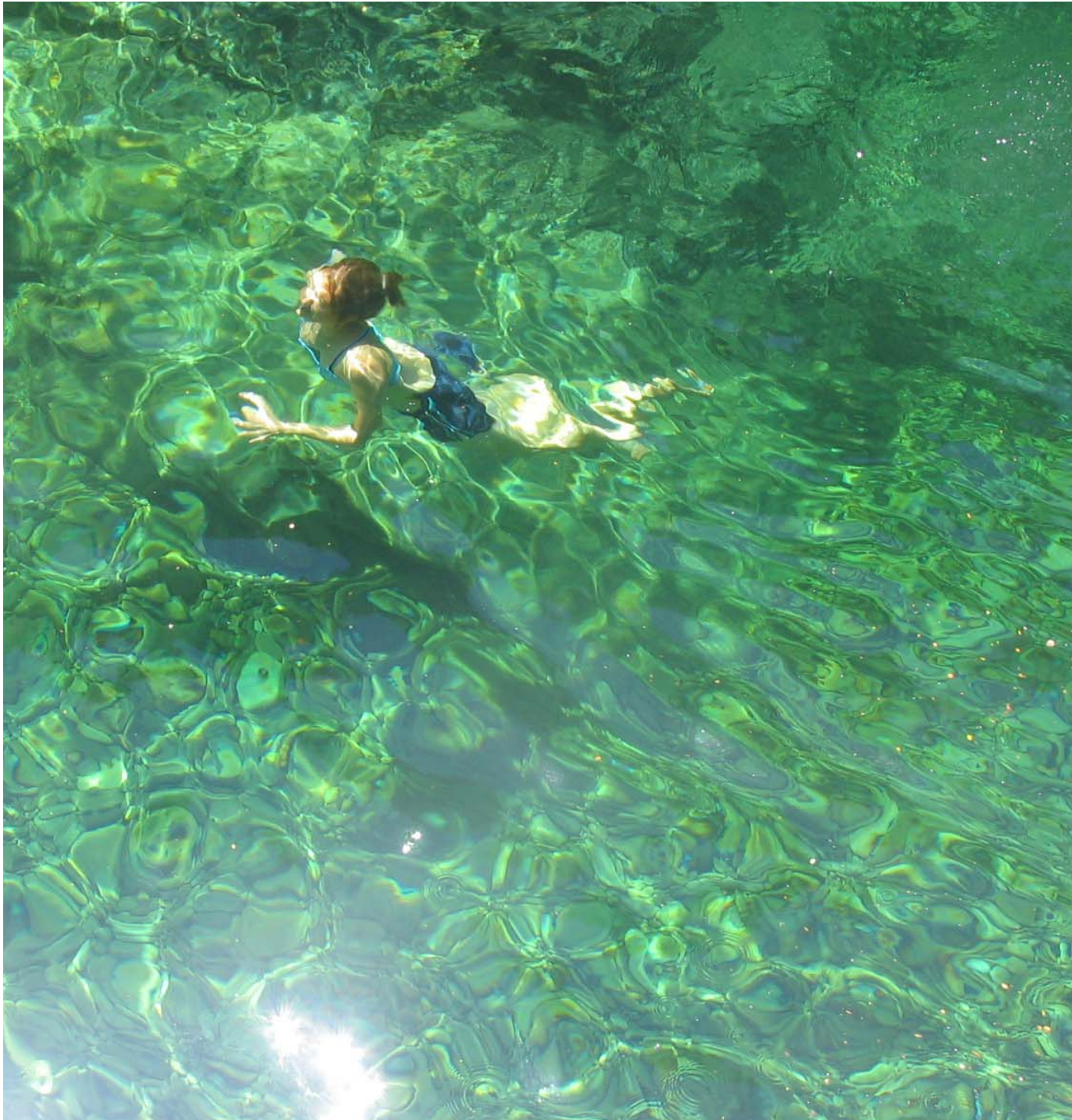


Recreational Water Quality Report, 2009-10

Technical Publication No. 10-014

November 2010





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MDC Technical Report No: 10-014

ISBN: 978-0-9864664-0-3

File Reference: W180-02
Record No: 10243281

November 2010

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Executive Summary

Thirteen river locations and eighteen coastal locations in Marlborough are monitored on a weekly basis during the summer months (November to March inclusive) and assessed against the Ministry for the Environment's (MfE's) bathing water guidelines.

Marlborough's rivers and coastal waters are generally of good quality and are safe for recreational activities. However rivers that drain urban and intensive agriculture areas and coastal beaches which are located in urban areas and/or which have a significant river flow to them are more prone to poor water quality and are sometimes not safe for recreational activities, even during dry weather. Wet weather events frequently result in exceedances of MfE's guidelines and therefore swimming following rainfall is not recommended, particularly in urban and intensive agricultural areas.

During the 2009-10 summer, just over half of river sites monitored were categorised as safe (i.e. compliant with both the alert and action level guidelines) for recreational use for more than 95% of the time. The poorest performing sites were located on the Rai and the Taylor Rivers. The best sites (100% compliant) were located on the Wairau River. Coastal water quality in Marlborough is generally very good and during the 2009-10 bathing water season, nearly 80% of sites were categorised as safe for recreational use for more than 95% of the time. 100% compliance with the bathing water guidelines was achieved at Marfells Beach; Whites Bay; Waikawa; Picton Foreshore; Shelley Beach and Tirimoana. The poorest water quality was recorded for Moenui and Momorangi.

Suitability for recreation grades (SFRG's) have been derived using MfE's methodology and are based on the most recent five years of microbiological data and sanitary inspections classes. One river site and five coastal sites have insufficient samples to determine a complete Recreation Grade (SFRG). Regular monitoring of each site is recommended to allow for comparisons in recreational water quality each year and to assign complete Suitability for Recreation Grades (SFRG's) to each site. Two sites (Wairau Bar and Pelorus Bridge) had a change in Grade, improving from 'Poor' to 'Fair'.

Marlborough's coastal water quality is very good in a national context. 77% of monitored coastal beaches nationally met the action level guideline for swimming almost all of the time (95% of the time) compared with 94% of coastal beaches in Marlborough. Marlborough's freshwater recreational water quality is also good in a national context with 57% of monitored river sites nationally meeting the action level guideline for swimming almost all of the time (95% of the time) compared with 85% of river sites in Marlborough.

Water quality at freshwater sites is generally poorer than at coastal sites, however overall water quality is seen to be improving in freshwater sites due to improvements in land use practices and improvements to on-site wastewater treatment systems. Continued improvements in these areas will result in further improvements in recreational water quality.

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1. Introduction

District councils are required under the Health Act 1956 to monitor environmental factors affecting public health and to abate conditions likely to be offensive or injurious to health. Water quality in our rivers and coastal areas can have an impact on public health when used for contact recreation purposes.

Regional councils have responsibilities under the Resource Management Act 1991 for the planning and management of natural resources including fresh and coastal waters. The Marlborough District Council as a unitary authority has responsibility for both district and regional functions.

Guidelines for the safe use of recreational waters are defined by the Ministry for the Environment in the Microbiological Water Quality Guidelines (MfE, 2003). The recreational waters in Marlborough are sampled in accordance with these guidelines. Results are sent to the Ministry for the Environment each year for national reporting. Recreational water quality is one of 22 national core environmental indicators. Environmental indicators are used to provide cost-effective, practical and meaningful information on high-priority environmental issues.

2. Objectives of the Recreational Water Quality Monitoring Programme

The objectives of the recreational water quality programme are:

1. To provide the results of monitoring to the public as soon as they become available. Towards this end, results are displayed on Councils website as soon as they become available from the laboratory (usually within 48 hours). Figure 1 below shows how results are presented on the website at: <http://www.marlborough.govt.nz/Recreation/Swimming-and-Boating/Swimming-Locations.aspx>

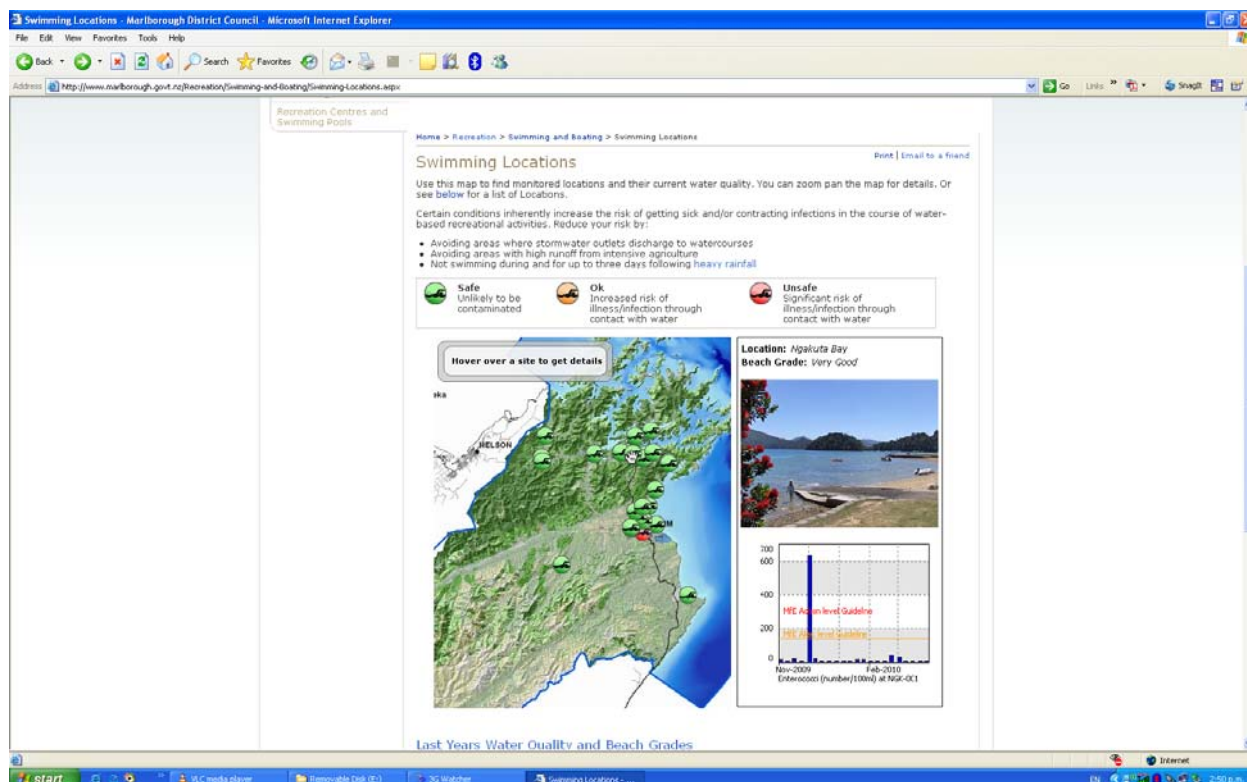


Figure 1: Screenshot of how recreational water quality results are displayed on the Council's website.

2. To assess the safety of each site in relation to the risk of contracting illness/infection at each site on a weekly basis and to inform the public as soon as possible. This includes taking follow-up samples where exceedances occur and reporting results to the District Health Board as shown in the flow chart in Appendix 1.
3. To grade bathing water sites using MfE's 2003 guidelines for grading swimming rivers and beaches.
4. To assess the results of annual monitoring to allow for national comparisons between bathing water sites and to enable long term trends in river and coastal bathing water quality to be determined.
5. To help identify sites which require additional investigation due to excessive faecal contamination.

3. Sites

During the summer of 2009-10 a total of 13 freshwater bathing sites (Table 1) and 18 coastal water sites (Table 2) were monitored on a weekly basis from November to March inclusive, the location of these sites are shown in Appendix 2. Sampling takes place irrespective of weather or tide times, this ensures that trends over time take account of all conditions and are not skewed towards one condition. Details for each site (showing name, ID and location) are shown in Tables 1 and 2.

Table 1: River Sites 2009-10

Site name	Site ID	Grid Reference (NZTM)
Taylor @ Hutcheson Street Bridge	TYR-5	1679716, 5404251
Taylor @ Riverside	TYR-16	1680023, 5403987
Opawa @ Malthouse Reserve	OPR-40	1683801, 5402597
Opawa @ Elizabeth Street Footbridge	OPL-1	1680393, 5404310
Wairau @ Blenheim Rowing Club	WRR-1	1684319, 5406605
Wairau @ Wairau Rowing Club	WRR-9	1682366, 5407875
Wairau @ Ferry Bridge	WRR-8	1681274, 5410163
Wairau Diversion @ Neals Road	WDV-1	1684047, 5411651
Pelorus @ Totara Flat	PLR-3	1648262, 5427731
Rai @ Brown River Reserve	RAR-2	1649232, 5436785
Rai @ Rai Falls	RAR-1	1648018, 5429266
Pelorus @ Pelorus Bridge	PLR-2	1648077, 5428091
Waihopai @ Craiglochart Bridge # 2	WHR-3	1655029, 5391098

Sites are chosen based on frequency of use, risk of contamination, importance (e.g. a high value kayaking/rowing site) and proximity to popular campgrounds/resorts. In general the beaches and rivers of Marlborough are suitable for contact recreational activities; however there are areas which are more susceptible to contamination which can lead to an increased risk of illness and infection, especially during and after periods of rainfall. Such areas are generally located in urban and areas of intensive agriculture.

Table 2: Coastal Sites 2009-10

Site name	Site ID	Grid Reference (NZTM)
Anakiwa	GRO-001	1677073, 5431495
Bobs Bay	PCT-3	1685171, 5430143
Hakahaka Bay	PTU-001	1693263, 5427510
Marfells Beach	MB-1	1700194, 5380089
Mistletoe Bay	OB-2	1681470, 5436007
Moenui	MOE-1	1666689, 5430394
Momorangi Bay	MOM-001	1678817, 5430879
Ngakuta Bay	NGK-001	1680514, 5430489
Oyster Bay	PTU-002	1693174, 5426985
Picton Foreshore	PCT-5	1684298, 5428815
Portage	POR-1	1686775, 5438697
Shelly Beach North	PCT-4A	1684586, 5428933
Te Mahia	TEM-1	1681395, 5436748
Tirimoana	TIR-5	1676233, 5430949
Waikawa Bay	WKB-1	1687695, 5431090
Wairau Bar	WRR-7	1688575, 5405201
Wairau Diversion	WDV-2	1686056, 5411923
Whites Bay	WB-1	1688425, 5417793

4. Sampling

The water quality at coastal sites is tested for the presence of enterococci¹ bacteria, whilst the water quality at freshwater sites is tested for *Escherichia coli* (*E. coli*)². These are commonly known as 'indicator organisms' as they give an indication of the presence or recent presence of faecal contamination which may indicate the presence of pathogens in the water. The results are reported in cfu/100mL (coliform forming units) and give an indication of the number of bacteria present per 100mL of water. All testing is carried out by ELS Ltd (Environmental Laboratories Services Ltd). Coastal water samples are taken in water approximately 0.5m deep at a depth of approximately 0.1m from the surface. River samples are taken midstream where possible or as close to midstream as feasible, in order to obtain a sample representative of the well mixed zone, at a depth of approximately 0.1m from the surface. All samples are chilled and couriered to the laboratory for immediate processing. A 'blank' sample is included with the samples, the temperature of this sample is tested at the laboratory to ensure samples have been appropriately chilled in transit. All samples received must be less than 10°C.

4.1. Indicator Organisms

An indicator organism can be defined as an organism which is used to indicate the potential presence of another organism. *E. coli* is chosen as the indicator bacteria for freshwater as it is deemed to be a

¹ Method: US Environmental Protection Agency method (EPA) method 1600: Enterococci in water by membranes filtration using membrane-enterococcus Indoxyl- β -D-Glucose Agar (mEI), April 2005. Minimum detection 1 cfu/100mL.

² Method: APHA 21st Edition 9213D using mTEC. Minimum detection 1 cfu/100mL.

good indicator of recent sewage and/or faecal contamination. Enterococci are chosen as the indicator bacteria for coastal waters due to its higher survival rates in saline waters and as such it is deemed to be a good indicator of recent sewage and/or faecal contamination. When monitoring surface waters used for recreational purposes, the primary concern is the presence of organisms which can cause illness and/or infection in people.

Indicator organisms are monitored in recreational waters as it may not always be possible to identify specific disease causing organisms due to their low numbers, difficulty and expense of analysis among other reasons. Indicator organisms are preferred because 1) they are easy to sample and inexpensive to measure and 2) they can survive for several weeks and are therefore a definite indication of recent faecal contamination. *E. coli* and Enterococci are present in the gut of all warm blooded animals (including humans, mammals and birds), all of which are potential carriers of disease causing organisms in humans.

The number of Enterococci and *E. coli* present in a water sample (100mL) denotes the potential health risk of the waters to humans, it is not a direct measurement of the actual health risks, and therefore an exceedance of the guideline value will indicate that there is an increased risk to bathers in the area. Further details on how this risk is quantified are available in the Microbiological Water Quality Guidelines (MfE, 2003).

4.2. Guideline Values - Coastal

The guideline values for safe coastal recreational sites have been determined by MfE and are as follows:

	<u>For a <i>single</i> sample</u>		<u>Requirement</u>	
Acceptable <i>'Green Mode'</i>	< 140 Enterococci / 100mL	Highly likely to be uncontaminated	Routine monitoring	Safe 😊
Alert <i>'Amber Mode'</i>	140 - 280 Enterococci / 100mL	Potentially contaminated	Investigate likely causes	OK 😐
Action <i>'Red Mode'</i>	> 280 Enterococci / 100mL ³	Highly likely to be contaminated	Further investigation, inform relevant interested parties	Unsafe 😞

These levels are based on keeping illness risks associated with recreational water use to less than 2% (MfE, 2003). In addition, the Ministry of the Environment has developed Suitability for Recreation Grades (SFRG's) for swimming beaches. These are defined using the Microbiological Assessment Category (MAC) and the Sanitary Inspection Category (SIC) as defined by MfE.

4.2.1. Microbiological Assessment Categories (MAC)

The Microbiological Assessment Category is assessed using data from the previous 5 years. A minimum of 20 samples over the bathing water season (November to March inclusive) for each year is required in order to establish a complete MAC, if there are less than 100 samples over this 5 year period then the MAC status is defined as being incomplete or interim. The MAC was assessed for 15 of the 18 sites, the

³ Applies to *two* consecutive single samples (resampled as soon as practicable after receiving first result) greater than 280/100mL

remaining 3 sites have <5 years of monitoring. Of the 15 sites assessed, 11 have adequate data over the past 5 years to calculate a complete MAC. The number of samples for each site ranges from 76 to over 100 for this 5 year period. Table 3 below defines the MAC grades for coastal sites.

Table 3: Microbiological Assessment Category (MAC) definitions for marine waters (MfE, 2003)

Grade	95 th Percentile (Hazen method)	
A	≤ 40	Enterococci / 100mL
B	41 - 200	Enterococci / 100mL
C	201 - 500	Enterococci / 100mL
D	> 500	Enterococci / 100mL

4.2.2. Sanitary Inspection Category (SIC)

The SIC assigns a category to the site based on the risk of contamination associated with faecal sources in the vicinity. Figure 2 details this risk. The SIC classes were updated for all coastal water sites in 2009 (MDC, 2009a).

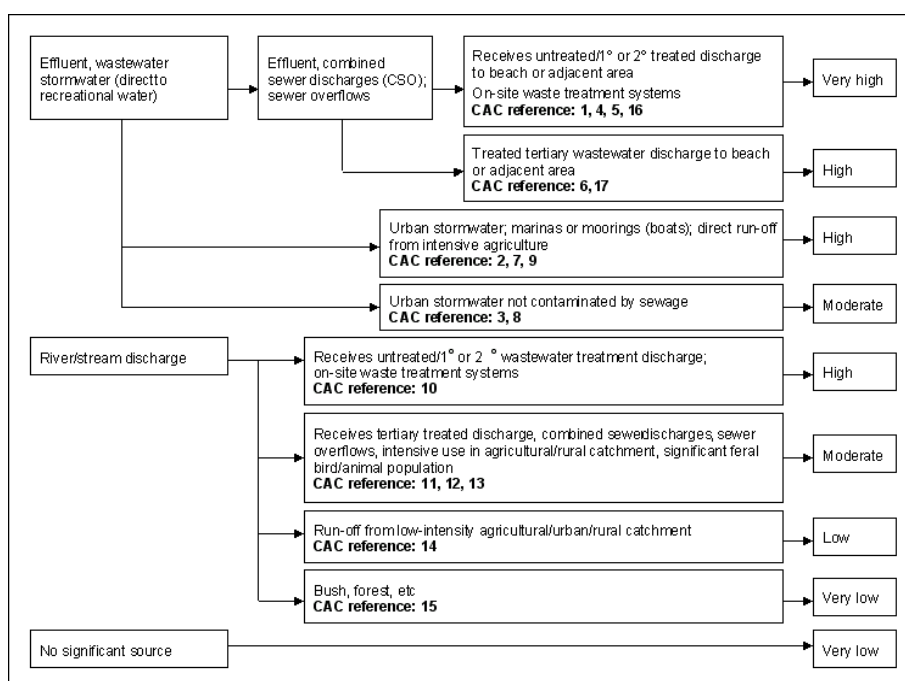


Figure 2: Sanitary Inspection Category for coastal water sites (MfE, 2003)

4.2.3. Suitability for Recreation Grades (SFRGs)

Bathing water sites are graded according to the SFRGs, as follows:

- Very Good,
- Good,

- Fair,
- Poor and
- Very Poor.

