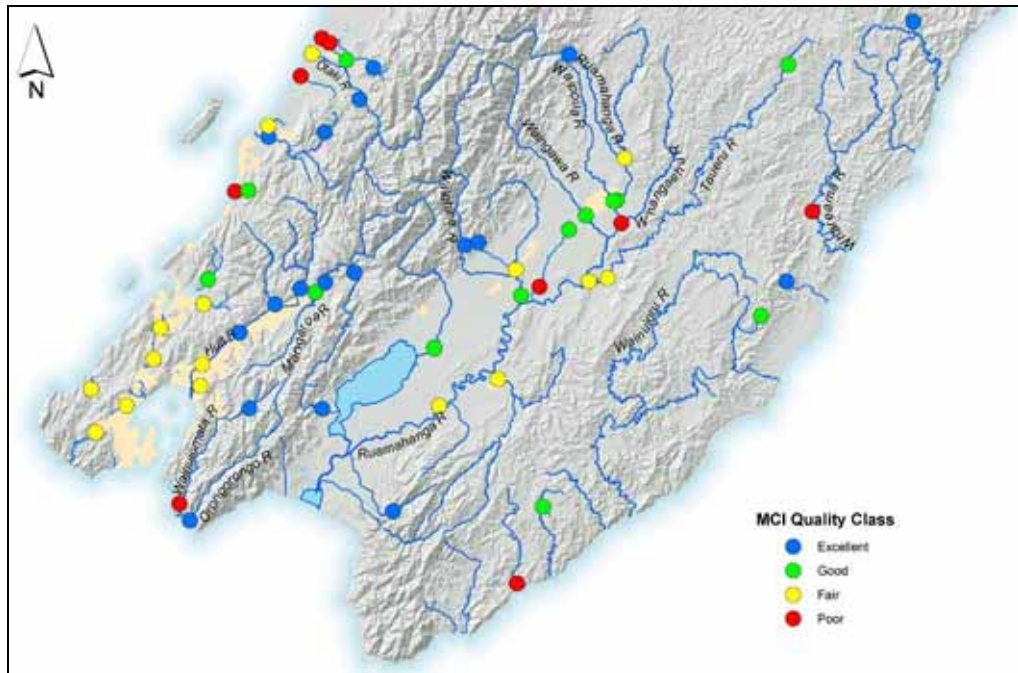


Figure 5.1: MCI quality classes for the 56 RSoE sites, determined from one sampling event over summer/autumn 2008

There was a reasonable correlation between the MCI quality classes and WQI grades. For example, of the 18 RSoE sites with an “excellent” MCI quality class, 15 had a WQI grade of “excellent”, and three a WQI grade of “good” (refer Section 3.3). Similarly, six of the nine RSoE sites with an MCI quality class of “poor” also had a WQI grade of “poor” and three a WQI grade of “fair”. The correlation between water quality and macroinvertebrate health based on WQI grades and MCI quality grades was less clear in the “good” and “fair” classes.

Table 5.2: MCI scores for RSoE sites sampled in 2008 (three replicate samples per site except in the case of sites RS53 and RS54) and the overall MCI quality class based on the mean MCI score from the replicate samples

Site No.	Site Name	Rep. 1	Rep. 2	Rep. 3	Mean	Std Dev.	MCI Quality Class
RS01	Mangapouri S at Rahui Rd	101.1	95.4	104.1	100.2	4.42	Good
RS02	Mangapouri S at Bennetts Rd	93.5	80.3	64.5	79.4	14.5	Poor
RS03	Waitohu S at Forest Park	141.5	133.3	142.1	139.0	4.90	Excellent
RS04	Waitohu S at Norfolk Cres.	64.3	59.3	68.7	64.1	4.70	Poor
RS05	Otaki R at Pukehinau	146.3	129.4	143.2	139.6	8.96	Excellent
RS06	Otaki R at Mouth	83.0	101.3	112.6	99.0	15.0	Fair
RS07	Mangaone S at Sims Rd Br	72.3	56.6	61.3	63.4	8.04	Poor
RS08	Ngarara S at Field Way	78.7	79.5	92.0	83.4	7.46	Fair
RS09	Waikanae R at Mangaone Walkway	138.1	136.8	143.5	139.5	3.54	Excellent
RS10	Waikanae R at Greenaway Rd	120.0	115.8	126.7	120.8	5.46	Excellent
RS11	Whareroa S at Waterfall Rd	111.0	110.4	122.6	114.7	6.86	Good
RS12	Whareroa S at QE Park	58.1	55.4	58.3	57.3	1.58	Poor
RS13	Horokiri S at Snodgrass	115.0	94.1	112.2	107.1	11.3	Good
RS14	Pauatahanui S at Elmwood Br	91.0	99.0	94.8	94.9	4.03	Fair
RS15	Porirua S at Glenside	81.1	85.6	92.4	86.3	5.70	Fair
RS16	Porirua S at Wall Park (Milk Depot)	100.0	89.4	78.8	89.4	10.6	Fair
RS17	Makara S at Kennels	102.0	96.3	97.6	98.6	3.00	Fair
RS18	Karori S at Makara Peak	91.3	90.9	95.0	92.4	2.27	Fair
RS19	Kaiwharawhara S at Ngaio Gorge	82.6	80.0	77.8	80.1	2.42	Fair
RS20	Hutt R at Te Marua Intake Site	124.0	133.0	133.0	130.0	5.21	Excellent
RS21	Hutt R opp. Manor Park G.C.	107.1	127.4	126.4	120.3	11.5	Excellent
RS22	Hutt R at Boulcott	114.7	100.0	81.3	98.7	16.7	Fair
RS23	Pakuratahi R 50m d/s Farm Ck	130.4	134.8	131.8	132.3	2.27	Excellent
RS24	Mangaroa R at Te Marua	105.9	104.8	113.7	108.1	4.85	Good
RS25	Akatarawa R at Hutt Confl.	128.3	120.0	128.2	125.5	4.77	Excellent
RS26	Whakatikei R at Riverstone	116.7	124.2	122.7	121.2	3.98	Excellent
RS27	Waiwhetu S at Wainui Hill Br	75.7	90.0	79.4	81.7	7.41	Fair
RS28	Wainuiomata R at Manuka Track	129.0	136.1	136.3	133.8	4.15	Excellent
RS29	Wainuiomata R u/s White Br	81.8	80.9	76.0	79.6	3.13	Poor
RS30	Orongorongo R at Orongorongo Stn	133.3	118.5	131.1	127.6	8.02	Excellent
RS31	Ruamahanga R at McLays	137.4	140.0	150.0	142.5	6.66	Excellent
RS32	Ruamahanga R at Te Ore Ore	105.9	106.3	115.4	109.2	5.38	Good
RS33	Ruamahanga R at Gladstone Br	88.6	100.0	102.7	97.1	7.49	Fair
RS34	Ruamahanga R at Pukio	100.0	97.1	102.4	99.8	2.61	Fair
RS35	Mataikona Trib. at Sugar Loaf Rd	126.5	117.9	118.7	121.0	4.72	Excellent
RS36	Taueru R at Castlehill	99.3	111.3	122.2	110.9	11.5	Good
RS37	Taueru R at Gladstone	80.0	89.2	84.0	84.4	4.63	Fair
RS38	Kopuaranga R at Stewarts	97.4	95.2	92.6	95.1	2.40	Fair
RS39	Whangaehu R 250m from Confl.	56.7	63.3	57.5	59.1	3.58	Poor
RS40	Waipoua R at Colombo Rd Br	97.8	103.2	107.7	102.9	4.96	Good
RS41	Waingawa R at South Rd	120.0	117.0	116.3	117.8	1.98	Good
RS42	Whareama R at Gauge	55.4	62.9	50.6	56.3	6.23	Poor
RS43	Motuwaireka R at Headwaters	137.7	143.1	130.8	137.2	6.17	Excellent
RS44	Totara S at Stronvar	102.2	101.6	115.2	106.4	7.70	Good
RS45	Parkvale Trib. at Lowes Res.	109.5	108.2	104.8	107.5	2.40	Good
RS46	Parkvale S at Weir	83.2	75.0	73.8	77.3	5.11	Poor
RS47	Waiohine R at Gorge	145.0	145.3	135.0	141.8	5.85	Excellent
RS48	Waiohine R at Bicknells	132.9	113.8	108.9	118.5	12.7	Good
RS49	Beef S at Headwaters	131.9	142.1	135.0	136.3	5.26	Excellent
RS50	Mangatarere S at SH 2	99.0	94.0	91.1	94.7	3.99	Fair
RS51	Huangarua R at Ponatahi Br	100.8	94.6	96.4	97.3	3.19	Fair
RS52	Tauanui S at Whakatomotomo Rd	117.3	120.8	122.4	120.2	2.59	Excellent
RS53	Awhea R at Tora Rd	73.8	-	-	73.8	-	Poor
RS54	Coles Trib. at Lagoon Hill Rd	102.4	-	-	102.4	-	Good
RS55	Tauherenikau R at Websters	109.3	102.4	113.7	108.5	5.72	Good
RS56	Waiorongomai R at Forest Pk	138.0	138.1	142.9	139.7	2.78	Excellent

6. Summary

Using the WQI, 19 of the 56 RSoE sites were allocated water quality grades of “excellent” for the 2007/08 reporting period. Ten sites scored grades of “good”, 16 sites “fair” and 11 sites “poor”.

Of the 46 RSoE sites monitored for periphyton, 16 sites exceeded the MfE (2000) streambed cover guidelines for filamentous growths at least once and two sites exceeded the guideline for mat growths on one or more occasions. Chlorophyll *a* guidelines for benthic biomass were exceeded at 17 sites while the AFDM guideline for trout habitat and angling was exceeded at four sites.

Based on MCI scores, the majority of the 56 RSoE sites received quality classifications of “excellent” (18 sites) or “good” (13 sites). Sixteen sites were classed as “fair” and nine sites were classed as “poor”.

Water quality and macroinvertebrate health is strongly influenced by land cover, with WQI and MCI scores highest at RSoE sites located on hill-fed river and stream reaches under predominantly unmodified indigenous forest cover. In contrast, RSoE sites with poor WQI and MCI scores are typically located on low elevation smaller streams and drain pastoral or urban catchments.

7. References

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Appendix 1: RSoE monitoring sites

Site No.	Site Name	Site Coordinates		Substrate (hard or soft bottomed)	REC	Dominant land cover
		Easting	Northing			
RS01	Mangapouri S at Rahui Rd	2693390	6046615	Soft	WD/L/A/U	Pasture
RS02	Mangapouri S at Bennetts Rd	2690920	6049359	Soft	WD/L/A/P	Urban
RS03	Waitohu S at Forest Pk	2697610	6045404	Hard	CW/H/HS/IF	Indigenous forest
RS04	Waitohu S at Norfolk Cres	2689554	6050018	Soft	CW/L/HS/P	Pasture
RS05	Otaki R at Pukehinau	2695443	6040464	Hard	CW/H/HS/IF	Indigenous forest
RS06	Otaki R at Mouth	2688000	6047600	Hard	CW/H/HS/IF	Indigenous forest
RS07	Mangaone S at Sims Rd Br	2686260	6044122	Soft	WW/L/AL/P	Pasture
RS08	Ngarara S at Field Way	2681198	6036335	Soft	WW/L/AL/P	Urban
RS09	Waikanae R at Mangaone Walkway	2689992	6035353	Hard	CW/L/HS/IF	Indigenous forest
RS10	Waikanae R at Greenaway Rd	2681241	6034630	Hard	CW/L/HS/P	Indigenous forest
RS11	Whareroa S at Waterfall Rd	2678093	6026247	Hard	WW/L/HS/P	Pasture
RS12	Whareroa S at QE Park	2675995	6026115	Soft	WW/L/HS/P	Pasture
RS13	Horokiri S at Snodgrass	2671824	6012367	Hard	CW/L/HS/P	Pasture
RS14	Pauatahanui S at Elmwood Br	2671117	6008497	Hard	CW/L/HS/P	Pasture
RS15	Porirua S at Glenside	2663310	6000077	Hard	CW/L/HS/U	Urban
RS16	Porirua S at Wall Park (Milk Depot)	2664386	6004745	Hard	WW/L/HS/U	Urban
RS17	Makara S at Kennels	2653551	5995347	Hard	CW/L/HS/P	Pasture
RS18	Karori S at Makara Peak	2654234	5988585	Hard	CW/L/HS/U	Urban
RS19	Kaiwharawhara S at Ngaio Gorge	2659090	5992789	Hard	CW/L/HS/U	Urban
RS20	Hutt R at Te Marua Intake Site	2690091	6011874	Hard	CX/H/HS/IF	Indigenous forest
RS21	Hutt R opp. Manor Park G.C.	2676700	6004000	Hard	CW/H/HS/IF	Indigenous forest
RS22	Hutt R at Boulcott	2670879	5999200	Hard	CW/L/HS/IF	Indigenous forest
RS23	Pakuratahi R 50m d/s Farm Ck	2694627	6013394	Hard	CX/H/HS/IF	Indigenous forest
RS24	Mangaroa R at Te Marua	2688563	6010359	Hard	CW/L/HS/P	Pasture
RS25	Akatarawa R at Hutt confl.	2686203	6010900	Hard	CW/L/HS/IF	Indigenous forest
RS26	Whakatikei R at Riverstone	2682276	6008463	Hard	CW/L/HS/S	Indigenous forest
RS27	Waiwhetu S at Wainui Hill Br	2670587	5995855	Soft	WW/L/HS/U	Urban
RS28	Wainuiomata R at Manuka Track	2678265	5992349	Hard	CW/L/HS/IF	Indigenous forest
RS29	Wainuiomata R u/s of White Br	2667340	5977436	Hard	CW/L/HS/IF	Indigenous forest
RS30	Orongorongo R at Orongorongo	2668955	5974807	Hard	CW/H/HS/IF	Indigenous forest
RS31	Ruamahanga R at McLays	2728161	6047524	Hard	CX/H/HS/S	Indigenous forest
RS32	Ruamahanga R at Te Ore Ore	2735588	6024740	Hard	CW/L/SS/P	Pasture
RS33	Ruamahanga R at Gladstone Br	2731225	6012049	Hard	CW/L/SS/P	Pasture
RS34	Ruamahanga R at Pukio	2707855	5992730	Hard	CW/L/SS/P	Pasture
RS35	Mataikona Trib at Sugar Loaf Rd	2781839	6052625	Hard	CW/L/SS/P	Pasture
RS36	Taueru R at Castlehill	2762304	6045917	Soft	CW/L/SS/P	Pasture
RS37	Taueru R at Gladstone	2734164	6012538	Hard	CD/L/SS/P	Pasture
RS38	Kopuaranga R at Stewarts	2736773	6031289	Hard	CW/L/SS/P	Pasture
RS39	Whangaehu R 250m u/s confl.	2736281	6021129	Soft	CD/L/SS/P	Pasture
RS40	Waipoua R at Colombo Rd Br	2735032	6024611	Hard	CW/L/HS/P	Pasture
RS41	Waingawa R at South Rd	2730731	6022370	Hard	CX/H/HS/IF	Indigenous forest
RS42	Whareama R at Gauge	2766097	6022956	Soft	WW/L/SS/P	Pasture
RS43	Motuwaireka S at Headwaters	2762028	6012031	Hard	CW/L/HS/S	Indigenous forest
RS44	Totara S at Stronvar	2758038	6006645	Hard	CW/L/HS/EF	Exotic forest
RS45	Parkvale Trib at Lowes Res.	2728110	6020073	Hard	WD/L/A/P	Pasture
RS46	Parkvale S at Weir	2723533	6011190	Hard	WD/L/A/P	Pasture
RS47	Waiohine R at Gorge	2711907	6017714	Hard	CX/H/HS/IF	Indigenous forest
RS48	Waiohine R at Bicknells	2720633	6009820	Hard	CW/H/HS/P	Pasture
RS49	Beef Ck at Headwaters	2713981	6018117	Hard	CW/L/HS/S	Indigenous forest
RS50	Mangatarere S at SH 2	2719786	6013880	Hard	CW/L/HS/P	Pasture
RS51	Huangarua R at Ponatahi Br	2717030	5996934	Hard	CD/L/SS/P	Pasture
RS52	Tauanui R at Whakatomotomo Rd	2700674	5976234	Hard	CW/H/HS/IF	Indigenous forest
RS53	Awhea R at Tora Rd	2719980	5965013	Hard	WW/L/SS/P	Pasture
RS54	Coles Ck Trib at Lagoon Hill Rd	2724046	5976941	Hard	WW/L/SS/S	Indigenous forest
RS55	Tauherenikau R at Websters	2707103	6001661	Hard	CW/H/HS/IF	Indigenous forest
RS56	Waiorongomai R at Forest Pk	2689627	5992276	Hard	CW/H/HS/IF	Indigenous forest

Appendix 2: Water quality variables and analytical methods

Variable	Method	Detection Limit
Temperature	Field Meter - YSI 550A and YSI 556 Meters	0.01 °C
Dissolved Oxygen	Field Meter - YSI 550A and YSI 556 Meters	0.01 mg/L
Visual Clarity	Black disc	0.01 m
pH	Field Meter - YSI 550A and YSI 556 Meters	0.01 units
Conductivity	Field Meter - YSI 550A and YSI 556 Meters	0.1 uS/cm
Turbidity	Analysis using a Hach 2100N, Turbidity meter. APHA 2130 B 20th ed. 1998	0.05 NTU
Total Organic Carbon	Catalytic oxidation, IR detection, for Total C. Acidification, purging for Total Inorganic C. TOC = TC - TIC. APHA5310 B 20th ed. 1998	0.5 mg/L
Ammoniacal Nitrogen	Filtered sample. Phenol/hyperchlorite colorimetry. Discrete Analyser. (NH ₄ -N = NH ₄ ⁺ -N + NH ₃ -N) APHA 4500-NH ₃ F (modified from manual analysis) 20th ed. 1998	0.001 mg/L
Nitrite	Automated Azo dye colorimetry, Flow induction analyser. APHA 4500-NO ₂ ⁻ I (proposed) 20th ed. 1998	0.002 mg/L
Nitrate	Calculation: (Nitrate-N + Nitrite-N) - Nitrite-N	0.002 mg/L
Nitrate + Nitrite Nitrogen	Total oxidised nitrogen. Automated cadmium reduction, Flow injection analyser. APHA 4500-NO ₃ ⁻ I (Proposed) 20th ed. 1998	0.002 mg/L
Total Kjeldahl Nitrogen	Kjeldahl digestion, phenol/hyperchlorite colorimetry (Discrete Analysis). APHA 4500-Norg B. (modified) 4500-NH ₃ F (modified) 20th ed. 1998	0.1 mg/L
Total Nitrogen	Calculation: TKN + Nitrate-N + Nitrite-N	0.1 mg/L
Total Phosphorus	Acid/Persulphate Digestion Ascorbic Acid Method APHA 20 th Ed. 4500-P E (modified from manual analysis). 20th ed. 1998	0.004 mg/L
Dissolved Reactive Phosphorus	Filtered Sample. Molybdenum blue colorimetry. Discrete Analyser. APHA 4500-P E (modified from manual analysis) 21st ed. 2005	0.004 mg/L
Faecal Coliforms	APHA 21st Ed. Method 9222 D	1 cfu/100 mL
<i>E. coli</i>	APHA 21st Ed. Method 9222 G	1 cfu/100 mL

Appendix 3: Biological monitoring methods

Periphyton

Periphyton assessments were limited to the 46 RSoE sites with hard bottomed substrates.

