

9.5 CONTACT RECREATION WATER QUALITY ANNUAL REPORT

Information Only - No Decision Required

Report To:	Environment and Planning Committee
Meeting Date:	22 May 2014
Report Author:	Trevor James, Resource Scientist
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1 Summary

- 1.1 Tasman District Council has monitored swimming holes and coastal beaches since the mid 1990s in accordance with national guidelines and responsibilities under s35 of the Resource Management Act. Councils around New Zealand report these data along with recreation site grades annually to the Ministry for the Environment.
- 1.2 A total of 21 sites (nine freshwater and 12 marine) were sampled for faecal indicator bacteria between November 2013 and March 2014. All sites were sampled weekly except for the seven core sites which were sampled twice-weekly during peak season (December to January) and weekly for the rest of the season. Additionally, targeted flood event sampling was carried out at four sites on the Motueka River and Kaiteriteri Coast.
- 1.3 There were a total of 27 exceedances of national guidelines (11 “Amber” and 16 “Red”). Out of a total of 354 samples taken, this equates to approximately 8% of samples exceeding microbiological guidelines. Of the 27 exceedances, 22 were associated with rainfall events. Excluding these rainfall-influenced samples, for comparison with previous years, gives a compliance rate of 98.6%. This 98.6% figure is in line with the average compliance rate of 97% over the last 10 years. Two follow-up samples, which are taken as soon as possible after an exceedance, were above the amber alert level for Tukurua Stream. In response, warning signs were put in place at Tukurua campground. Warning signs were also put in place at Pohara Beach from 6-8 March after a result of >2000 *Enterococci*/100ml. Ten sites were fully compliant this season in all weather.
- 1.4 Using the Ministry for the Environment “Suitability for Recreation Grade” criteria, Kaiteriteri Beach was graded “Good” and both Mapua Leisure Park Beach and Rabbit Island Main Beach were graded “Very Good” during all weather. Interim grades for all other marine beaches and freshwater sites were graded “Good” during dry weather, but several sites were graded “Fair” or “Poor” when including all samples.
- 1.5 Faecal indicator bacteria in the Motueka River plume from the river mouth to Kaiteriteri were sampled again this season during floods. The aim of this plume sampling is to provide data to use in predictive modelling of faecal indicator bacteria concentrations at beaches along the coast near Kaiteriteri. Two rainfall events were captured over the period from January to March. Data from at least three more floods within the bathing season will be required to successfully build a predictive model of compliance with contact recreation guidelines at these very popular beaches.
- 1.6 Monitoring of toxic algal coverage was undertaken in parallel with the bathing water sampling. Coverage was above national guidelines in the lower Waimea River during the last week of January and from 25 February to 16 March 2014. These increases in toxic algal coverage occurred after several weeks of stable river flow. Unlike last season, there

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were no dog deaths this season that were linked to toxic algae anywhere in the region, as far as we are aware.

2 Draft Resolution

That the Environment and Planning Committee receives the Contact Recreation Water Quality Annual Report REP14-05-10.

CONTACT RECREATION WATER QUALITY ANNUAL REPORT**3 Purpose of the Report**

- 3.1 To present information from the regular Contact Recreation Water Quality Monitoring Programme over the past season, toxic algae issues and any other related investigations or issues.

4 Background

- 4.1 This report outlines:

- results of bathing water quality monitoring at Tasman's most popular contact recreation sites over the 2013/2014 summer
- data collection to support predictive modelling of faecal indicator bacteria concentrations at Kaiteriteri and nearby beaches
- monitoring of toxic algal coverage in the region