Suitability for Recreation Grades (SFRGs) are obtained using the MAC in conjunction with the SICs (figure 3) and are calculated using MfE’s Recreational Water Quality Assessment software called ‘Bathewatch’. There are between 21 and 22 weeks in the bathing water season so it is important to ensure each site is consistently monitored over the bathing water season to ensure accurate reporting of MAC grades and Suitability for Recreation Grades (SFRGs). Where there are inconsistencies between monitored data and results from the SIC a conservative ‘follow-up’ grade is assigned.

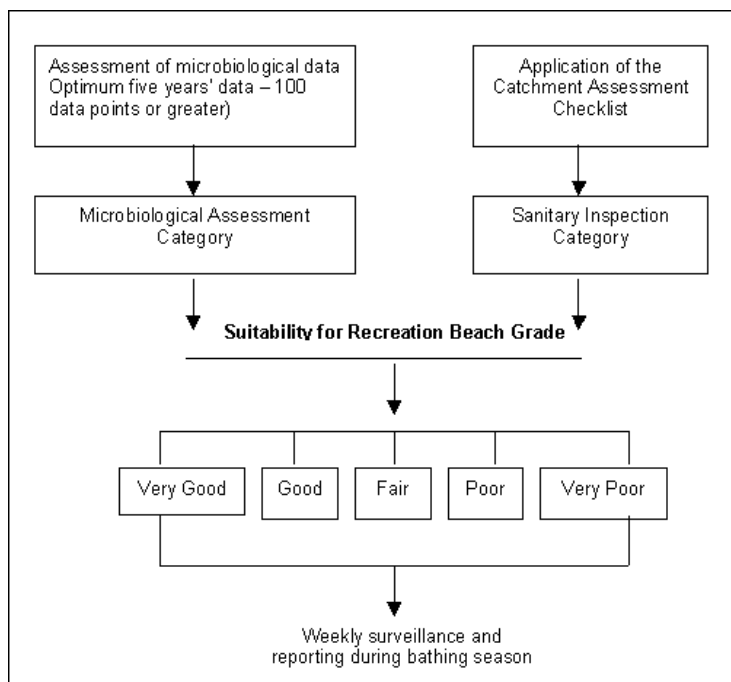


Figure 3: Requirements for grading swimming rivers (MfE, 2003)

4.3. Guideline values - Rivers

The guideline values for safe freshwater recreational sites have been determined by MfE and are as follows:

	<u>For a <i>single</i> sample</u>		<u>Requirement</u>	
Acceptable <i>'Green Mode'</i>	< 260 <i>E.coli</i> / 100mL	Highly likely to be uncontaminated	Routine monitoring	Safe 😊
Alert <i>'Amber Mode'</i>	> 260 < 550 <i>E.coli</i> / 100mL	Potentially contaminated	Investigate likely causes	OK 😐
Action <i>'Red Mode'</i>	> 550 <i>E.coli</i> / 100mL	Highly likely to be contaminated	Further investigation, inform relevant interested parties	Unsafe 😞

These levels are based on an estimate that approximately 5% of *Campylobacter* infections could be attributable to freshwater contact recreation (MfE, 2003). In addition, the Ministry for the Environment has developed Suitability for Recreation Grades (SFRG's). These are defined using the Microbiological Assessment Category (MAC) and the Sanitary Inspection Category (SIC).

4.3.1. Microbiological Assessment Categories (MAC)

The Microbiological Assessment Category is assessed using data from the previous 5 years. A minimum of 20 samples over the bathing water season (November to March inclusive) for each year is required in order to establish a complete MAC, if there are less than 100 samples over this 5 year period then the MAC status is defined as being incomplete or interim. The MAC was assessed for all of the 13 sites; of the 13 sites assessed, 12 have adequate data over the past 5 years to calculate a complete MAC. The number of samples for each site ranges from 98 to over 100 for this 5 year period. Table 4 below defines the MAC grades for freshwater sites.

Table 4: Microbiological Assessment Category (MAC) definitions

Grade	95 th Percentile (Hazen method)
A	≤ 130 <i>E.coli</i> / 100mL
B	131 - 260 <i>E.coli</i> / 100mL
C	260 - 550 <i>E.coli</i> / 100mL
D	> 550 <i>E.coli</i> / 100mL

4.3.2. Sanitary Inspection Category (SIC)

The SIC assigns a category to the site based on the risk of contamination associated with faecal sources in the vicinity. Figure 4 details this risk. SIC classes for the freshwater bathing sites were assessed in 2009 (MDC. 2009b).

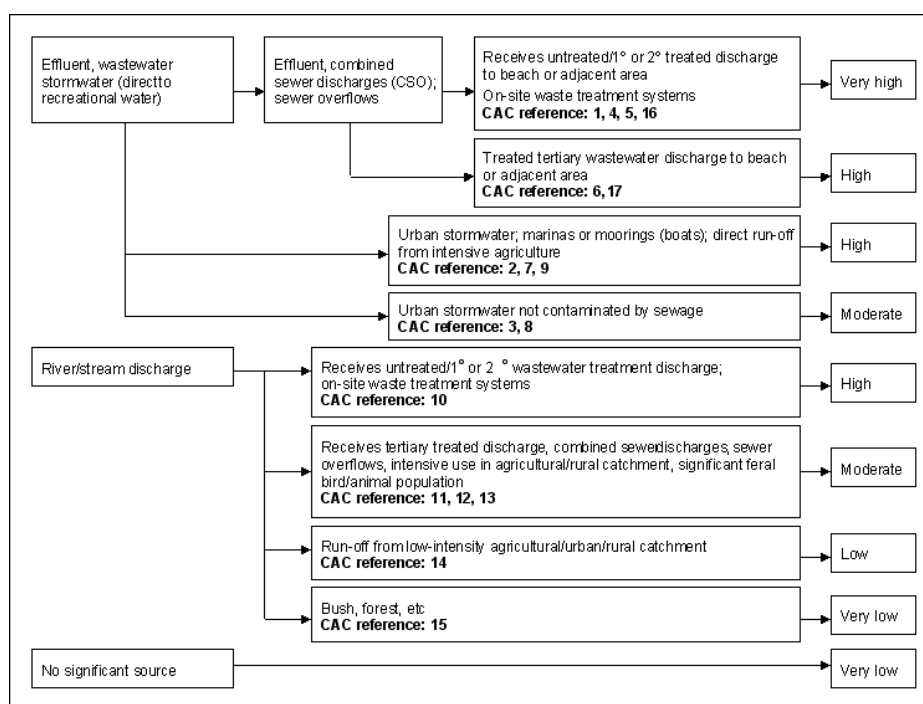


Figure 4: Sanitary Inspection Category for freshwater sites (MfE, 2003)

4.3.3. Suitability for Recreation Grades (SFRG)

Bathing water sites are graded according to the SFRGs, as follows:

- Very Good,
- Good,
- Fair,
- Poor and
- Very Poor.

Suitability for Recreation Grades (SFRGs) are obtained using the MAC in conjunction with the SICs (figure 5) and are calculated using MfE's Recreational Water Quality Assessment software called 'Bathewatch'. There are between 21 and 22 weeks in the bathing water season so it is important to ensure each site is consistently monitored over the bathing water season to ensure accurate reporting of MAC grades and Suitability for Recreation Grades (SFRGs). Where there are inconsistencies between monitored data and results from the SIC a conservative 'follow-up' grade is assigned.

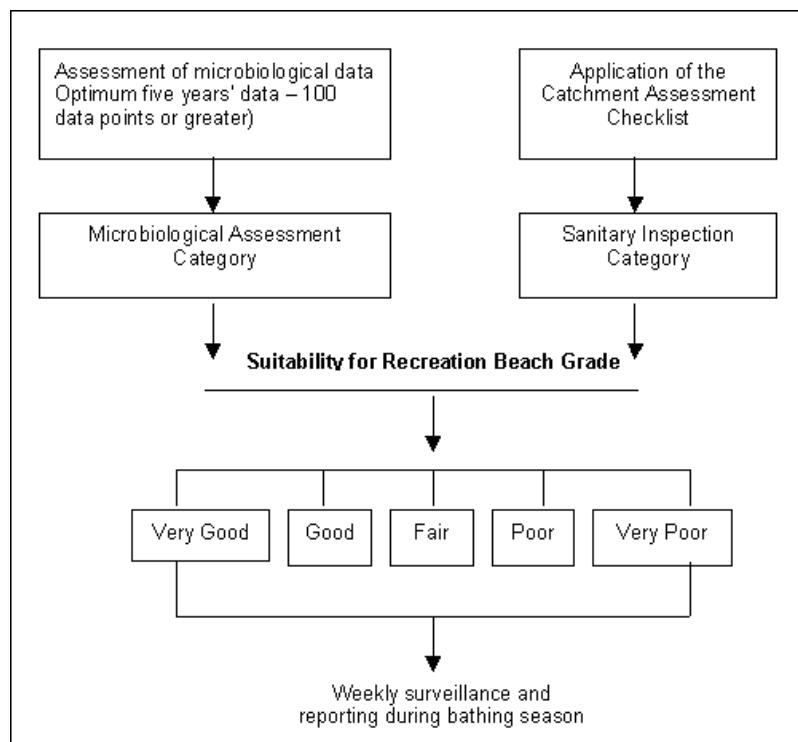


Figure 5: Requirements for grading swimming rivers (MfE, 2003)

5. Recreational Water Quality Results 2009-10

The results of the summer 2009-10 sampling are shown in Appendix 3. The results are graphed for each site and are shown in Appendix 4. The graphs show the enterococci or *E. coli* numbers alongside rainfall and are plotted against both the relevant alert and action level bathing water guideline standards as defined by MfE (2003).

5.1. Coastal

5.1.1. 2009-10 Summer Results

The percentage of time in which coastal sites were deemed safe or otherwise for swimming is shown in figure 6. Fourteen of the eighteen sites were deemed safe for swimming for more than 95% of the time whilst six were deemed safe for swimming for 100% of the time.

Moenui and Momorangi had the poorest water quality; this is consistent with previous years. Poor water quality at these sites is predominately associated with high rainfall. The source of faecal contamination at Momorangi is suspected to be from the local wildfowl population. Investigations, carried out in 2008, which support this theory included: faecal source tracking; a sanitary survey of the Bay and an assessment of the campgrounds wastewater system (MDC, 2008). An exceedance of the action level guideline on the 9th November (1876 enterococci/100mL) was associated some rainfall; there were 3 further exceedances of the alert level guideline, only one of these was associated with rainfall.

There were two exceedances of the action level guideline and two exceedances of the alert level guideline at Moenui; two of which occurred in wet weather and two in dry weather. However a significant amount of rainfall fell in the Rai and Kaituna Valleys 3-4 days preceding the dry weather exceedances and thus the influence of the rivers draining into the inner Pelorus Sound on water quality in the coastal areas cannot be ruled out.

Two exceedances of the alert level guideline and one exceedance of the action level guideline were recorded at Oyster Bay. Rainfall is likely to have contributed to these exceedances. Exceedances occurred within a month during January/February and may be associated with increased occupancy of the Bay at that time.

Water quality at Te Mahia is generally very good; exceedances of the guidelines are rare. The exceedance of the action level guideline at Te Mahia coincided with exceedances at; Moenui, Portage, Mistletoe Bay and Ngakuta and were associated with heavy rainfall. Unusually, no exceedance was recorded at Picton Foreshore at this time. The widespread contamination is most likely a result of diffuse pollution from a number of catchments draining into the Pelorus and Queen Charlotte Sounds.

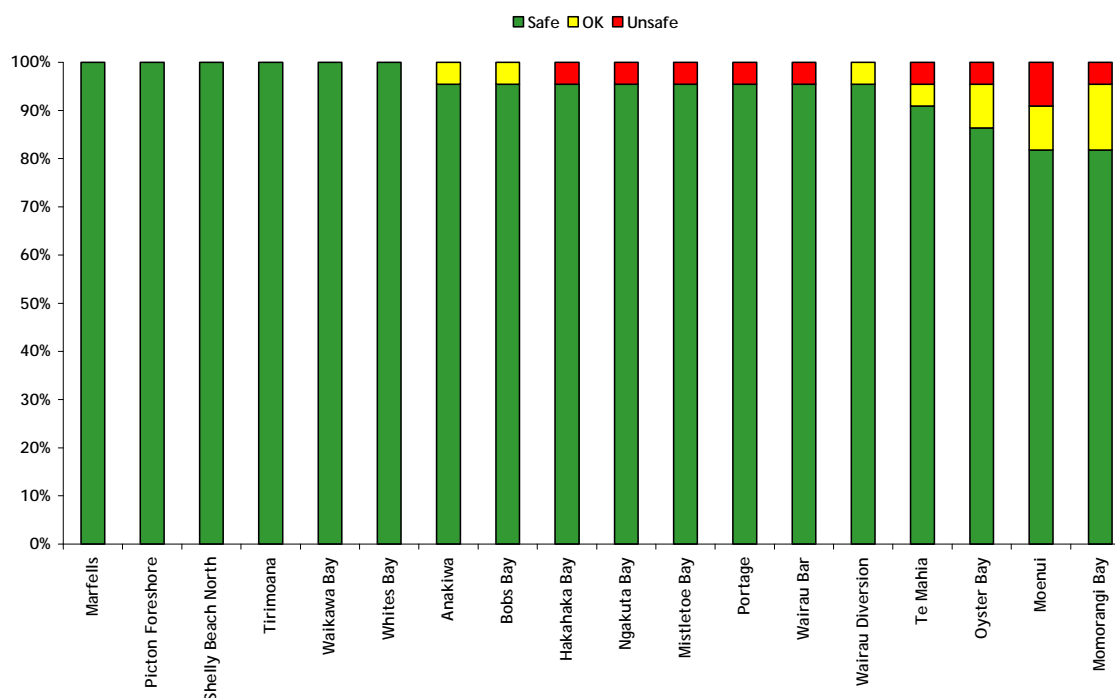


Figure 6: Coastal water bathing sites ranked according to the percentage of time they were suitable for contact recreation

5.1.2. Recent Trends

An overall improvement is observed in coastal water quality over a seven year period (figure 7). A slight decline was observed during the summer of 2007-08 but subsequent years have shown improvements. Excellent water quality, in terms of compliance with the bathing water guidelines, was achieved in 2006-07 and 2009-10 when compliance with the guidelines was achieved 95% of the time. Maximum rainfall from year to year will have some influence on water quality but will not solely be responsible for bathing water quality from year to year.

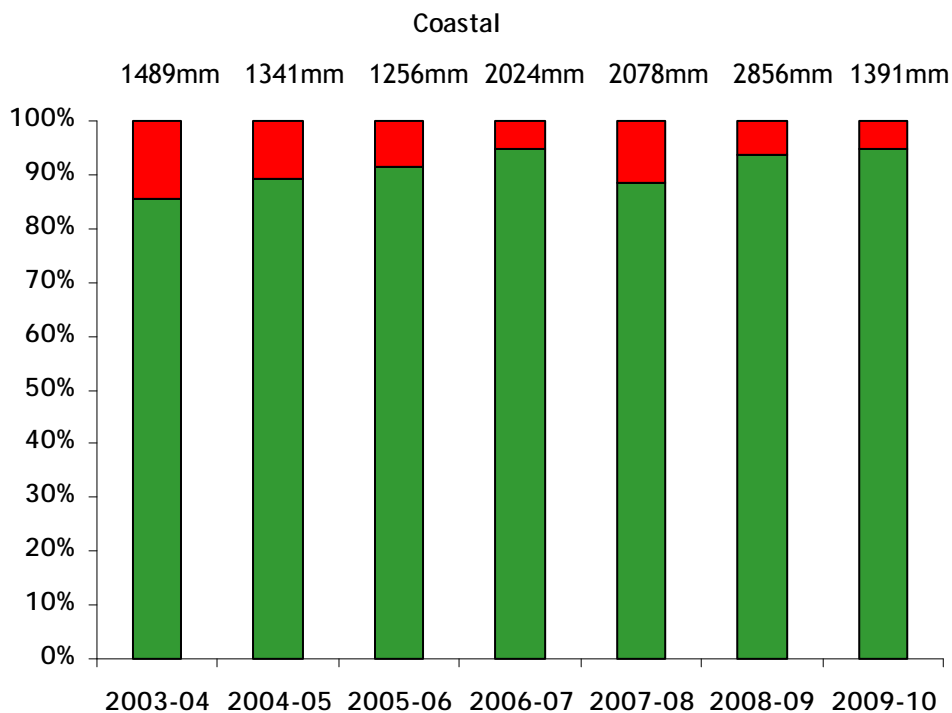


Figure 7: Percentage compliance with the bathing water guidelines from 2003 to 2010 at coastal sites. Compliance is denoted by the green bars and non-compliance with the red bars. Total summer rainfall from four key sites in Marlborough is shown above each bar for each summer.

Trends in water quality for each site are shown in Table 5. The table shows both the median and 95%ile for the last 7 years. Water quality has significantly improved at Anakiwa, Picton Foreshore and Shelly Beach, whilst water quality has significantly declined at Moenui.

Table 5: The median and 95%ile for each coastal site for each summer season from 2003 to 2010

Median	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
Anakiwa	5	25	10	5	7.5	5	4
Bobs Bay	5	5	5	5	7.5	5	4
Hakahaka Bay					5	10	12
Oyster Bay					5	10	4
Marfells	5		5	5	5	5	4
Moenui	5	5	5	5	40	10	4
Momorangi Bay	40	46.5	20	40	87	7.5	12
Ngakuta Bay	5	7.5	5	5	5	5	4
Mistletoe Bay	91.5	0				5	4
Picton Foreshore	58.5	46.5	40	10	10	7.5	4

Portage	10	5	5	5	5	10	4
Shelly Beach North	15	5	5	5	10	5	4
Te Mahia	7.5	5	5	5	5	5	4
Tirimoana	10	10	5	5	5	5	4
Waikawa Bay	10	10	5	5	5	5	4
Wairau Bar	10	10	5	5	5	7.5	8
Wairau Diversion	64	10	5	10	10	20	22
Whites Bay	7.5	5	5	5	5	5	4
95%ile	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
Anakiwa	1227	1473	1835.45	332	1174	10	109.60
Bobs Bay	271.25	99	119	27	519	5	152.80
Hakahaka Bay					1216.6	227.5	402.40
Oyster Bay					301.05	335.25	390.40
Marfells	28				34.3	364.2	13.60
Moenui	99.2	155.85	109	57.5	2001	969.7	1438.00
Momorangi Bay	1273.35	694	344	1175	1100	98.4	911.20
Ngakuta Bay	223	94	135.7	212.5	74.35	135.6	276.80
Mistletoe Bay						736	712.00
Picton Foreshore	1343.1	1767	2001	639.45	810.45	648.8	29.60
Portage	947.3	1550.5	183.75	802.8	10	375.75	732.00
Shelly Beach North	223	281.15	276.9	286.75	192.35	49.6	37.60
Te Mahia	93.1	234	532.5	90.6	32	420.6	441.20
Tirimoana	1473	194.8	258.05	865	1387.2	185.4	72.00
Waikawa Bay	140.1	175.45	556.05	124	677.85	330.2	110.80
Wairau Bar	450.3	2001	274	237.5	473.2	369.6	188.00
Wairau Diversion	814.8	217.3	173.8	32	762	208	156.80
Whites Bay		392	36	15	77	442.3	12.00

Over this seven year period the worst sites are Picton Foreshore, Momorangi Bay, Moenui and Anakiwa. Of these Picton Foreshore and Anakiwa have shown significant improvements in recent years (Table 5) whilst water quality at Moenui has declined. Momorangi shows neither an improvement nor deterioration in recent years.

