

Freshwater contact recreational  
water quality at Taranaki sites  
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#### 4.2.14 Waitara River at the town wharf, Waitara

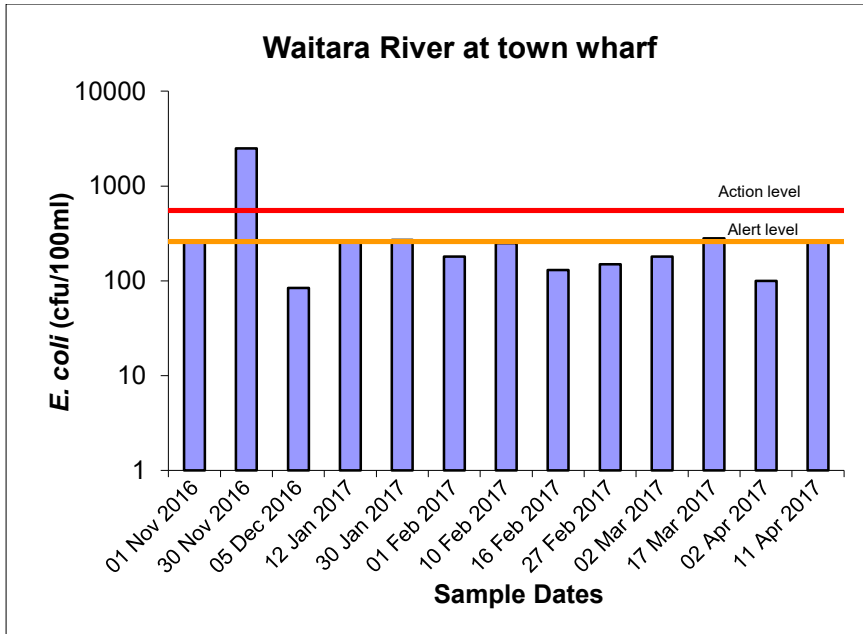
No bathing usage of this river site at the new town wharf was recorded at the time of sampling surveys, the majority of which were prior to midday. Both bathing and fishing (including whitebaiting in season) have been noted from time-to-time in previous seasons at this site with rowing and canoeing as additional activities. Ducks were present on occasions but in low numbers, and gulls once.

Concerns relating to the source of faecal bacteria found at this site by past monitoring, led TRC to undertake additional microbial source tracing (MST) using DNA marker techniques at four sites in the lower Waitara River during the 2010-2011 season (TRC, 2011b). In summary, faecal bacteria found at this Town Wharf site were sourced predominantly from cattle (under all tidal and flow conditions) with some indication of bacteria of human origin under high tide and flood conditions. Upstream (Bertrand Road site) faecal bacteria were totally of cattle origin whilst downstream (on both sides of the river mouth), faecal bacteria of cattle (all occasions), wildfowl and human (occasional) derivation were found.

Regular sampling data from the site for the 2016-2017 season are presented in Table 80 and illustrated in Figure 61 with a statistical summary provided in Table 81. River flow information is illustrated in Figure 62.

**Table 80** Analytical results for the Waitara River at the town wharf, Waitara

Date	Time	Conductivity @ 20°C	Bacteria			Temperature	Turbidity
	(NZST)	(mS/m)	<i>E. coli</i> (cfu/100ml)	Enterococci (cfu/100ml)	Faecal coliforms (cfu/100ml)	(°C)	(NTU)
01.11.16	1000	579	260	9	270	14.5	11
30.11.16	1005	179	2500	330	2500	15.5	120
05.12.16	1305	270	84	11	92	20.9	11
12.01.17	0845	477	260	48	260	19.9	5.6
30.01.17	1025	644	270	68	280	18.3	12
01.02.17	1145	422	180	52	180	18.8	6.4
10.02.17	0900	503	250	120	250	18.2	7.0
16.02.17	1220	579	130	64	140	19.0	12
27.02.17	1025	765	150	88	150	19.5	6.2
02.03.17	1150	664	180	19	180	21.2	5.4
17.03.17	1145	550	280	51	280	18.2	17
02.04.17	1220	868	100	63	100	18.6	4.8
11.04.17	0955	557	260	100	260	15.4	12