Sampling for Faecal Indicator Bacteria at Contact Recreation Sites

- 4.2 Water contaminated with animal or human excreta may contain a range of disease-causing organisms and when consumed by mouth, ears or nose can cause gastro-enteritis and respiratory health effects, as well as a small chance of more serious diseases such as hepatitis A, cryptosporidiosis, campylobacteriosis and salmonellosis. The health risk from contact recreation in natural waters increases with increasing concentration of disease causing organisms. Guidelines used in New Zealand effectively allow for a low rate of illness risk (about 19 illnesses per 1000 contact recreation events). Contact recreation involves full immersion of a person's head and includes swimming, water skiing and whitewater kayaking.
- 4.3 Monitoring of waters used for contact recreation in Tasman District has been ongoing since the mid-1990s. During that time, 17 of the sampling sites in the programme have been sampled consistently, with three of those sites being sampled every year since 2000 (Mapua Leisure Park Beach, Kaiteriteri Beach and Rabbit Island at Main Beach). Other sites have been surveyed for short periods and then discontinued because of consistently good water quality. To ensure we get some water quality information at additional lesser-used sites or sites with lower risk of faecal pollution, additional short-term investigations have been carried out. Where it is found that there are on-going issues, such as in the Tukurua catchment, those sites may then be brought into the programme until such time as the issue is resolved.
- 4.4 The contact recreation water quality sampling season begins in November and ends in March. During the 2013-14 season, a total of 21 sites were sampled (nine freshwater and 12 marine) at least once per week. The seven core sites were sampled twice-weekly during peak season (December to January) and weekly for the rest of the season. The locations of the contact recreation water quality monitoring sites sampled this season are shown in Figure 1.
- 4.5 Next summer, sampling will only occur at the core six bathing water quality sites and Tukurua Stream (including Microbial Source Tracking tests).
- 4.6 Further targeted flood-flow samples will be taken from the Motueka River and associated coastal plume from September 2014-April 2015 or until there is enough data to be able to successfully predict water quality at key beaches in the plume.

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- 4.7 Sampling follows accepted best practice guidelines and results of the contact recreation water quality sampling were posted on the Council website at <http://www.tasman.govt.nz/environment/water/swimming-water-quality/> . There is also information on this website about the sampling sites and background to the monitoring programme. To enable a swift response after an exceedance of the microbiological water quality guidelines, all staff involved in the sampling programme are sent a text message alert from the lab.
- 4.8 One sample for microbial source tracking (MST) analysis was taken at Tukurua Stream to try to determine the source of contamination.
- 4.9 For most sites, an exceedance of the microbiological water quality guidelines is likely after more than 30mm of rainfall in 24 hours. For a few sites, more than 20mm of rainfall within 48 hours can be enough to produce an exceedance, particularly if there is intensive farming in the upstream catchment (eg Pohara Beach). To keep the public aware of this risk, Council installs standards signage.

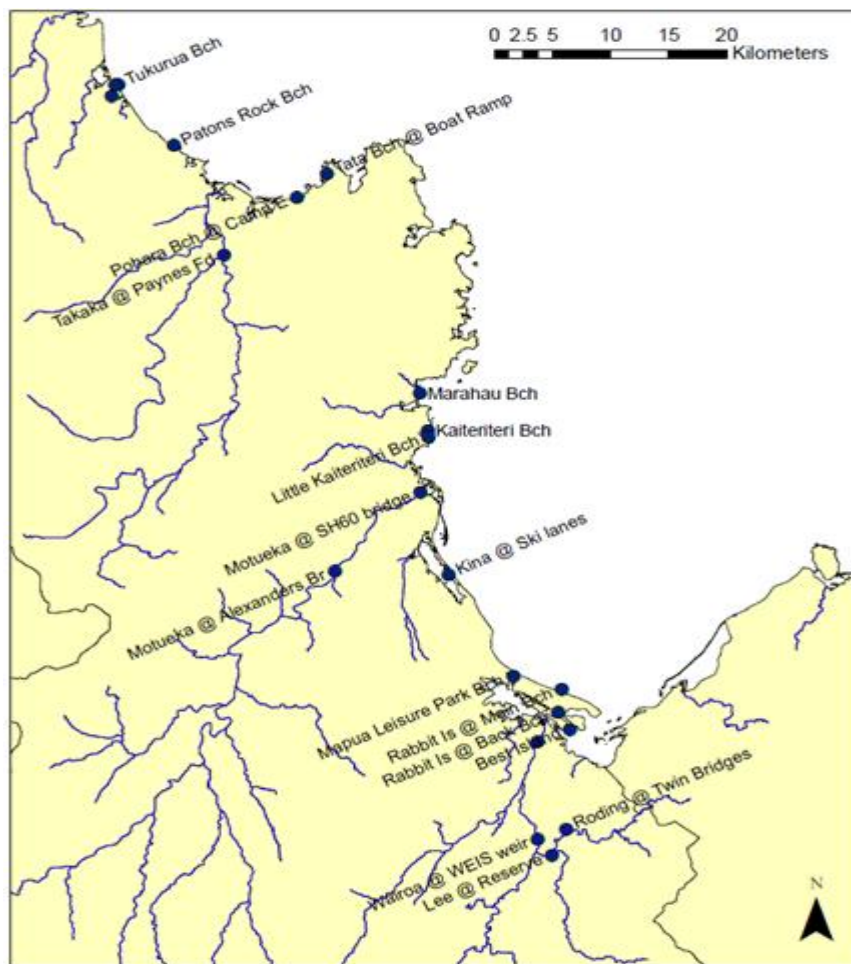


Figure 1: Contact recreation water quality monitoring sites sampled in the 2013-14 season.