Monthly assessment of visible streambed cover

Over the reporting period, periphyton cover was determined by estimating the percentage of visible mats (>0.3 cm thick) and filaments (>2 cm long) present on the stream or river bed within a 20 cm diameter metal ring. Ten observations were made across the width of the stream or river, along a transect. If the stream or river was not wide enough for 10 observations, five observations were made across the width of the waterway in two locations at the site. Two transects of five observations (usually to 0.6 m depth) were also used where it was not possible to wade across more than half of the river's width.

Visible streambed assessments were typically carried out in a run, as opposed to riffle or pool-type habitats.

Annual assessment of biomass

Periphyton samples for quantitative biomass assessments (chlorophyll *a* and AFDM) were collected over January to March 2007 at the time of macroinvertebrate sample collection. Sampling protocols followed quantitative method 1a (QM-1a), as outlined in the stream periphyton monitoring manual (Biggs and Kilroy 2000).

Biomass assessments were carried out on periphyton samples collected in riffle-type habitats in close proximity to macroinvertebrate sampling sites.

Macroinvertebrates

Three macroinvertebrate samples were collected from cobbly riffle areas at or adjacent to each RSoE water sampling site over January to March 2007. The timing of sampling was determined at random, although no macroinvertebrate sampling was undertaken within two weeks of any flood event. Flood events were defined as flows greater than three times the median river flow.

Samples were collected with the use of a kick-net (250 um mesh size) following Protocol C1 of the national macroinvertebrate sampling protocols (Stark et al. 2001) for the 46 RSoE sites with hard bottom substrate and Protocol C2 for the ten RSoE sites with a soft bottom substrate. All samples were processed in accordance with protocol P2 (Stark et al. 2001).

Appendix 4: Physico-chemical and bacteriological data

Table A4.1: Temperature (°C)

Site No.	Site Name	Median	Minimum	5 th percentile	95 th percentile	Maximum	<i>n</i>
RS01	Mangapouri S at Rahui Rd	12.4	8.0	9.7	16.6	17.3	12
RS02	Mangapouri S at Bennetts Rd	13.6	7.2	9.6	18.0	18.7	12
RS03	Waitohu S at Forest Pk	9.9	5.2	6.7	14.0	14.1	12
RS04	Waitohu S at Norfolk Cres	12.7	6.6	8.5	17.9	18.1	12
RS05	Otaki R at Pukehinou	10.5	6.1	7.0	15.9	16.6	12
RS06	Otaki R at Mouth	11.9	6.9	7.9	19.2	20.9	12
RS07	Mangaone S at Sims Rd Br	12.9	7.9	9.5	17.9	18.3	12
RS08	Ngarara S at Field Way	14.5	9.2	9.6	19.4	20.4	12
RS09	Waikanae R at Mangaone Walkway	11.2	6.6	6.9	14.7	15.1	12
RS10	Waikanae R at Greenaway Rd	14.2	8.5	9.2	19.0	19.5	12
RS11	Whareroa S at Waterfall Rd	11.3	7.1	7.8	15.3	15.4	12
RS12	Whareroa S at QE Park	13.7	9.2	9.2	19.2	19.8	12
RS13	Horokiri S at Snodgrass	14.9	7.2	8.6	17.8	18.0	12
RS14	Pauatahanui S at Elmwood Br	13.2	7.3	7.5	17.7	18.0	12
RS15	Porirua S at Glenside	13.2	6.9	7.3	18.4	18.4	12
RS16	Porirua S at Wall Park (Milk Depot)	14.6	7.8	8.1	19.4	20.3	12
RS17	Makara S at Kennels	13.0	6.8	7.7	19.0	20.4	12
RS18	Karori S at Makara Peak	12.5	7.9	9.2	16.2	16.6	12
RS19	Kaiwharawhara S at Ngaio Gorge	12.5	7.2	7.7	16.8	17.7	12
RS20	Hutt R at Te Marua Intake Site	10.6	7.1	7.5	16.2	17.5	12
RS21	Hutt R opp. Manor Park G.C.	13.3	7.7	8.6	19.0	20.4	12
RS22	Hutt R at Boulcott	13.6	7.5	8.6	19.7	21.8	12
RS23	Pakuratahi R 50m d/s Farm Ck	11.5	7.6	7.9	16.5	18.0	12
RS24	Mangaroa R at Te Marua	12.8	8.0	8.1	17.2	18.0	12
RS25	Akatarawa R at Hutt confl.	11.0	7.0	7.3	17.0	18.4	12
RS26	Whakatikei R at Riverstone	10.7	6.8	6.8	16.6	17.8	12
RS27	Waiwhetu S at Wainui Hill Br	16.8	11.6	11.9	19.2	19.8	12
RS28	Wainuiomata R at Manuka Track	10.6	6.7	7.5	14.3	14.4	12
RS29	Wainuiomata R u/s of White Br	14.4	9.5	9.8	18.6	19.8	12
RS30	Orongorongo R at Orongorongo Stn	14.9	10.1	10.3	17.4	17.6	12
RS31	Ruamahanga R at McLays	9.5	5.2	5.4	16.8	17.6	12
RS32	Ruamahanga R at Te Ore Ore	12.2	6.9	7.5	19.7	20.0	12
RS33	Ruamahanga R at Gladstone Br	14.6	7.6	8.4	20.9	21.2	12
RS34	Ruamahanga R at Pukio	13.4	7.4	8.1	20.6	20.9	12
RS35	Mataikona Trib at Sugar Loaf Rd	11.6	7.7	7.9	16.2	17.5	12
RS36	Taueru R at Castlehill	11.5	6.8	7.1	18.3	20.8	12
RS37	Taueru R at Gladstone	15.4	8.3	8.9	20.3	21.4	12
RS38	Kopuaranga R at Stewarts	12.5	7.5	7.7	18.5	19.0	12
RS39	Whangaehu R 250m u/s confl.	13.5	8.0	8.0	18.5	18.6	12
RS40	Waipoua R at Colombo Rd Br	13.8	7.9	8.2	22.5	24.6	12
RS41	Waingawa R at South Rd	13.8	6.7	7.6	23.4	24.6	12
RS42	Whareama R at Gauge	13.9	6.1	7.2	22.6	22.9	12
RS43	Motuwaireka S at Headwaters	10.1	7.9	8.3	17.3	17.8	12
RS44	Totara S at Stronvar	13.1	8.2	8.6	24.4	26.1	12
RS45	Parkvale Trib at Lowes Res.	13.9	10.8	11.1	15.7	15.8	10
RS46	Parkvale S at Weir	16.7	8.2	8.7	23.8	25.4	12
RS47	Waiohine R at Gorge	11.0	6.4	6.7	15.8	16.7	12
RS48	Waiohine R at Bicknells	13.7	7.6	8.4	18.2	19.0	12
RS49	Beef Ck at Headwaters	11.5	7.6	7.9	16.2	16.2	12
RS50	Mangatarere S at SH 2	14.3	8.8	9.2	19.0	19.8	12
RS51	Huangaaru R at Ponatahi Br	16.3	7.6	8.0	22.8	22.8	12
RS52	Tauanui R at Whakatomotomo Rd	11.5	6.8	7.1	17.6	18.2	12
RS53	Awhea R at Tora Rd	12.9	5.4	6.6	21.4	22.6	12
RS54	Coles Ck Trib at Lagoon Hill Rd	13.1	6.5	7.1	19.0	19.8	12
RS55	Tauherenikau R at Websters	14.7	7.6	8.0	21.8	23.6	12
RS56	Waiorongomai R at Forest Pk	12.4	7.8	8.0	19.2	21.2	12

Table A4.2: Dissolved Oxygen (% saturation)

Site No.	Site Name	Median	Minimum	5 th percentile	95 th percentile	Maximum	<i>n</i>
RS01	Mangapouri S at Rahui Rd	89.9	75.2	79.1	96.6	101.3	12
RS02	Mangapouri S at Bennetts Rd	74.7	48.6	55.4	83.8	86.2	12
RS03	Waitohu S at Forest Pk	101.6	95.8	96.0	113.1	121.7	12
RS04	Waitohu S at Norfolk Cres	82.7	64.1	65.5	94.9	95.7	12
RS05	Otaki R at Pukehinou	101.8	94.6	95.3	111.7	119.0	12
RS06	Otaki R at Mouth	101.5	97.8	98.8	119.2	127.5	12
RS07	Mangaone S at Sims Rd Br	82.7	71.8	73.5	119.4	140.1	12
RS08	Ngarara S at Field Way	64.3	43.6	48.8	87.5	101.0	12
RS09	Waikanae R at Mangaone Walkway	97.9	91.0	93.4	120.0	130.7	12
RS10	Waikanae R at Greenaway Rd	102.6	94.1	94.2	125.3	142.5	12
RS11	Whareroa S at Waterfall Rd	94.6	83.0	84.5	108.8	117.0	12
RS12	Whareroa S at QE Park	66.7	44.0	49.2	81.6	87.8	12
RS13	Horokiri S at Snodgrass	100.3	89.5	93.1	118.8	129.7	12
RS14	Pauatahanui S at Elmwood Br	99.6	71.2	78.4	117.4	125.5	12
RS15	Porirua S at Glenside	101.6	84.1	87.9	117.8	122.7	12
RS16	Porirua S at Wall Park (Milk Depot)	105.6	96.3	96.8	123.9	132.9	12
RS17	Makara S at Kennels	97.3	92.0	93.3	106.5	110.2	12
RS18	Karori S at Makara Peak	98.6	91.5	93.8	102.4	102.5	12
RS19	Kaiwharawhara S at Ngaio Gorge	97.8	90.2	90.2	104.8	105.8	12
RS20	Hutt R at Te Marua Intake Site	100.1	93.1	93.4	108.6	113.9	12
RS21	Hutt R opp. Manor Park G.C.	100.9	98.8	99.1	119.7	132.5	12
RS22	Hutt R at Boulcott	101.1	97.1	98.1	117.4	133.0	12
RS23	Pakuratahi R 50m d/s Farm Ck	94.2	81.8	86.1	101.6	103.8	12
RS24	Mangaroa R at Te Marua	100.1	95.0	95.8	117.6	125.0	12
RS25	Akatarawa R at Hutt confl.	100.5	95.7	97.1	111.8	121.6	12
RS26	Whakatikei R at Riverstone	100.1	89.4	92.5	111.9	123.9	12
RS27	Waiwhetu S at Wainui Hill Br	79.3	24.7	34.2	121.4	151.1	12
RS28	Wainuiomata R at Manuka Track	100.3	96.5	96.8	105.4	107.0	12
RS29	Wainuiomata R u/s of White Br	93.4	63.2	73.9	121.6	137.1	12
RS30	Orongorongo R at Orongorongo Stn	99.2	91.2	93.4	105.0	108.1	12
RS31	Ruamahanga R at McLays	99.7	92.1	93.9	112.3	121.6	12
RS32	Ruamahanga R at Te Ore Ore	100.7	96.2	96.8	116.2	125.3	12
RS33	Ruamahanga R at Gladstone Br	102.1	90.8	93.5	124.6	128.2	12
RS34	Ruamahanga R at Pukio	96.1	82.0	83.1	120.4	123.8	12
RS35	Mataikona Trib at Sugar Loaf Rd	97.6	92.3	93.6	102.0	103.6	12
RS36	Taueru R at Castlehill	96.9	93.5	93.7	100.7	103.2	12
RS37	Taueru R at Gladstone	103.3	83.1	85.8	154.6	156.7	12
RS38	Kopuaranga R at Stewarts	91.1	71.6	73.4	142.1	143.1	12
RS39	Whangaehu R 250m u/s confl.	92.0	52.5	53.1	114.0	114.8	12
RS40	Waipoua R at Colombo Rd Br	102.9	94.8	95.5	116.9	122.8	12
RS41	Waingawa R at South Rd	99.6	84.6	89.9	109.2	117.2	12
RS42	Whareama R at Gauge	93.4	81.5	82.5	106.6	107.7	12
RS43	Motuwaireka S at Headwaters	97.9	79.6	84.3	101.6	102.6	12
RS44	Totara S at Stronvar	100.7	92.4	94.2	107.3	112.9	12
RS45	Parkvale Trib at Lowes Res.	70.2	58.2	60.7	103.3	104.1	10
RS46	Parkvale S at Weir	98.4	81.0	87.5	117.4	118.3	12
RS47	Waiohine R at Gorge	100.2	92.2	94.5	104.4	104.5	12
RS48	Waiohine R at Bicknells	97.5	85.4	88.3	110.0	111.0	12
RS49	Beef Ck at Headwaters	98.9	90.3	90.4	102.8	104.0	12
RS50	Mangatarere S at SH 2	95.7	80.8	85.0	131.7	144.7	12
RS51	Huangaaru R at Ponatahi Br	102.2	91.2	92.5	155.1	157.4	12
RS52	Tauanui R at Whakatomotomo Rd	98.4	93.0	93.2	102.7	102.8	12
RS53	Awhea R at Tora Rd	94.0	72.2	79.3	142.2	153.0	12
RS54	Coles Ck Trib at Lagoon Hill Rd	93.5	41.5	51.5	109.1	115.1	12
RS55	Tauherenikau R at Websters	96.0	88.4	89.7	99.7	99.8	12
RS56	Waiorongomai R at Forest Pk	97.6	85.3	89.9	104.2	104.6	12

Table A4.3: Dissolved Oxygen (mg/L)