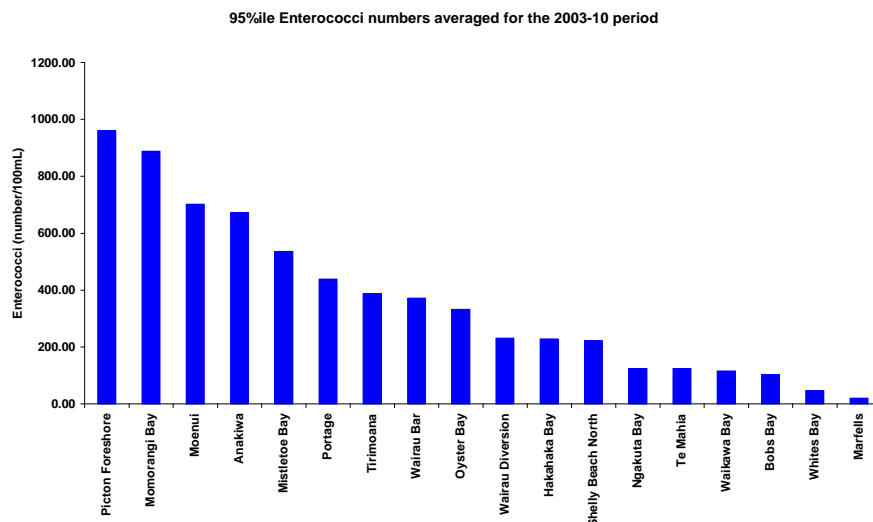


Figure 8: Coastal sites ranked according to the 95%ile numbers averaged over 7 years

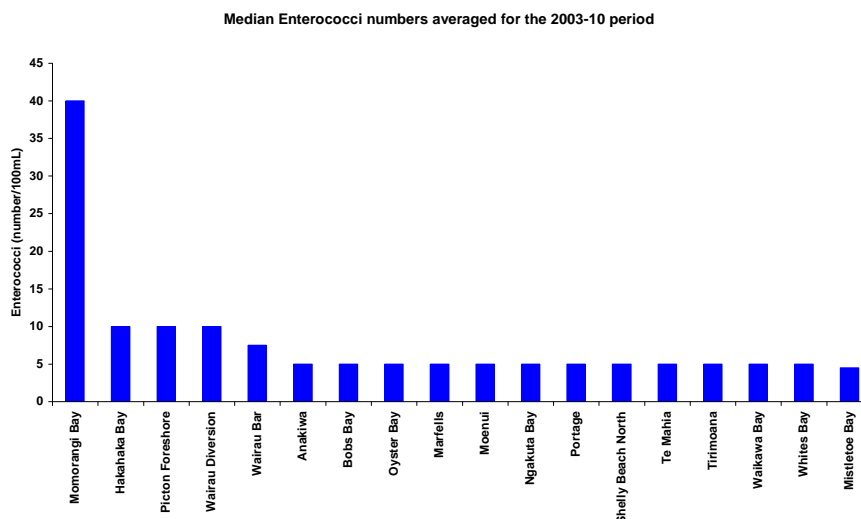


Figure 9: Coastal sites ranked according to the median numbers averaged over 7 years

5.1.3. Suitability for Recreation Grades (SFRGs) 2009-10

The Suitability for Recreation Grades have been calculated using the latest five years of microbiological data and the SIC classes which were reassessed in 2009; complete results are shown in Appendix 5. Three of the eighteen sites sampled in 2009-10 have no long term data and consequently only fifteen sites have an SFRG calculated. Eleven of these fifteen sites have complete datasets over the last five years for the calculation of the MAC grade. The results are shown in Table 6.

Table 6: Suitability for Recreation Grades for Marlborough's Coastal Bathing water sites

Site	MAC Grade* Summer season 2009-10	MAC Grade** long term (5 years)	Trend	SFRG	Status of SFRG grade
Anakiwa	B	D	↑	Poor	Complete
Bobs Bay	B	B	↔	Very Good	Incomplete
Hakahaka Bay	C	-	-	-	-
Marfells Beach	A	B	↑	Very Good	Incomplete
Mistletoe Bay	D	-	-	-	-
Moenui	D	D	↔	Very Poor	Complete
Momorangi Bay	D	D	↔	Poor	Complete
Ngakuta Bay	C	B	↓	Very Good	Complete
Oyster Bay	C	-	-	-	-
Picton Foreshore	A	D	↑	Very Poor	Complete
Portage	D	C	↓	Very Poor	Follow-up ^y
Shelly Beach North	A	C	↑	Fair	Complete
Te Mahia	C	B	↓	Very Good	Incomplete
Tirimoana	B	C	↑	Fair	Complete
Waikawa Bay	B	B	↔	Good	Complete
Wairau Bar	B	C	↑	Fair	Complete
Wairau Diversion	B	B	↔	Good	Complete
Whites Bay	A	A	↔	Very Good	Complete

* Based on the 95th percentile (Hazen) for the 2009-10 Bathing Water season.

** Calculated using MfE's Bathewatch programme, includes the latest 5 years of microbiological data

† 'Follow-up' grades, the Bathewatch software detected inconsistencies between the MAC and the SIC. A conservative default grade was subsequently calculated by Bathewatch. A complete sample set (>100 samples over the last 5 years) and/or a recalculation of the SIC is required to confirm the SFRG.

Where there are apparent inconsistencies in the recorded microbiological data and the SIC, Bathewatch calculates the most conservative grade for the site and flags the grade as an 'Irreconcilable Follow-up Grade'. Portage is the only site for which inconsistencies were detected between the recorded microbiological data and the SIC. The SIC rates the site as being at 'very high' risk however the microbiological data shows that the site has moderate to high faecal contamination. The sewage system at Portage is currently being upgraded. The SIC will be recalculated once the upgrade has been completed. This may resolve the inconsistencies in the calculation of the beach grade.

Figure 10 shows the percentage of sites that fall within each SFRG grade. One third of all sites are graded as poor or very poor. The Wairau Bar site has improved from being graded as Poor in 2008-09 to Fair in 2009-10. Table 6 compares this years results with results over the long term (the past 5 years) and shows that whilst some sites showed an improvement; notably Anakiwa, Picton Foreshore, Shelley Beach and Wairau Bar, several showed a decline in water quality, namely Ngakuta, Portage and Te Mahia.

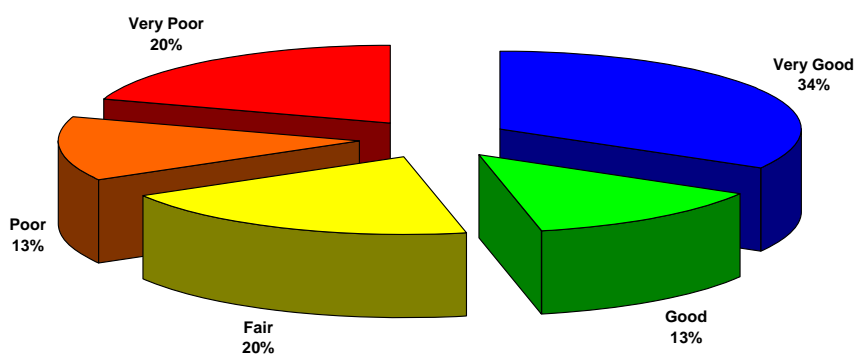


Figure 10: Pie-chart of SFRG's for the marine bathing water sites for the summer 2009-10

5.1.4. Marlborough's Coastal Sites in a National Context

Results from the recreational monitoring programme are reported to the Ministry for the Environment (MfE) annually. MfE publish annual reports which compare recreational water quality around the country and analyse for trends over time (www.mfe.govt.nz/environmental-reporting/freshwater/recreational/snapshot/). Recreational water quality, at a national level, has remained relatively stable over the last seven years. Coastal water quality in Marlborough compares favourably with coastal water quality nationally, with most sites suitable for swimming nearly all of the time (figure 11). Water quality at 77% of coastal sites nationally met the action level guidelines 95% of the time compared with 94% of coastal beaches in Marlborough.

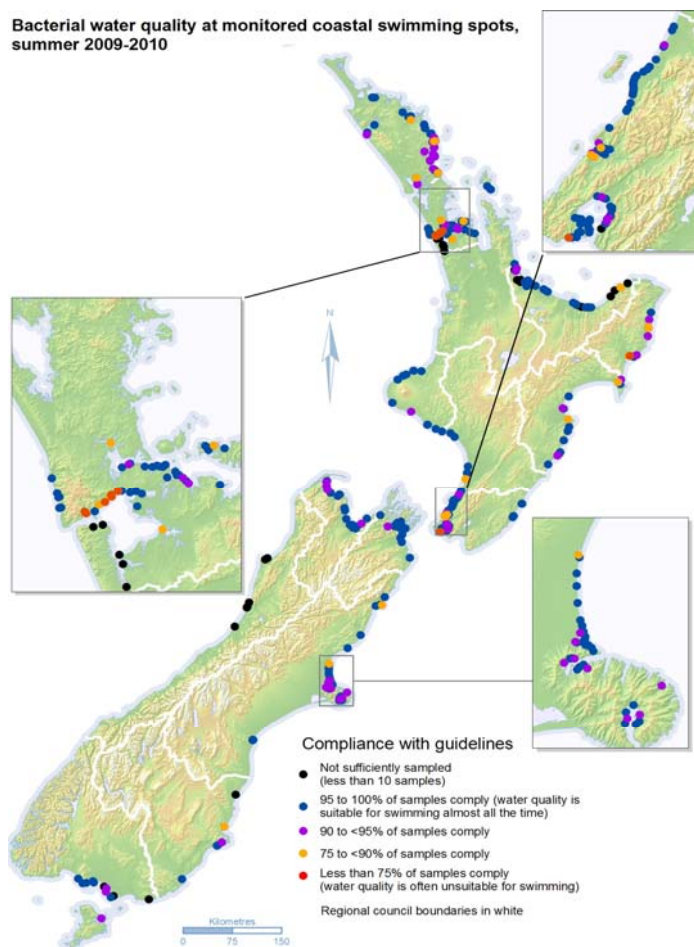


Figure 11: National comparison of compliance with coastal bathing water action level guidelines (from: www.mfe.govt.nz/environmental-reporting/freshwater/recreational/snapshot/coastal.html)

5.2. Rivers

5.2.1. 2009-10 Summer Results

The percentage of time in which river sites were deemed safe or otherwise for swimming is shown in figure 12. Seven of the thirteen sites were deemed safe for swimming for more than 95% of the time whilst three were deemed safe for swimming for 100% of the time.

The Rai at Rai Falls had the poorest water quality. Poor water quality at the Rai Falls is predominately associated with high rainfall. Three of the four exceedances recorded at the Rai Falls were as a result of heavy rainfall. The fourth exceedance (25th January 2010) may in part be attributed to heavy rainfall on the 21st January, however none of the 3 other sites in the catchment showed elevated *E. coli* levels on this date (figure 13). The main source of faecal contamination is from farming (principally dairying) in the catchment.

The best water quality was recorded at three sites on the Wairau; these sites are located at the Blenheim Rowing Club, the Wairau Rowing Club and at Ferry Road Bridge.

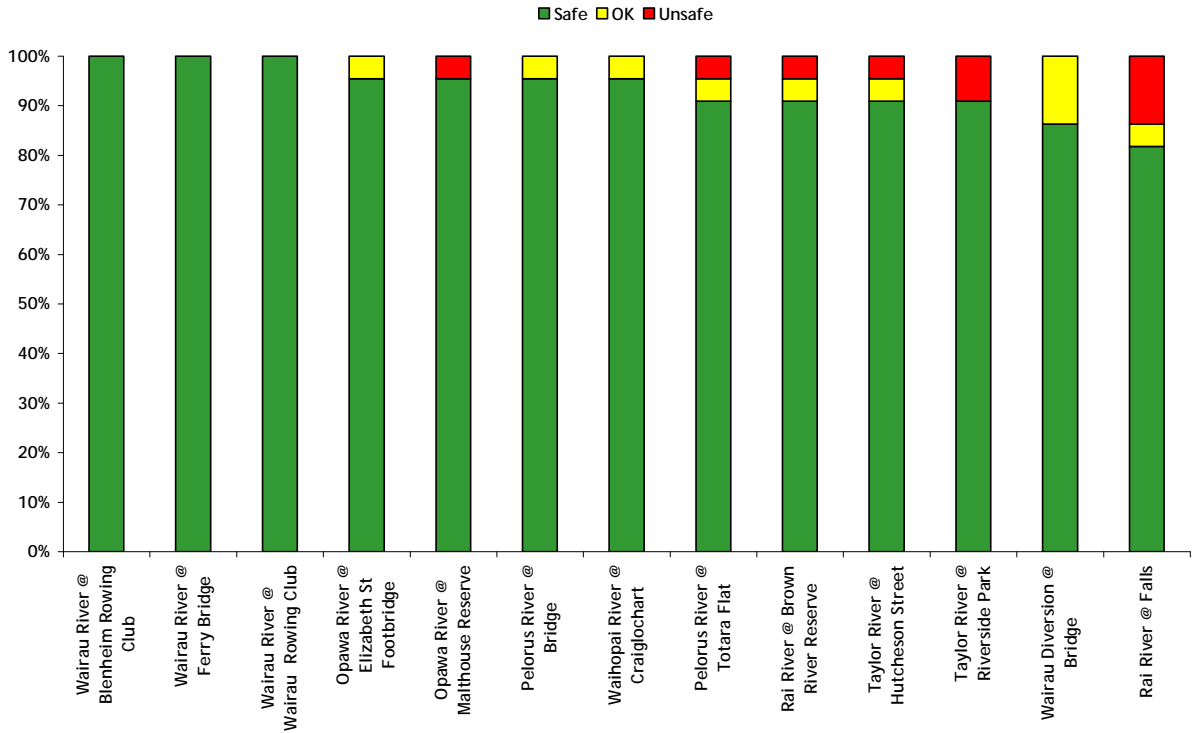


Figure 12: Freshwater bathing sites ranked according to the percentage of time they were suitable for contact recreation

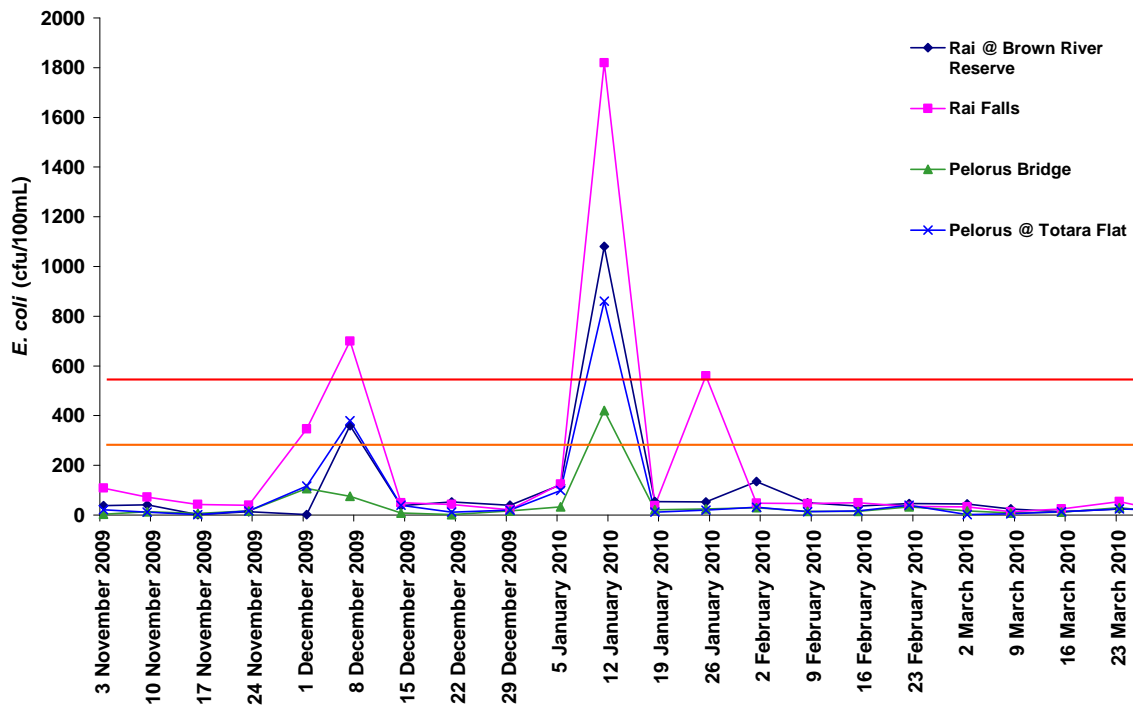


Figure 13: E. coli numbers recorded in the Rai Catchment

5.2.2. Recent Trends

An overall improvement is observed in freshwater recreational water quality over a seven year period (figure 14). The 2009-10 summer showed the greatest compliance with the bathing water guidelines, in part due to the dry summer. Improvements in land management practices, such as the elimination of stream crossings in the Rai Catchment, will also have helped to improve overall freshwater bathing quality. Rainfall from year to year will have some influence on water quality but will not solely be responsible for bathing water quality from year to year.

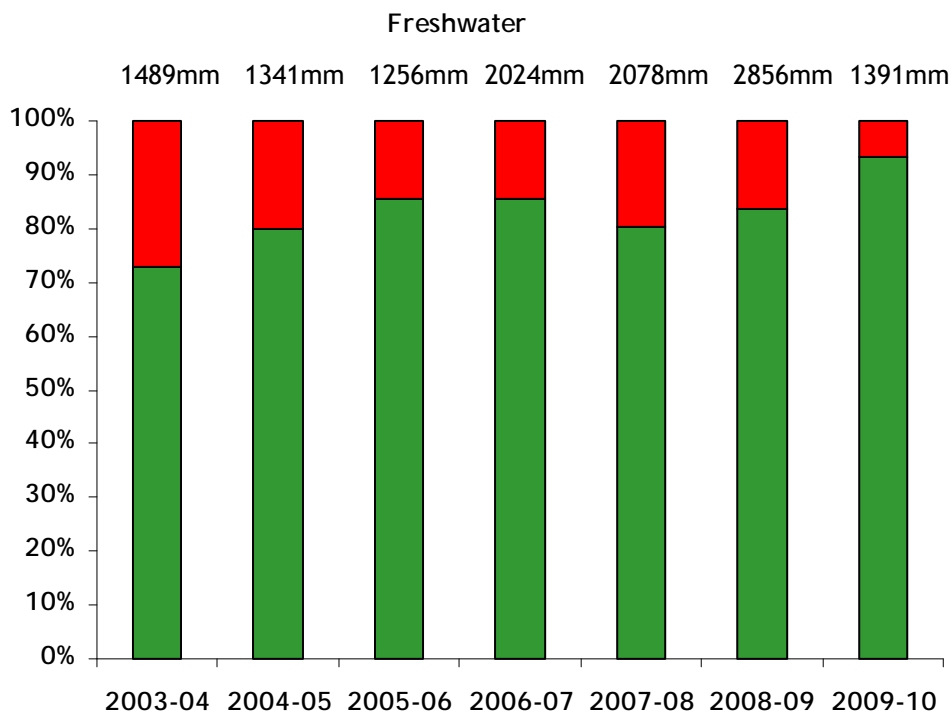


Figure 14: Percentage compliance with the bathing water guidelines from 2003 to 2010 at freshwater sites. Compliance is denoted by the green bars and non-compliance with the red bars. Total summer rainfall from four key sites in Marlborough is shown above each bar for each summer.

Trends in water quality for each site are shown in Table 7. The table shows both the median and 95%ile for the last 7 years. Water quality has significantly improved at the Opawa River sites. Some improvement is seen in Rai River at the Brown River Reserve and at the Rai Falls and in the Wairau River at the Wairau Rowing Club, as indicated by the median *E. coli* number recorded over the last seven years. Bathing water quality has not significantly declined at any site.

Table 7: The median and 95%ile for each freshwater site for each summer season from 2003 to 2010

Median	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
Opawa River @ Elizabeth St Footbridge	111	111.5	178	124	178	99	10.5
Opawa River @ Malthouse Reserve	150.5	215	53	87	87	105	28.5
Pelorus River @ Bridge	20	30	30	20	20	20	16.5
Pelorus River @ Totara Flat	87	111	20	40	75	47.5	20
Rai River @ Brown River Reserve	316	207	172	87	271	99	40
Rai River @ Falls	207	192	69.5	53	99	83	46.5
Taylor River @ Hutcheson Street	124	171	207	192	137	178.5	27

Taylor River @ Riverside Park		137	192	178	164	150	22.5
Waihopai River @ Craiglochart	75	46.5	30	20	75	47.5	12
Wairau Diversion @ Bridge	178	81	75	64	40	105	33
Wairau River @ Blenheim Rowing Club	75	25	40	30	30	35.5	7.5
Wairau River @ Ferry Bridge	40	64	75	40	75	36.5	13.5
Wairau River @ Wairau Rowing Club	99	58.5	30	40	40	31	1.5
95%ile	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
Opawa River @ Elizabeth St Footbridge	1498.8	314	988.3	877	312.85	526	318.4
Opawa River @ Malthouse Reserve	2001	2001	150	1306	706.2	742	358.6
Pelorus River @ Bridge	666.65	740.1	955.05	778	789.15	438	232.2
Pelorus River @ Totara Flat	682.1	1267.1	1266	720	1145	2001	572
Rai River @ Brown River Reserve	2001	1300	2001	1452	1425	2240	648
Rai River @ Falls	1520	1510.3	1367.4	1731	1670.45	2001	1148
Taylor River @ Hutcheson Street	2001	617.5	1835.45	427	965.2	1331	1556
Taylor River @ Riverside Park		520.5	1330.55	344	2001	1640	1504
Waihopai River @ Craiglochart	257.8	644	1738.95	586	2001	194	245.2
Wairau Diversion @ Bridge	511.85	1239.5	245.2	432	524.85	1007	496
Wairau River @ Blenheim Rowing Club	392.5	271	465.75	143	528.85	630	80
Wairau River @ Ferry Bridge	265.5	316	176	301	449.1	773	85.2
Wairau River @ Wairau Rowing Club	1430	431	393.15	162	416.35	582	118.2

Over this seven year period the worst sites are located on the Rai and the Taylor rivers (figures 15 and 16). The Rai at Rai Falls has shown a decrease in the median *E. coli* number in recent years (table 7), showing that despite frequent exceedances of the guidelines improvements in water quality are being made. The best recreational water quality is from the Pelorus Bridge and the Wairau.