Predicting Faecal Indicator Bacteria Concentrations along the Kaiteriteri Coast

- 4.10 Continued flood-targeted sampling in the Motueka/Riwaka River plume and affected beaches was recommended in last year’s contact reaction water quality report. The aim is

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to develop a model that will successfully predict faecal indicator bacteria at the beaches and efficiently assist in beach water quality management. Five samples were taken this season over two flood events (5 January and 17 March). This adds to the existing set of 13 samples over five flood events taken in the 2012/13 season.

Toxic Algae (cyanobacteria)

- 4.11 The toxins produced by the cyanobacteria are some of the most toxic in the natural world. In New Zealand, cyanobacteria have been implicated in numerous dog deaths. Cyanobacteria in the genus *Phormidium* are the main toxin-producing algae in New Zealand rivers. The toxins produced are diverse and can cause liver, nerve and skin damage, as well as nausea, diarrhoea, gastroenteritis and possibly cancer. *Phormidium* is native and is even found in many of our pristine rivers such as the upper Wangapeka. Fortunately, there have been very few reported health effects of *Phormidium* on humans in New Zealand, most likely because people rarely consume water directly from rivers. There remains, however, a reasonable risk for toddlers due to their habit of exploring their environment by putting things in their mouth.
- 4.12 *Phormidium* is known to proliferate during periods of stable flow (about three weeks without flushing flows) during October-April. During the rest of the year its growth is thought to be light limited. So far in Tasman we have not had coverage above guidelines outside of the period of November to March. In addition, it appears to have a competitive advantage over other algae when soluble phosphorus concentrations are very low and soluble nitrogen concentrations are slightly elevated.
- 4.13 This season, we again recorded an estimate of toxic algae percentage coverage at all freshwater contact recreation sites weekly from November to February. In addition, we regularly performed the national protocol for assessing algal coverage in the lower Waimea River at River Road. This site had the highest and most prolonged levels of toxic algae of the sites monitoring last season. Toxic algal coverage information was posted within three days of sampling on the following webpage:
<http://tasman.govt.nz/environment/water/rivers/river-water-quality/monitoring-toxic-algae/>
- 4.14 In June 2013 all dog owners in the district were sent a brochure explaining the dangers of contact with *Phormidium* which included photos of the algae.

5 Results and Discussion**Sampling for Faecal Indicator Bacteria at Contact Recreation Sites**

- 5.1 In the 2013-14 summer sampling programme, there were 27 exceedances of national guidelines (11 “Amber” and 16 “Red”) out of a total of 354 samples taken. This is an overall rate of compliance of approximately 92%. Of the 27 exceedances, 22 were associated with rainfall events. Excluding these rainfall-influenced samples, for comparison with previous years, gives a compliance rate of 98.6%. This is in line with the average compliance rate of 97% over the last 10 years. This season, nine of the 12 beach sites were fully-compliant, including Kaiteriteri, Mapua and Rabbit Island (refer Figure 2). The Roding at Twin Bridges was the only freshwater sites that was fully-compliant even when influenced by rainfall (refer Figure 3).

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5.2 With the exception of samples from the Tukurua at Playground and Tukurua at SH60 sites, all the results from follow-up samples, taken as soon as possible after an exceedance, were below the amber alert level.