Site No.	Site Name	Median	Minimum	5 th percentile	95 th percentile	Maximum	<i>n</i>
RS01	Mangapouri S at Rahui Rd	9.5	8.2	8.4	10.4	10.7	12
RS02	Mangapouri S at Bennetts Rd	7.9	4.7	5.3	9.1	9.5	12
RS03	Waitohu S at Forest Pk	11.5	10.1	10.2	12.8	13.0	12
RS04	Waitohu S at Norfolk Cres	8.8	6.4	6.4	10.7	10.8	12
RS05	Otaki R at Pukehinou	11.7	9.6	9.9	12.5	12.6	12
RS06	Otaki R at Mouth	11.1	9.6	9.8	12.4	12.6	12
RS07	Mangaone S at Sims Rd Br	8.5	7.2	7.4	11.1	11.4	12
RS08	Ngarara S at Field Way	6.6	4.7	5.1	8.6	9.6	12
RS09	Waikanae R at Mangaone Walkway	11.2	9.3	9.7	12.9	13.4	12
RS10	Waikanae R at Greenaway Rd	10.7	8.7	9.1	12.6	13.3	12
RS11	Whareroa S at Waterfall Rd	10.9	8.5	8.8	11.8	12.0	12
RS12	Whareroa S at QE Park	6.9	4.3	5.0	8.7	8.8	12
RS13	Horokiri S at Snodgrass	10.7	8.8	9.0	12.6	12.6	12
RS14	Pauatahanui S at Elmwood Br	9.9	7.1	8.1	12.5	13.3	12
RS15	Porirua S at Glenside	10.8	9.3	9.5	12.3	12.3	12
RS16	Porirua S at Wall Park (Milk Depot)	11.1	9.5	9.7	12.3	12.3	12
RS17	Makara S at Kennels	10.4	9.2	9.2	11.9	12.0	12
RS18	Karori S at Makara Peak	10.6	9.5	9.6	11.5	11.9	12
RS19	Kaiwharawhara S at Ngaio Gorge	10.3	9.4	9.5	11.8	11.9	12
RS20	Hutt R at Te Marua Intake Site	11.1	9.4	9.9	11.9	12.0	12
RS21	Hutt R opp. Manor Park G.C.	11.0	9.5	9.7	12.0	12.0	12
RS22	Hutt R at Boulcott	10.9	9.3	9.5	12.0	12.2	12
RS23	Pakuratahi R 50m d/s Farm Ck	10.0	8.9	9.0	11.3	11.5	12
RS24	Mangaroa R at Te Marua	11.3	9.4	9.4	12.0	12.2	12
RS25	Akatarawa R at Hutt confl.	11.2	9.5	9.8	11.8	12.0	12
RS26	Whakatikei R at Riverstone	11.1	9.0	9.5	12.1	12.1	12
RS27	Waiwhetu S at Wainui Hill Br	8.0	2.2	3.2	12.3	14.7	12
RS28	Wainuiomata R at Manuka Track	11.3	10.0	10.1	12.2	12.3	12
RS29	Wainuiomata R u/s of White Br	10.0	5.8	7.0	12.5	13.1	12
RS30	Orongorongo R at Orongorongo Stn	10.1	8.9	9.1	11.1	11.3	12
RS31	Ruamahanga R at McLays	11.1	9.5	9.7	13.8	15.5	12
RS32	Ruamahanga R at Te Ore Ore	10.7	9.4	9.6	13.2	14.6	12
RS33	Ruamahanga R at Gladstone Br	10.2	9.1	9.2	12.8	14.1	12
RS34	Ruamahanga R at Pukio	10.1	7.7	7.9	13.2	14.4	12
RS35	Mataikona Trib at Sugar Loaf Rd	10.8	8.8	9.1	11.7	12.0	12
RS36	Taueru R at Castlehill	10.6	8.6	9.0	11.7	12.0	12
RS37	Taueru R at Gladstone	11.1	8.9	9.5	14.2	14.4	12
RS38	Kopuaranga R at Stewarts	10.4	7.2	7.6	13.4	13.5	12
RS39	Whangaehu R 250m u/s confl.	10.3	5.0	5.1	12.4	13.4	12
RS40	Waipoua R at Colombo Rd Br	10.6	9.4	9.5	12.0	12.0	12
RS41	Waingawa R at South Rd	10.4	8.3	8.3	12.2	12.5	12
RS42	Whareama R at Gauge	9.3	7.2	7.5	11.3	11.4	12
RS43	Motuwaireka S at Headwaters	10.4	8.3	8.8	11.7	11.9	12
RS44	Totara S at Stronvar	10.3	8.3	8.4	11.5	11.5	12
RS45	Parkvale Trib at Lowes Res.	7.3	6.0	6.2	10.9	10.9	10
RS46	Parkvale S at Weir	9.8	8.0	8.4	12.0	12.5	12
RS47	Waiohine R at Gorge	11.0	10.0	10.1	12.5	12.7	12
RS48	Waiohine R at Bicknells	10.4	8.9	9.1	11.9	12.0	12
RS49	Beef Ck at Headwaters	10.5	9.7	9.7	12.0	12.0	12
RS50	Mangatarere S at SH 2	10.1	8.6	8.7	12.8	13.8	12
RS51	Huangaaru R at Ponatahi Br	11.3	8.7	9.1	14.4	14.5	12
RS52	Tauanui R at Whakatomotomo Rd	10.5	9.0	9.1	12.2	12.3	12
RS53	Awhea R at Tora Rd	10.7	6.7	7.4	12.6	13.4	12
RS54	Coles Ck Trib at Lagoon Hill Rd	10.0	4.2	5.0	12.2	12.3	12
RS55	Tauherenikau R at Websters	9.8	8.3	8.4	11.5	12.0	11
RS56	Waiorongomai R at Forest Pk	10.3	8.3	8.5	12.1	12.3	12

Table A4.4: pH

Site No.	Site Name	Median	Minimum	5 th percentile	95 th percentile	Maximum	<i>n</i>
RS01	Mangapouri S at Rahui Rd	7.0	6.5	6.6	7.1	7.2	10
RS02	Mangapouri S at Bennetts Rd	6.9	6.4	6.5	7.0	7.1	10
RS03	Waitohu S at Forest Pk	7.3	7.0	7.0	7.6	7.7	10
RS04	Waitohu S at Norfolk Cres	6.8	6.3	6.4	7.0	7.0	10
RS05	Otaki R at Pukehinau	7.4	6.5	6.6	7.8	7.9	10
RS06	Otaki R at Mouth	7.4	6.9	6.9	8.3	8.3	10
RS07	Mangaone S at Sims Rd Br	6.9	6.3	6.4	7.1	7.2	10
RS08	Ngarara S at Field Way	6.9	6.3	6.4	7.4	7.5	10
RS09	Waikanae R at Mangaone Walkway	7.4	6.6	6.8	7.7	7.8	10
RS10	Waikanae R at Greenaway Rd	7.3	6.7	6.8	7.7	7.8	10
RS11	Whareroa S at Waterfall Rd	7.6	7.3	7.3	7.8	7.9	10
RS12	Whareroa S at QE Park	6.8	6.4	6.5	7.1	7.1	10
RS13	Horokiri S at Snodgrass	7.4	7.0	7.0	7.8	8.0	10
RS14	Pauatahanui S at Elmwood Br	7.5	6.9	6.9	9.4	9.4	10
RS15	Porirua S at Glenside	7.5	7.2	7.2	8.5	9.0	11
RS16	Porirua S at Wall Park (Milk Depot)	7.6	7.0	7.1	9.0	9.1	11
RS17	Makara S at Kennels	7.4	7.0	7.1	7.7	7.8	11
RS18	Karori S at Makara Peak	7.4	6.9	6.9	7.8	7.9	11
RS19	Kaiwharawhara S at Ngaio Gorge	7.5	7.3	7.3	8.0	8.2	11
RS20	Hutt R at Te Marua Intake Site	7.3	6.7	6.7	7.8	7.9	11
RS21	Hutt R opp. Manor Park G.C.	7.3	6.7	6.9	7.8	7.8	11
RS22	Hutt R at Boulcott	7.2	6.6	6.8	7.6	7.6	11
RS23	Pakuratahi R 50m d/s Farm Ck	7.1	6.5	6.5	7.8	7.9	11
RS24	Mangaroa R at Te Marua	7.2	6.7	6.8	8.1	8.7	11
RS25	Akatarawa R at Hutt confl.	7.4	6.8	6.9	7.8	7.9	11
RS26	Whakatikei R at Riverstone	7.6	7.0	7.0	7.8	7.8	11
RS27	Waiwhetu S at Wainui Hill Br	6.7	6.1	6.4	7.4	7.6	11
RS28	Wainuiomata R at Manuka Track	7.3	6.4	6.6	7.8	7.9	11
RS29	Wainuiomata R u/s of White Br	7.4	6.6	6.7	9.1	9.3	11
RS30	Orongorongo R at Orongorongo Stn	7.6	7.0	7.0	7.8	7.8	11
RS31	Ruamahanga R at McLays	7.5	6.8	7.0	7.9	8.0	10
RS32	Ruamahanga R at Te Ore Ore	7.9	7.4	7.4	8.2	8.4	10
RS33	Ruamahanga R at Gladstone Br	7.7	7.2	7.2	8.3	8.6	10
RS34	Ruamahanga R at Pukio	7.7	7.3	7.4	8.1	8.3	10
RS35	Mataikona Trib at Sugar Loaf Rd	7.7	7.4	7.5	8.0	8.1	10
RS36	Taueru R at Castlehill	7.7	7.4	7.4	7.9	8.0	10
RS37	Taueru R at Gladstone	8.1	7.7	7.7	8.5	8.6	10
RS38	Kopuaranga R at Stewarts	7.7	7.3	7.4	8.2	8.2	10
RS39	Whangaehu R 250m u/s confl.	7.4	6.9	7.0	7.9	7.9	10
RS40	Waipoua R at Colombo Rd Br	7.6	7.0	7.0	7.9	7.9	11
RS41	Waingawa R at South Rd	7.6	6.8	6.8	7.9	8.0	11
RS42	Whareama R at Gauge	7.9	7.3	7.4	8.2	8.2	11
RS43	Motuwaireka S at Headwaters	7.5	7.1	7.1	7.9	8.1	11
RS44	Totara S at Stronvar	7.6	6.9	7.1	7.9	8.0	11
RS45	Parkvale Trib at Lowes Res.	6.8	6.2	6.2	7.9	8.0	8
RS46	Parkvale S at Weir	7.5	7.1	7.1	9.2	9.4	10
RS47	Waiohine R at Gorge	7.4	7.0	7.0	7.7	7.8	10
RS48	Waiohine R at Bicknells	7.2	6.4	6.4	7.5	7.5	10
RS49	Beef Ck at Headwaters	7.6	7.2	7.2	7.9	8.0	10
RS50	Mangatarere S at SH 2	6.9	6.4	6.5	7.1	7.1	10
RS51	Huangaaru R at Ponatahi Br	8.3	7.6	7.7	9.0	9.1	11
RS52	Tauanui R at Whakatomotomo Rd	7.6	7.1	7.2	7.8	7.8	11
RS53	Awhea R at Tora Rd	8.1	7.6	7.6	8.3	8.3	11
RS54	Coles Ck Trib at Lagoon Hill Rd	7.8	7.3	7.3	8.1	8.2	11
RS55	Tauherenikau R at Websters	7.5	6.9	6.9	8.0	8.0	10
RS56	Waiorongomai R at Forest Pk	7.5	6.4	6.7	7.7	7.8	11

Table A4.5: Visual Clarity (m)

Site No.	Site Name	Median	Minimum	Maximum	<i>n</i>
RS01	Mangapouri S at Rahui Rd	0.58	0.22	1.18	10
RS02	Mangapouri S at Bennetts Rd	1.02	0.49	1.80	12
RS03	Waitohu S at Forest Pk	3.10	0.67	5.23	12
RS04	Waitohu S at Norfolk Cres	0.86	0.51	1.90	12
RS05	Otaki R at Pukehinau	6.07	0.15	9.80	12
RS06	Otaki R at Mouth	4.16	0.17	9.15	12
RS07	Mangaone S at Sims Rd Br	0.82	0.08	1.55	10
RS08	Ngarara S at Field Way	0.84	0.42	2.70	12
RS09	Waikanae R at Mangaone Walkway	4.23	0.88	5.95	12
RS10	Waikanae R at Greenaway Rd	4.29	0.61	9.85	12
RS11	Whareroa S at Waterfall Rd	1.06	0.24	1.55	12
RS12	Whareroa S at QE Park	0.62	0.43	1.67	12
RS13	Horokiri S at Snodgrass	3.17	1.41	5.68	12
RS14	Pauatahanui S at Elmwood Br	2.31	0.71	3.52	12
RS15	Porirua S at Glenside	1.45	0.35	3.53	11
RS16	Porirua S at Wall Park (Milk Depot)	1.40	0.36	2.93	12
RS17	Makara S at Kennels	1.54	0.61	2.66	12
RS18	Karori S at Makara Peak	2.81	1.60	5.83	12
RS19	Kaiwharawhara S at Ngaio Gorge	2.77	0.66	4.38	12
RS20	Hutt R at Te Marua Intake Site	3.28	0.52	8.15	12
RS21	Hutt R opp. Manor Park G.C.	1.84	0.40	3.93	12
RS22	Hutt R at Boulcott	1.77	0.15	4.45	12
RS23	Pakuratahi R 50m d/s Farm Ck	3.20	1.54	6.80	12
RS24	Mangaroa R at Te Marua	1.56	0.39	3.23	12
RS25	Akatarawa R at Hutt confl.	4.22	0.73	6.90	12
RS26	Whakatikei R at Riverstone	3.83	1.09	6.38	12
RS27	Waiwhetu S at Wainui Hill Br	0.47	0.20	1.47	12
RS28	Wainuiomata R at Manuka Track	3.64	0.85	4.61	12
RS29	Wainuiomata R u/s of White Br	1.39	0.43	2.15	12
RS30	Orongorongo R at Orongorongo Stn	0.31	0.03	8.88	12
RS31	Ruamahanga R at McLays	6.24	0.37	12.7	12
RS32	Ruamahanga R at Te Ore Ore	2.31	0.13	8.11	12
RS33	Ruamahanga R at Gladstone Br	2.98	0.05	5.60	12
RS34	Ruamahanga R at Pukio	1.87	0.44	3.48	12
RS35	Mataikona Trib at Sugar Loaf Rd	2.27	0.08	3.09	12
RS36	Taueru R at Castlehill	1.80	0.25	3.50	12
RS37	Taueru R at Gladstone	0.94	0.16	4.04	12
RS38	Kopuaranga R at Stewarts	2.06	0.12	5.31	12
RS39	Whangaehu R 250m u/s confl.	1.51	0.19	4.45	12
RS40	Waipoua R at Colombo Rd Br	3.23	0.19	8.25	12
RS41	Waingawa R at South Rd	3.50	0.14	10.1	12
RS42	Whareama R at Gauge	0.98	0.08	6.32	12
RS43	Motuwaireka S at Headwaters	2.74	0.41	5.70	12
RS44	Totara S at Stronvar	2.76	0.29	7.85	12
RS45	Parkvale Trib at Lowes Res.	2.50	1.43	4.00	9
RS46	Parkvale S at Weir	1.19	0.15	3.52	12
RS47	Waiohine R at Gorge	6.21	0.12	10.8	12
RS48	Waiohine R at Bicknells	3.47	0.07	6.15	12
RS49	Beef Ck at Headwaters	2.80	1.47	3.60	11
RS50	Mangatarere S at SH 2	2.29	0.04	6.55	12
RS51	Huangaaru R at Ponatahi Br	0.61	0.09	5.50	12
RS52	Tauanui R at Whakatomotomo Rd	3.75	0.34	9.00	12
RS53	Awhea R at Tora Rd	0.95	0.03	4.02	12
RS54	Coles Ck Trib at Lagoon Hill Rd	1.51	0.19	2.71	12
RS55	Tauherenikau R at Websters	1.59	0.10	4.53	12
RS56	Waiorongomai R at Forest Pk	3.99	0.20	9.15	12

Table A4.6: Turbidity (NTU)