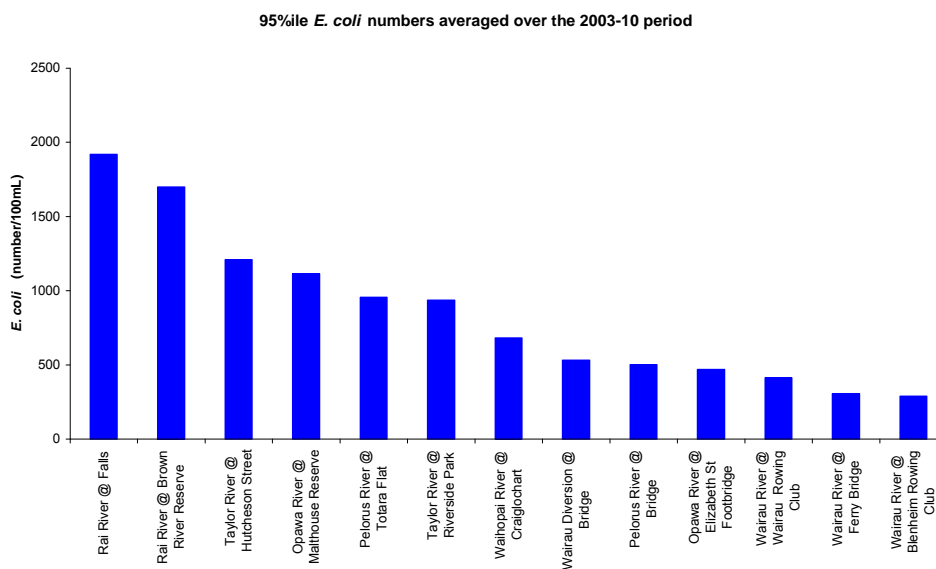


Figure 15: Freshwater sites ranked according to the 95%ile numbers averaged over 7 years

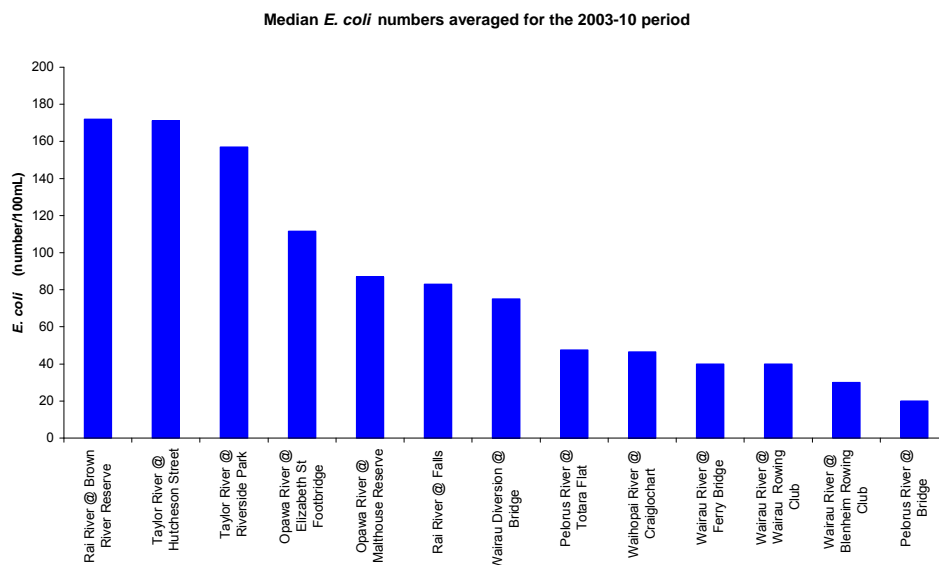


Figure 16: Freshwater sites ranked according to the median numbers averaged over 7 years

5.2.3. Suitability for Recreation Grades (SFRGs) 2009-10

The Suitability for Recreation Grades have been calculated using the latest five years of microbiological data and the SIC classes which were reassessed in 2009; complete results are shown in Appendix 5. Long term data exists for all sites sampled and thus it is possible to calculate the SFRG grade for all sites. Only one site has <100 samples over 5 years (Waihopai at Craiglochart; 98 samples) and thus the grade is marked as incomplete. The results are shown in Table 8.

Table 8: Suitability for Recreation Grades for Marlborough's Freshwater recreation sites

Site	MAC Grade* Summer season 2009-10	MAC Grade** long term (5 years)	Trend	SFRG	Status of SFRG grade
Opawa at Elizabeth St Footbridge	C	C	↔	Fair	Complete
Opawa at Malthouse Reserve	C	D	↑	Poor	Complete
Pelorus Bridge	B	C	↑	Fair	Complete
Pelorus at Totara Flat	D	D	↔	Very Poor	Complete
Rai at Brown River Reserve	D	D	↔	Very Poor	Complete
Rai at Rai Falls	D	D	↔	Very Poor	Complete
Taylor at Hutcheson	D	D	↔	Very Poor	Complete
Taylor at Riverside	D	D	↔	Very Poor	Complete
Waihopai at Craiglochart	B	D	↑	Poor	Incomplete
Wairau at Blenheim Rowing Club	A	C	↑	Fair	Complete
Wairau at Ferry Bridge	A	C	↑	Fair	Complete ^y
Wairau at Wairau Rowing Club	A	C	↑	Fair	Complete
Wairau Diversion at Neals Road	C	D	↑	Poor	Complete

* Based on the 95th percentile (Hazen) for the 2009-10 Bathing Water season.

** Calculated using MfEs' Bathewatch programme, includes the latest 5 years of microbiological data

Over half of the sites show an improvement in the MAC grade in 2009-10 over the long term, whilst the remainder show no change. No site shows a deterioration in the MAC grade calculated in 2009-10 over the long term.

Figure 17 shows the percentage of sites that fall within each SFRG grade. The best freshwater bathing sites are only classed as Fair. Just over 60% are graded as Poor or Very Poor. This is an improvement on last year's grades when 69% of sites were graded as Poor or Very Poor. This is a result of the Pelorus Bridge site improving from Poor to Fair in 2009-10.

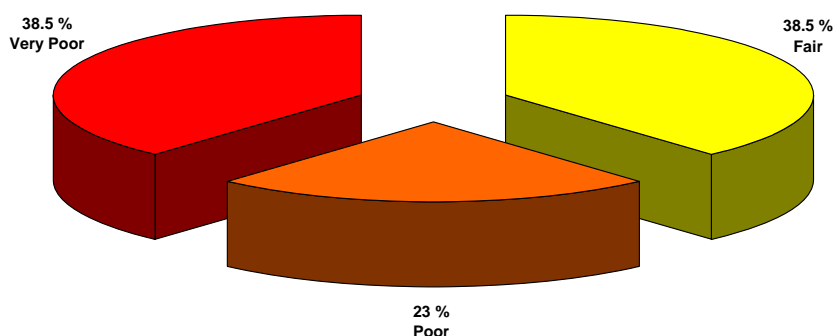


Figure 17: Pie-chart of SFRG's for the freshwater bathing water sites for the summer 2009-10

5.2.4. Marlborough's River Sites in a National Context

Scarsbrook and McBride (2004) showed that from 410 river sites in New Zealand 69% were rated as Poor or Very Poor according to MfE's methodology for grading sites. River water quality is primarily impacted by diffuse pollution, either from urban runoff or from areas of intensive agriculture. Mitigation measures such as stock exclusion from waterways and riparian planting can reduce the faecal contaminant load reaching rivers.

Results from the recreational monitoring programme are reported to the Ministry for the Environment (MfE) annually. MfE publish annual reports which compare recreational water quality around the country and analyse for trends over time (www.mfe.govt.nz/environmental-reporting/freshwater/recreational/snapshot/). Recreational water quality, at a national level, has remained relatively stable over the last seven years. River water quality in Marlborough compares favourably with river water quality nationally, with most sites suitable for swimming nearly all of the time (figure 18). Water quality at 57% of river sites nationally met the action level guidelines 95% of the time compared with 85% of river sites in Marlborough.

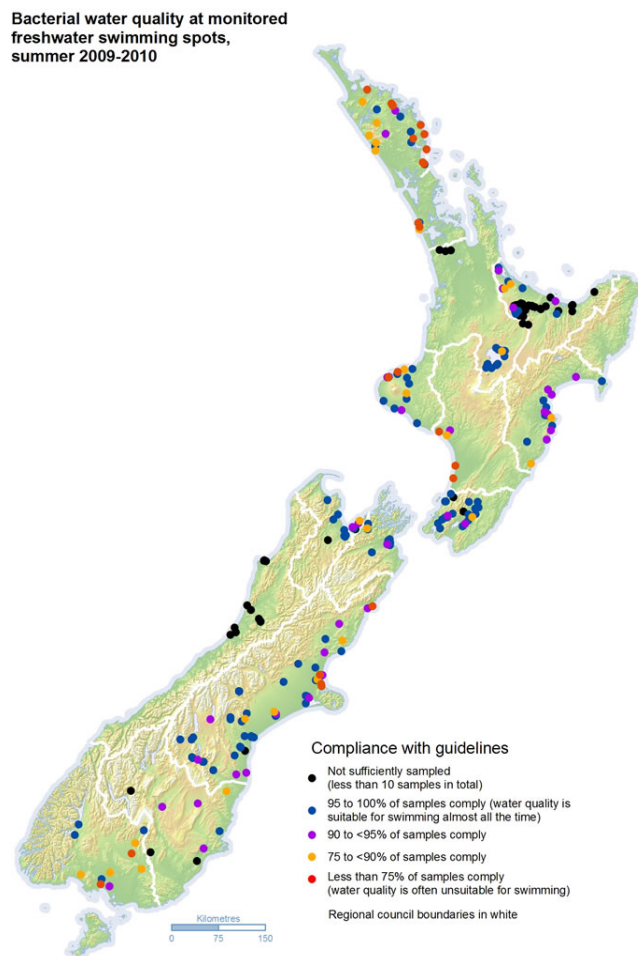


Figure 18: National comparison of compliance with river bathing water action level guidelines (from: www.mfe.govt.nz/environmental-reporting/freshwater/recreational/snapshot/freshwater.html)

6. Recommendations for Summer Sampling 2010-11

- Carry out a faecal source investigation at Moenui during wet weather in order to determine whether faecal contamination is local (i.e. septic tanks) or diffuse (i.e. from the major rivers draining into the inner Pelorus Sound).
- Maintain routine monitoring of all sites to allow for the assessment of beach grades, the assessment of trends over time and for a comparison of Marlborough's recreational water quality with sites across the country.

7. Conclusions

- Marlborough's coastal water quality is very good in a national context with most sites in 2009-10 being 95% or more compliant with the action level guidelines. However there has been a deterioration in some coastal sites. 77% of monitored coastal beaches nationally met the action level guideline for swimming almost all of the time (95% of the time) compared with 94% of coastal beaches in Marlborough.

- Marlborough's freshwater recreational water quality is good in a national context with a most sites in 2009-10 being 95% or more compliant with the action level guidelines. Most river sites showed an improvement in water quality over the long term; there was no deterioration in freshwater recreational water quality over the long term. 57% of monitored river sites nationally met the action level guideline for swimming almost all of the time (95% of the time) compared with 85% of river sites in Marlborough.
- Water quality at freshwater sites is generally poorer than at coastal sites, however overall water quality is seen to be improving in freshwater sites. This is due to a number of reasons 1. Improvements in land use practices to reduce contamination from diffuse sources 2. Improvements to on-site wastewater treatment (e.g. the elimination of direct discharges from septic tanks on the Opawa River). Continued improvements in these areas will result in further improvements in recreational water quality. Nationally, 2% of coastal sites regularly exceeded the action level guidelines whilst 11% of freshwater sites regularly exceeded the action level guidelines. Therefore the trend for poorer water quality at freshwater sites, as seen for Marlborough, is reflected across the country.

8. References

MDC (2008) *Marlborough's Coastal Bathing Water Quality, 2007-08*. May 2008. Marlborough District Council.

MDC (2009a) *Marlborough's Coastal Recreational Water Quality 2008-09*. Marlborough District Council.

MDC (2009b) *Marlborough's Freshwater Recreational Water Quality 2008-09*. Marlborough District Council.

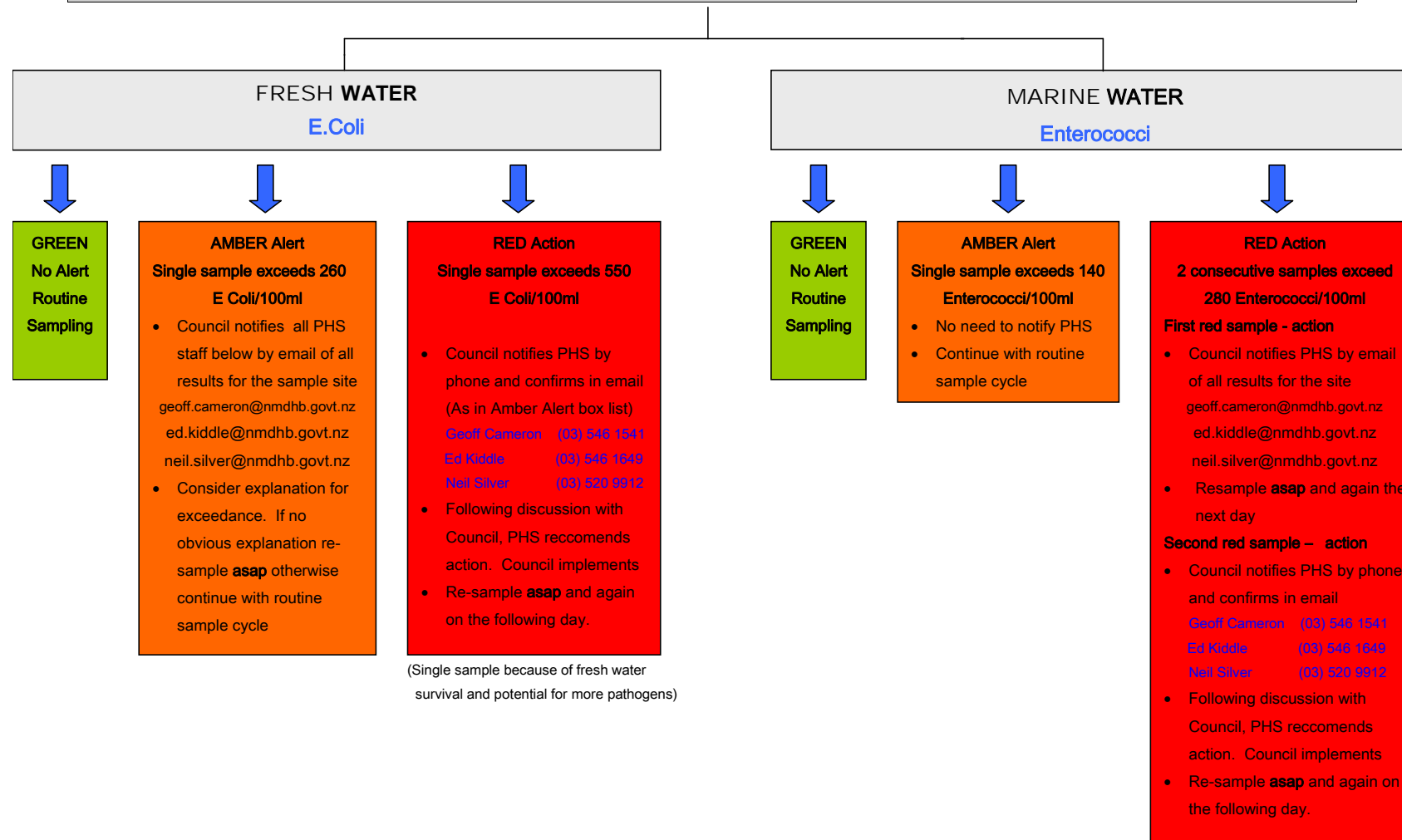
MfE (2003) *Microbiological Water Quality Guidelines for Marine and Freshwater Recreational Areas*. Ministry for the Environment <http://www.mfe.govt.nz/publications/water/microbiological-quality-jun03/microbiological-quality-jun03.pdf>

Scarsbrook, M. and McBride, G. (2004) *Levels of E. coli in New Zealand's rivers*. NIWA Client Report: HAM2004-157. December 2004.

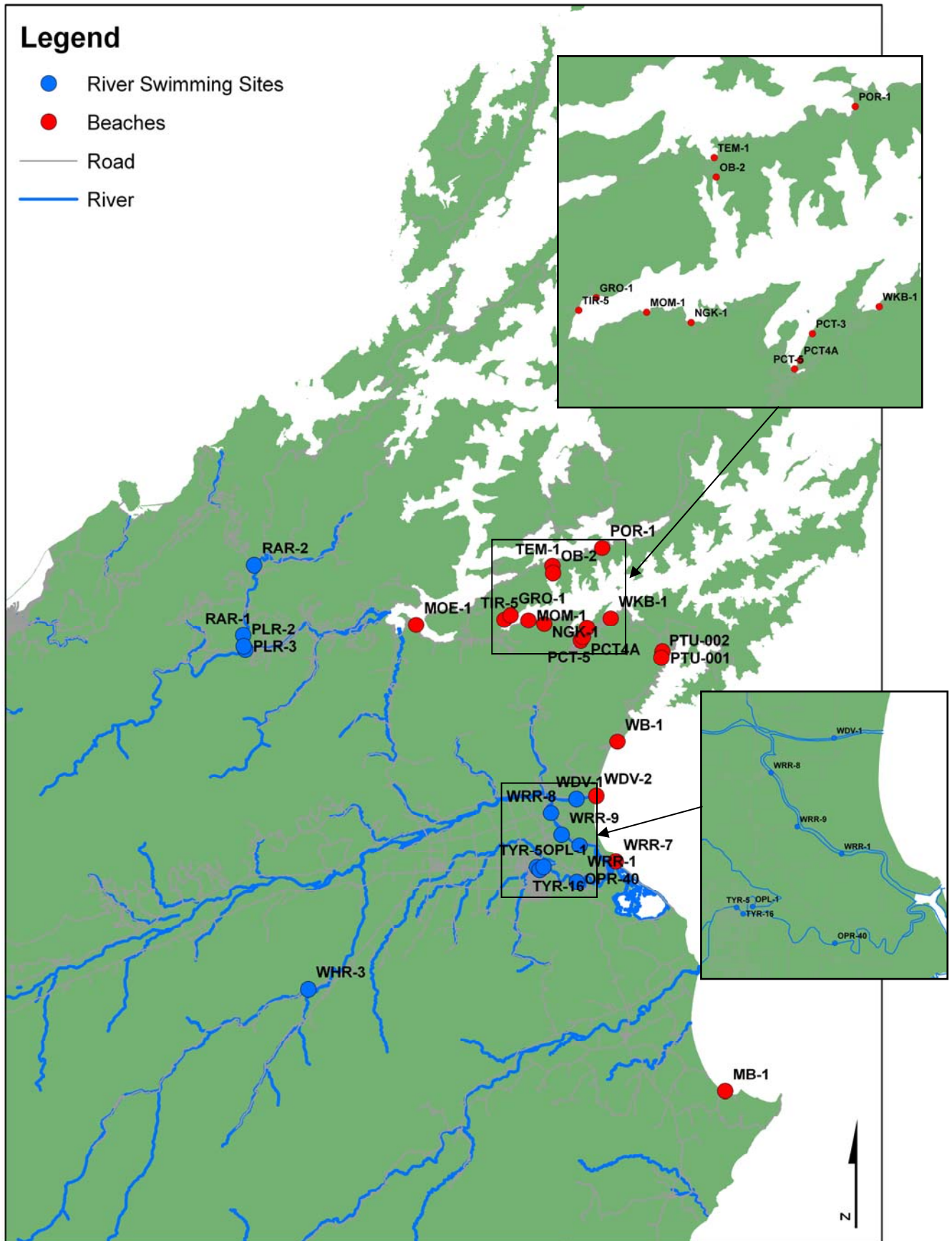
Appendix 1: Management procedure for exceedances of bathing water guidelines.