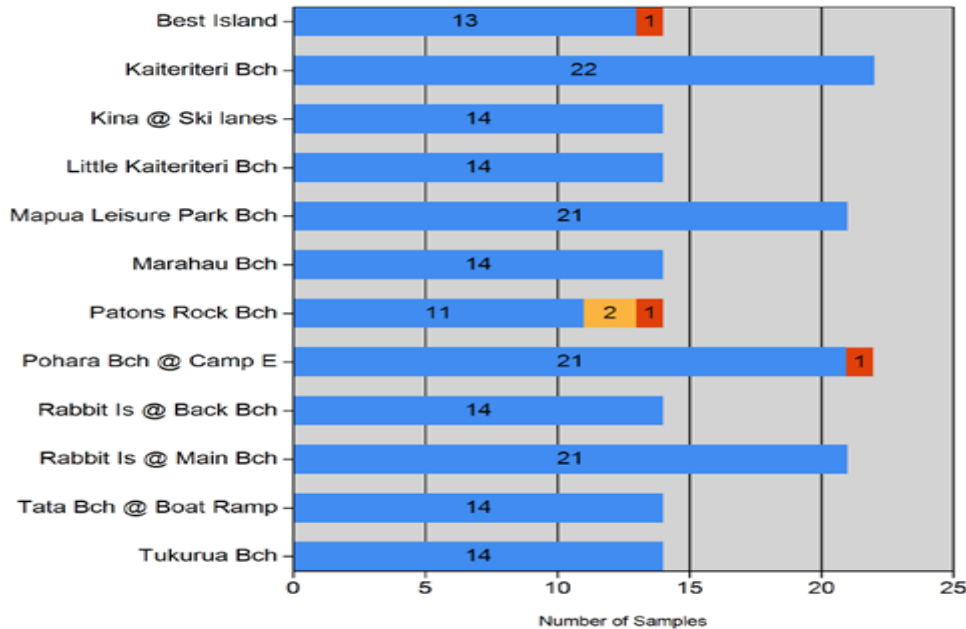


Figure 2: Number of samples exceeding national guidelines for contact recreation water quality at coastal beaches for the 2013-2014 season. Red results are over alarm levels (>280 Enterococci/100ml) and orange results are in the alert range (140-280 Enterococci/100ml).

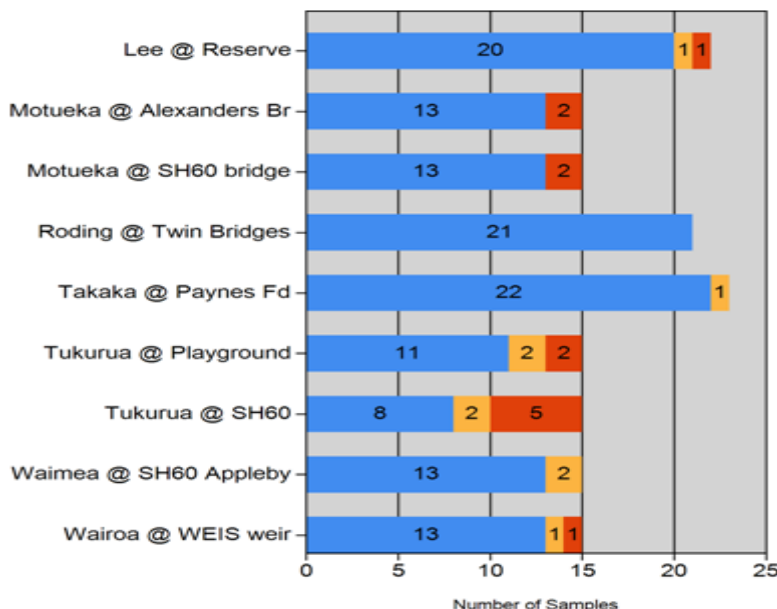


Figure 3: Number of samples exceeding national guidelines for contact recreation water quality at freshwater swimming holes for the 2013-2014 season. Red results are over alarm levels (>550 E. coli/100ml) and orange results are in the alert range (260-550 E. coli/100ml). Note: Tukurua River at SH60 is not a swimming site but it is included as a reference for the Tukurua @ Playground site.