Site No.	Site Name	Median	Minimum	Maximum	<i>n</i>
RS01	Mangapouri S at Rahui Rd	8.5	3.8	15.9	12
RS02	Mangapouri S at Bennetts Rd	4.6	2.4	13.0	12
RS03	Waitohu S at Forest Pk	0.8	0.3	8.0	12
RS04	Waitohu S at Norfolk Cres	5.2	3.5	14.0	12
RS05	Otaki R at Pukehinau	0.6	0.3	41.3	12
RS06	Otaki R at Mouth	1.0	0.3	43.2	12
RS07	Mangaone S at Sims Rd Br	5.8	2.9	102	12
RS08	Ngarara S at Field Way	6.9	1.7	14.0	12
RS09	Waikanae R at Mangaone Walkway	0.6	0.4	8.2	12
RS10	Waikanae R at Greenaway Rd	0.8	0.3	7.2	12
RS11	Whareroa S at Waterfall Rd	3.3	2.0	29.4	12
RS12	Whareroa S at QE Park	7.7	3.5	12.2	12
RS13	Horokiri S at Snodgrass	1.0	0.5	4.7	12
RS14	Pauatahanui S at Elmwood Br	1.8	1.2	7.9	12
RS15	Porirua S at Glenside	4.0	0.8	190	12
RS16	Porirua S at Wall Park (Milk Depot)	3.0	1.9	21.3	12
RS17	Makara S at Kennels	2.6	1.0	14.5	12
RS18	Karori S at Makara Peak	1.1	0.7	1.7	12
RS19	Kaiwharawhara S at Ngaio Gorge	1.2	0.7	4.7	12
RS20	Hutt R at Te Marua Intake Site	0.9	0.3	6.2	12
RS21	Hutt R opp. Manor Park G.C.	1.8	0.4	17.8	12
RS22	Hutt R at Boulcott	2.4	0.6	73.0	12
RS23	Pakuratahi R 50m d/s Farm Ck	1.1	0.4	5.1	12
RS24	Mangaroa R at Te Marua	1.4	0.6	6.7	12
RS25	Akatarawa R at Hutt confl.	0.8	0.3	2.9	12
RS26	Whakatikei R at Riverstone	0.8	0.3	3.4	12
RS27	Waiwhetu S at Wainui Hill Br	12.0	3.6	18.2	12
RS28	Wainuiomata R at Manuka Track	1.2	0.3	3.7	12
RS29	Wainuiomata R u/s of White Br	3.0	1.0	11.9	12
RS30	Orongorongo R at Orongorongo Stn	20.0	0.5	290	12
RS31	Ruamahanga R at McLays	0.3	0.2	150	12
RS32	Ruamahanga R at Te Ore Ore	1.1	0.3	502	12
RS33	Ruamahanga R at Gladstone Br	0.7	0.4	223	12
RS34	Ruamahanga R at Pukio	2.3	0.7	18.7	12
RS35	Mataikona Trib at Sugar Loaf Rd	1.4	0.3	249	12
RS36	Taueru R at Castlehill	3.0	1.5	27.9	12
RS37	Taueru R at Gladstone	5.7	0.9	224	12
RS38	Kopuaranga R at Stewarts	1.3	0.5	220	12
RS39	Whangaehu R 250m u/s confl.	2.0	0.5	185	12
RS40	Waipoua R at Colombo Rd Br	0.6	0.2	812	12
RS41	Waingawa R at South Rd	0.7	0.3	1,180	12
RS42	Whareama R at Gauge	5.6	0.9	489	12
RS43	Motuwaireka S at Headwaters	1.2	0.1	78.6	12
RS44	Totara S at Stronvar	0.6	0.2	38.1	12
RS45	Parkvale Trib at Lowes Res.	0.9	0.3	11.2	10
RS46	Parkvale S at Weir	2.9	1.9	40.3	12
RS47	Waiohine R at Gorge	0.5	0.2	89.5	12
RS48	Waiohine R at Bicknells	0.8	0.6	141	12
RS49	Beef Ck at Headwaters	0.6	0.5	17.5	12
RS50	Mangatarere S at SH 2	1.3	0.5	362	12
RS51	Huangaaru R at Ponatahi Br	8.0	0.6	75.4	12
RS52	Tauanui R at Whakatomotomo Rd	0.6	0.2	12.2	12
RS53	Awhea R at Tora Rd	5.6	1.0	1,050	12
RS54	Coles Ck Trib at Lagoon Hill Rd	5.7	1.2	250	12
RS55	Tauherenikau R at Websters	2.0	1.0	94.0	12
RS56	Waiorongomai R at Forest Pk	0.6	0.3	13.0	12

Table A4.7: Conductivity ($\mu\text{S}/\text{cm}$)

Site No.	Site Name	Median	Minimum	5 th percentile	95 th percentile	Maximum	<i>n</i>
RS01	Mangapouri S at Rahui Rd	221	201	201	229	233	12
RS02	Mangapouri S at Bennetts Rd	228	182	184	243	245	12
RS03	Waitohu S at Forest Pk	88	81	82	99	104	12
RS04	Waitohu S at Norfolk Cres	161	112	121	192	197	12
RS05	Otaki R at Pukehinau	69	49	54	81	86	12
RS06	Otaki R at Mouth	72	53	56	98	120	12
RS07	Mangaone S at Sims Rd Br	205	0	79	232	237	12
RS08	Ngarara S at Field Way	370	243	280	3,437	4,430	12
RS09	Waikanae R at Mangaone Walkway	89	75	76	97	100	12
RS10	Waikanae R at Greenaway Rd	107	91	93	117	120	12
RS11	Whareroa S at Waterfall Rd	254	219	226	272	276	12
RS12	Whareroa S at QE Park	296	239	249	377	453	12
RS13	Horokiri S at Snodgrass	190	168	175	205	206	12
RS14	Pauatahanui S at Elmwood Br	187	163	164	199	200	12
RS15	Porirua S at Glenside	249	197	213	274	279	12
RS16	Porirua S at Wall Park (Milk Depot)	266	229	232	359	442	12
RS17	Makara S at Kennels	282	197	228	318	322	12
RS18	Karori S at Makara Peak	228	176	203	235	237	12
RS19	Kaiwharawhara S at Ngaio Gorge	282	226	247	311	315	12
RS20	Hutt R at Te Marua Intake Site	72	0	30	102	121	12
RS21	Hutt R opp. Manor Park G.C.	91	74	76	124	145	12
RS22	Hutt R at Boulcott	91	71	75	123	139	12
RS23	Pakuratahi R 50m d/s Farm Ck	84	76	77	114	142	12
RS24	Mangaroa R at Te Marua	105	0	51	135	161	12
RS25	Akatarawa R at Hutt confl.	82	65	69	109	130	12
RS26	Whakatikei R at Riverstone	100	72	74	139	160	12
RS27	Waiwhetu S at Wainui Hill Br	251	97	125	3,781	6,971	12
RS28	Wainuiomata R at Manuka Track	107	94	94	137	162	12
RS29	Wainuiomata R u/s of White Br	150	125	126	243	306	12
RS30	Orongorongo R at Orongorongo Stn	148	118	123	184	208	12
RS31	Ruamahanga R at McLays	59	39	40	66	66	12
RS32	Ruamahanga R at Te Ore Ore	159	77	87	195	199	12
RS33	Ruamahanga R at Gladstone Br	126	62	75	155	158	12
RS34	Ruamahanga R at Pukio	141	97	97	161	169	12
RS35	Mataikona Trib at Sugar Loaf Rd	354	99	105	514	524	12
RS36	Taueru R at Castlehill	236	153	154	300	303	12
RS37	Taueru R at Gladstone	398	232	276	483	537	12
RS38	Kopuaranga R at Stewarts	302	144	180	373	374	12
RS39	Whangaehu R 250m u/s confl.	282	140	180	377	384	12
RS40	Waipoua R at Colombo Rd Br	102	68	76	125	128	12
RS41	Waingawa R at South Rd	65	49	50	85	96	12
RS42	Whareama R at Gauge	471	355	362	612	676	12
RS43	Motuwaireka S at Headwaters	200	102	113	358	383	12
RS44	Totara S at Stronvar	237	98	136	417	438	12
RS45	Parkvale Trib at Lowes Res.	179	109	115	186	186	10
RS46	Parkvale S at Weir	155	134	139	182	190	12
RS47	Waiohine R at Gorge	59	45	50	78	85	12
RS48	Waiohine R at Bicknells	76	59	61	86	89	12
RS49	Beef Ck at Headwaters	108	75	83	143	162	12
RS50	Mangatarere S at SH 2	128	81	92	155	165	12
RS51	Huangaaru R at Ponatahi Br	362	246	251	421	433	12
RS52	Tauanui R at Whakatomotomo Rd	150	108	116	183	186	12
RS53	Awhea R at Tora Rd	425	216	246	548	551	12
RS54	Coles Ck Trib at Lagoon Hill Rd	410	194	216	2,005	2,400	12
RS55	Tauherenikau R at Websters	72	52	54	82	85	12
RS56	Waiorongomai R at Forest Pk	117	94	101	145	152	12

Table A4.8: Total Organic Carbon (mg/L)

Site No.	Site Name	Median	Minimum	Maximum	n
RS01	Mangapouri S at Rahui Rd	5.6	<0.5	13.1	12
RS02	Mangapouri S at Bennetts Rd	5.2	2.6	11.7	12
RS03	Waitohu S at Forest Pk	1.5	1.1	4.9	12
RS04	Waitohu S at Norfolk Cres	4.1	2.1	6.2	12
RS05	Otaki R at Pukehinau	0.8	0.6	3.0	12
RS06	Otaki R at Mouth	0.7	0.5	4.7	12
RS07	Mangaone S at Sims Rd Br	4.1	2.3	12.9	12
RS08	Ngarara S at Field Way	12.0	3.0	18.5	12
RS09	Waikanae R at Mangaone Walkway	1.1	0.6	4.1	12
RS10	Waikanae R at Greenaway Rd	0.8	0.6	2.4	12
RS11	Whareoa S at Waterfall Rd	3.3	1.8	5.4	12
RS12	Whareoa S at QE Park	11.5	5.9	23.0	12
RS13	Horokiri S at Snodgrass	1.9	1.2	3.0	12
RS14	Pauatahanui S at Elmwood Br	3.8	2.5	6.5	12
RS15	Porirua S at Glenside	4.0	1.7	13.0	12
RS16	Porirua S at Wall Park (Milk Depot)	3.9	1.5	6.3	12
RS17	Makara S at Kennels	5.1	1.9	8.6	12
RS18	Karori S at Makara Peak	2.4	<0.5	4.4	12
RS19	Kaiwharawhara S at Ngaio Gorge	3.7	1.6	4.8	12
RS20	Hutt R at Te Marua Intake Site	2.7	0.9	4.5	12
RS21	Hutt R opp. Manor Park G.C.	2.8	1.2	4.3	12
RS22	Hutt R at Boulcott	2.5	1.4	3.9	12
RS23	Pakuratahi R 50m d/s Farm Ck	3.0	0.8	5.8	12
RS24	Mangaroa R at Te Marua	3.6	1.9	6.4	12
RS25	Akatarawa R at Hutt confl.	1.9	0.9	3.3	12
RS26	Whakatikei R at Riverstone	1.7	1.0	3.8	12
RS27	Waiwhetu S at Wainui Hill Br	4.5	2.4	6.9	12
RS28	Wainuiomata R at Manuka Track	2.8	0.8	8.2	12
RS29	Wainuiomata R u/s of White Br	2.4	1.0	5.8	12
RS30	Orongorongo R at Orongorongo Stn	1.9	<0.5	7.4	12
RS31	Ruamahanga R at McLays	0.9	<0.5	16.9	12
RS32	Ruamahanga R at Te Ore Ore	1.9	1.0	15.7	12
RS33	Ruamahanga R at Gladstone Br	1.7	<0.5	9.6	12
RS34	Ruamahanga R at Pukio	1.9	0.6	2.8	12
RS35	Mataikona Trib at Sugar Loaf Rd	2.8	1.0	9.9	12
RS36	Taueru R at Castlehill	5.7	4.3	10.0	12
RS37	Taueru R at Gladstone	5.6	1.1	13.2	12
RS38	Kopuaranga R at Stewarts	3.6	1.0	22.5	12
RS39	Whangaeu R 250m u/s confl.	5.3	2.3	9.1	12
RS40	Waipoua R at Colombo Rd Br	1.6	<0.5	33.7	12
RS41	Waingawa R at South Rd	0.9	<0.5	17.6	12
RS42	Whareama R at Gauge	6.7	4.0	15.1	11
RS43	Motuwaireka S at Headwaters	2.0	0.6	9.2	12
RS44	Totara S at Stronvar	3.4	<0.5	17.0	12
RS45	Parkvale Trib at Lowes Res.	4.2	1.3	11.2	10
RS46	Parkvale S at Weir	5.7	4.2	14.3	12
RS47	Waiohine R at Gorge	1.1	<0.5	5.7	12
RS48	Waiohine R at Bicknells	0.9	0.5	6.8	12
RS49	Beef Ck at Headwaters	1.7	0.8	3.4	12
RS50	Mangatarere S at SH 2	1.9	1.0	11.6	12
RS51	Huangarua R at Ponatahi Br	4.7	1.8	9.5	12
RS52	Tauanui R at Whakatomotomo Rd	2.4	0.7	12.0	12
RS53	Awhea R at Tora Rd	3.9	1.9	25.0	12
RS54	Coles Ck Trib at Lagoon Hill Rd	7.0	1.8	20.0	12
RS55	Tauherenikau R at Websters	1.1	0.6	6.1	12
RS56	Waiorongomai R at Forest Pk	3.0	0.5	13.0	12

Table A4.9: Ammoniacal Nitrogen (mg/L)

Site No.	Site Name	Median	Minimum	Maximum	<i>n</i>
RS01	Mangapouri S at Rahui Rd	0.005	<0.010	0.06	12
RS02	Mangapouri S at Bennetts Rd	0.037	<0.010	0.12	12
RS03	Waitohu S at Forest Pk	0.005	<0.010	0.01	12
RS04	Waitohu S at Norfolk Cres	0.030	<0.010	0.05	12
RS05	Otaki R at Pukehinau	0.005	<0.010	0.01	12
RS06	Otaki R at Mouth	0.005	<0.010	0.01	12
RS07	Mangaone S at Sims Rd Br	0.089	0.020	0.17	12
RS08	Ngarara S at Field Way	0.040	0.010	0.10	12
RS09	Waikanae R at Mangaone Walkway	0.005	<0.010	0.01	12
RS10	Waikanae R at Greenaway Rd	0.005	<0.010	0.01	12
RS11	Whareroa S at Waterfall Rd	0.005	<0.010	0.26	12
RS12	Whareroa S at QE Park	0.102	<0.010	0.22	12
RS13	Horokiri S at Snodgrass	0.005	<0.010	0.02	12
RS14	Pauatahanui S at Elmwood Br	0.008	<0.010	0.02	12
RS15	Porirua S at Glenside	0.005	<0.010	0.02	12
RS16	Porirua S at Wall Park (Milk Depot)	0.008	<0.010	0.85	12
RS17	Makara S at Kennels	0.008	<0.010	0.08	12
RS18	Karori S at Makara Peak	0.011	<0.010	0.05	12
RS19	Kaiwharawhara S at Ngaio Gorge	0.020	<0.010	0.62	12
RS20	Hutt R at Te Marua Intake Site	0.005	<0.010	0.05	12
RS21	Hutt R opp. Manor Park G.C.	0.005	<0.010	0.02	12
RS22	Hutt R at Boulcott	0.005	<0.010	0.01	12
RS23	Pakuratahi R 50m d/s Farm Ck	0.005	<0.010	0.03	12
RS24	Mangaroa R at Te Marua	0.005	<0.010	0.02	12
RS25	Akatarawa R at Hutt confl.	0.005	<0.010	0.04	12
RS26	Whakatikei R at Riverstone	0.005	<0.010	0.06	12
RS27	Waiwhetu S at Wainui Hill Br	0.089	<0.010	0.21	12
RS28	Wainuiomata R at Manuka Track	0.005	<0.010	0.02	12
RS29	Wainuiomata R u/s of White Br	0.009	<0.010	0.04	12
RS30	Orongorongo R at Orongorongo Stn	0.005	<0.010	0.01	12
RS31	Ruamahanga R at McLays	0.005	<0.010	0.01	12
RS32	Ruamahanga R at Te Ore Ore	0.005	<0.010	0.04	12
RS33	Ruamahanga R at Gladstone Br	0.019	<0.010	0.08	12
RS34	Ruamahanga R at Pukio	0.005	<0.010	0.04	12
RS35	Mataikona Trib at Sugar Loaf Rd	0.005	<0.010	0.03	12
RS36	Taueru R at Castlehill	0.005	<0.010	0.09	12
RS37	Taueru R at Gladstone	0.005	<0.010	0.05	12
RS38	Kopuaranga R at Stewarts	0.005	<0.010	0.23	12
RS39	Whangaehu R 250m u/s confl.	0.005	<0.010	0.04	12
RS40	Waipoua R at Colombo Rd Br	0.005	<0.010	0.11	12
RS41	Waingawa R at South Rd	0.005	<0.010	0.02	12
RS42	Whareama R at Gauge	0.005	<0.010	0.12	12
RS43	Motuwaireka S at Headwaters	0.005	<0.010	0.04	12
RS44	Totara S at Stronvar	0.005	<0.010	0.03	12
RS45	Parkvale Trib at Lowes Res.	0.005	<0.010	0.01	10
RS46	Parkvale S at Weir	0.017	<0.010	0.11	12
RS47	Waiohine R at Gorge	0.005	<0.010	0.01	12
RS48	Waiohine R at Bicknells	0.008	<0.010	0.04	12
RS49	Beef Ck at Headwaters	0.005	<0.010	0.05	12
RS50	Mangatarere S at SH 2	0.160	<0.010	0.26	12
RS51	Huangarua R at Ponatahi Br	0.005	<0.010	0.01	12
RS52	Tauanui R at Whakatomotomo Rd	0.005	<0.010	0.02	12
RS53	Awhea R at Tora Rd	0.005	<0.010	0.02	12
RS54	Coles Ck Trib at Lagoon Hill Rd	0.005	<0.010	0.08	12
RS55	Tauherenikau R at Websters	0.005	<0.010	0.01	12
RS56	Waiorongomai R at Forest Pk	0.005	<0.010	0.01	12

Table A4.10: Nitrite-Nitrate Nitrogen (mg/L)