RECREATIONAL WATER SAMPLE EXCEEDANCES – RESPONSE PROCEDURE

Based on Microbial water Quality Guidelines Page D9 (Box 1) and E9 (Box 2)



Appendix 2: Locations of Recreational Water Quality Sites



Appendix 3: Recreational water quality results 2009-10.

COASTAL SITES			RIVER SITES		
Site ID	Time	Enterococci (cfu/100mL)	Site ID	Time	<i>E. coli</i> (cfu/100mL)
GRO-001	3/11/2009 12:51	4	OPL-1	4/11/2009 14:00	11
GRO-001	9/11/2009 12:10	4	OPL-1	10/11/2009 14:04	2
GRO-001	16/11/2009 12:56	2	OPL-1	17/11/2009 13:42	1
GRO-001	23/11/2009 12:08	2	OPL-1	24/11/2009 13:56	4
GRO-001	1/12/2009 12:50	56	OPL-1	2/12/2009 14:01	29
GRO-001	7/12/2009 12:45	2	OPL-1	8/12/2009 13:02	11
GRO-001	14/12/2009 12:17	2	OPL-1	15/12/2009 13:36	8
GRO-001	21/12/2009 12:51	4	OPL-1	22/12/2009 13:23	9
GRO-001	29/12/2009 12:06	4	OPL-1	30/12/2009 13:48	161
GRO-001	5/01/2010 13:04	4	OPL-1	6/01/2010 14:14	10
GRO-001	11/01/2010 12:46	4	OPL-1	12/01/2010 13:24	6
GRO-001	18/01/2010 12:42	4	OPL-1	19/01/2010 13:39	54
GRO-001	25/01/2010 12:13	24	OPL-1	26/01/2010 13:59	3
GRO-001	1/02/2010 12:53	12	OPL-1	2/02/2010 13:47	520
GRO-001	8/02/2010 12:26	4	OPL-1	9/02/2010 13:52	18
GRO-001	15/02/2010 12:55	12	OPL-1	16/02/2010 14:06	8
GRO-001	22/02/2010 13:15	24	OPL-1	23/02/2010 14:00	7
GRO-001	2/03/2010 12:34	190	OPL-1	3/03/2010 14:18	12
GRO-001	8/03/2010 13:08	4	OPL-1	9/03/2010 13:44	6
GRO-001	15/03/2010 12:49	4	OPL-1	16/03/2010 13:55	23
GRO-001	23/03/2010 12:12	4	OPL-1	24/03/2010 13:51	184
GRO-001	29/03/2010 13:03	2	OPL-1	30/03/2010 12:11	15
MB-1	5/11/2009 10:00	2	OPR-40	4/11/2009 14:30	21
MB-1	9/11/2009 8:10	16	OPR-40	10/11/2009 14:42	29
MB-1	16/11/2009 9:00	2	OPR-40	17/11/2009 14:29	53
MB-1	23/11/2009 8:30	2	OPR-40	24/11/2009 14:43	10
MB-1	1/12/2009 10:10	2	OPR-40	2/12/2009 14:42	33
MB-1	7/12/2009 8:30	8	OPR-40	8/12/2009 13:47	43
MB-1	14/12/2009 7:20	2	OPR-40	15/12/2009 14:17	11
MB-1	21/12/2009 7:30	4	OPR-40	22/12/2009 13:56	760
MB-1	29/12/2009 10:00	4	OPR-40	30/12/2009 14:21	91
MB-1	5/01/2010 8:40	12	OPR-40	6/01/2010 14:41	64
MB-1	11/01/2010 8:20	4	OPR-40	12/01/2010 14:02	9
MB-1	18/01/2010 9:20	4	OPR-40	19/01/2010 14:13	28
MB-1	25/01/2010 8:45	4	OPR-40	26/01/2010 14:36	10
MB-1	1/02/2010 14:00	4	OPR-40	2/02/2010 14:39	9
MB-1	8/02/2010 10:10	8	OPR-40	9/02/2010 14:30	29
MB-1	15/02/2010 8:45	4	OPR-40	16/02/2010 14:45	38
MB-1	22/02/2010 8:20	4	OPR-40	23/02/2010 14:33	8
MB-1	2/03/2010 10:00	4	OPR-40	3/03/2010 14:50	29
MB-1	8/03/2010 8:30	4	OPR-40	9/03/2010 14:27	1
MB-1	15/03/2010 8:30	4	OPR-40	16/03/2010 14:32	5
MB-1	23/03/2010 8:00	4	OPR-40	24/03/2010 14:29	5
MB-1	29/03/2010 11:00	2	OPR-40	30/03/2010 12:54	56
MOE-1	3/11/2009 9:47	84	PLR-2	3/11/2009 9:00	4
MOE-1	9/11/2009 9:50	4	PLR-2	9/11/2009 9:02	13
MOE-1	16/11/2009 9:43	2	PLR-2	16/11/2009 8:56	7
MOE-1	23/11/2009 9:21	4	PLR-2	23/11/2009 8:41	16
MOE-1	1/12/2009 10:00	2800	PLR-2	1/12/2009 8:51	107

MOE-1	7/12/2009 9:38	2	PLR-2	7/12/2009 8:46	76
MOE-1	14/12/2009 9:41	4	PLR-2	14/12/2009 8:56	8
MOE-1	21/12/2009 9:27	2	PLR-2	21/12/2009 8:43	2
MOE-1	29/12/2009 9:00	4	PLR-2	29/12/2009 8:18	17
MOE-1	5/01/2010 10:04	264	PLR-2	5/01/2010 9:07	33
MOE-1	11/01/2010 9:50	4	PLR-2	11/01/2010 8:51	420
MOE-1	18/01/2010 9:40	12	PLR-2	18/01/2010 8:54	21
MOE-1	25/01/2010 9:07	4	PLR-2	25/01/2010 8:28	25
MOE-1	1/02/2010 10:43	36	PLR-2	1/02/2010 9:00	30
MOE-1	8/02/2010 9:23	4	PLR-2	8/02/2010 8:35	15
MOE-1	15/02/2010 9:44	136	PLR-2	15/02/2010 8:57	14
MOE-1	22/02/2010 9:43	2	PLR-2	22/02/2010 8:43	33
MOE-1	2/03/2010 9:45	4	PLR-2	2/03/2010 8:49	17
MOE-1	8/03/2010 9:28	8	PLR-2	8/03/2010 8:42	9
MOE-1	15/03/2010 9:50	530	PLR-2	15/03/2010 8:55	12
MOE-1	23/03/2010 9:03	8	PLR-2	23/03/2010 8:18	30
MOE-1	29/03/2010 9:07	180	PLR-2	29/03/2010 8:09	12
MOM-001	3/11/2009 13:25	12	PLR-3	3/11/2009 9:14	22
MOM-001	9/11/2009 13:05	1876	PLR-3	9/11/2009 9:12	12
MOM-001	16/11/2009 13:42	8	PLR-3	16/11/2009 9:06	2
MOM-001	23/11/2009 12:35	192	PLR-3	23/11/2009 8:52	16
MOM-001	1/12/2009 13:26	268	PLR-3	1/12/2009 9:05	117
MOM-001	7/12/2009 13:14	24	PLR-3	7/12/2009 9:00	380
MOM-001	14/12/2009 13:12	20	PLR-3	14/12/2009 9:05	40
MOM-001	21/12/2009 13:34	2	PLR-3	21/12/2009 8:57	12
MOM-001	29/12/2009 12:35	4	PLR-3	29/12/2009 8:27	20
MOM-001	5/01/2010 13:34	4	PLR-3	5/01/2010 9:26	99
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MOM-001	8/02/2010 12:55	4	PLR-3	8/02/2010 8:50	13
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MOM-001	22/02/2010 13:52	12	PLR-3	22/02/2010 8:59	40
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NGK-001	25/01/2010 13:04	12	RAR-1	25/01/2010 8:18	560
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NGK-001	15/02/2010 13:47	4	RAR-1	1/02/2010 8:32	47
NGK-001	22/02/2010 14:05	40	RAR-1	8/02/2010 8:22	46
NGK-001	2/03/2010 13:54	28	RAR-1	15/02/2010 8:47	49
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PCT-4A	16/11/2009 14:38	2	TYR-5	4/11/2009 14:04	66

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PCT-4A	11/01/2010 14:18	12	TYR-5	30/12/2009 13:59	24
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POR-1	18/01/2010 11:05	68	WHR-3	29/12/2009 11:20	11
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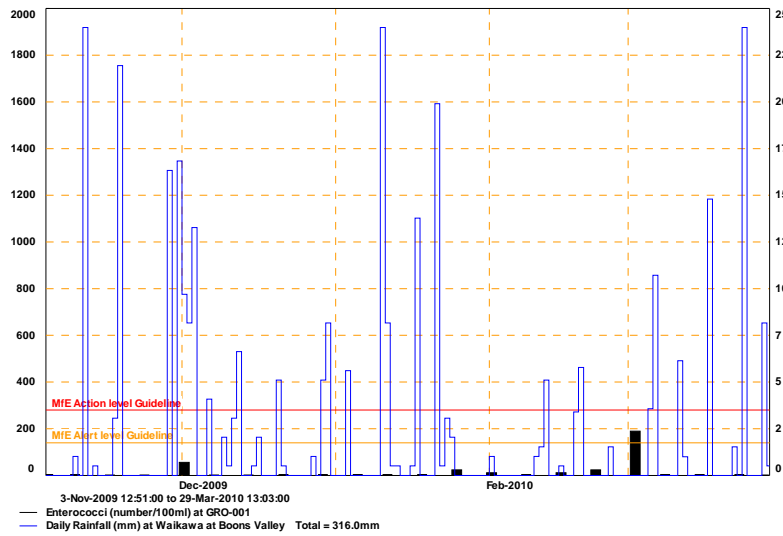
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WDV-2	9/03/2010 11:33	28
WDV-2	16/03/2010 12:33	12
WDV-2	24/03/2010 12:02	36
WDV-2	30/03/2010 10:15	44
WKB-1	4/11/2009 9:02	28
WKB-1	10/11/2009 9:35	2
WKB-1	17/11/2009 8:52	2
WKB-1	24/11/2009 8:52	4
WKB-1	2/12/2009 9:27	12
WKB-1	8/12/2009 8:16	52
WKB-1	15/12/2009 9:22	112
WKB-1	22/12/2009 8:38	4
WKB-1	30/12/2009 9:16	48
WKB-1	6/01/2010 9:33	4
WKB-1	12/01/2010 8:55	12
WKB-1	19/01/2010 9:03	4
WKB-1	26/01/2010 9:08	24
WKB-1	2/02/2010 9:29	20
WKB-1	9/02/2010 9:02	2
WKB-1	16/02/2010 9:31	4
WKB-1	23/02/2010 8:51	4
WKB-1	3/03/2010 9:50	4
WKB-1	9/03/2010 8:51	4
WKB-1	16/03/2010 9:32	4
WKB-1	24/03/2010 9:35	110

WKB-1	30/03/2010 8:10	2
WRR-7	4/11/2009 12:45	16
WRR-7	10/11/2009 12:53	36
WRR-7	17/11/2009 12:23	2
WRR-7	24/11/2009 12:43	4
WRR-7	2/12/2009 12:25	24
WRR-7	8/12/2009 11:46	16
WRR-7	15/12/2009 12:29	2
WRR-7	22/12/2009 12:09	4
WRR-7	30/12/2009 12:45	12
WRR-7	6/01/2010 12:56	4
WRR-7	12/01/2010 12:18	60
WRR-7	19/01/2010 12:37	4
WRR-7	26/01/2010 12:54	48
WRR-7	2/02/2010 12:50	32
WRR-7	9/02/2010 12:45	4
WRR-7	16/02/2010 12:58	44
WRR-7	23/02/2010 12:37	4
WRR-7	3/03/2010 12:58	40
WRR-7	9/03/2010 12:36	4
WRR-7	16/03/2010 13:08	4
WRR-7	24/03/2010 12:37	380
WRR-7	30/03/2010 10:45	2

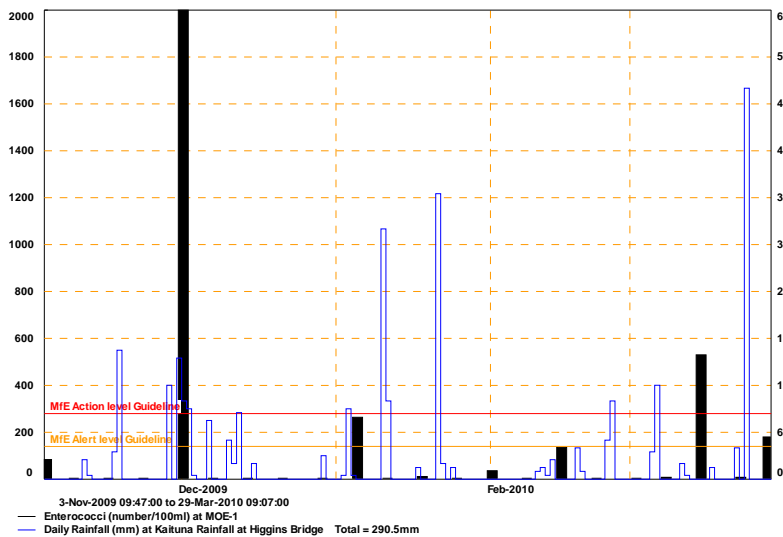
Appendix 4: Graphed results showing daily rainfall for the summer period 2009-2010