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- 5.3 An exceedance of the faecal indicator bacteria guidelines occurred at Patons Rock (on January 28) and another occurred at Pohara Beach (on March 4). In both cases, the concentration of bacteria was very high (>2000 *Enterococci*/100ml) and unrelated to rainfall. Follow-up samples, however, showed bacterial concentrations close to the lower detection limit (10 *Enterococci*/100ml) and well within safe levels. Warning signs were put up at four sites at Pohara Beach from 6-8 March and emails sent to the campground and motel. Public feedback recommended that if this happens again, warning signs should be erected at the far eastern end of the beach as this area is used frequently by residents from Pohara Valley Road.
- 5.4 It is unclear why these exceedances occurred as there were no obvious sources of contamination at the time of sampling (For example: no birds in the vicinity) and methods of sampling were no different from that prescribed. For Pohara Beach, it is the second time in in two years that we have had results as high as this. Possible sources include Pohara Creek or discharges of sewage from the holding tanks of boats at Port Tarakohe. In 2005-06 sanitary surveys of Pohara Creek found several sources of faecal contamination which were then investigated and remediated.
- 5.5 This season, the exceedances that were unrelated to rainfall typically presented as a short-term spike. Due to the lack of further samples in the catchment upstream on the day of the spike, it is often not possible to determine the source. Such exceedances are prevalent in intensively-farmed catchments. Yet, as we have experienced in the Aorere catchment, it is possible to improve water quality at base flow and to reduce the magnitude of the peaks during smaller rainfall events.

Date	Site Name	Initial Sample (cells/100ml)	Follow-up Sample (cells/100ml)
26/11/2013	SH60	2000	624
	Playground	2000	124
3/12/2013	Playground	1300	99
30/12/2013	Playground	271	124
	SH60	782	124
7/01/2014	SH60	453	164
21/01/2014	SH60	945	111
	Playground	306	178
4/02/2014	SH60	2000	271

Table 1: Exceedances of faecal indicator bacteria thresholds at the two monitoring sites (SH60 and Playground) in the Tukurua Stream from November 2013 to April 2014. Amber shading indicates an *E.coli* reading over the alert level (260 *E.coli*/100ml) and red shading indicates an *E.coli* reading over the alarm level (550 *E.coli*/100ml). Exceedances not associated with a rainfall event are in bold.

- 5.6 For the last few seasons, we have displayed a sign at Tukurua Playground with a warning of the potential for faecal contamination. With the exception of this site, warning signs have only been erected on four occasions (one at a freshwater site and three at marine sites) in the last 14 years. We have put out warnings more frequently since a result of >2000 *Enterococci*/100ml was recorded for Kaiteriteri Beach on 27 December 2010. That event triggered a review of our response and Nelson-Marlborough District Health Board recommended that we put up signs in response to a very high (>1000 *Enterococci*/100ml or

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>2000 *E.coli*/100ml) faecal indicator bacteria concentrations without waiting for results from the follow-up sample. Since then Pohara Beach failed the guidelines this season and last season but each of the re-samples showed *Enterococci* below detection.

- 5.7 Using Ministry for the Environment’s “Suitability for Recreation Grade” criteria, Mapua Leisure Park Beach and Rabbit Island Main beach were graded “Very Good” and Kaiteriteri Beach was graded “Good” using all data, including rainfall-affected samples (see Table 2a). For the other beach sites only interim gradings are available as there are fewer than the recommended 100 sample results collected over five years. To calculate this interim grade the full record was used for sites (over greater than 10 years) there are more than 100 data points. Interim grades were also calculated for dry weather data only for the following beaches: Pohara, Patons Rock and Marahau (see Table 2b). This resulted in grades elevating from “Fair” to “Good” for these sites.
- 5.8 There are no freshwater sites that have final grades (only interim due to insufficient samples). However, Takaka at Paynes Ford, Lee at Lee Reserve and Roding at Twin Bridges will all be able to graded according to the guidelines within three years. When using all data including rain-affected samples, all the river sites had either “Poor” or “Fair” interim grades. However, when only dry weather samples were used in the analysis, all sites achieved “Good” grades.

Site	Microbiological Assessment Category	Sanitary Inspection Category	Suitability for Recreation Grade
Kaiteriteri Bch	B	Moderate	Good
Mapua Leisure Park Bch	B	Very Low	Very Good
Pohara Bch @ Camp E	C	Very Low	Fair
Rabbit Is @ Main Bch	B	Very Low	Very Good
Best Island	B	Low	Good*
Kina @ Ski lanes	A	Very Low	Very Good*
Little Kaiteriteri Bch	B	Very Low	Very Good*
Marahau Bch	C	Very Low	Fair*
Patons Rock Bch	C	Very Low	Fair*
Rabbit Is @ Back Bch	B	Low	Good*
Tata Bch @ Boat Ramp	A	Very Low	Very Good*
Tukurua Bch	B	Very Low	Very Good*
* Interim grading			

Table 2a. Assessment of Suitability for Recreation Grade for the marine beach sites in the contact recreation bathing water quality programme - **all samples**. Number of samples and the period of data used are provided in the appendices. Interim gradings are marked by *.