Site No.	Site Name	Median	Minimum	Maximum	<i>n</i>
RS01	Mangapouri S at Rahui Rd	7.715	3.390	8.900	12
RS02	Mangapouri S at Bennetts Rd	2.090	1.100	3.350	12
RS03	Waitohu S at Forest Pk	0.029	<0.002	0.310	12
RS04	Waitohu S at Norfolk Cres	0.550	0.280	0.951	12
RS05	Otaki R at Pukehinau	0.049	0.008	0.190	12
RS06	Otaki R at Mouth	0.058	<0.002	0.680	12
RS07	Mangaone S at Sims Rd Br	2.220	0.905	3.000	12
RS08	Ngarara S at Field Way	0.413	0.014	0.814	12
RS09	Waikanae R at Mangaone Walkway	0.115	0.032	0.255	12
RS10	Waikanae R at Greenaway Rd	0.235	0.048	0.420	12
RS11	Wharetoa S at Waterfall Rd	0.255	0.029	0.652	12
RS12	Wharetoa S at QE Park	0.322	0.055	1.300	12
RS13	Horokiri S at Snodgrass	0.466	0.079	0.984	12
RS14	Pauatahanui S at Elmwood Br	0.190	0.013	0.632	12
RS15	Porirua S at Glenside	1.145	0.670	1.840	12
RS16	Porirua S at Wall Park (Milk Depot)	1.075	0.490	1.930	12
RS17	Makara S at Kennels	0.405	<0.002	1.290	12
RS18	Karori S at Makara Peak	1.400	0.960	1.600	12
RS19	Kaiwharawhara S at Ngaio Gorge	1.170	0.730	1.500	12
RS20	Hutt R at Te Marua Intake Site	0.094	0.034	0.210	12
RS21	Hutt R opp. Manor Park G.C.	0.215	0.150	0.990	12
RS22	Hutt R at Boulcott	0.210	0.140	0.330	12
RS23	Pakuratahi R 50m d/s Farm Ck	0.220	0.100	2.400	12
RS24	Mangaroa R at Te Marua	0.539	0.270	1.600	12
RS25	Akatarawa R at Hutt confl.	0.125	0.014	0.430	12
RS26	Whakatikei R at Riverstone	0.140	0.022	0.690	12
RS27	Waiwhetu S at Wainui Hill Br	0.335	0.016	0.888	12
RS28	Wainuiomata R at Manuka Track	0.096	0.022	0.140	12
RS29	Wainuiomata R u/s of White Br	0.145	0.003	0.570	12
RS30	Orongorongo R at Orongorongo Stn	0.084	0.025	0.150	12
RS31	Ruamahanga R at McLays	0.035	0.009	1.900	12
RS32	Ruamahanga R at Te Ore Ore	0.517	0.141	1.800	12
RS33	Ruamahanga R at Gladstone Br	0.479	0.147	1.000	12
RS34	Ruamahanga R at Pukio	0.310	<0.002	0.970	12
RS35	Mataikona Trib at Sugar Loaf Rd	0.078	<0.002	0.700	12
RS36	Taueru R at Castlehill	0.062	0.002	0.620	12
RS37	Taueru R at Gladstone	1.039	0.280	1.600	12
RS38	Kopuaranga R at Stewarts	1.095	0.455	1.800	12
RS39	Whangaeahu R 250m u/s confl.	0.980	0.250	2.700	12
RS40	Waipoua R at Colombo Rd Br	0.957	0.008	1.900	12
RS41	Waingawa R at South Rd	0.095	0.024	1.000	12
RS42	Whareama R at Gauge	0.020	<0.002	0.523	12
RS43	Motuwaireka S at Headwaters	0.145	<0.002	0.560	12
RS44	Totara S at Stronvar	0.116	<0.002	0.540	12
RS45	Parkvale Trib at Lowes Res.	4.700	0.120	5.800	10
RS46	Parkvale S at Weir	1.330	0.078	3.800	12
RS47	Waiohine R at Gorge	0.028	0.007	0.290	12
RS48	Waiohine R at Bicknells	0.254	0.065	0.830	12
RS49	Beef Ck at Headwaters	0.057	0.012	2.000	12
RS50	Mangatarere S at SH 2	1.435	0.350	2.200	12
RS51	Huangaaru R at Ponatahi Br	0.184	<0.002	0.480	12
RS52	Tauanui R at Whakatomotomo Rd	0.014	0.005	0.061	12
RS53	Awhea R at Tora Rd	0.003	<0.002	0.350	12
RS54	Coles Ck Trib at Lagoon Hill Rd	0.020	0.002	0.097	12
RS55	Tauherenikau R at Websters	0.029	<0.002	0.170	12
RS56	Waiorongomai R at Forest Pk	0.015	0.004	0.044	12

Table A4.11: Total Kjeldahl Nitrogen (mg/L)

Site No.	Site Name	Median	Minimum	Maximum	<i>n</i>
RS01	Mangapouri S at Rahui Rd	0.69	0.4	1.3	12
RS02	Mangapouri S at Bennetts Rd	0.58	0.4	1.2	12
RS03	Waitohu S at Forest Pk	0.05	<0.1	0.2	12
RS04	Waitohu S at Norfolk Cres	0.39	0.2	0.6	12
RS05	Otaki R at Pukehinau	0.05	<0.1	0.2	12
RS06	Otaki R at Mouth	0.05	<0.1	0.1	12
RS07	Mangaone S at Sims Rd Br	0.47	0.3	1.5	12
RS08	Ngarara S at Field Way	0.63	0.2	1.0	12
RS09	Waikanae R at Mangaone Walkway	0.05	<0.1	0.2	12
RS10	Waikanae R at Greenaway Rd	0.05	<0.1	0.1	12
RS11	Whareroa S at Waterfall Rd	0.20	0.1	0.3	12
RS12	Whareroa S at QE Park	0.59	0.4	1.1	12
RS13	Horokiri S at Snodgrass	0.18	0.1	0.3	12
RS14	Pauatahanui S at Elmwood Br	0.21	0.2	0.6	12
RS15	Porirua S at Glenside	0.30	0.2	0.9	12
RS16	Porirua S at Wall Park (Milk Depot)	0.30	<0.1	1.6	12
RS17	Makara S at Kennels	0.40	0.2	0.9	12
RS18	Karori S at Makara Peak	0.24	<0.1	0.4	12
RS19	Kaiwharawhara S at Ngaio Gorge	0.31	0.2	1.7	12
RS20	Hutt R at Te Marua Intake Site	0.05	<0.1	0.2	12
RS21	Hutt R opp. Manor Park G.C.	0.12	<0.1	0.2	12
RS22	Hutt R at Boulcott	0.13	<0.1	0.2	12
RS23	Pakuratahi R 50m d/s Farm Ck	0.11	<0.1	0.2	12
RS24	Mangaroa R at Te Marua	0.19	<0.1	0.4	12
RS25	Akatarawa R at Hutt confl.	0.05	<0.1	0.2	12
RS26	Whakatikei R at Riverstone	0.05	<0.1	0.2	12
RS27	Waiwhetu S at Wainui Hill Br	0.50	0.2	0.8	12
RS28	Wainuiomata R at Manuka Track	0.08	<0.1	0.3	12
RS29	Wainuiomata R u/s of White Br	0.19	<0.1	0.3	12
RS30	Orongorongo R at Orongorongo Stn	0.08	<0.1	0.7	12
RS31	Ruamahanga R at McLays	0.05	<0.1	1.9	12
RS32	Ruamahanga R at Te Ore Ore	0.14	<0.1	1.7	12
RS33	Ruamahanga R at Gladstone Br	0.18	<0.1	1.3	12
RS34	Ruamahanga R at Pukio	0.20	<0.1	0.4	12
RS35	Mataikona Trib at Sugar Loaf Rd	0.13	<0.1	0.7	12
RS36	Taueru R at Castlehill	0.40	0.2	2.4	12
RS37	Taueru R at Gladstone	0.39	0.2	1.8	12
RS38	Kopuaranga R at Stewarts	0.30	0.2	2.9	12
RS39	Whangaehu R 250m u/s confl.	0.42	0.2	0.7	12
RS40	Waipoua R at Colombo Rd Br	0.20	<0.1	4.3	12
RS41	Waingawa R at South Rd	0.05	<0.1	1.9	12
RS42	Whareama R at Gauge	0.40	0.3	1.8	12
RS43	Motuwaireka S at Headwaters	0.08	<0.1	0.4	12
RS44	Totara S at Stronvar	0.13	<0.1	0.5	12
RS45	Parkvale Trib at Lowes Res.	0.40	0.3	0.7	10
RS46	Parkvale S at Weir	0.60	0.4	1.6	12
RS47	Waiohine R at Gorge	0.05	<0.1	0.3	12
RS48	Waiohine R at Bicknells	0.08	<0.1	0.6	12
RS49	Beef Ck at Headwaters	0.05	<0.1	0.4	12
RS50	Mangatarere S at SH 2	0.44	0.2	1.8	12
RS51	Huangaaru R at Ponatahi Br	0.21	0.1	0.8	12
RS52	Tauanui R at Whakatomotomo Rd	0.05	<0.1	0.3	12
RS53	Awhea R at Tora Rd	0.24	0.2	2.6	12
RS54	Coles Ck Trib at Lagoon Hill Rd	0.38	<0.1	1.1	12
RS55	Tauherenikau R at Websters	0.05	<0.1	0.2	12
RS56	Waiorongomai R at Forest Pk	0.05	<0.1	1.2	12

Table A4.12: Total Nitrogen (mg/L)

Site No.	Site Name	Median	Minimum	Maximum	n
RS01	Mangapouri S at Rahui Rd	8.40	4.7	9.5	12
RS02	Mangapouri S at Bennetts Rd	2.95	1.5	3.9	12
RS03	Waitohu S at Forest Pk	0.06	<0.1	0.4	12
RS04	Waitohu S at Norfolk Cres	0.93	0.7	1.4	12
RS05	Otaki R at Pukehinau	0.06	<0.1	0.3	12
RS06	Otaki R at Mouth	0.06	<0.1	0.7	12
RS07	Mangaone S at Sims Rd Br	2.70	1.9	3.4	12
RS08	Ngarara S at Field Way	1.05	0.4	1.7	12
RS09	Waikanae R at Mangaone Walkway	0.17	<0.1	0.5	12
RS10	Waikanae R at Greenaway Rd	0.31	0.1	0.5	12
RS11	Whareroa S at Waterfall Rd	0.43	0.2	0.9	12
RS12	Whareroa S at QE Park	0.95	0.5	1.7	12
RS13	Horokiri S at Snodgrass	0.66	0.2	1.3	12
RS14	Pauatahanui S at Elmwood Br	0.48	0.2	1.2	12
RS15	Porirua S at Glenside	1.50	1.0	2.5	12
RS16	Porirua S at Wall Park (Milk Depot)	1.40	0.7	2.9	12
RS17	Makara S at Kennels	0.92	0.3	2.1	12
RS18	Karori S at Makara Peak	1.70	1.2	1.8	12
RS19	Kaiwharawhara S at Ngaio Gorge	1.50	1.1	3.0	12
RS20	Hutt R at Te Marua Intake Site	0.17	<0.1	0.3	12
RS21	Hutt R opp. Manor Park G.C.	0.33	0.3	1.0	12
RS22	Hutt R at Boulcott	0.36	0.2	0.4	12
RS23	Pakuratahi R 50m d/s Farm Ck	0.36	0.3	2.5	12
RS24	Mangaroa R at Te Marua	0.81	0.5	1.8	12
RS25	Akatarawa R at Hutt confl.	0.19	0.1	0.4	12
RS26	Whakatikei R at Riverstone	0.20	<0.1	0.8	12
RS27	Waiwhetu S at Wainui Hill Br	0.90	0.5	1.5	12
RS28	Wainuiomata R at Manuka Track	0.20	<0.1	0.4	12
RS29	Wainuiomata R u/s of White Br	0.35	<0.1	0.9	12
RS30	Orongorongo R at Orongorongo Stn	0.21	<0.1	0.7	12
RS31	Ruamahanga R at McLays	0.06	<0.1	1.9	12
RS32	Ruamahanga R at Te Ore Ore	0.73	0.4	1.9	12
RS33	Ruamahanga R at Gladstone Br	0.72	0.3	1.4	12
RS34	Ruamahanga R at Pukio	0.50	<0.1	1.2	12
RS35	Mataikona Trib at Sugar Loaf Rd	0.27	<0.1	0.9	12
RS36	Taueru R at Castlehill	0.73	0.2	2.4	12
RS37	Taueru R at Gladstone	1.60	0.9	2.1	12
RS38	Kopuaranga R at Stewarts	1.45	0.9	3.4	12
RS39	Whangaehu R 250m u/s confl.	1.50	0.5	2.9	12
RS40	Waipoua R at Colombo Rd Br	1.25	<0.1	4.6	12
RS41	Waingawa R at South Rd	0.17	<0.1	2.3	12
RS42	Whareama R at Gauge	0.40	0.3	2.0	12
RS43	Motuwaireka S at Headwaters	0.26	<0.1	1.0	12
RS44	Totara S at Stronvar	0.26	0.1	0.7	12
RS45	Parkvale Trib at Lowes Res.	5.10	0.5	6.1	10
RS46	Parkvale S at Weir	2.15	0.6	4.5	12
RS47	Waiohine R at Gorge	0.06	<0.1	0.4	12
RS48	Waiohine R at Bicknells	0.44	0.2	0.9	12
RS49	Beef Ck at Headwaters	0.16	<0.1	2.4	12
RS50	Mangatarere S at SH 2	2.00	1.1	2.6	12
RS51	Huangarua R at Ponatahi Br	0.45	0.1	1.3	12
RS52	Tauanui R at Whakatomotomo Rd	0.12	<0.1	0.4	12
RS53	Awhea R at Tora Rd	0.27	0.2	2.9	12
RS54	Coles Ck Trib at Lagoon Hill Rd	0.38	<0.1	1.1	12
RS55	Tauherenikau R at Websters	0.08	<0.1	0.2	12
RS56	Waiorongomai R at Forest Pk	0.08	<0.1	1.2	12

Table A4.13: Dissolved Reactive Phosphorus (mg/L)

Site No.	Site Name	Median	Minimum	Maximum	n
RS01	Mangapouri S at Rahui Rd	0.009	0.004	0.016	12
RS02	Mangapouri S at Bennetts Rd	0.032	0.013	0.048	12
RS03	Waitohu S at Forest Pk	0.005	0.005	0.008	12
RS04	Waitohu S at Norfolk Cres	0.017	0.011	0.027	12
RS05	Otaki R at Pukehinau	0.002	<0.004	0.005	12
RS06	Otaki R at Mouth	0.002	<0.004	0.007	12
RS07	Mangaone S at Sims Rd Br	0.021	0.010	0.055	12
RS08	Ngarara S at Field Way	0.045	0.013	0.067	12
RS09	Waikanae R at Mangaone Walkway	0.011	0.006	0.013	12
RS10	Waikanae R at Greenaway Rd	0.006	<0.004	0.009	12
RS11	Whareroa S at Waterfall Rd	0.037	0.027	0.049	12
RS12	Whareroa S at QE Park	0.055	0.036	0.070	12
RS13	Horokiri S at Snodgrass	0.013	0.005	0.017	12
RS14	Pauatahanui S at Elmwood Br	0.016	0.006	0.033	12
RS15	Porirua S at Glenside	0.020	<0.004	0.032	12
RS16	Porirua S at Wall Park (Milk Depot)	0.020	0.006	0.030	12
RS17	Makara S at Kennels	0.038	0.007	0.061	12
RS18	Karori S at Makara Peak	0.041	0.029	0.087	12
RS19	Kaiwharawhara S at Ngaio Gorge	0.046	0.030	0.180	12
RS20	Hutt R at Te Marua Intake Site	0.002	<0.004	0.005	12
RS21	Hutt R opp. Manor Park G.C.	0.002	<0.004	0.010	12
RS22	Hutt R at Boulcott	0.002	<0.004	0.007	12
RS23	Pakuratahi R 50m d/s Farm Ck	0.004	<0.004	0.013	12
RS24	Mangaroa R at Te Marua	0.006	<0.004	0.018	12
RS25	Akatarawa R at Hutt confl.	0.002	<0.004	0.005	12
RS26	Whakatikei R at Riverstone	0.005	<0.004	0.025	12
RS27	Waiwhetu S at Wainui Hill Br	0.040	0.010	0.130	12
RS28	Wainuiomata R at Manuka Track	0.009	0.005	0.011	12
RS29	Wainuiomata R u/s of White Br	0.016	<0.004	0.046	12
RS30	Orongorongo R at Orongorongo Stn	0.005	<0.004	0.008	12
RS31	Ruamahanga R at McLays	0.002	<0.004	0.005	12
RS32	Ruamahanga R at Te Ore Ore	0.006	<0.004	0.019	12
RS33	Ruamahanga R at Gladstone Br	0.044	0.021	0.057	12
RS34	Ruamahanga R at Pukio	0.016	<0.004	0.030	12
RS35	Mataikona Trib at Sugar Loaf Rd	0.002	<0.004	0.007	12
RS36	Taueru R at Castlehill	0.008	0.004	0.031	12
RS37	Taueru R at Gladstone	0.008	<0.004	0.043	12
RS38	Kopuaranga R at Stewarts	0.014	0.005	0.243	12
RS39	Whangaehu R 250m u/s confl.	0.022	0.007	0.061	12
RS40	Waipoua R at Colombo Rd Br	0.002	<0.004	0.131	12
RS41	Waingawa R at South Rd	0.002	<0.004	0.015	12
RS42	Whareama R at Gauge	0.005	<0.004	0.027	12
RS43	Motuwaireka S at Headwaters	0.002	<0.004	0.011	12
RS44	Totara S at Stronvar	0.002	<0.004	0.004	12
RS45	Parkvale Trib at Lowes Res.	0.015	<0.004	0.039	10
RS46	Parkvale S at Weir	0.043	0.018	0.088	12
RS47	Waiohine R at Gorge	0.002	<0.004	0.006	12
RS48	Waiohine R at Bicknells	0.020	0.008	0.058	12
RS49	Beef Ck at Headwaters	0.007	0.005	0.088	12
RS50	Mangatarere S at SH 2	0.131	0.049	0.450	12
RS51	Huangarua R at Ponatahi Br	0.005	<0.004	0.022	12
RS52	Tauanui R at Whakatomotomo Rd	0.006	<0.004	0.010	12
RS53	Awhea R at Tora Rd	0.002	<0.004	0.015	12
RS54	Coles Ck Trib at Lagoon Hill Rd	0.002	<0.004	0.011	12
RS55	Tauherenikau R at Websters	0.002	<0.004	0.005	12
RS56	Waiorongomai R at Forest Pk	0.002	<0.004	0.002	12