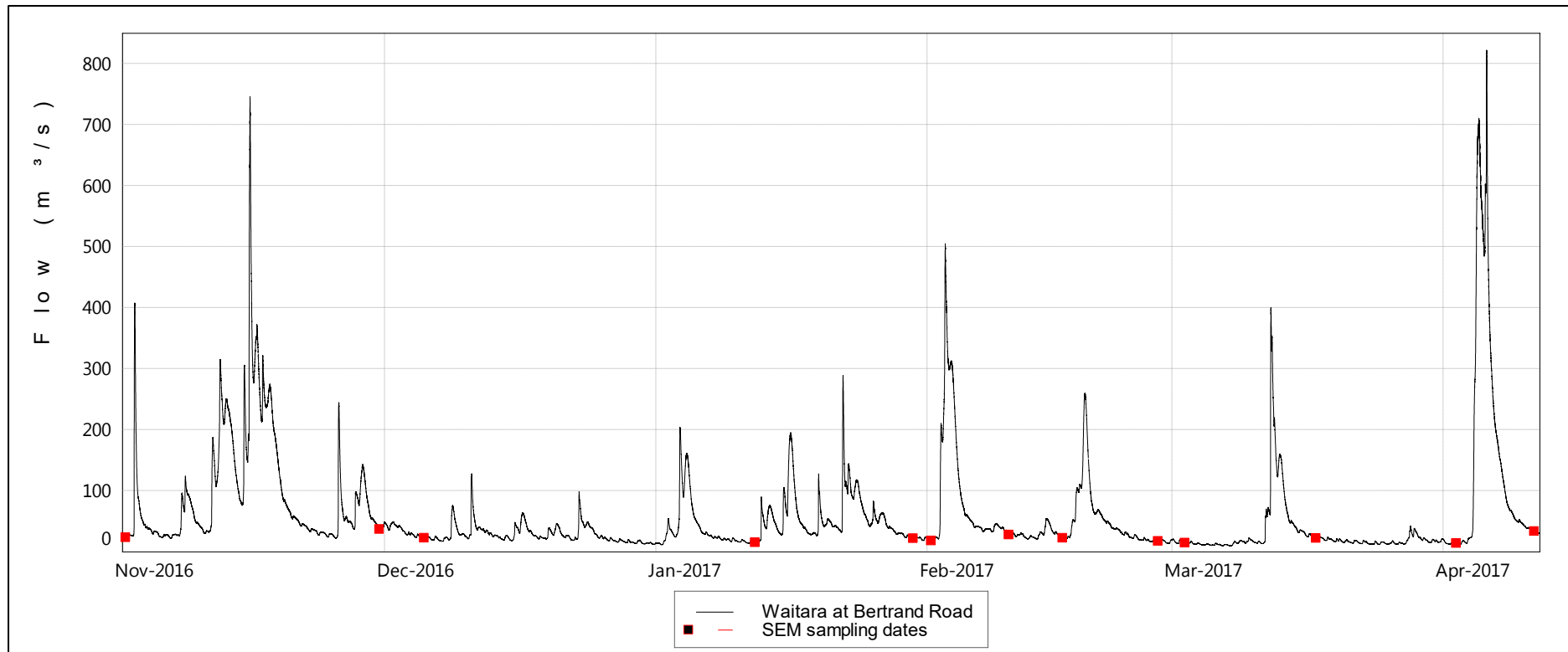
**Figure 61** *E. coli* numbers for the Waitara River at the town wharf, Waitara during the survey season

**Table 81** Statistical results summary for the Waitara River at the town wharf, Waitara

Parameter	Unit	Number of samples	Minimum	Maximum	Median
Conductivity @ 20° C	mS/m	13	179	868	557
<i>E. coli</i>	nos/100ml	13	84	2500	250
Enterococci	nos/100ml	13	9	330	63
Faecal coliforms	nos/100ml	13	92	2500	250
Temperature	°C	13	14.5	21.2	18.3
Turbidity	NTU	13	4.8	120	11

This ring plain and eastern hill country river drains an extensively developed agricultural catchment. The survey site is situated in the lower tidal reaches of this large river, some 1.5 km upstream of the river mouth. There are consented dairy ponds treated wastes discharges in the catchment upstream of the site particularly in the Manganui River sub catchment (see 4.2.16). River water was generally slightly turbid, green-brown to turbid brown in appearance, with the highest median turbidity (11 NTU) over the eight seasons of record. Elevated conductivity levels typical of seawater ingress near high tide occurred on all sampling occasions, and occasionally coincidental with ponded or very slow downstream flow conditions.

Water temperatures had a moderate range of 6.7°C partly due to the coastal seawater influence, with a maximum of 21.2°C recorded in early afternoon in early March 2017. All of the samples were collected before 1310 hrs and therefore maximum river temperatures (which tend to occur later in the afternoon) were not recorded.