Site	Microbiological Assessment Category	Sanitary Inspection Category	Suitability for Recreation Grade
Pohara Bch @ Camp E	B	Very Low	Very Good
Marahau Bch	B	Very Low	Very Good*
Patons Rock Bch	B	Very Low	Very Good*

Table 2b. Assessment of Suitability for Recreation Grade for the marine beach sites in the contact recreation bathing water quality programme **during dry weather**. Number of samples (N) and the period of data used are provided in the appendices. Interim gradings are marked by *.

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Site	Microbiological Assessment Category	Sanitary Inspection Category	Suitability for Recreation Grade
Takaka Rv @ Paynes Ford	C	Moderate	Fair*
Motueka Rv @ SH60	D	Moderate	Poor*
Motueka Rv @ Alexander Br	D	Moderate	Poor*
Waimea @ SH60	D	Moderate	Poor*
Wairoa @ WEIS weir	C	Moderate	Fair*
Lee Rv @ Lee Reserve	C	Low	Fair*
Roding @ Twin Bridges	C	Low	Fair*
* Interim grading			

Table 2c. Assessment of Suitability for Recreation Grade for the **Freshwater** in the contact recreation bathing water quality programme - **all samples in all weather**. Number of samples (N) and the period of data used are provided in the appendices. Interim gradings are marked by *.

Site	Microbiological Assessment Category	Sanitary Inspection Category	Suitability for Recreation Grade
Takaka Rv @ Paynes Ford	B	Moderate	Good*
Motueka Rv @ SH60	B	Moderate	Good*
Motueka Rv @ Alexander Br	B	Moderate	Good*
Waimea @ SH60	B	Moderate	Good*
Wairoa @ WEIS weir	B	Moderate	Good*
Lee Rv @ Lee Reserve	B	Low	Good*
Roding @ Twin Bridges	B	Low	Good*
* Interim grading			

Table 2d. Assessment of Suitability for Recreation Grade for the **Freshwater** in the contact recreation bathing water quality programme - **dry weather samples only**. Number of samples and the period of data used are provided in the appendices. Interim gradings are marked by *.

Water Quality for Contact Recreation along the Kaiteriteri Coast

5.9 As we found last year:

- Reasonably small flood events (~90 m³/sec in the Motueka River) can cause poor water quality at Kaiteriteri and Stephens Bay.
- The time between rainfall events is an important predictor because a small flood occurring after a long dry spell allows more faecal matter to build up on the land before being washed into waterways.
- Both the Motueka/Riwaka River plumes and local sources are likely to be implicated in exceedances at the beaches given the high *Enterococci* concentrations in both, very early peaks of *Enterococci* at the beaches and obvious turbid water coming from both.
- The concentration of *E.coli* in the rivers and the beaches tends to fall soon after the peak in the hydrograph. The time to recover to full compliance with guidelines is typically from eight to 36 hours.

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- Under calm conditions with an out-going tide throughout the sampling period, the fall in faecal indicator bacteria concentration is relatively constant (and therefore reasonably predictable).

Toxic Algae in Rivers

- 5.10 In previous years dog deaths linked to toxic algae have been reported to Council. Fortunately, there were no dog deaths this year, as far as we are aware.
- 5.11 In most monitored waterways in the Tasman District, toxic algae remained at low levels (below the 20% amber level) during the 2013-14 season. Toxic algae remained at very low coverage in the Roding River, Wairoa River, Lee River and Motueka River at the SH60 bridge swimming holes throughout the season.
- 5.12 The level of toxic algae in the Motueka River from the Dove confluence to downstream of the Baton Bridge in December 2013 was unusually high. Coverage up to 60% was recorded during the last two weeks of 2013. These high levels may be attributable to the preceding low, stable flows and fine sediment discharges (possibly from a dam that was constructed in the Dove catchment over the previous year and the pulse of fine sediment is still moving through). This section of river has shallow, smooth flowing water allowing most sunlight to reach the bed and permitting toxic algae mats to grow with little chance of being detached. Despite these high levels, we believe that there is no need to implement more frequent monitoring of this site. That is because the Motueka River near Baton Bridge is rarely used for dog walking and bathing toddlers (the most at-risk activities). Sites downstream and upstream, such as at Alexanders Bridge and McLeans reserve, are favoured for swimming and dog walking. At these other sites toxic algae levels remained below amber alert levels this season. The great majority of users in the Baton Bridge section of river are there to fish or kayak, rather than swim. A similar situation of toxic algae cover well over guidelines was present in the Anatoki River downstream of Bengo Creek. The source of sediment in this case has not been determined.
- 5.13 At the rivers sampled in the River Water Quality Monitoring Programme in February and March, the vast majority of sites were within guidelines. The exception was the Motupiko 250m upstream of the Motueka River which had toxic algal coverage of approximately 60%. The high coverage here may be due to vehicle crossings and/or sediment discharges from gravel processing operations. It is unlikely that this is a popular dog-walking area given the distance from any settlement. For comparison, the top eight highest recorded toxic algae coverage estimates from the River Water Quality Monitoring Programme are in Table 3.