Table A4.14: Total Phosphorus (mg/L)

Site No.	Site Name	Median	Minimum	Maximum	<i>n</i>
RS01	Mangapouri S at Rahui Rd	0.038	0.024	0.069	12
RS02	Mangapouri S at Bennetts Rd	0.060	0.049	0.112	12
RS03	Waitohu S at Forest Pk	0.012	0.007	0.035	12
RS04	Waitohu S at Norfolk Cres	0.055	0.041	0.090	12
RS05	Otaki R at Pukehinau	0.007	0.004	0.073	12
RS06	Otaki R at Mouth	0.007	<0.004	0.051	12
RS07	Mangaone S at Sims Rd Br	0.060	0.031	0.220	12
RS08	Ngarara S at Field Way	0.085	0.039	0.140	12
RS09	Waikanae R at Mangaone Walkway	0.017	0.012	0.028	12
RS10	Waikanae R at Greenaway Rd	0.014	0.005	0.026	12
RS11	Whareroa S at Waterfall Rd	0.047	0.032	0.067	12
RS12	Whareroa S at QE Park	0.085	0.061	0.114	12
RS13	Horokiri S at Snodgrass	0.025	0.012	0.160	12
RS14	Pauatahanui S at Elmwood Br	0.033	0.017	0.065	12
RS15	Porirua S at Glenside	0.034	0.009	0.270	12
RS16	Porirua S at Wall Park (Milk Depot)	0.036	0.017	0.067	12
RS17	Makara S at Kennels	0.062	0.019	0.088	12
RS18	Karori S at Makara Peak	0.051	0.026	0.096	12
RS19	Kaiwharawhara S at Ngaio Gorge	0.054	0.036	0.238	12
RS20	Hutt R at Te Marua Intake Site	0.009	<0.004	0.015	12
RS21	Hutt R opp. Manor Park G.C.	0.012	<0.004	0.035	12
RS22	Hutt R at Boulcott	0.015	<0.004	0.086	12
RS23	Pakuratahi R 50m d/s Farm Ck	0.009	<0.004	0.022	12
RS24	Mangaroa R at Te Marua	0.015	0.008	0.045	12
RS25	Akatarawa R at Hutt confl.	0.007	<0.004	0.012	12
RS26	Whakatikei R at Riverstone	0.011	<0.004	0.066	12
RS27	Waiwhetu S at Wainui Hill Br	0.095	0.038	0.290	12
RS28	Wainuiomata R at Manuka Track	0.018	0.006	0.760	12
RS29	Wainuiomata R u/s of White Br	0.033	<0.004	0.068	12
RS30	Orongorongo R at Orongorongo Stn	0.018	<0.004	0.350	12
RS31	Ruamahanga R at McLays	0.004	<0.004	0.293	12
RS32	Ruamahanga R at Te Ore Ore	0.012	0.008	0.697	12
RS33	Ruamahanga R at Gladstone Br	0.051	0.034	0.485	12
RS34	Ruamahanga R at Pukio	0.032	0.014	0.065	12
RS35	Mataikona Trib at Sugar Loaf Rd	0.010	<0.004	0.315	12
RS36	Taueru R at Castlehill	0.028	0.019	0.073	12
RS37	Taueru R at Gladstone	0.045	0.012	0.322	12
RS38	Kopuaranga R at Stewarts	0.033	0.019	0.595	12
RS39	Whangaehu R 250m u/s confl.	0.053	0.015	0.245	12
RS40	Waipoua R at Colombo Rd Br	0.008	<0.004	1.080	12
RS41	Waingawa R at South Rd	0.005	<0.004	1.110	12
RS42	Whareama R at Gauge	0.030	0.009	0.652	12
RS43	Motuwaireka S at Headwaters	0.008	<0.004	0.145	12
RS44	Totara S at Stronvar	0.006	<0.004	0.075	12
RS45	Parkvale Trib at Lowes Res.	0.030	0.013	0.067	10
RS46	Parkvale S at Weir	0.074	0.043	0.287	12
RS47	Waiohine R at Gorge	0.005	<0.004	0.128	12
RS48	Waiohine R at Bicknells	0.027	0.015	0.208	12
RS49	Beef Ck at Headwaters	0.014	0.010	0.110	12
RS50	Mangatarere S at SH 2	0.190	0.059	0.499	12
RS51	Huangaaru R at Ponatahi Br	0.033	0.007	0.120	12
RS52	Tauanui R at Whakatomotomo Rd	0.010	0.006	0.037	12
RS53	Awhea R at Tora Rd	0.024	0.008	1.800	12
RS54	Coles Ck Trib at Lagoon Hill Rd	0.019	0.007	0.380	12
RS55	Tauherenikau R at Websters	0.010	<0.004	0.087	12
RS56	Waiorongomai R at Forest Pk	0.007	<0.004	0.028	12

Table A4.15: *E. coli* (cfu/100mL)

Site No.	Site Name	Median	Minimum	Maximum	<i>n</i>
RS01	Mangapouri S at Rahui Rd	91	18	800	12
RS02	Mangapouri S at Bennetts Rd	500	100	3,800	12
RS03	Waitohu S at Forest Pk	17	3	63	12
RS04	Waitohu S at Norfolk Cres	320	100	3,500	12
RS05	Otaki R at Pukehinau	5	1	25	12
RS06	Otaki R at Mouth	34	3	100	12
RS07	Mangaone S at Sims Rd Br	600	170	8,200	12
RS08	Ngarara S at Field Way	135	56	2,000	12
RS09	Waikanae R at Mangaone Walkway	17	2	100	12
RS10	Waikanae R at Greenaway Rd	15	3	140	12
RS11	Whareroa S at Waterfall Rd	56	3	450	12
RS12	Whareroa S at QE Park	205	100	1,500	12
RS13	Horokiri S at Snodgrass	250	55	1,200	12
RS14	Pauatahanui S at Elmwood Br	205	37	3,800	12
RS15	Porirua S at Glenside	300	100	1,000	12
RS16	Porirua S at Wall Park (Milk Depot)	730	60	4,400	12
RS17	Makara S at Kennels	900	<100	6,100	12
RS18	Karori S at Makara Peak	1,100	220	5,800	12
RS19	Kaiwharawhara S at Ngaio Gorge	1,100	81	46,000	12
RS20	Hutt R at Te Marua Intake Site	25	3	430	12
RS21	Hutt R opp. Manor Park G.C.	120	16	4,200	12
RS22	Hutt R at Boulcott	110	52	2,700	12
RS23	Pakuratahi R 50m d/s Farm Ck	47	1	3,500	12
RS24	Mangaroa R at Te Marua	135	19	2,700	12
RS25	Akatarawa R at Hutt confl.	71	13	260	12
RS26	Whakatikei R at Riverstone	42	5	210	12
RS27	Waiwhetu S at Wainui Hill Br	1,800	190	10,000	12
RS28	Wainuiomata R at Manuka Track	5	<1	140	12
RS29	Wainuiomata R u/s of White Br	275	3	5,200	12
RS30	Orongorongo R at Orongorongo Stn	67	22	2,300	12
RS31	Ruamahanga R at McLays	7	1	48	12
RS32	Ruamahanga R at Te Ore Ore	84	30	7,300	12
RS33	Ruamahanga R at Gladstone Br	24	9	4,700	12
RS34	Ruamahanga R at Pukio	60	13	400	12
RS35	Mataikona Trib at Sugar Loaf Rd	97	2	530	12
RS36	Taueru R at Castlehill	76	22	2,400	12
RS37	Taueru R at Gladstone	84	17	11,000	12
RS38	Kopuaranga R at Stewarts	87	50	17,000	12
RS39	Whangaehu R 250m u/s confl.	140	11	400	12
RS40	Waipoua R at Colombo Rd Br	106	27	19,000	12
RS41	Waingawa R at South Rd	46	2	2,000	12
RS42	Whareama R at Gauge	235	17	7,700	12
RS43	Motuwaireka S at Headwaters	18	1	1,300	12
RS44	Totara S at Stronvar	12	<1	200	12
RS45	Parkvale Trib at Lowes Res.	31	10	3,800	10
RS46	Parkvale S at Weir	870	80	9,800	12
RS47	Waiohine R at Gorge	5	<1	60	12
RS48	Waiohine R at Bicknells	50	16	2,400	12
RS49	Beef Ck at Headwaters	14	<1	200	12
RS50	Mangatarere S at SH 2	49	15	8,900	12
RS51	Huangarua R at Ponatahi Br	100	6	5,800	12
RS52	Tauanui R at Whakatomotomo Rd	11	1	40	12
RS53	Awhea R at Tora Rd	220	4	3,400	12
RS54	Coles Ck Trib at Lagoon Hill Rd	99	<1	6,300	12
RS55	Tauherenikau R at Websters	32	3	700	12
RS56	Waiorongomai R at Forest Pk	6	<1	110	12

Table A4.16: Faecal coliforms (cfu/100mL)

Site No.	Site Name	Median	Minimum	Maximum	<i>n</i>
RS01	Mangapouri S at Rahui Rd	105	24	1,000	12
RS02	Mangapouri S at Bennetts Rd	700	100	3,800	12
RS03	Waitohu S at Forest Pk	17	3	65	12
RS04	Waitohu S at Norfolk Cres	325	120	3,500	12
RS05	Otaki R at Pukehinau	6	1	25	12
RS06	Otaki R at Mouth	41	3	100	12
RS07	Mangaone S at Sims Rd Br	700	170	8,200	12
RS08	Ngarara S at Field Way	135	56	2,100	12
RS09	Waikanae R at Mangaone Walkway	26	3	100	12
RS10	Waikanae R at Greenaway Rd	20	3	140	12
RS11	Whareroa S at Waterfall Rd	64	3	450	12
RS12	Whareroa S at QE Park	260	100	2,100	12
RS13	Horokiri S at Snodgrass	250	55	1,200	12
RS14	Pauatahanui S at Elmwood Br	205	43	3,800	12
RS15	Porirua S at Glenside	400	110	1,200	12
RS16	Porirua S at Wall Park (Milk Depot)	830	70	4,400	12
RS17	Makara S at Kennels	1,200	100	6,500	12
RS18	Karori S at Makara Peak	1,250	220	5,800	12
RS19	Kaiwharawhara S at Ngaio Gorge	1,500	81	46,000	12
RS20	Hutt R at Te Marua Intake Site	28	3	430	12
RS21	Hutt R opp. Manor Park G.C.	120	18	4,400	12
RS22	Hutt R at Boulcott	110	55	2,700	12
RS23	Pakuratahi R 50m d/s Farm Ck	51	3	4,300	12
RS24	Mangaroa R at Te Marua	135	30	2,800	12
RS25	Akatarawa R at Hutt confl.	71	15	260	12
RS26	Whakatikei R at Riverstone	44	5	210	12
RS27	Waiwhetu S at Wainui Hill Br	2,200	190	10,000	12
RS28	Wainuiomata R at Manuka Track	5	<1	140	12
RS29	Wainuiomata R u/s of White Br	275	16	6,200	12
RS30	Orongorongo R at Orongorongo Stn	68	22	2,300	12
RS31	Ruamahanga R at McLays	7	1	68	12
RS32	Ruamahanga R at Te Ore Ore	99	30	7,300	12
RS33	Ruamahanga R at Gladstone Br	28	9	4,900	12
RS34	Ruamahanga R at Pukio	60	17	500	12
RS35	Mataikona Trib at Sugar Loaf Rd	97	2	530	12
RS36	Taueru R at Castlehill	92	22	3,100	12
RS37	Taueru R at Gladstone	100	21	11,000	12
RS38	Kopuaranga R at Stewarts	110	50	18,000	12
RS39	Whangaehu R 250m u/s confl.	145	11	500	12
RS40	Waipoua R at Colombo Rd Br	106	44	19,000	12
RS41	Waingawa R at South Rd	47	4	2,800	12
RS42	Whareama R at Gauge	235	17	7,700	12
RS43	Motuwaireka S at Headwaters	18	1	1,300	12
RS44	Totara S at Stronvar	12	<1	200	12
RS45	Parkvale Trib at Lowes Res.	47	17	4,600	10
RS46	Parkvale S at Weir	870	85	10,000	12
RS47	Waiohine R at Gorge	6	<1	79	12
RS48	Waiohine R at Bicknells	54	23	2,600	12
RS49	Beef Ck at Headwaters	14	<1	400	12
RS50	Mangatarere S at SH 2	69	16	9,200	12
RS51	Huangaaru R at Ponatahi Br	101	10	6,900	12
RS52	Tauanui R at Whakatomotomo Rd	11	1	55	12
RS53	Awhea R at Tora Rd	220	7	3,400	12
RS54	Coles Ck Trib at Lagoon Hill Rd	105	<1	6,300	12
RS55	Tauherenikau R at Websters	50	3	700	12
RS56	Waiorongomai R at Forest Pk	7	<1	110	12

Appendix 5: Macroinvertebrate indices (2007/08)

Table A5.1: QMCI 2007/08

Site No.	Site Name	Rep. 1	Rep. 2	Rep. 3	Mean	Std Dev.
RS01	Mangapouri S at Rahui Rd	4.07	3.97	4.13	4.05	0.08
RS02	Mangapouri S at Bennetts Rd	4.70	4.43	4.48	4.54	0.14
RS03	Waitohu S at Forest Pk	8.24	8.34	8.07	8.22	0.14
RS04	Waitohu S at Norfolk Cres	4.79	4.59	4.78	4.72	0.11
RS05	Otaki R at Pukehinou	7.93	7.41	7.96	7.76	0.31
RS06	Otaki R at Mouth	4.11	5.97	5.36	5.15	0.95
RS07	Mangaone S at Sims Rd Br	4.90	4.65	4.55	4.70	0.18
RS08	Ngarara S at Field Way	4.99	4.55	4.73	4.76	0.22
RS09	Waikanae R at Mangaone Walkway	7.97	7.80	8.09	7.95	0.15
RS10	Waikanae R at Greenaway Rd	6.70	5.27	5.95	5.97	0.72
RS11	Whareroa S at Waterfall Rd	5.71	6.61	6.41	6.24	0.47
RS12	Whareroa S at QE Park	4.73	4.92	4.84	4.83	0.10
RS13	Horokiri S at Snodgrass	7.19	6.81	7.28	7.09	0.25
RS14	Pauatahanui S at Elmwood Br	4.07	4.47	4.38	4.31	0.21
RS15	Porirua S at Glenside	2.89	3.41	3.49	3.26	0.33
RS16	Porirua S at Wall Park (Milk Depot)	2.37	2.76	3.56	2.90	0.60
RS17	Makara S at Kennels	4.60	4.47	4.13	4.40	0.25
RS18	Karori S at Makara Peak	3.82	4.41	3.93	4.05	0.32
RS19	Kaiwharawhara S at Ngaio Gorge	3.24	3.50	3.49	3.41	0.14
RS20	Hutt R at Te Marua Intake Site	7.83	8.11	7.86	7.93	0.15
RS21	Hutt R opp. Manor Park G.C.	3.94	4.78	6.08	4.93	1.08
RS22	Hutt R at Boulcott	5.59	3.63	3.95	4.39	1.05
RS23	Pakuratahi R 50m d/s Farm Ck	6.70	6.78	6.83	6.77	0.07
RS24	Mangaroa R at Te Marua	4.98	5.09	4.58	4.88	0.27
RS25	Akatarawa R at Hutt confl.	6.69	6.86	7.23	6.93	0.28
RS26	Whakatikei R at Riverstone	6.57	6.99	7.18	6.91	0.32
RS27	Waiwhetu S at Wainui Hill Br	3.86	3.84	3.77	3.83	0.05
RS28	Wainuiomata R at Manuka Track	6.90	7.19	7.39	7.16	0.25
RS29	Wainuiomata R u/s of White Br	3.58	3.79	3.45	3.61	0.18
RS30	Orongorongo R at Orongorongo Stn	6.37	6.75	6.59	6.57	0.19
RS31	Ruamahanga R at McLays	7.97	8.04	8.16	8.06	0.09
RS32	Ruamahanga R at Te Ore Ore	6.43	7.15	7.04	6.87	0.39
RS33	Ruamahanga R at Gladstone Br	6.12	5.62	5.31	5.68	0.41
RS34	Ruamahanga R at Pukio	5.26	5.23	5.36	5.28	0.07
RS35	Mataikona Trib at Sugar Loaf Rd	5.86	5.77	5.73	5.79	0.07
RS36	Taueru R at Castlehill	5.13	5.21	5.10	5.15	0.06
RS37	Taueru R at Gladstone	4.09	4.36	4.00	4.15	0.19
RS38	Kopuaranga R at Stewarts	4.55	4.47	4.59	4.54	0.06
RS39	Whangaehu R 250m u/s confl.	3.82	3.72	3.66	3.73	0.08
RS40	Waipoua R at Colombo Rd Br	5.06	5.10	4.72	4.96	0.21
RS41	Waingawa R at South Rd	7.06	6.02	5.94	6.34	0.63
RS42	Whareama R at Gauge	3.98	3.94	3.95	3.96	0.02
RS43	Motuwaireka S at Headwaters	7.38	7.51	6.00	6.97	0.84
RS44	Totara S at Stronvar	5.37	5.18	5.35	5.30	0.11
RS45	Parkvale Trib at Lowes Res.	5.22	5.17	5.19	5.19	0.02
RS46	Parkvale S at Weir	3.77	3.69	3.66	3.71	0.05
RS47	Waiohine R at Gorge	7.82	8.00	7.83	7.89	0.10
RS48	Waiohine R at Bicknells	6.77	7.38	7.39	7.18	0.36
RS49	Beef Ck at Headwaters	7.47	8.05	8.05	7.85	0.34
RS50	Mangatarere S at SH 2	5.57	5.52	5.50	5.53	0.04
RS51	Huangarua R at Ponatahi Br	4.70	3.78	4.13	4.20	0.47
RS52	Tauanui R at Whakatomotomo Rd	5.47	5.95	5.88	5.77	0.26
RS53	Awhea R at Tora Rd	4.32			4.32	
RS54	Coles Ck Trib at Lagoon Hill Rd	4.04			4.04	
RS55	Tauherenikau R at Websters	6.16	6.03	6.16	6.12	0.08
RS56	Waiorongomai R at Forest Pk	7.16	6.99	6.63	6.93	0.27