COASTAL SITES

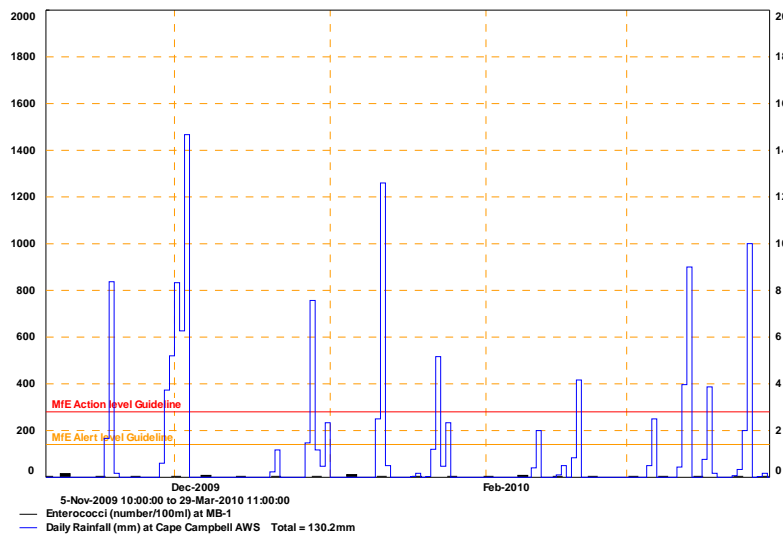
Anakiwa



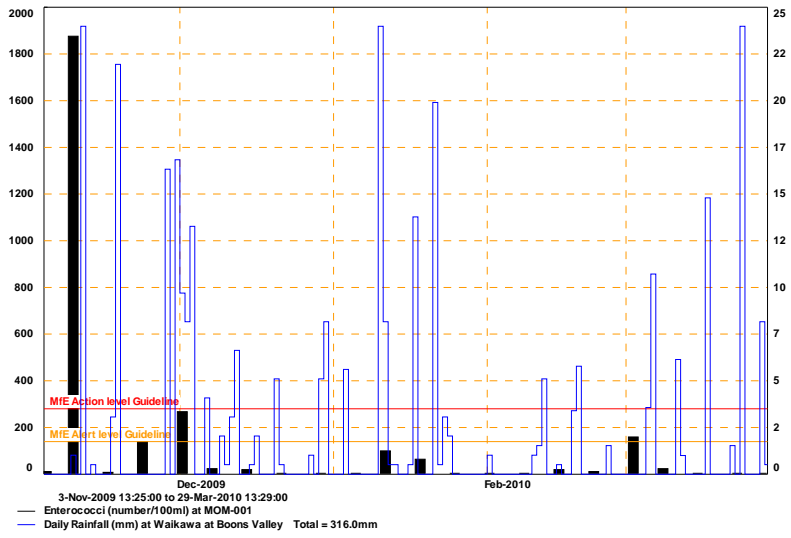
Moenui



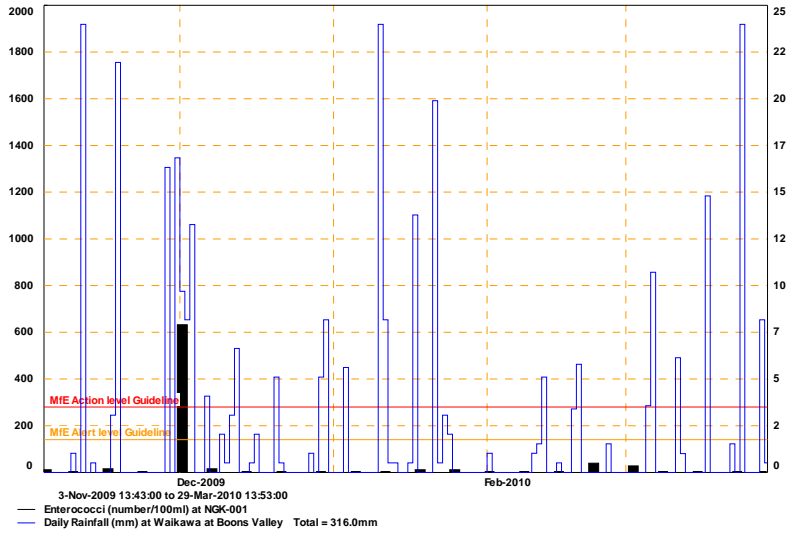
Marfells Beach



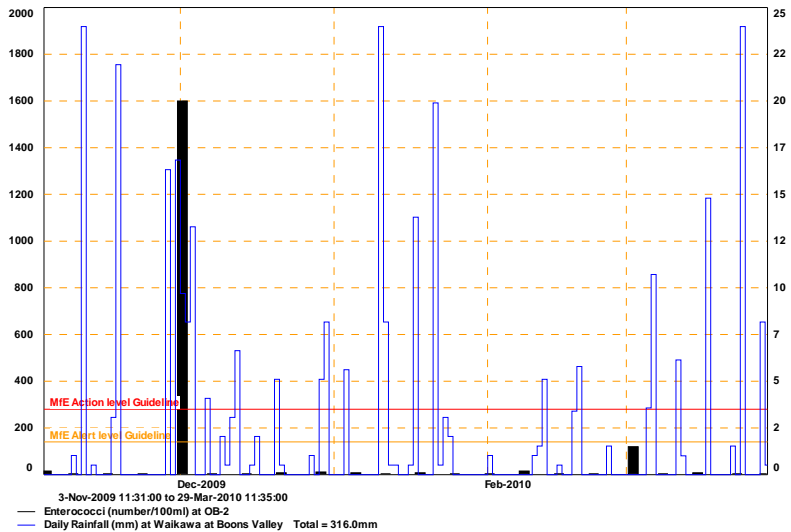
Momorangi Bay



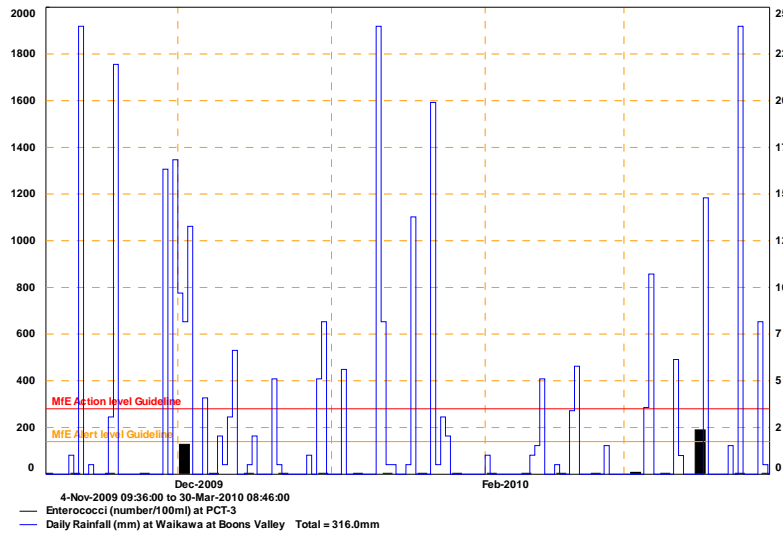
Ngakuta Bay



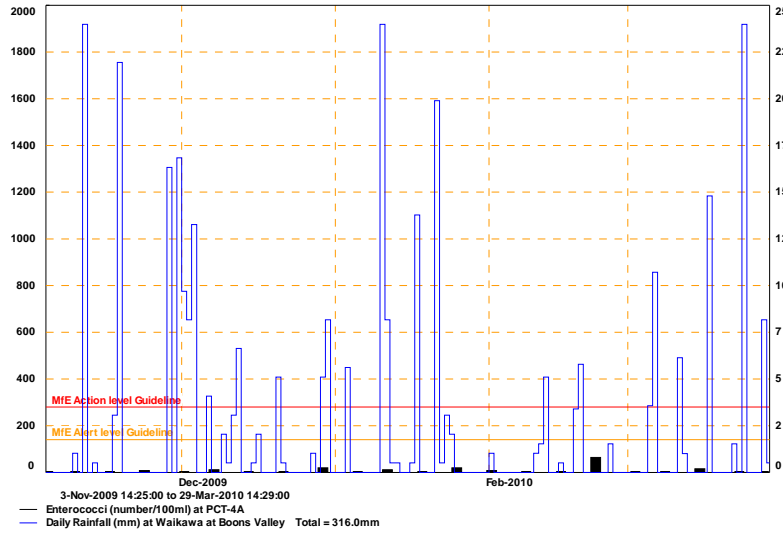
Mistletoe Bay



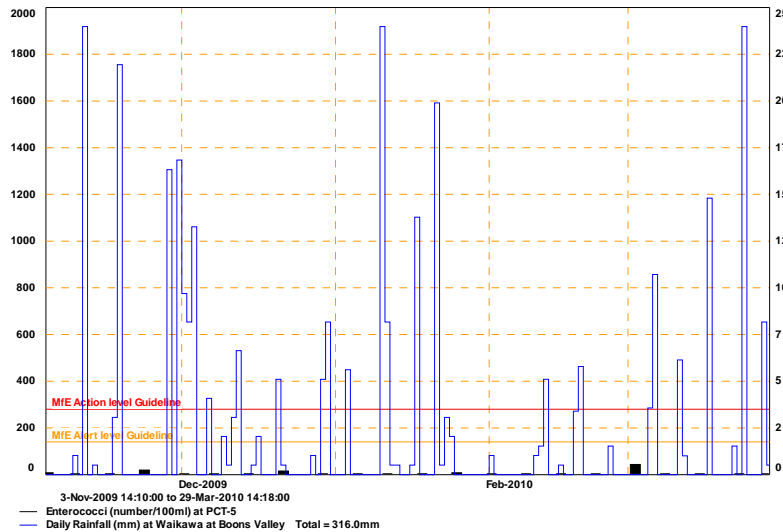
Bobs Bay



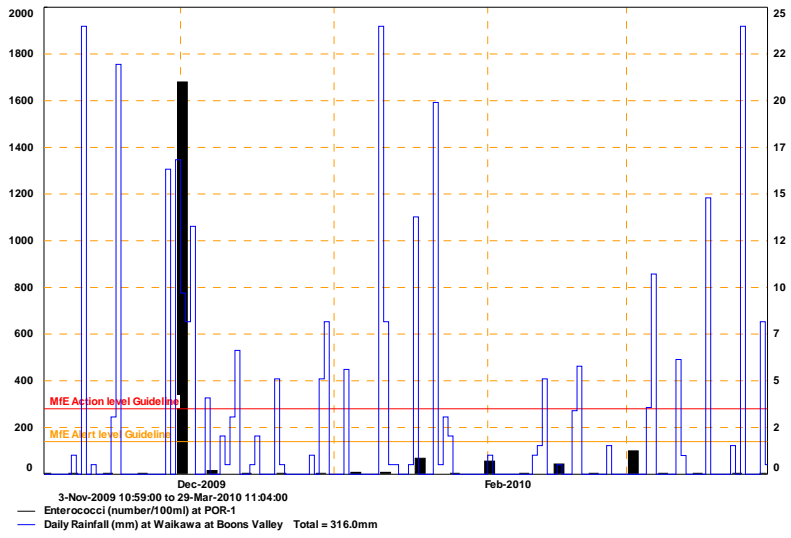
Shelly Beach



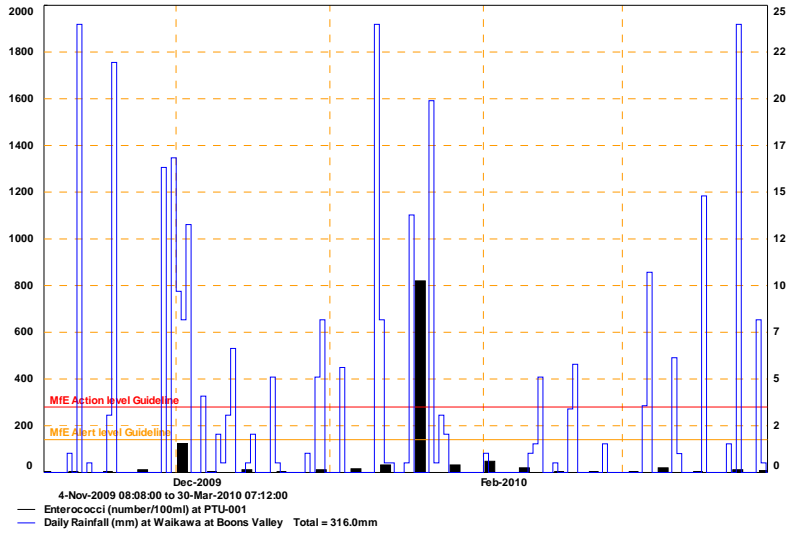
Picton Foreshore



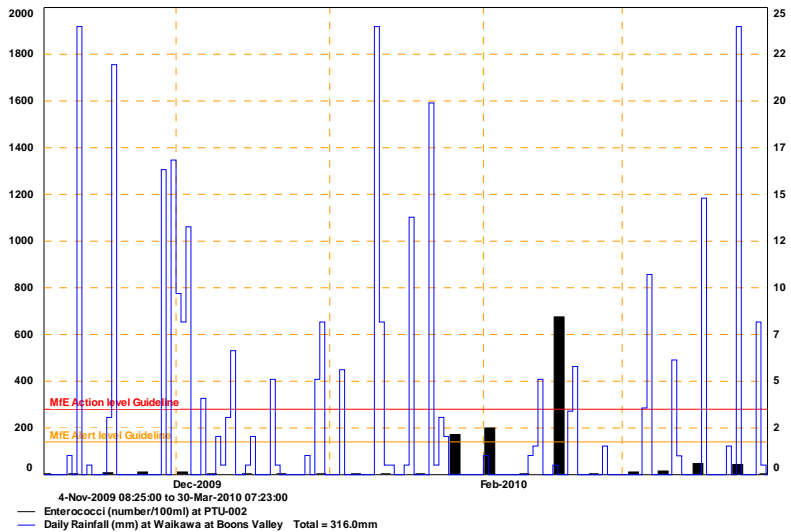
Portage Bay



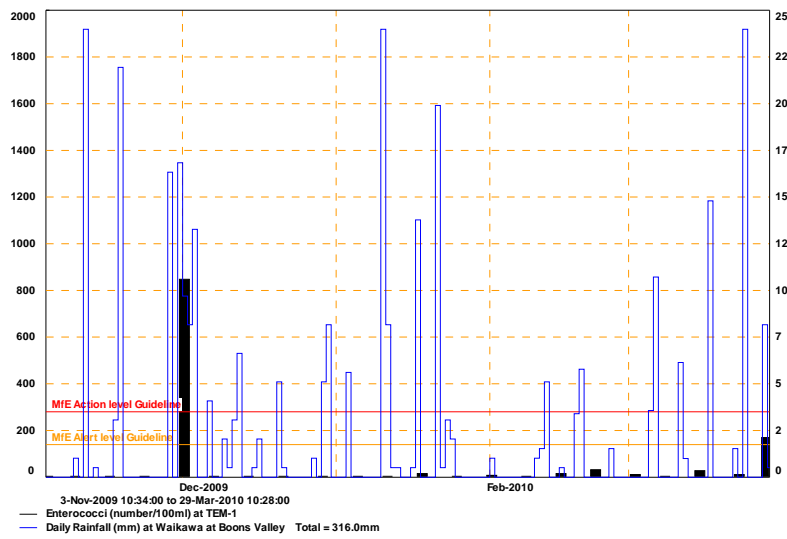
Hakahaka Bay



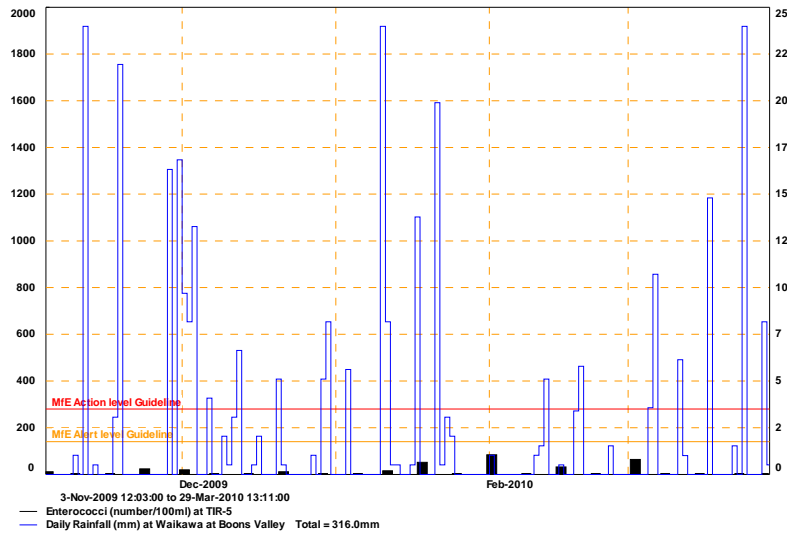
Oyster Bay



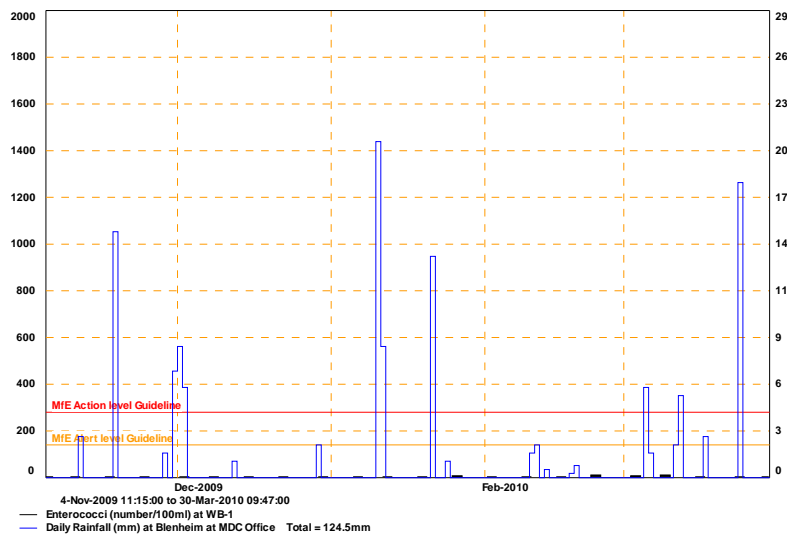
Te Mahia



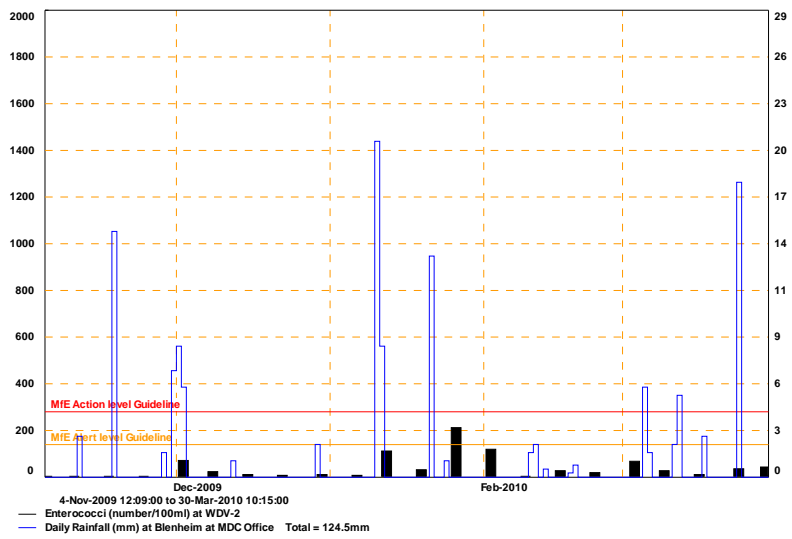
Tirimoana



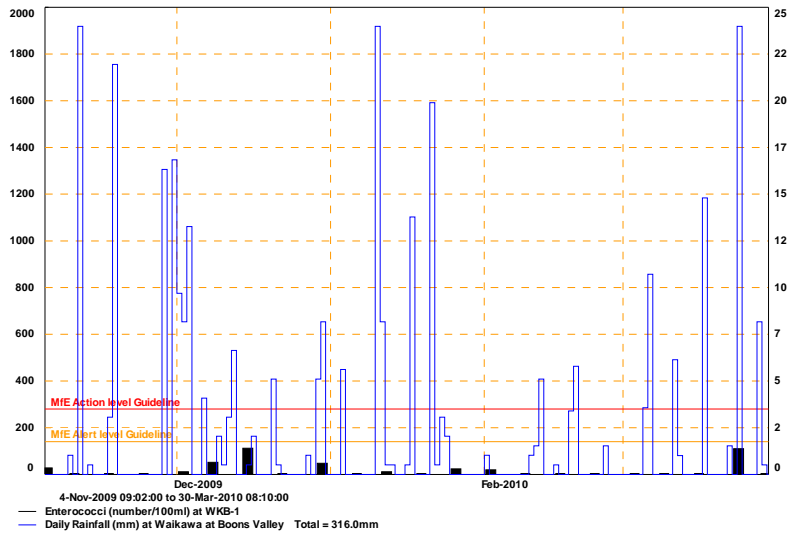
Whites Bay



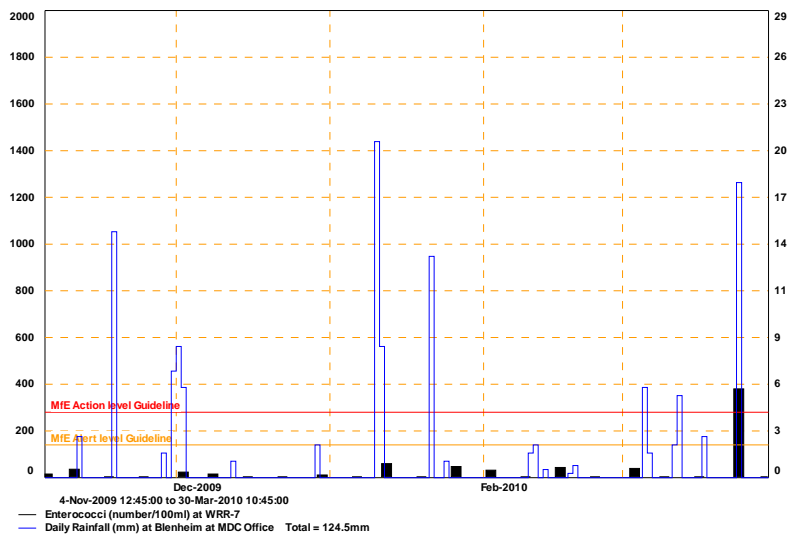
Wairau Diversion



Waikawa Bay

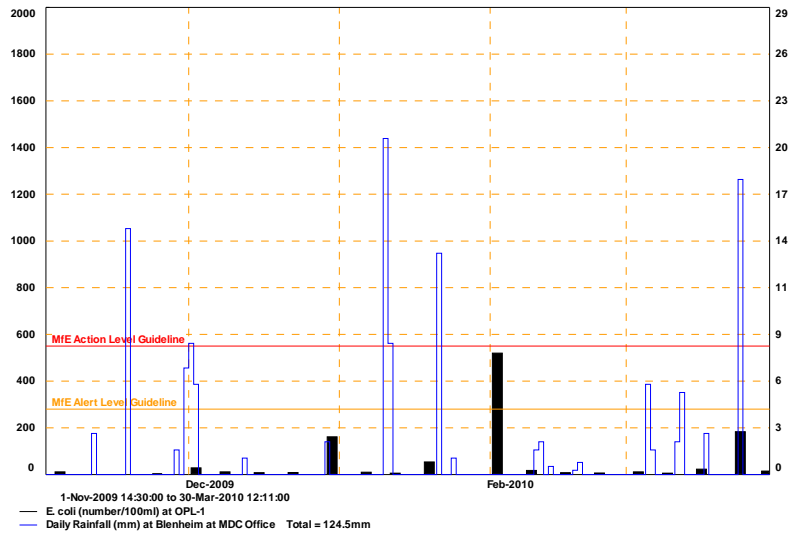


Wairau Bar

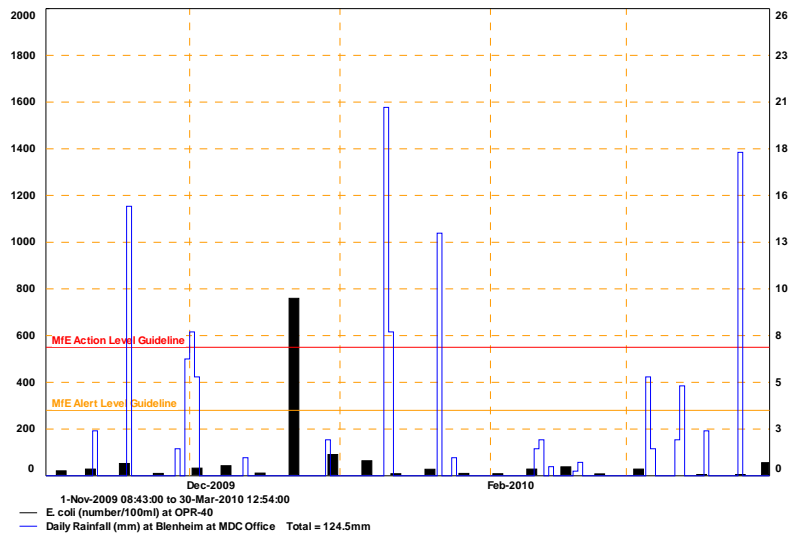


FRESHWATER SITES

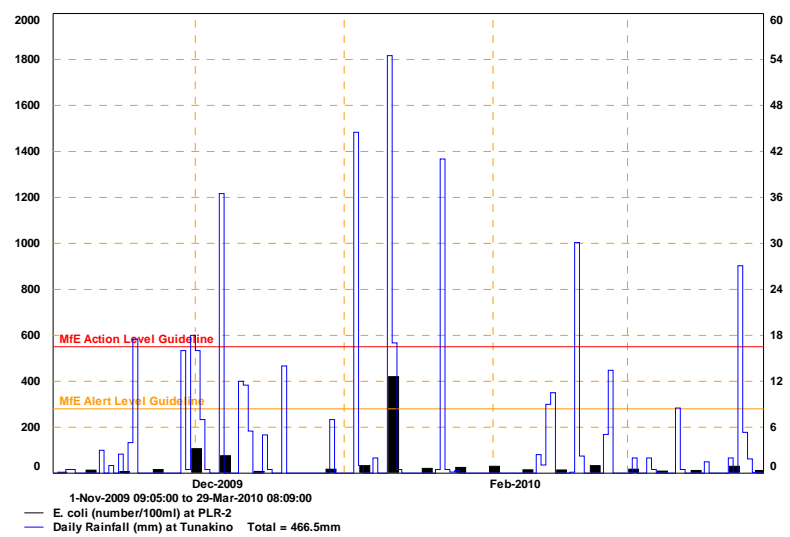
Opawa at Elizabeth Street Footbridge



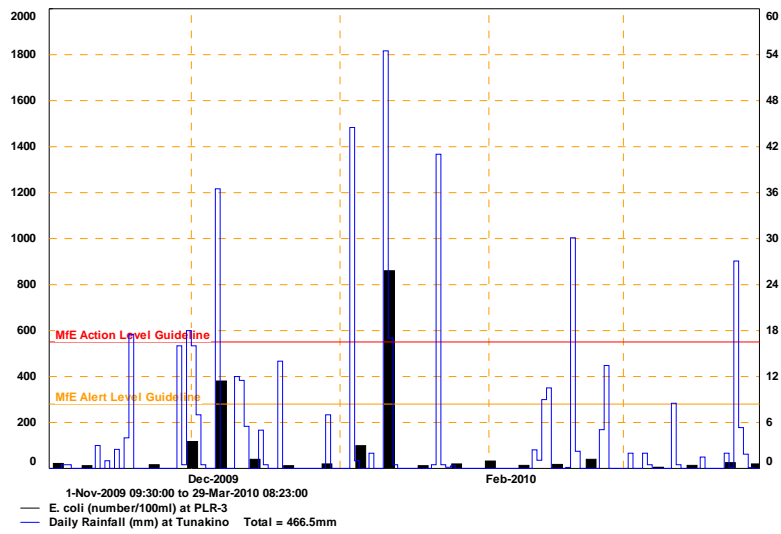
Opawa at Malthouse Reserve



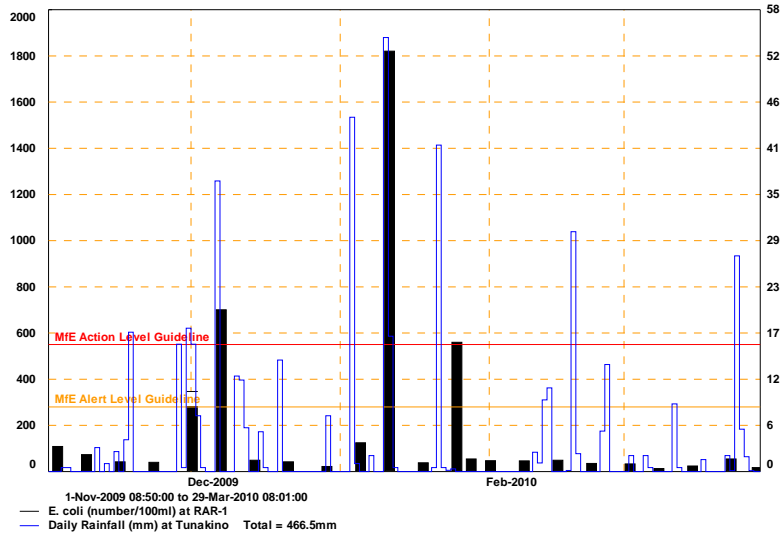
Pelorus at Pelorus Bridge



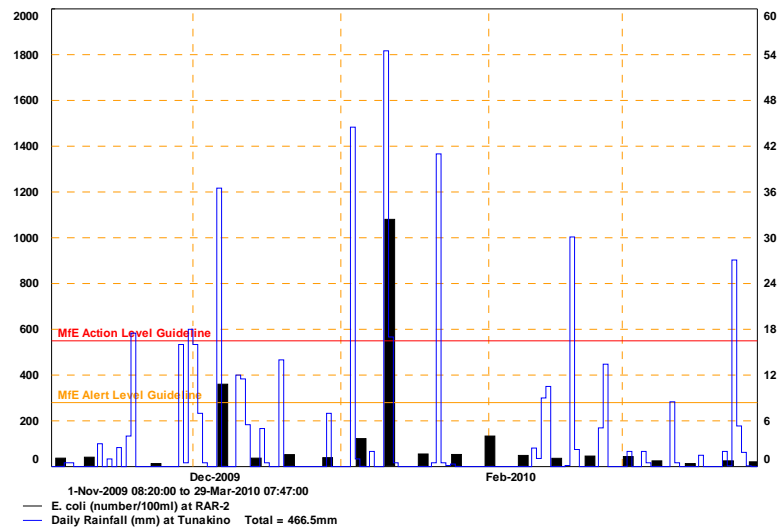
Pelorus at Totara Flat



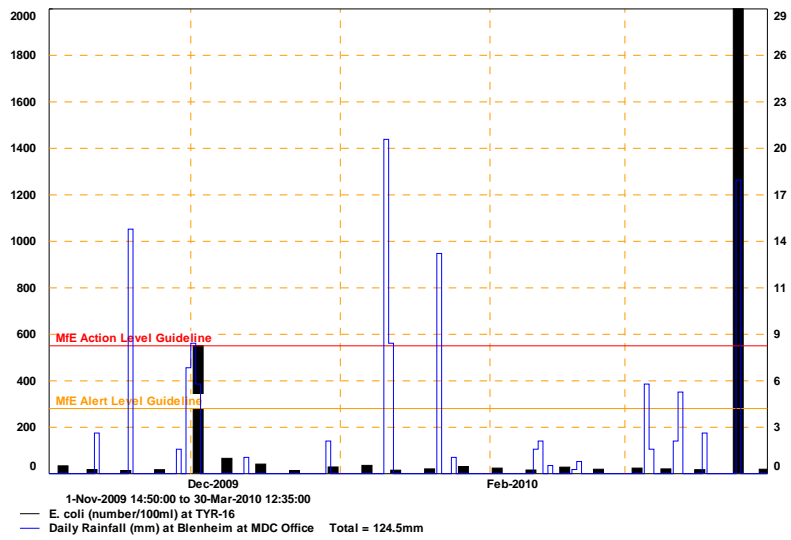
Rai at Rai Falls



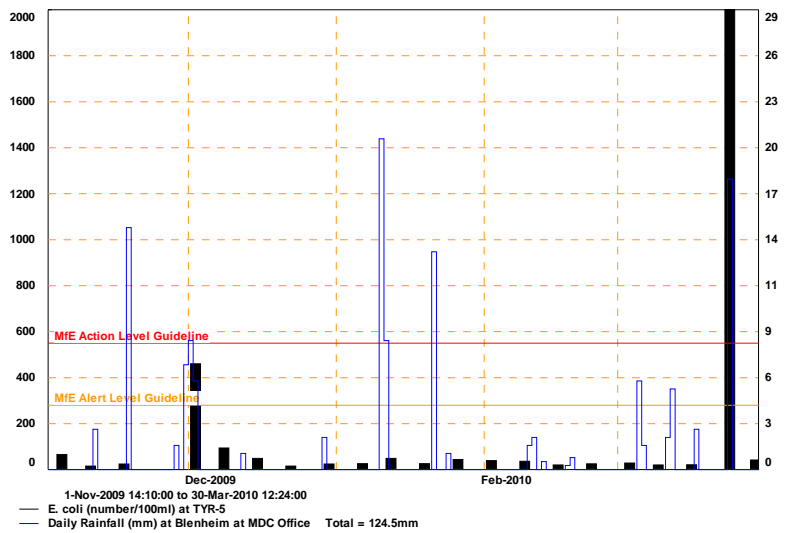
Rai at Brown River Reserve



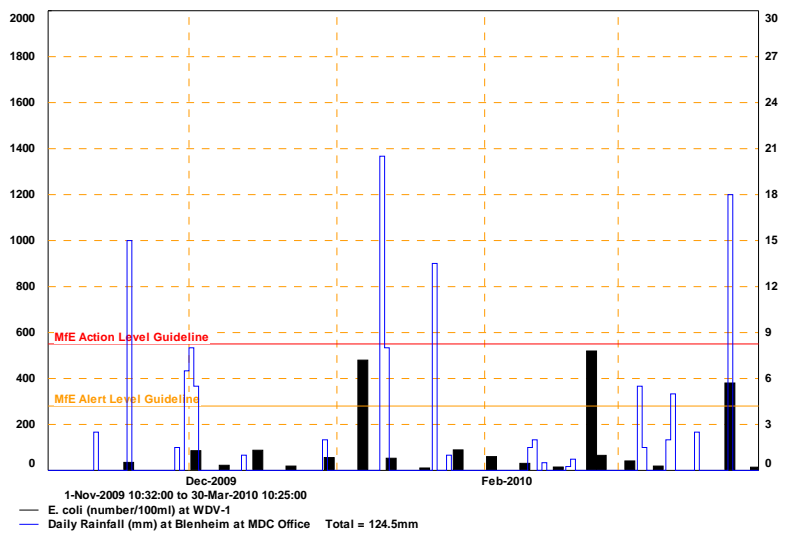
Taylor at Riverside



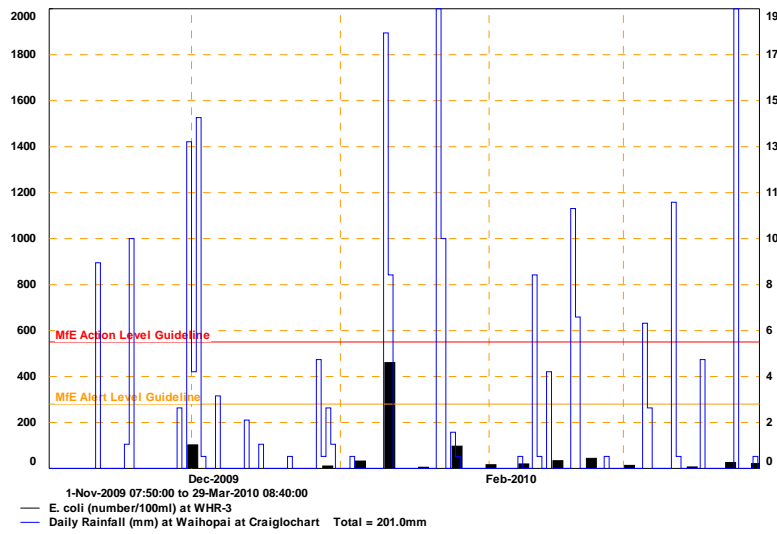
Taylor at Hutcheson



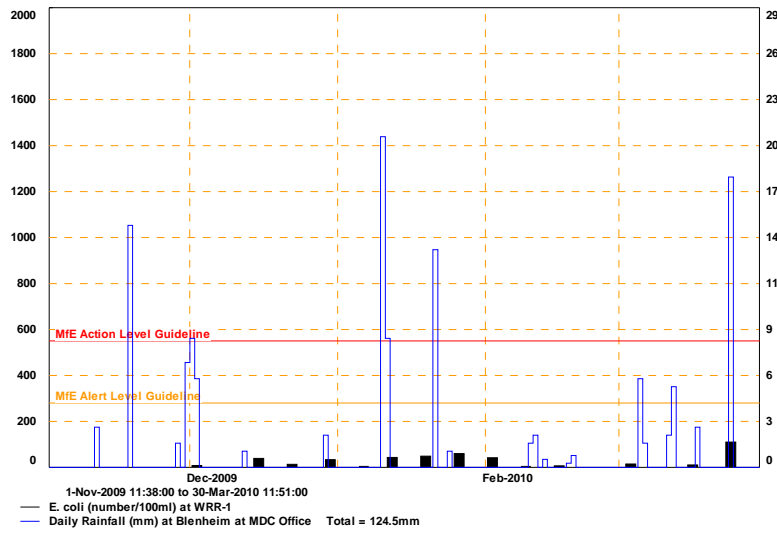
Wairau Diversion at Neals Road Bridge



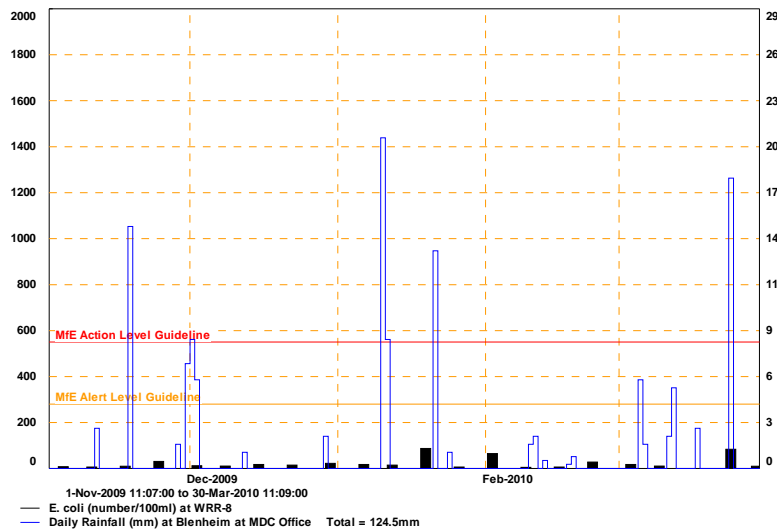
Waihopai at Craiglochart at Bridge No. 2



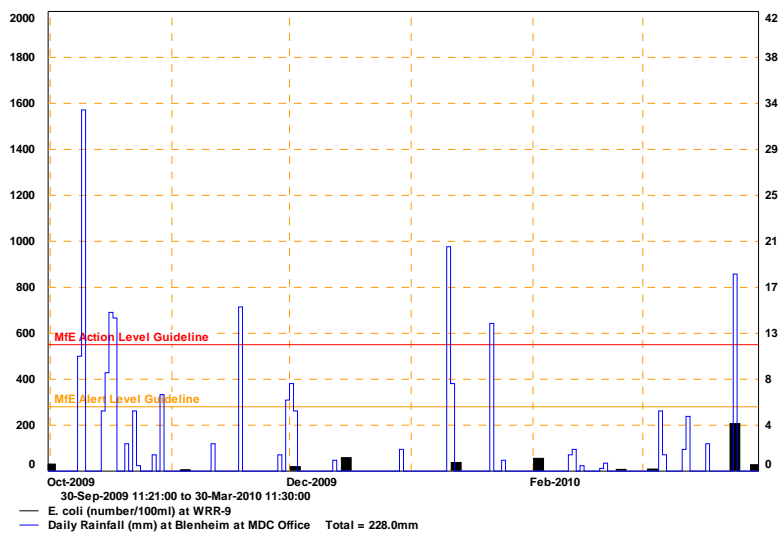
Wairau at Blenheim Rowing Club



Wairau at Ferry Road Bridge



Wairau at Wairau Rowing Club



Appendix 5: 2009-10 Suitability for Recreation Grade (SFRGs) Results Coastal

ANAKIWA						
***** Microbiological Assessment Category *****						
Annual exceedance information (for water year 01 November to 31 October)						
	sample season	sample size	median	exceed 140 to 280	exceed >280	%days <280
Year	2009	22	4	1	0	100
Year	2008	22	5	0	0	100
Year	2007	23	10	3	2	91
Year	2006	20	10	0	1	95
Year	2005	21	10	0	3	85
Total	0	108	10	4	6	94
Assessment Results						
Microbiological Assessment Grade - D						
Hazen Percentile Result - 624						
Data Set Extent - Complete Data Set (5 years with at least 100 samples)						
***** Suitability for Recreation Grade *****						
Suitability Assessment Results						
SFRG Assessment Grade - Poor						
Primary Impact - ,13: River - agricultural activities/birds/feral animals						
Complete Data Set (5 years with at least 100 samples)						
***** Sanitary Inspection Category *****						
Catchment Assessment Checklist Results						
SIC Assessment Grade - Moderate						
Primary Impact:						
13: River - agricultural activities/birds/feral animals						

BOBS BAY

***** Microbiological Assessment Category *****

Annual exceedance information (for water year 01 November to 31 October)

	sample season	sample size	median	exceed 140 to 280	exceed >280	%days <280
Year	2009	22	4	1	0	100
Year	2008	22	5	0	0	100
Year	2007	20	10	1	1	95
Year	2006	16	10	0	0	100
Year	2005	14	10	0	0	100
Total	0	94	10	2	1	98

Assessment Results

Microbiological Assessment Grade - B

Hazen Percentile Result - 119

Data Set Extent - Interim Data Set (< 5 years or < 100 samples used)

***** Suitability for Recreation Grade *****

Suitability Assessment Results

SFRG Assessment Grade - Very Good

Primary Impact - ,0: No significant source indicated.

Interim Data Set (< 5 years, or < 100 samples used)

***** Sanitary Inspection Category *****

Catchment Assessment Checklist Results

SIC Assessment Grade - Very Low

Primary Impact:

0: No significant source indicated.