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Date	Site Name	Coverage (%)
11/02/2014	Sherry @ Blue Rock	12
12/02/2014	Motupiko @ 250m u-s Motueka Rv	60
19/02/2014	Motupipi @ Reilly's	8
20/02/2014	Onekaka @ Shambala Br	10
20/02/2014	Aorere @ Devils Boots	7
11/03/2014	Waimea @ SH60 Appleby	30
12/03/2014	Baton @ Bridge	10
31/03/2014	Mangles @ Gorge	6
31/03/2014	Maruia @ 1km u-s Buller	10

Table 3: The eight records in the River Water Quality Monitoring Programme with the greatest *Phormidium* coverage between January and March 2014.

Toxic Algae on the Lower Waimea River

- 5.14 Toxic algal coverage in the Waimea River was above guideline levels (20% cover) on two occasions this season, during the last week of January and from 25 February to 16 March. This is about half the period of high toxic algal coverage compared to last year. A possible reason for this reduced period of high coverage is the shorter duration of stable flows in the Waimea River during the 2013-14 summer. High flows were observed in the Waimea River at the start and end of both December and January, which helped to wash away the toxic algal mats that had accumulated. Another possible reason is reduced fine sediment deposition in the 2013-14 summer.
- 5.15 Two sites were monitored for toxic algae in the lower Waimea River: a downstream site at the state highway bridge and a site 500m upstream. Both areas are used for dog walking and swimming. At the downstream site, toxic algae rose above the red alert level in the last week of January. In response, we placed signs warning river users about the potential for algal poisoning at five popular river access points. A news item reporting the high toxic algal levels was posted on the TDC website. Overall, there were fewer enquiries about toxic algae compared to the previous season. This may mean that the information provided in the brochures to all dog owners has “hit the mark”.



Figure 3: Patches of toxic algae in the lower Waimea River on 11 February 2014. When growing in fast-flowing water, the toxic algal films appear dark brown to black.

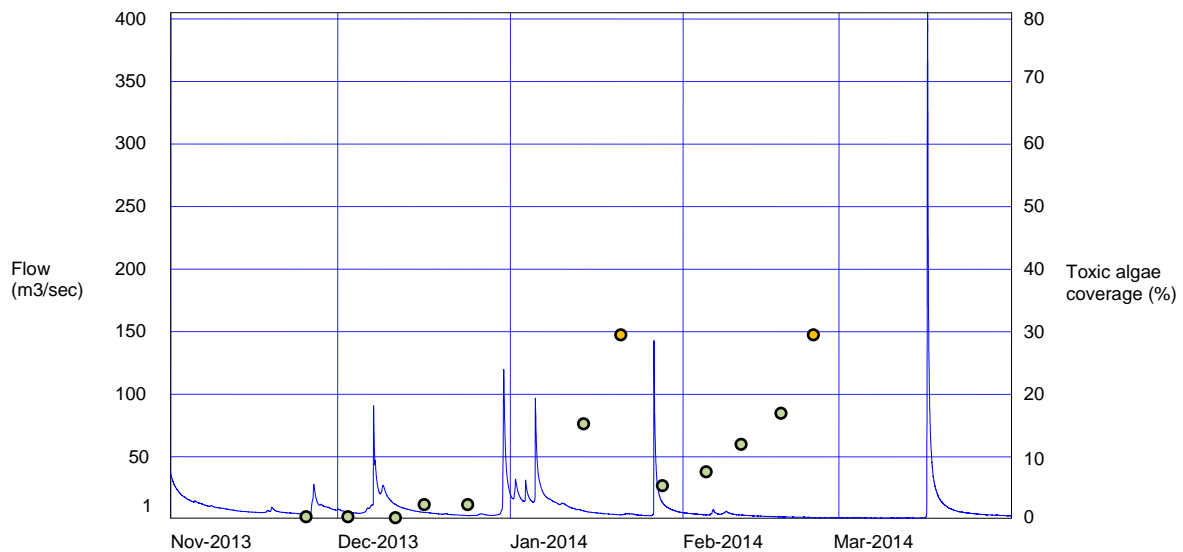
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Figure 4: Waimea River flow at TDC Nursery gauging site (blue line) and toxic algae coverage in the lower Waimea. Dots representing toxic algae coverage above the amber alert level (20%) are coloured yellow.