Table A5.2: %EPT taxa 2007/08

Site No.	Site Name	Rep. 1	Rep. 2	Rep. 3	Mean	Std Dev.
RS01	Mangapouri S at Rahui Rd	1.1	0.0	1.5	0.9	0.76
RS02	Mangapouri S at Bennetts Rd	0.8	0.9	0.5	0.7	0.24
RS03	Waitohu S at Forest Pk	91.0	89.1	90.8	90.3	1.05
RS04	Waitohu S at Norfolk Cres	0.0	0.0	0.0	0.0	0.03
RS05	Otaki R at Pukehinau	97.2	90.5	95.7	94.5	3.51
RS06	Otaki R at Mouth	17.1	51.5	43.9	37.5	18.1
RS07	Mangaone S at Sims Rd Br	0.0	0.0	0.0	0.0	0.01
RS08	Ngarara S at Field Way	2.9	0.5	2.1	1.8	1.22
RS09	Waikanae R at Mangaone Walkway	85.8	85.3	87.4	86.2	1.09
RS10	Waikanae R at Greenaway Rd	64.7	38.3	50.2	51.1	13.2
RS11	Whareroa S at Waterfall Rd	43.2	60.5	65.3	56.3	11.7
RS12	Whareroa S at QE Park	1.9	0.5	0.0	0.8	0.98
RS13	Horokiri S at Snodgrass	80.4	64.5	82.6	75.8	9.84
RS14	Pauatahanui S at Elmwood Br	4.6	16.9	13.9	11.8	6.44
RS15	Porirua S at Glenside	8.0	10.5	10.0	9.5	1.32
RS16	Porirua S at Wall Park (Milk Depot)	1.4	3.1	1.1	1.9	1.10
RS17	Makara S at Kennels	9.5	17.3	4.4	10.4	6.46
RS18	Karori S at Makara Peak	25.1	34.4	28.3	29.3	4.73
RS19	Kaiwharawhara S at Ngaio Gorge	5.3	6.0	5.4	5.5	0.37
RS20	Hutt R at Te Marua Intake Site	92.7	89.5	87.2	89.8	2.77
RS21	Hutt R opp. Manor Park G.C.	22.8	37.7	62.6	41.0	20.1
RS22	Hutt R at Boulcott	51.1	20.7	23.7	31.8	16.8
RS23	Pakuratahi R 50m d/s Farm Ck	77.1	86.8	88.4	84.1	6.12
RS24	Mangaroa R at Te Marua	67.9	44.5	56.3	56.2	11.7
RS25	Akatarawa R at Hutt confl.	72.7	84.7	84.5	80.6	6.87
RS26	Whakatikei R at Riverstone	58.8	72.1	78.3	69.7	9.93
RS27	Waiwhetu S at Wainui Hill Br	0.0	0.0	0.0	0.0	0.00
RS28	Wainuiomata R at Manuka Track	76.4	78.9	81.5	78.9	2.55
RS29	Wainuiomata R u/s of White Br	12.8	21.7	47.7	27.4	18.1
RS30	Orongorongo R at Orongorongo Stn	45.2	57.2	51.3	51.2	5.98
RS31	Ruamahanga R at McLays	84.8	89.2	88.6	87.6	2.37
RS32	Ruamahanga R at Te Ore Ore	55.5	74.6	75.0	68.3	11.2
RS33	Ruamahanga R at Gladstone Br	34.7	19.1	16.9	23.5	9.72
RS34	Ruamahanga R at Pukio	24.8	21.3	33.0	26.4	6.04
RS35	Mataikona Trib at Sugar Loaf Rd	77.9	82.0	80.0	80.0	2.03
RS36	Taueru R at Castlehill	65.9	66.9	66.5	66.4	0.52
RS37	Taueru R at Gladstone	6.5	17.8	4.0	9.4	7.38
RS38	Kopuaranga R at Stewarts	54.9	39.5	41.7	45.4	8.31
RS39	Whangaehu R 250m u/s confl.	0.4	0.0	0.6	0.3	0.30
RS40	Waipoua R at Colombo Rd Br	59.1	53.8	56.3	56.4	2.64
RS41	Waingawa R at South Rd	69.3	46.2	46.6	54.0	13.2
RS42	Whareama R at Gauge	0.0	0.5	0.0	0.2	0.26
RS43	Motuwaireka S at Headwaters	59.0	55.1	76.3	63.5	11.3
RS44	Totara S at Stronvar	55.1	64.6	69.3	63.0	7.21
RS45	Parkvale Trib at Lowes Res.	16.6	20.6	19.9	19.0	2.10
RS46	Parkvale S at Weir	3.0	6.6	3.7	4.4	1.92
RS47	Waiohine R at Gorge	90.9	94.4	90.8	92.0	2.03
RS48	Waiohine R at Bicknells	69.6	78.1	73.2	73.7	4.26
RS49	Beef Ck at Headwaters	79.0	87.0	76.3	80.7	5.56
RS50	Mangatarere S at SH 2	36.8	46.9	44.5	42.7	5.25
RS51	Huangarua R at Ponatahi Br	65.1	36.0	50.5	50.5	14.6
RS52	Tauanui R at Whakatomotomo Rd	52.1	78.1	75.2	68.5	14.3
RS53	Awhea R at Tora Rd	0.0			0.0	
RS54	Coles Ck Trib at Lagoon Hill Rd	4.4			4.4	
RS55	Tauherenikau R at Websters	43.8	41.7	54.2	46.6	6.71
RS56	Waiorongomai R at Forest Pk	91.5	92.5	89.7	91.2	1.43

Table A5.3: Taxa richness 2007/08

Site No.	Site Name	Rep. 1	Rep. 2	Rep. 3	Mean	Std Dev.
RS01	Mangapouri S at Rahui Rd	21	20	20	20.33	0.58
RS02	Mangapouri S at Bennetts Rd	12	14	13	13.00	1.00
RS03	Waitohu S at Forest Pk	26	30	29	28.33	2.08
RS04	Waitohu S at Norfolk Cres	15	11	18	14.67	3.51
RS05	Otaki R at Pukehinau	16	17	19	17.33	1.53
RS06	Otaki R at Mouth	20	15	19	18.00	2.65
RS07	Mangaone S at Sims Rd Br	14	19	17	16.67	2.52
RS08	Ngarara S at Field Way	6	13	12	10.33	3.79
RS09	Waikanae R at Mangaone Walkway	21	25	23	23.00	2.00
RS10	Waikanae R at Greenaway Rd	23	24	21	22.67	1.53
RS11	Whareora S at Waterfall Rd	29	25	31	28.33	3.06
RS12	Whareora S at QE Park	21	18	15	18.00	3.00
RS13	Horokiri S at Snodgrass	20	17	18	18.33	1.53
RS14	Pauatahanui S at Elmwood Br	20	21	23	21.33	1.53
RS15	Porirua S at Glenside	19	25	21	21.67	3.06
RS16	Porirua S at Wall Park (Milk Depot)	10	17	16	14.33	3.79
RS17	Makara S at Kennels	20	16	17	17.67	2.08
RS18	Karori S at Makara Peak	16	22	24	20.67	4.16
RS19	Kaiwharawhara S at Ngaio Gorge	23	22	18	21.00	2.65
RS20	Hutt R at Te Marua Intake Site	25	20	23	22.67	2.52
RS21	Hutt R opp. Manor Park G.C.	17	19	22	19.33	2.52
RS22	Hutt R at Boulcott	19	21	15	18.33	3.06
RS23	Pakuratahi R 50m d/s Farm Ck	27	27	22	25.33	2.89
RS24	Mangaroa R at Te Marua	27	21	19	22.33	4.16
RS25	Akatarawa R at Hutt confl.	24	24	22	23.33	1.15
RS26	Whakatikei R at Riverstone	24	24	22	23.33	1.15
RS27	Waiwhetu S at Wainui Hill Br	7	9	7	7.67	1.15
RS28	Wainuiomata R at Manuka Track	31	31	27	29.67	2.31
RS29	Wainuiomata R u/s of White Br	22	22	15	19.67	4.04
RS30	Orongorongo R at Orongorongo Stn	12	13	18	14.33	3.21
RS31	Ruamahanga R at McLays	23	19	20	20.67	2.08
RS32	Ruamahanga R at Te Ore Ore	17	16	13	15.33	2.08
RS33	Ruamahanga R at Gladstone Br	14	17	15	15.33	1.53
RS34	Ruamahanga R at Pukio	13	14	17	14.67	2.08
RS35	Mataikona Trib at Sugar Loaf Rd	31	29	30	30.00	1.00
RS36	Taueru R at Castlehill	22	24	20	22.00	2.00
RS37	Taueru R at Gladstone	23	26	25	24.67	1.53
RS38	Kopuaranga R at Stewarts	23	29	27	26.33	3.06
RS39	Whangaehu R 250m u/s confl.	18	16	16	16.67	1.15
RS40	Waipoua R at Colombo Rd Br	27	25	26	26.00	1.00
RS41	Waingawa R at South Rd	17	20	16	17.67	2.08
RS42	Whareama R at Gauge	16	13	14	14.33	1.53
RS43	Motuwaireka S at Headwaters	26	26	26	26.00	0.00
RS44	Totara S at Stronvar	18	25	21	21.33	3.51
RS45	Parkvale Trib at Lowes Res.	19	17	19	18.33	1.15
RS46	Parkvale S at Weir	19	16	16	17.00	1.73
RS47	Waiohine R at Gorge	16	19	20	18.33	2.08
RS48	Waiohine R at Bicknells	14	16	9	13.00	3.61
RS49	Beef Ck at Headwaters	32	28	28	29.33	2.31
RS50	Mangatarere S at SH 2	20	20	18	19.33	1.15
RS51	Huangarua R at Ponatahi Br	25	26	22	24.33	2.08
RS52	Tauanui R at Whakatomotomo Rd	30	24	25	26.33	3.21
RS53	Awhea R at Tora Rd	16			16.00	
RS54	Coles Ck Trib at Lagoon Hill Rd	21			21.00	
RS55	Tauherenikau R at Websters	15	17	19	17.00	2.00
RS56	Waiorongomai R at Forest Pk	20	21	21	20.67	0.58

Appendix 6: Macroinvertebrate indices (2006/07)⁴

Table A6.1: MCI 2006/07

Site No.	Site Name	Rep. 1	Rep. 2	Rep. 3	Mean	Std Dev.
RS01	Mangapouri S at Rahui Rd	81.3	77.3	102.8	87.1	13.7
RS02	Mangapouri S at Bennetts Rd	85.8	59.6	64.5	70.0	13.9
RS03	Waitohu S at Forest Pk	146.2	138.0	130.3	138.2	7.91
RS04	Waitohu S at Norfolk Cres	108.9	92.3	103.1	101.4	8.43
RS05	Otaki R at Pukehinau	111.0	133.3	128.0	124.1	11.7
RS06	Otaki R at Mouth	115.4	114.5	100.0	110.0	8.65
RS07	Mangaone S at Sims Rd Br	67.2	58.9	55.6	60.6	6.00
RS08	Ngarara S at Field Way	68.9	76.0	77.6	74.2	4.59
RS09	Waikanae R at Mangaone Walkway	135.3	142.7	140.7	139.6	3.79
RS10	Waikanae R at Greenaway Rd	110.0	120.0	124.7	118.2	7.51
RS11	Whareroa S at Waterfall Rd	120.7	110.4	112.7	114.6	5.41
RS12	Whareroa S at QE Park	72.1	72.9	78.6	74.6	3.53
RS13	Horokiri S at Snodgrass	118.2	108.0	110.0	112.1	5.39
RS14	Pauatahanui S at Elmwood Br	101.2	90.0	82.7	91.3	9.32
RS15	Porirua S at Glenside	95.5	89.0	88.8	91.1	3.79
RS16	Porirua S at Wall Park (Milk Depot)	105.7	84.4	88.2	92.8	11.4
RS17	Makara S at Kennels	93.8	100.0	93.3	95.7	3.73
RS18	Karori S at Makara Peak	89.6	83.1	90.0	87.6	3.89
RS19	Kaiwharawhara S at Ngaio Gorge	94.2	100.0	90.0	94.7	5.02
RS20	Hutt R at Te Marua Intake Site	140.0	134.5	156.0	143.5	11.2
RS21	Hutt R opp. Manor Park G.C.	110.0	106.4	96.7	104.3	6.89
RS22	Hutt R at Boulcott	108.0	85.7	103.3	99.0	11.8
RS23	Pakuratahi R 50m d/s Farm Ck	128.3	127.7	130.9	129.0	1.70
RS24	Mangaroa R at Te Marua	116.7	116.8	104.5	112.7	7.04
RS25	Akatarawa R at Hutt confl.	118.5	131.3	123.1	124.3	6.51
RS26	Whakatikei R at Riverstone	120.8	123.1	117.5	120.5	2.81
RS27	Waiwhetu S at Wainui Hill Br	78.5	84.0	84.6	82.4	3.36
RS28	Wainuiomata R at Manuka Track	136.1	132.0	132.4	133.5	2.27
RS29	Wainuiomata R u/s of White Br	88.2	93.9	107.1	96.4	9.72
RS30	Orongorongo R at Orongorongo Stn	97.1	101.5	100.0	99.6	2.23
RS31	Ruamahanga R at McLays	156.5	146.2	145.3	149.3	6.21
RS32	Ruamahanga R at Te Ore Ore	106.0	118.8	113.3	112.7	6.40
RS33	Ruamahanga R at Gladstone Br	115.0	104.6	107.7	109.1	5.33
RS34	Ruamahanga R at Pukio	106.0	111.1	109.1	108.7	2.57
RS35	Mataikona Trib at Sugar Loaf Rd	127.9	121.3	123.0	124.0	3.43
RS36	Taueru R at Castlehill	123.5	128.5	125.3	125.8	2.51
RS37	Taueru R at Gladstone	79.1	97.1	90.0	88.7	9.09
RS38	Kopuaranga R at Stewarts	102.9	109.6	110.8	107.7	4.26
RS39	Whangaehu R 250m u/s confl.	64.3	53.7	66.1	61.3	6.70
RS40	Waipoua R at Colombo Rd Br	106.7	112.2	108.0	108.9	2.87
RS41	Waingawa R at South Rd	112.0	120.0	130.8	120.9	9.42
RS42	Whareama R at Gauge	67.6	71.4	76.5	71.8	4.45
RS43	Motuwaireka S at Headwaters	128.6	125.7	129.4	127.9	1.94
RS44	Totara S at Stronvar	95.0	102.7	92.0	96.6	5.53
RS45	Parkvale Trib at Lowes Res.	100.0	101.0	103.3	101.4	1.71
RS46	Parkvale S at Weir	89.5	88.4	88.0	88.6	0.76
RS47	Waiohine R at Gorge	131.3	136.7	142.5	136.8	5.63
RS48	Waiohine R at Bicknells	112.3	110.6	95.0	106.0	9.54
RS49	Beef Ck at Headwaters	136.8	129.0	132.0	132.6	3.95
RS50	Mangatarere S at SH 2	102.4	105.7	109.5	105.8	3.56
RS51	Huangarua R at Ponatahi Br	105.3	108.8	98.9	104.3	4.98
RS52	Tauanui R at Whakatomotomo Rd	125.8	111.3	120.9	119.3	7.38
RS53	Awhea R at Tora Rd	83.6	87.1	86.7	85.8	1.87
RS54	Coles Ck Trib at Lagoon Hill Rd	102.8	105.1	115.4	107.8	6.71
RS55	Tauherenikau R at Websters	108.0	112.3	108.9	109.7	2.27
RS56	Waiorongomai R at Forest Pk	113.0	119.1	116.0	116.0	3.05

⁴ The results presented here differ from those presented in Perrie (2007b); the latter used a higher taxonomic resolution than that recommended by Stark & Maxted (2007) for state of the environment reporting.