MARFELLS BEACH						
***** Microbiological Assessment Category *****						
Annual exceedance information (for water year 01 November to 31 October)						
	sample season	sample size	median	exceed 140 to 280	exceed >280	%days <280
Year	2009	22	4	0	0	100
Year	2008	22	5	0	1	95
Year	2007	21	10	0	0	100
Year	2006	7	10	0	0	100
Year	2005	4	10	0	0	100
Total	0	76	10	0	1	98
Assessment Results						
Microbiological Assessment Grade - B						
Hazen Percentile Result - 43.1						
Data Set Extent - Interim Data Set (< 5 years or < 100 samples used)						
***** Suitability for Recreation Grade *****						
Suitability Assessment Results						
SFRG Assessment Grade - Very Good						
Primary Impact - ,0: No significant source indicated.						
Interim Data Set (< 5 years, or < 100 samples used)						
***** Sanitary Inspection Category *****						
Catchment Assessment Checklist Results						
SIC Assessment Grade - Very Low						
Primary Impact:						
0: No significant source indicated.						

MOENUI

***** Microbiological Assessment Category *****

Annual exceedance information (for water year 01 November to 31 October)

	sample season	sample size	median	exceed 140 to 280	exceed >280	%days <280
Year	2009	22	4	2	2	90
Year	2008	21	10	1	2	90
Year	2007	24	40	3	6	75
Year	2006	20	10	0	0	100
Year	2005	21	10	1	0	100
Total	0	108	10	7	10	90

Assessment Results

Microbiological Assessment Grade - D

Hazen Percentile Result - 843.8

Data Set Extent - Complete Data Set (5 years with at least 100 samples)

***** Suitability for Recreation Grade *****

Suitability Assessment Results

SFRG Assessment Grade - Very Poor

Primary Impact - ,4: Private sewage disposal systems

Complete Data Set (5 years with at least 100 samples)

***** Sanitary Inspection Category *****

Catchment Assessment Checklist Results

SIC Assessment Grade - Very High

Primary Impact:

4: Private sewage disposal systems

MOMORANGI BAY							
***** Microbiological Assessment Category *****							
Annual exceedance information (for water year 01 November to 31 October)							
	sample season	sample size	median	exceed 140 to 280	exceed >280	%days <280	
Year	2009	22	12	3	1	95	
Year	2008	22	7.5	1	0	100	
Year	2007	36	20	4	6	83	
Year	2006	26	40	1	5	80	
Year	2005	21	20	0	2	90	
Total	0	127	20	9	14	88	
Assessment Results							
Microbiological Assessment Grade - D							
Hazen Percentile Result - 701.9							
Data Set Extent - Complete Data Set (5 years with at least 100 samples)							
***** Suitability for Recreation Grade *****							
Suitability Assessment Results							
SFRG Assessment Grade - Poor							
Primary Impact - ,13: River - agricultural activities/birds/feral animals							
Complete Data Set (5 years with at least 100 samples)							
***** Sanitary Inspection Category *****							
Catchment Assessment Checklist Results							
SIC Assessment Grade - Moderate							
Primary Impact:							
13: River - agricultural activities/birds/feral animals							

NGAKUTA BAY

***** Microbiological Assessment Category *****

Annual exceedance information (for water year 01 November to 31 October)

	sample season	sample size	median	exceed 140 to 280	exceed >280	%days <280	
Year	2009	22	4	0	1	95	
Year	2008	22	5	0	1	95	
Year	2007	21	10	0	0	100	
Year	2006	20	10	0	1	95	
Year	2005	21	10	1	0	100	
Total	0	106	10	1	3	97	

Assessment Results

Microbiological Assessment Grade - B

Hazen Percentile Result - 126.6

Data Set Extent - Complete Data Set (5 years with at least 100 samples)

***** Suitability for Recreation Grade *****

Suitability Assessment Results

SFRG Assessment Grade - Very Good

Primary Impact - ,0: No significant source indicated.

Complete Data Set (5 years with at least 100 samples)

***** Sanitary Inspection Category *****

Catchment Assessment Checklist Results

SIC Assessment Grade - Very Low

Primary Impact:

0: No significant source indicated.