Publicity about Toxic Algae.

5.17 The following actions were undertaken to manage toxic algae (in the genus *Phormidium*) in the past six months:

- Warning signs were placed at five of the main access points along the lower Waimea River during periods when *Phormidium* coverage was above guidelines. After a flood, signs were left up until such time as the water level receded enough to be able to reassess coverage.
- Article in the 20 December 2013 issue of Newsline
- News item on the TDC website on 22 January
- Information brochures kept on display in the Council foyer.

6 Strategic Challenges / Risks

- 6.1 This work aligns with Council's strategic challenge for managing the impact of growth on the Tasman environment and stewardship for the environment. State of the Environment reports provide an assessment and discussion about whether the impacts of that growth are being well managed.
- 6.2 There is the risk to people of disease-causing organisms discharged to waterways including sewage discharges, particularly from unsewered settlements and dog faeces as people go about their work and recreation.
- 6.3 By way of building trust and confidence between Council and the community, we can work to improve the way our rivers and coasts are managed and the way in which environmental threats and risks are minimised.

CONTACT RECREATION WATER QUALITY ANNUAL REPORT**7 Policy / Legal Requirements / Plan**

- 7.1 This report is one means of the Council meeting its duty under section 35 of the Resource Management Act (RMA) to monitor the state of the environment particularly in relation to the coastal and biodiversity management functions it has under the RMA.

8 Consideration of Financial or Budgetary Implications

- 8.1 There are no additional budgetary impacts forecast over the next year. Laboratory costs of around \$12,000 make up the vast majority of the annual budget apart from staff time and vehicle running costs. Summer student employees do most of the fieldwork required.

9 Significance and Consultation

- 9.1 This report is not a decision report but the monitoring and management of our waterways and coast for contact recreation is of interest to a large number of people. Whenever Council becomes aware of undue risk to contact recreation, other than associated with rainfall, signage is immediately erected, local businesses (eg campgrounds and accommodation) are informed as soon as possible and, if the risk continues, a notice is placed in the local newspaper.

10 Conclusion

- 10.1 Overall compliance of swimming holes and coastal beaches with the microbiological water quality (contact recreation) guideline at base flows was slightly better than previous years (98.6% compared to 97%). Using the Ministry for the Environment "Suitability for Recreation Grade" criteria, Kaiteriteri Beach was graded "Good" and both Mapua Leisure Park Beach and Rabbit Island Main Beach were graded "Very Good". Interim gradings for other sites with sufficient samples (eg Pohara Beach, Takaka River at Paynes Ford, Roding at Twin Bridges and Lee River at Lee Reserve) were graded "Good".
- 10.2 The sampling programme is on-track for re-running a predictive model for water quality at beaches in the Kaiteriteri area influenced by the Motueka River plume.
- 10.3 Toxic algae has been found to be an issue in the lower Waimea river and is generally at low coverage elsewhere.

11 Next Steps / Timeline

- 11.1 Next summer, sampling will only occur at the core six bathing water quality sites and Tukuru Stream (including Microbial Source Tracking tests).
- 11.2 Further targeted flood-flow samples will be taken from the Motueka River and associated coastal plume from September 2014-April 2015 or until there is enough data to be able to successfully predict water quality at key beaches in the plume.
- 11.3 Given the exceedences at Pohara Beach it would be prudent to sample potential sources of contamination such as Pohara Creek.

12 Attachments

1. Bathing Water Sampling Results