**Figure 62** Flow in the Waitara River at Bertrand Road during the survey period

Bacteriological water quality was moderate, and typical for the lower reaches of this large Taranaki eastern hill country and ring plain river draining a predominantly agricultural catchment subject to coastal seawater influence under high tide conditions (median 250 *E.coli* per 100 ml and 63 enterococci per 100 ml). The existing recreational sampling programme was performed around higher tidal conditions for SEM trend purposes (due to its incorporation within the coastal sites programme) at times when public usage is often more predominant at this site. Poorer bacteriological water quality might be expected under outflowing low tide conditions, although monitoring undertaken 6km further upstream (at the flow recorder site at Bertrand Road) over the recreational period 2009-2014 has found a lower median *E.coli* bacterial number of 67 per 100 ml but a wider range of *E. coli* numbers (6 to 5000 per 100 ml).

#### 4.2.14.1 Comparison with guidelines

Comparison with the 2003 guidelines for freshwater contact usage is summarised in Table 72.

**Table 82** Bacterial guidelines performance at the Waitara River at the town wharf, Waitara [% of 13 samples]

Parameter	Number of exceedances of <i>E. coli</i> guidelines	
	ALERT Single sample 261-550/100ml	ACTION Single sample >550/100ml
<i>E. coli</i>	2 [15]	1 [8]

(Designation: freshwater contact recreational area)

Two single samples fell within the 'Alert' mode and one sample within the 'Action' mode during the monitoring period. The 'Action' mode exceedance occurred in overcast weather less than four days after a substantial rainfall event in the hinterland and coincided with the highest turbidity (120 NTU) recorded during the survey period. It has been noted, during past survey periods, that the three-day post rainfall sampling protocols followed by the SEM programme for the other (ringplain) catchment sites are not necessarily appropriate for baseline assessments of bacteriological water quality at this site near the mouth of this predominantly eastern hill country catchment river as a result of the lag effects of rainfall run-off further upstream within this large catchment.



**Photo 8** Warning signage at Waitara River (boat ramp)

These issues have been discussed with the Area Health Board and NPDC staff and appropriately worded health warning signage was permanently installed at the town wharf prior to the 2010-2011 season. (Photo 7). However, the permanency of this signage has been problematical due in part to vandalism.

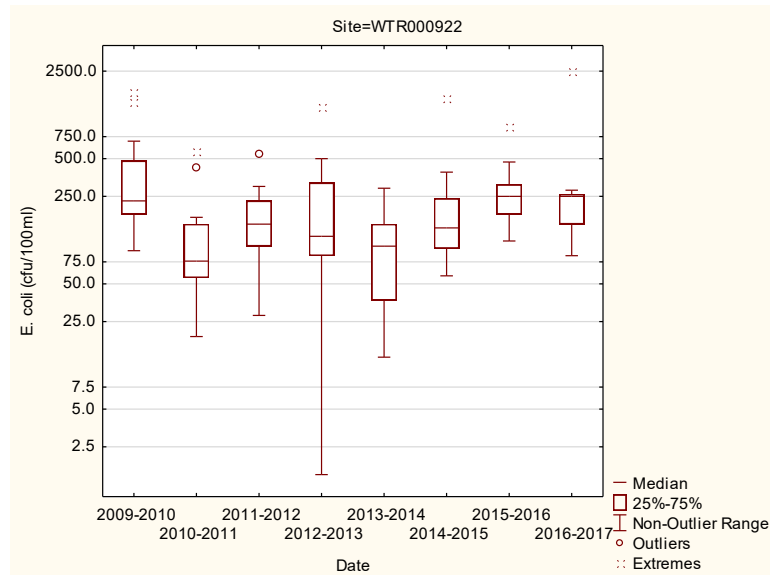
In summary, the bacteriological water quality at this estuarine site was within guidelines for contact recreation for the majority of the survey period.

#### 4.2.14.2 Comparison with previous summers' surveys

Seven previous SEM sampling seasons have been monitored at this site. Therefore only a brief statistical comparison can be made with previous data. These data for the Waitara River at the town wharf, Waitara site are summarised in Table 83 and illustrated in Figure 63 for this, the eighth season of monitoring.

**Table 83** Summary *E. coli* bacteriological water quality data (cfu/100ml) for summer surveys in the Waitara River at the town wharf, Waitara

Summer	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17
Minimum	92	19	28	3	13	58	100	84
Maximum	1700	570	550	1300	290	1500	900	2500
Median	230	76	150	120	100	140	250	250



**Figure 63** Box and whisker plots for all summer surveys of *E. coli* bacterial numbers for the Waitara River at the town wharf, Waitara

The median *E. coli* number found by this eighth season's survey was equal to the highest recorded, and was just below the 'Alert' mode. A similar median value was recorded the previous year, and six years before. A wide range of counts was recorded, due in part to delayed effects of preceding freshes in this large, predominantly hill country catchment, and partly to high turbidity and sometimes cloudy weather reducing the sterilizing effect of sunlight. Trend analysis of median *E. coli* numbers will not be performed until the sampling period has encompassed ten seasons of data collection at this site.