PICTON FORESHORE

***** Microbiological Assessment Category *****

Annual exceedance information (for water year 01 November to 31 October)

	sample season	sample size	median	exceed 140 to 280	exceed >280	%days <280
Year	2009	22	4	0	0	100
Year	2008	22	10	0	2	90
Year	2007	23	10	0	3	86
Year	2006	21	10	0	1	95
Year	2005	34	40	1	7	79
Total	0	122	10	1	13	89

Assessment Results

Microbiological Assessment Grade - D

Hazen Percentile Result - 847.2

Data Set Extent - Complete Data Set (5 years with at least 100 samples)

***** Suitability for Recreation Grade *****

Suitability Assessment Results

SFRG Assessment Grade - Very Poor

Primary Impact - ,2: Stormwater outlets

Complete Data Set (5 years with at least 100 samples)

***** Sanitary Inspection Category *****

Catchment Assessment Checklist Results

SIC Assessment Grade - High

Primary Impact:

2: Stormwater outlets

PORTAGE

***** Microbiological Assessment Category *****

Annual exceedance information (for water year 01 November to 31 October)

	sample season	sample size	median	exceed 140 to 280	exceed >280	%days <280
Year	2009	22	4	0	1	95
Year	2008	21	5	3	2	90

Year	2007	19	10	0	0	100
Year	2006	18	10	1	1	94
Year	2005	19	10	1	0	100
Total	0	99	10	5	4	95

Assessment Results

Microbiological Assessment Grade - C

Hazen Percentile Result - 239.6

Data Set Extent - Interim Data Set (< 5 years or < 100 samples used)

***** Suitability for Recreation Grade *****

Suitability Assessment Results

SFRG Assessment Grade - Very Poor

Primary Impact - ,5: Primary or secondary treatment facilities

Interim Data Set (< 5 years, or < 100 samples used)

***** Sanitary Inspection Category *****

Catchment Assessment Checklist Results

SIC Assessment Grade - Very High

Primary Impact:

5: Primary or secondary treatment facilities

SHELLEY BEACH						
***** Microbiological Assessment Category *****						
Annual exceedance information (for water year 01 November to 31 October)						
	sample season	sample size	median	exceed 140 to 280	exceed >280	%days <280
Year	2009	22	4	0	0	100
Year	2008	22	5	0	0	100
Year	2007	23	10	2	0	100
Year	2006	21	10	1	1	95
Year	2005	21	10	2	1	95
Total	0	109	10	5	2	98
Assessment Results						
Microbiological Assessment Grade - C						
Hazen Percentile Result - 222						
Data Set Extent - Complete Data Set (5 years with at least 100 samples)						
***** Suitability for Recreation Grade *****						
Suitability Assessment Results						
SFRG Assessment Grade - Fair						
Primary Impact - ,3: Urban stormwater						
Complete Data Set (5 years with at least 100 samples)						
***** Sanitary Inspection Category *****						
Catchment Assessment Checklist Results						
SIC Assessment Grade - Moderate						
Primary Impact:						
3: Urban stormwater						

TE MAHIA

***** Microbiological Assessment Category *****

Annual exceedance information (for water year 01 November to 31 October)

	sample season	sample size	median	exceed 140 to 280	exceed >280	%days <280
Year	2009	22	4	1	1	95
Year	2008	21	5	0	1	95
Year	2007	18	10	0	0	100
Year	2006	17	10	0	0	100
Year	2005	21	10	0	2	90
Total	0	99	10	1	4	95

Assessment Results

Microbiological Assessment Grade - B

Hazen Percentile Result - 143.45

Data Set Extent - Interim Data Set (< 5 years or < 100 samples used)

***** Suitability for Recreation Grade *****

Suitability Assessment Results

SFRG Assessment Grade - Very Good

Primary Impact - ,0: No significant source indicated.

Interim Data Set (< 5 years, or < 100 samples used)

***** Sanitary Inspection Category *****

Catchment Assessment Checklist Results

SIC Assessment Grade - Very Low

Primary Impact:

0: No significant source indicated.

TIRIMOANA

***** Microbiological Assessment Category *****

Annual exceedance information (for water year 01 November to 31 October)

	sample season	sample size	median	exceed 140 to 280	exceed >280	%days <280
Year	2009	22	4	0	0	100
Year	2008	22	5	0	1	95
Year	2007	21	10	0	4	80
Year	2006	20	10	0	1	95
Year	2005	21	10	0	1	95
Total	0	106	10	0	7	93

Assessment Results

Microbiological Assessment Grade - C

Hazen Percentile Result - 388.4

Data Set Extent - Complete Data Set (5 years with at least 100 samples)

***** Suitability for Recreation Grade *****

Suitability Assessment Results

SFRG Assessment Grade - Fair

Primary Impact - ,13: River - agricultural activities/birds/feral animals

Complete Data Set (5 years with at least 100 samples)

***** Sanitary Inspection Category *****

Catchment Assessment Checklist Results

SIC Assessment Grade - Moderate

Primary Impact:

13: River - agricultural activities/birds/feral animals

WAIKAWA BAY

***** Microbiological Assessment Category *****

Annual exceedance information (for water year 01 November to 31 October)

	sample season	sample size	median	exceed 140 to 280	exceed >280	%days <280
Year	2009	22	4	0	0	100
Year	2008	22	5	0	1	95
Year	2007	21	10	0	1	95
Year	2006	20	10	0	0	100
Year	2005	21	10	0	1	95
Total	0	106	10	0	3	97

Assessment Results

Microbiological Assessment Grade - B

Hazen Percentile Result - 114.4

Data Set Extent - Complete Data Set (5 years with at least 100 samples)

***** Suitability for Recreation Grade *****

Suitability Assessment Results

SFRG Assessment Grade - Good

Primary Impact - ,14: River - focal points of drainage

Complete Data Set (5 years with at least 100 samples)

***** Sanitary Inspection Category *****

Catchment Assessment Checklist Results

SIC Assessment Grade - Low

Primary Impact:

14: River - focal points of drainage

WAIRAU BAR						
***** Microbiological Assessment Category *****						
Annual exceedance information (for water year 01 November to 31 October)						
	sample season	sample size	median	exceed 140 to 280	exceed >280	%days <280
Year	2009	22	8	0	1	95
Year	2008	22	7.5	0	1	95
Year	2007	22	10	0	2	90
Year	2006	20	10	0	1	95
Year	2005	16	10	0	1	93
Total	0	102	10	0	6	94
Assessment Results						
Microbiological Assessment Grade - C						
Hazen Percentile Result - 340						
Data Set Extent - Complete Data Set (5 years with at least 100 samples)						
***** Suitability for Recreation Grade *****						
Suitability Assessment Results						
SFRG Assessment Grade - Fair						
Primary Impact - ,13: River - agricultural activities/birds/feral animals						
Complete Data Set (5 years with at least 100 samples)						
***** Sanitary Inspection Category *****						
Catchment Assessment Checklist Results						

SIC Assessment Grade - Moderate

Primary Impact:

13: River - agricultural activities/birds/feral animals

WAIRAU DIVERSION

***** Microbiological Assessment Category *****

Annual exceedance information (for water year 01 November to 31 October)

	sample season	sample size	median	exceed 140 to 280	exceed >280	%days <280
Year	2009	22	22	1	0	100
Year	2008	22	15	0	1	95
Year	2007	20	10	0	1	95
Year	2006	18	10	0	0	100
Year	2005	18	10	1	0	100
Total	0	100	10	2	2	98

Assessment Results

Microbiological Assessment Grade - B

Hazen Percentile Result - 124

Data Set Extent - Complete Data Set (5 years with at least 100 samples)

***** Suitability for Recreation Grade *****

Suitability Assessment Results

SFRG Assessment Grade - Good

Primary Impact - ,13: River - agricultural activities/birds/feral animals

Complete Data Set (5 years with at least 100 samples)

***** Sanitary Inspection Category *****

Catchment Assessment Checklist Results

SIC Assessment Grade - Moderate

Primary Impact:

13: River - agricultural activities/birds/feral animals

WHITES BAY

***** Microbiological Assessment Category *****

Annual exceedance information (for water year 01 November to 31 October)

	sample season	sample size	median	exceed 140 to 280	exceed >280	%days <280
Year	2009	22	4	0	0	100
Year	2008	22	5	0	1	95
Year	2007	20	10	0	0	100
Year	2006	20	10	0	0	100
Year	2005	18	10	0	0	100
Total	0	102	10	0	1	99

Assessment Results

Microbiological Assessment Grade - A

Hazen Percentile Result - 30

Data Set Extent - Complete Data Set (5 years with at least 100 samples)

***** Suitability for Recreation Grade *****

Suitability Assessment Results

SFRG Assessment Grade - Very Good

Primary Impact - ,0: No significant source indicated.

Complete Data Set (5 years with at least 100 samples)						
***** Sanitary Inspection Category *****						
Catchment Assessment Checklist Results						
SIC Assessment Grade - Very Low						
Primary Impact:						
0: No significant source indicated.						

Freshwater

OPAWA AT ELIZABETH STREET FOOTBRIDGE						
***** Microbiological Assessment Category *****						
Annual exceedance information (for water year 01 November to 31 October)						
	sample season	sample size	median	exceed 260 to 550	exceed >550	%days <550
Year	2009	22	10.5	1	0	100
Year	2008	22	99	2	1	95
Year	2007	21	178	2	0	100
Year	2006	18	130.5	0	1	94
Year	2005	22	178	5	1	95
Total	0	105	111	10	3	97
Assessment Results						
Microbiological Assessment Grade - C						
Hazen Percentile Result - 430.5						
Data Set Extent - Complete Data Set (5 years with at least 100 samples)						
***** Suitability for Recreation Class *****						
Suitability Assessment Results						
SFRC Assessment Grade - Fair						
Primary Impact - ,5: Primary or secondary treatment facilities						
Complete Data Set (5 years with at least 100 samples)						
***** Sanitary Inspection Category *****						
Catchment Assessment Checklist Results						
SIC Assessment Grade - Moderate						
Primary Impact:						
3: Urban stormwater						

OPAWA AT MALTHOUSE RESERVE						
***** Microbiological Assessment Category *****						
Annual exceedance information (for water year 01 November to 31 October)						
	sample season	sample size	median	exceed 260 to 550	exceed >550	%days <550
Year	2009	22	28.5	0	1	95
Year	2008	22	105	2	1	95
Year	2007	21	87	2	1	95
Year	2006	19	64	1	2	89
Year	2005	21	53	0	0	100
Total	0	105	64	5	5	95

Assessment Results

Microbiological Assessment Grade - D

Hazen Percentile Result - 562.5

Data Set Extent - Complete Data Set (5 years with at least 100 samples)

***** Suitability for Recreation Class *****

Suitability Assessment Results

SFRC Assessment Grade - Poor

Primary Impact - ,5: Primary or secondary treatment facilities

Complete Data Set (5 years with at least 100 samples)

***** Sanitary Inspection Category *****

Catchment Assessment Checklist Results

SIC Assessment Grade - Moderate

Primary Impact:

8: Run-off from low intensity agriculture

PELORUS AT PELORUS BRIDGE

***** Microbiological Assessment Category *****

Annual exceedance information (for water year 01 November to 31 October)

	sample season	sample size	median	exceed 260 to 550	exceed >550	%days <550
Year	2009	22	16.5	1	0	100
Year	2008	22	20	0	1	95
Year	2007	21	20	1	1	95
Year	2006	19	20	2	1	94
Year	2005	22	30	0	2	90
Total	0	106	20	4	5	95

Assessment Results

Microbiological Assessment Grade - C

Hazen Percentile Result - 480.6

Data Set Extent - Complete Data Set (5 years with at least 100 samples)

***** Suitability for Recreation Class *****

Suitability Assessment Results

SFRC Assessment Grade - Fair

Primary Impact - ,5: Primary or secondary treatment facilities

Complete Data Set (5 years with at least 100 samples)

***** Sanitary Inspection Category *****

Catchment Assessment Checklist Results

SIC Assessment Grade - Moderate

Primary Impact:

8: Run-off from low intensity agriculture

PELORUS AT TOTARA FLAT

***** Microbiological Assessment Category *****

Annual exceedance information (for water year 01 November to 31 October)

	sample season	sample size	median	exceed 260 to 550	exceed >550	%days <550
Year	2009	22	20	1	1	95
Year	2008	22	47.5	1	4	81
Year	2007	21	75	3	2	90

Year	2006	19	40	1	2	89
Year	2005	24	20	2	1	95
Total	0	108	31.5	8	10	90

Assessment Results

Microbiological Assessment Grade - D

Hazen Percentile Result - 1110

Data Set Extent - Complete Data Set (5 years with at least 100 samples)

***** Suitability for Recreation Class *****

Suitability Assessment Results

SFRC Assessment Grade - Very Poor

Primary Impact - ,5: Primary or secondary treatment facilities

Complete Data Set (5 years with at least 100 samples)

***** Sanitary Inspection Category *****

Catchment Assessment Checklist Results

SIC Assessment Grade - High

Primary Impact:

7: Intensive agricultural use

RAI AT BROWN RIVER RESERVE						
***** Microbiological Assessment Category *****						
Annual exceedance information (for water year 01 November to 31 October)						
	sample season	sample size	median	exceed 260 to 550	exceed >550	%days <550
Year	2009	22	40	1	1	95
Year	2008	22	99	2	3	86
Year	2007	21	271	8	3	85
Year	2006	19	87	3	2	89
Year	2005	23	207	4	2	91
Total	0	107	124	18	11	89
Assessment Results						
Microbiological Assessment Grade - D						
Hazen Percentile Result - 1275						
Data Set Extent - Complete Data Set (5 years with at least 100 samples)						
***** Suitability for Recreation Class *****						
Suitability Assessment Results						
SFRC Assessment Grade - Very Poor						
Primary Impact - ,5: Primary or secondary treatment facilities						
Complete Data Set (5 years with at least 100 samples)						
***** Sanitary Inspection Category *****						
Catchment Assessment Checklist Results						
SIC Assessment Grade - High						
Primary Impact:						
7: Intensive agricultural use						

RAI AT RAI FALLS

***** Microbiological Assessment Category *****

Annual exceedance information (for water year 01 November to 31 October)

	sample season	sample size	median	exceed 260 to 550	exceed >550	%days <550
Year	2009	22	46.5	1	3	86
Year	2008	22	83	1	4	81
Year	2007	21	99	3	3	85
Year	2006	19	53	1	4	78
Year	2005	26	87	1	4	84
Total	0	110	75	7	18	83

Assessment Results

Microbiological Assessment Grade - D

Hazen Percentile Result - 2000

Data Set Extent - Complete Data Set (5 years with at least 100 samples)

***** Suitability for Recreation Class *****

Suitability Assessment Results

SFRC Assessment Grade - Very Poor

Primary Impact - ,5: Primary or secondary treatment facilities

Complete Data Set (5 years with at least 100 samples)

***** Sanitary Inspection Category *****

Catchment Assessment Checklist Results

SIC Assessment Grade - High

Primary Impact:

7: Intensive agricultural use

TAYLOR AT HUTCHESON STREET BRIDGE						
***** Microbiological Assessment Category *****						
Annual exceedance information (for water year 01 November to 31 October)						
	sample season	sample size	median	exceed 260 to 550	exceed >550	%days <550
Year	2009	22	27	1	1	95
Year	2008	22	178.5	5	2	90
Year	2007	21	137	2	1	95
Year	2006	19	192	5	0	100
Year	2005	21	207	4	4	80
Total	0	105	164	17	8	92
Assessment Results						
Microbiological Assessment Grade - D						
Hazen Percentile Result - 1175						
Data Set Extent - Complete Data Set (5 years with at least 100 samples)						
***** Suitability for Recreation Class *****						
Suitability Assessment Results						
SFRC Assessment Grade - Very Poor						
Primary Impact - ,5: Primary or secondary treatment facilities						
Complete Data Set (5 years with at least 100 samples)						
***** Sanitary Inspection Category *****						
Catchment Assessment Checklist Results						
SIC Assessment Grade - High						
Primary Impact:						
2: Stormwater outlets						

TAYLOR AT RIVERSIDE

***** Microbiological Assessment Category *****

Annual exceedance information (for water year 01 November to 31 October)

	sample season	sample size	median	exceed 260 to 550	exceed >550	%days <550
Year	2009	22	22.5	0	2	90
Year	2008	22	150	3	3	86
Year	2007	21	164	6	2	90
Year	2006	19	178	6	0	100
Year	2005	21	192	4	3	85
Total	0	105	150	19	10	90

Assessment Results

Microbiological Assessment Grade - D

Hazen Percentile Result - 1550

Data Set Extent - Complete Data Set (5 years with at least 100 samples)

***** Suitability for Recreation Class *****

Suitability Assessment Results

SFRC Assessment Grade - Very Poor

Primary Impact - ,5: Primary or secondary treatment facilities

Complete Data Set (5 years with at least 100 samples)

***** Sanitary Inspection Category *****

Catchment Assessment Checklist Results

SIC Assessment Grade - High

Primary Impact:

2: Stormwater outlets

WAIHOPAI AT CRAIGLOCHART BRIDGE NO. 2

***** Microbiological Assessment Category *****

Annual exceedance information (for water year 01 November to 31 October)

	sample season	sample size	median	exceed 260 to 550	exceed >550	%days <550
Year	2009	22	12	1	0	100
Year	2008	22	47.5	0	0	100
Year	2007	21	75	0	4	80
Year	2006	19	20	0	1	94
Year	2005	14	35	0	1	92
Total	0	98	31.5	1	6	93

Assessment Results

Microbiological Assessment Grade - D

Hazen Percentile Result - 793.8

Data Set Extent - Interim Data Set (< 5 years or < 100 samples used)

***** Suitability for Recreation Class *****

Suitability Assessment Results

SFRC Assessment Grade - Poor

Primary Impact - ,5: Primary or secondary treatment facilities

Interim Data Set (< 5 years, or < 100 samples used)

***** Sanitary Inspection Category *****

Catchment Assessment Checklist Results

SIC Assessment Grade - Moderate

Primary Impact:

8: Run-off from low intensity agriculture

WAIRAU AT BLENHEIM ROWING CLUB

***** Microbiological Assessment Category *****

Annual exceedance information (for water year 01 November to 31 October)

	sample season	sample size	median	exceed 260 to 550	exceed >550	%days <550
Year	2009	22	7.5	0	0	100
Year	2008	22	35.5	1	1	95
Year	2007	21	30	1	1	95
Year	2006	18	30	0	0	100
Year	2005	21	40	0	1	95
Total	0	104	30	2	3	97

Assessment Results

Microbiological Assessment Grade - C

Hazen Percentile Result - 260.1

Data Set Extent - Complete Data Set (5 years with at least 100 samples)

***** Suitability for Recreation Class *****

Suitability Assessment Results

SFRC Assessment Grade - Fair

Primary Impact - ,5: Primary or secondary treatment facilities

Complete Data Set (5 years with at least 100 samples)

***** Sanitary Inspection Category *****

Catchment Assessment Checklist Results

SIC Assessment Grade - Moderate

Primary Impact:

8: Run-off from low intensity agriculture

WAIRAU AT FERRY ROAD BRIDGE

***** Microbiological Assessment Category *****

Annual exceedance information (for water year 01 November to 31 October)

	sample season	sample size	median	exceed 260 to 550	exceed >550	%days <550
Year	2009	22	13.5	0	0	100
Year	2008	22	36.5	1	2	90
Year	2007	21	75	2	1	95
Year	2006	18	40	1	0	100
Year	2005	21	75	0	0	100
Total	0	104	40	4	3	97

Assessment Results

Microbiological Assessment Grade - C

Hazen Percentile Result - 306

Data Set Extent - Complete Data Set (5 years with at least 100 samples)

***** Suitability for Recreation Class *****

Suitability Assessment Results

SFRC Assessment Grade - Fair

Primary Impact - ,5: Primary or secondary treatment facilities						
Complete Data Set (5 years with at least 100 samples)						
***** Sanitary Inspection Category *****						
Catchment Assessment Checklist Results						
SIC Assessment Grade - Moderate						
Primary Impact:						
8: Run-off from low intensity agriculture						

WAIRAU AT WAIRAU ROWING CLUB

***** Microbiological Assessment Category *****

Annual exceedance information (for water year 01 November to 31 October)

	sample season	sample size	median	exceed 260 to 550	exceed >550	%days <550
Year	2009	22	1.5	0	0	100
Year	2008	22	31	1	1	95
Year	2007	21	40	3	0	100
Year	2006	17	40	0	0	100
Year	2005	22	30	0	1	95
Total	0	104	30	4	2	98

Assessment Results

Microbiological Assessment Grade - C

Hazen Percentile Result - 406

Data Set Extent - Complete Data Set (5 years with at least 100 samples)

***** Suitability for Recreation Class *****

Suitability Assessment Results

SFRC Assessment Grade - Fair

Primary Impact - ,5: Primary or secondary treatment facilities

Complete Data Set (5 years with at least 100 samples)

***** Sanitary Inspection Category *****

Catchment Assessment Checklist Results

SIC Assessment Grade - Moderate

Primary Impact:

8: Run-off from low intensity agriculture

WAIRAU DIVERSION AT NEALS ROAD BRIDGE						
***** Microbiological Assessment Category *****						
Annual exceedance information (for water year 01 November to 31 October)						
	sample season	sample size	median	exceed 260 to 550	exceed >550	%days <550
Year	2009	23	35	3	0	100
Year	2008	22	105	1	4	81
Year	2007	21	40	1	1	95
Year	2006	18	64	2	0	100
Year	2005	21	75	0	0	100
Total	0	105	64	7	5	95
Assessment Results						
Microbiological Assessment Grade - D						
Hazen Percentile Result - 554.75						
Data Set Extent - Complete Data Set (5 years with at least 100 samples)						

***** Suitability for Recreation Class *****				
Suitability Assessment Results				
SFRC Assessment Grade - Poor				
Primary Impact - ,5: Primary or secondary treatment facilities				
Complete Data Set (5 years with at least 100 samples)				
***** Sanitary Inspection Category *****				
Catchment Assessment Checklist Results				
SIC Assessment Grade - Moderate				
Primary Impact:				
16: Indirect influences - High intensity agriculture or feral animals/birds				