Table A6.2: QMCI 2006/07

Site No.	Site Name	Rep. 1	Rep. 2	Rep. 3	Mean	Std Dev.
RS01	Mangapouri S at Rahui Rd	4.63	4.28	4.61	4.51	0.20
RS02	Mangapouri S at Bennetts Rd	4.86	4.46	4.12	4.48	0.37
RS03	Waitohu S at Forest Pk	8.28	8.02	7.97	8.09	0.17
RS04	Waitohu S at Norfolk Cres	4.56	4.56	4.33	4.48	0.13
RS05	Otaki R at Pukehinau	7.55	7.52	7.55	7.54	0.02
RS06	Otaki R at Mouth	7.72	7.66	6.36	7.25	0.77
RS07	Mangaone S at Sims Rd Br	4.40	4.43	4.41	4.41	0.02
RS08	Ngarara S at Field Way	4.34	4.12	4.17	4.21	0.12
RS09	Waikanae R at Mangaone Walkway	7.65	7.84	8.06	7.85	0.20
RS10	Waikanae R at Greenaway Rd	5.58	4.10	3.44	4.38	1.10
RS11	Whareroa S at Waterfall Rd	5.83	6.22	6.62	6.22	0.40
RS12	Whareroa S at QE Park	4.34	4.37	4.64	4.45	0.17
RS13	Horokiri S at Snodgrass	5.95	6.43	6.56	6.31	0.32
RS14	Pauatahanui S at Elmwood Br	3.49	3.43	3.05	3.32	0.24
RS15	Porirua S at Glenside	5.09	4.95	5.14	5.06	0.10
RS16	Porirua S at Wall Park (Milk Depot)	3.71	3.37	3.96	3.68	0.30
RS17	Makara S at Kennels	4.72	4.15	4.53	4.47	0.29
RS18	Karori S at Makara Peak	2.64	2.89	2.94	2.83	0.16
RS19	Kaiwharawhara S at Ngaio Gorge	3.85	3.41	3.40	3.55	0.26
RS20	Hutt R at Te Marua Intake Site	7.55	7.91	7.95	7.80	0.22
RS21	Hutt R opp. Manor Park G.C.	5.22	3.89	3.86	4.32	0.78
RS22	Hutt R at Boulcott	3.85	4.63	4.36	4.28	0.39
RS23	Pakuratahi R 50m d/s Farm Ck	7.32	6.86	7.38	7.19	0.28
RS24	Mangaroa R at Te Marua	4.93	4.34	4.63	4.63	0.29
RS25	Akatarawa R at Hutt confl.	6.69	7.15	6.69	6.84	0.26
RS26	Whakatikei R at Riverstone	7.28	6.82	7.30	7.13	0.27
RS27	Waiwhetu S at Wainui Hill Br	3.99	4.19	4.29	4.16	0.15
RS28	Wainuiomata R at Manuka Track	7.42	7.54	7.22	7.39	0.16
RS29	Wainuiomata R u/s of White Br	4.14	4.05	4.75	4.31	0.38
RS30	Orongorongo R at Orongorongo Stn	3.84	3.86	4.11	3.94	0.15
RS31	Ruamahanga R at McLays	7.99	7.99	8.06	8.01	0.04
RS32	Ruamahanga R at Te Ore Ore	6.08	6.73	6.96	6.59	0.45
RS33	Ruamahanga R at Gladstone Br	7.77	7.48	7.71	7.65	0.15
RS34	Ruamahanga R at Pukio	7.07	6.85	7.26	7.06	0.20
RS35	Mataikona Trib at Sugar Loaf Rd	5.55	5.96	5.22	5.58	0.37
RS36	Taueru R at Castlehill	4.92	4.66	4.26	4.62	0.34
RS37	Taueru R at Gladstone	4.41	4.64	4.52	4.52	0.11
RS38	Kopuaranga R at Stewarts	6.17	5.48	5.26	5.63	0.48
RS39	Whangaehu R 250m u/s confl.	4.48	4.61	4.77	4.62	0.15
RS40	Waipoua R at Colombo Rd Br	4.37	4.57	5.04	4.66	0.34
RS41	Waingawa R at South Rd	7.11	7.35	7.31	7.26	0.13
RS42	Whareama R at Gauge	4.01	4.02	4.13	4.06	0.07
RS43	Motuwaireka S at Headwaters	6.22	5.52	6.18	5.97	0.40
RS44	Totara S at Stronvar	4.84	4.62	4.92	4.79	0.16
RS45	Parkvale Trib at Lowes Res.	5.41	5.09	5.03	5.17	0.20
RS46	Parkvale S at Weir	4.87	4.88	4.76	4.84	0.07
RS47	Waiohine R at Gorge	7.95	7.96	8.02	7.98	0.04
RS48	Waiohine R at Bicknells	6.81	5.91	6.82	6.51	0.52
RS49	Beef Ck at Headwaters	7.35	6.88	7.28	7.17	0.26
RS50	Mangatarere S at SH 2	5.23	5.63	5.98	5.61	0.37
RS51	Huangarua R at Ponatahi Br	6.04	5.83	5.85	5.91	0.11
RS52	Tauanui R at Whakatomotomo Rd	5.82	5.23	5.39	5.48	0.31
RS53	Awhea R at Tora Rd	4.07	3.89	4.02	3.99	0.09
RS54	Coles Ck Trib at Lagoon Hill Rd	5.72	5.51	6.84	6.03	0.71
RS55	Tauherenikau R at Websters	7.48	6.79	7.62	7.30	0.45
RS56	Waiorongomai R at Forest Pk	5.15	4.94	4.71	4.94	0.22

Table A6.3: %EPT taxa 2006/07

Site No.	Site Name	Rep. 1	Rep. 2	Rep. 3	Mean	Std Dev.
RS01	Mangapouri S at Rahui Rd	0.2	0.0	0.0	0.1	0.13
RS02	Mangapouri S at Bennetts Rd	2.1	0.0	0.0	0.7	1.24
RS03	Waitohu S at Forest Pk	91.8	86.2	87.8	88.6	2.88
RS04	Waitohu S at Norfolk Cres	4.5	1.7	2.0	2.7	1.51
RS05	Otaki R at Pukehinau	90.8	91.0	88.5	90.1	1.39
RS06	Otaki R at Mouth	89.9	90.3	64.9	81.7	14.6
RS07	Mangaone S at Sims Rd Br	0.7	0.0	0.0	0.2	0.41
RS08	Ngarara S at Field Way	1.1	0.5	0.6	0.8	0.34
RS09	Waikanae R at Mangaone Walkway	86.3	87.4	89.1	87.6	1.41
RS10	Waikanae R at Greenaway Rd	64.9	33.4	23.5	40.6	21.6
RS11	Whareroa S at Waterfall Rd	50.7	75.3	63.9	63.3	12.3
RS12	Whareroa S at QE Park	0.0	0.0	0.0	0.0	0.00
RS13	Horokiri S at Snodgrass	78.7	73.2	78.8	76.9	3.20
RS14	Pauatahanui S at Elmwood Br	6.2	7.0	6.0	6.4	0.54
RS15	Porirua S at Glenside	47.9	45.2	42.6	45.2	2.65
RS16	Porirua S at Wall Park (Milk Depot)	59.8	22.2	17.8	33.3	23.1
RS17	Makara S at Kennels	16.5	4.0	14.3	11.6	6.69
RS18	Karori S at Makara Peak	5.1	6.0	10.5	7.2	2.90
RS19	Kaiwharawhara S at Ngaio Gorge	33.6	10.9	17.1	20.5	11.7
RS20	Hutt R at Te Marua Intake Site	83.9	93.5	93.9	90.5	5.66
RS21	Hutt R opp. Manor Park G.C.	47.7	24.5	21.5	31.2	14.4
RS22	Hutt R at Boulcott	24.6	42.6	36.1	34.4	9.07
RS23	Pakuratahi R 50m d/s Farm Ck	85.8	79.3	90.0	85.0	5.41
RS24	Mangaroa R at Te Marua	69.6	44.2	60.9	58.2	12.9
RS25	Akatarawa R at Hutt confl.	71.1	75.9	86.0	77.7	7.61
RS26	Whakatikei R at Riverstone	74.8	69.3	79.3	74.5	5.04
RS27	Waiwhetu S at Wainui Hill Br	0.1	0.0	0.0	0.0	0.07
RS28	Wainuiomata R at Manuka Track	74.3	78.2	78.9	77.2	2.49
RS29	Wainuiomata R u/s of White Br	52.8	28.3	56.6	45.9	15.3
RS30	Orongorongo R at Orongorongo Stn	7.5	5.1	19.5	10.7	7.73
RS31	Ruamahanga R at McLays	93.9	95.4	98.3	95.9	2.24
RS32	Ruamahanga R at Te Ore Ore	58.0	72.6	84.0	71.5	13.0
RS33	Ruamahanga R at Gladstone Br	91.8	79.6	92.1	87.8	7.14
RS34	Ruamahanga R at Pukio	71.2	60.5	74.9	68.8	7.48
RS35	Mataikona Trib at Sugar Loaf Rd	70.0	63.1	58.8	64.0	5.64
RS36	Taueru R at Castlehill	41.0	35.0	20.5	32.2	10.5
RS37	Taueru R at Gladstone	20.6	10.0	25.0	18.5	7.71
RS38	Kopuaranga R at Stewarts	78.6	73.4	67.9	73.3	5.36
RS39	Whangaehu R 250m u/s confl.	0.3	0.0	0.8	0.4	0.39
RS40	Waipoua R at Colombo Rd Br	52.6	45.0	56.6	51.4	5.89
RS41	Waingawa R at South Rd	90.5	92.5	87.2	90.1	2.65
RS42	Whareama R at Gauge	0.2	0.0	7.8	2.7	4.44
RS43	Motuwaiereka S at Headwaters	84.6	76.4	81.6	80.9	4.18
RS44	Totara S at Stronvar	64.0	58.6	32.5	51.7	16.8
RS45	Parkvale Trib at Lowes Res.	23.4	16.3	12.3	17.3	5.59
RS46	Parkvale S at Weir	19.1	29.8	34.5	27.8	7.88
RS47	Waiohine R at Gorge	92.8	95.0	94.1	94.0	1.15
RS48	Waiohine R at Bicknells	75.2	50.5	74.1	66.6	14.0
RS49	Beef Ck at Headwaters	73.2	70.1	79.8	74.4	4.92
RS50	Mangatarere S at SH 2	60.6	49.1	52.4	54.0	5.97
RS51	Huangarua R at Ponatahi Br	61.2	60.4	50.4	57.3	6.03
RS52	Tauanui R at Whakatomotomo Rd	66.5	50.8	54.7	57.3	8.19
RS53	Awhea R at Tora Rd	2.5	7.4	17.3	9.1	7.52
RS54	Coles Ck Trib at Lagoon Hill Rd	50.7	37.4	70.1	52.8	16.5
RS55	Tauherenikau R at Websters	90.7	83.3	94.6	89.5	5.77
RS56	Waiorongomai R at Forest Pk	47.2	36.8	39.4	41.1	5.44

Table A6.4: Taxa richness 2006/07

Site No.	Site Name	Rep. 1	Rep. 2	Rep. 3	Mean	Std Dev.
RS01	Mangapouri S at Rahui Rd	16	15	10	13.7	3.2
RS02	Mangapouri S at Bennetts Rd	8	15	12	11.7	3.5
RS03	Waitohu S at Forest Pk	26	30	29	28.3	2.1
RS04	Waitohu S at Norfolk Cres	13	13	11	12.3	1.2
RS05	Otaki R at Pukehinau	20	18	20	19.3	1.2
RS06	Otaki R at Mouth	13	11	16	13.3	2.5
RS07	Mangaone S at Sims Rd Br	18	20	14	17.3	3.1
RS08	Ngarara S at Field Way	19	15	14	16.0	2.6
RS09	Waikanae R at Mangaone Walkway	30	30	30	30.0	0.0
RS10	Waikanae R at Greenaway Rd	24	24	17	21.7	4.0
RS11	Whareora S at Waterfall Rd	30	27	30	29.0	1.7
RS12	Whareora S at QE Park	14	13	13	13.3	0.6
RS13	Horokiri S at Snodgrass	22	20	22	21.3	1.2
RS14	Pauatahanui S at Elmwood Br	17	20	15	17.3	2.5
RS15	Porirua S at Glenside	22	20	25	22.3	2.5
RS16	Porirua S at Wall Park (Milk Depot)	28	27	22	25.7	3.2
RS17	Makara S at Kennels	16	19	15	16.7	2.1
RS18	Karori S at Makara Peak	25	26	34	28.3	4.9
RS19	Kaiwharawhara S at Ngaio Gorge	24	23	22	23.0	1.0
RS20	Hutt R at Te Marua Intake Site	22	22	15	19.7	4.0
RS21	Hutt R opp. Manor Park G.C.	24	22	18	21.3	3.1
RS22	Hutt R at Boulcott	20	14	12	15.3	4.2
RS23	Pakuratahi R 50m d/s Farm Ck	24	26	22	24.0	2.0
RS24	Mangaroa R at Te Marua	24	25	22	23.7	1.5
RS25	Akatarawa R at Hutt confl.	26	23	26	25.0	1.7
RS26	Whakatikei R at Riverstone	24	26	24	24.7	1.2
RS27	Waiwhetu S at Wainui Hill Br	12	7	10	9.7	2.5
RS28	Wainuiomata R at Manuka Track	31	30	29	30.0	1.0
RS29	Wainuiomata R u/s of White Br	22	23	28	24.3	3.2
RS30	Orongorongo R at Orongorongo Stn	14	13	14	13.7	0.6
RS31	Ruamahanga R at McLays	17	13	15	15.0	2.0
RS32	Ruamahanga R at Te Ore Ore	20	16	18	18.0	2.0
RS33	Ruamahanga R at Gladstone Br	12	13	13	12.7	0.6
RS34	Ruamahanga R at Pukio	10	9	11	10.0	1.0
RS35	Mataikona Trib at Sugar Loaf Rd	28	32	27	29.0	2.6
RS36	Taueru R at Castlehill	28	22	15	21.7	6.5
RS37	Taueru R at Gladstone	22	21	14	19.0	4.4
RS38	Kopuaranga R at Stewarts	21	23	26	23.3	2.5
RS39	Whangaehu R 250m u/s confl.	23	19	23	21.7	2.3
RS40	Waipoua R at Colombo Rd Br	21	23	25	23.0	2.0
RS41	Waingawa R at South Rd	10	13	13	12.0	1.7
RS42	Whareama R at Gauge	10	10	13	11.0	1.7
RS43	Motuwaireka S at Headwaters	28	28	34	30.0	3.5
RS44	Totara S at Stronvar	24	22	20	22.0	2.0
RS45	Parkvale Trib at Lowes Res.	21	20	18	19.7	1.5
RS46	Parkvale S at Weir	19	19	15	17.7	2.3
RS47	Waiohine R at Gorge	16	18	16	16.7	1.2
RS48	Waiohine R at Bicknells	13	17	12	14.0	2.6
RS49	Beef Ck at Headwaters	25	29	30	28.0	2.6
RS50	Mangatarere S at SH 2	17	21	19	19.0	2.0
RS51	Huangarua R at Ponatahi Br	15	16	19	16.7	2.1
RS52	Tauanui R at Whakatomotomo Rd	24	23	23	23.3	0.6
RS53	Awhea R at Tora Rd	22	17	21	20.0	2.6
RS54	Coles Ck Trib at Lagoon Hill Rd	29	35	26	30.0	4.6
RS55	Tauherenikau R at Websters	15	13	18	15.3	2.5
RS56	Waiorongomai R at Forest Pk	20	22	25	22.3	2.5